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The New York Environmental Lawyer

A publication of the Environmental & Energy Law Section of the New York State Bar Association

New Unified Stormwater Rule in NYC: Why Now and What Developers Need to Know

Professor William R. Ginsberg Memorial Essay Contest Winners

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James L. Simpson and L. Margaret Barry, Co-Editors-in-Chief

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The New York Environmental Lawyer—Law Student Editorial Board

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Message From the Section Chair

By Linda R. Shaw

2022 is off to a busy start for the Environmental and Energy Law Section! The Brownfield Task Force is continuing to actively work on the promotion of its Brownfield Extender bill to the governor's office and Legislature with the valuable assistance of the Bar's legislative affairs team, and will be commenting on the proposed Part 375 regulations. The Climate Change Task Force is also actively working on comments to the Climate Leadership Community Protection Act (CLCPA) Scoping Plan, which is a critically important CLCPA implementation document. During the year's first Executive Committee meeting on February 9, we discussed the various 20+ committees in the Section and whether some committees should be consolidated, only to end up realizing we did not even have an air committee! Nevertheless, this discussion triggered some of this year's upcoming webinar events, which will include environmental insurance, the legislative forum and energy virtual meeting events. We also voted in Amy Kendall as the new secretary as I plan to pass the baton to James Rigano to be next year's Section chair. Serving as chair this past year has been an honor and has hopefully opened up the opportunity for our Section to draft and comment on environmental and energy legislative proposals in the future.

–Linda Shaw
June 2021-June 2022 EELS Chair

Message From the Co-Editor-in-Chief

By L. Margaret Barry

I am excited to officially join Jay Simpson as co-editor-in-chief of *The New York Environmental Lawyer* in this issue. I have been a member of the Section for 15 years, and I'm glad and grateful to have this opportunity to contribute to the Section's work. As Jay said in the last issue, we are grateful to Miriam Villani for guiding us through the transition from her leadership. Thank you also to issue editors Alicia Artessa, Aaron Gershonowitz and Keith Hirokawa for making the transition as seamless as possible. (Make sure to read Keith's column this month!) I look forward to working with Jay, Alicia, Aaron, Keith, the Albany Law School student editorial board (make sure to read their column as well!), EELS leadership and the NYSBA publications staff as we continue to bring EELS members news about the Section and updates on recent developments in environmental and energy law, as well as longer, more in-depth articles on a variety of topics of interest to members.

I hope *The New York Environmental Lawyer* can be a conduit for updates on and insights into important work that members of the Section are doing. As Linda Shaw notes in her chair's column, the Section is currently working on comments on the massive draft scoping plan for the Climate Leadership and Community Protection Act and is also engaged at the legislative and regulatory level on the ongoing implementation and evolution of the Brownfield Cleanup Program. In addition, a new Task Force on Implementation of the Green Amendment will provide advice and support on the implementation of the Environmental Rights Amendment to the New York Constitution that voters approved last November. Stay tuned for updates on these efforts.

We know that there is much more work that committees and individual members of the Section are doing. Please reach out to Jay and me if you would like to write about your work—short and long pieces are welcome. As an example, Karen Mintz and Helen Mauch, along with their law student clerk, Christine Morano, write in this issue about New York City's new stormwater rule—a topic that might have slipped under the radar but that has important ramifications for private development in New York City.

This issue also features the future of the profession—law students—in several ways. First, it includes the second edition of the Law School Corner, curated by two Pace law students (Gabriella Mickel and Dana McClure). The first edition of Law Student Corner focused on Pace, but this second edition expands to cover Pace and five other New York law schools! And more will be featured in future editions. This issue also contains reports by the 2021 recipients of the

Continued on page 4

Message From the Student Editorial Board

By Kathleen Anderson

Every summer, the Hudson Youth Department opened its paint-peeling bungalow doors and provided free outdoor recreational programs at Oakdale for children across the city. Every day, my siblings and I would walk from our home on Frederick Street, over broken sidewalks, past the old Pocketbook factory, until we reached the lake. At Oakdale, we would meet up with dozens of other children who, like us, were seeking a break from the sweltering heat of brick and concrete.

Like the people of Hudson, the youth of Oakdale came from a wide variety of racial and cultural backgrounds. I shared space with Puerto Rican kids from New York City spending summers with their grandparents upstate and African American kids whose families came to Hudson during the "Great Migration" from the Jim Crow South. Some of my playmates were the children of immigrants from Poland, Ukraine, Haiti, Guyana, and Bangladesh. Other children were from families who had lived in Hudson for generations. All of us were poor.

Oakdale was one of the few places in Hudson where "disadvantaged" kids were free to experience nature. With over 7,500 people living in the two square miles of the city, there was precious little greenspace available to us. Most of our parents didn't own cars. For children of color in our community, spending time in the rural landscape of majority-white Columbia County was often a risky activity that inspired fear and discomfort. Unlike other parks in the surrounding county, Oakdale was free. Located right in downtown Hudson, you could easily walk or ride your bicycle there from anywhere in the city, with no parents required.

Oakdale was not without its problems. Like most of Hudson at that time, the park was in a constant state of neglect and disrepair. Most of Hudson's "respectable" families refused to send their children to Oakdale, believing it to be "dirty." While this criticism had clear race and class connotations for people in Hudson, the lake was also actually contaminated. The water was so murky at Oakdale that kids would scare each other with ominous stories about mutant snapping turtles lurking in the brownish-green algae that covered every inch of lake's surface. In an odd way, the neglect and avoidance by Hudson's respectable citizens also created opportunities for this space to be claimed by children who had very few public venues to find acceptance or build community elsewhere.

Hudson has changed. Over time, the rundown apartments and boarded up buildings that defined the city of my childhood have transformed into antique stores, boutique coffee shops and renovated historic Airbnbs. Hudson has capitalized on the unique culture created by its diverse community of working-class residents and is now a trendy destination for some of the wealthiest people in the world.

Like Hudson, Oakdale is beginning to change, too. In 2020, the New York State Department of Environmental Conservation awarded an Environmental Justice grant to fund restoration of the park. Today, studies are being conducted to determine the source of lake eutrophication and restore the ecosystem there. This is certainly a good thing. But, while Oakdale continues to be a haven for Hudson's youth, Hudson is gentrifying: housing shortages and skyrocketing rent prices are pushing an increasing number of Hudson's oldest and poorest families out of the city and further into the rural areas of Columbia and Greene counties. These children will not have the same opportunities that I had. Unlike my generation, these children will not be able to walk on summer mornings to this place where they can experience nature—together and as a community.

While I am pleased that Hudson is vibrant and thriving, I wonder who benefits in the end. Without effective mechanisms in place to prevent the displacement of Environmental Justice communities, programs aimed at improving lands, lakes and sidewalks ultimately prime these neighborhoods for their residents' displacement. Low income, BIPOC communities continue to suffer the inequitable distribution of environmental burdens, and too few such communities boast the cornucopia of environmental benefits enjoyed by others. Agencies at both the state and federal level need to take more seriously the manner in which our environmental decisions cause displacement and dispossession, maintain challenges with housing affordability, and further embed segregation and its effects.

Message From the Co-Editor-in-Chief continued

EELS Diversity and Inclusion Summer Fellowship, Tania K. Parra and Nardos Girma. They reflect on their work last year at Environmental Defense Fund and New York Lawyers for the Public Interest. Finally, this issue brings you the first- and second-place winners of the 34th annual Professor William R. Ginsberg Memorial Essay Contest.

This issue also contains an update from DEC staff on recycling, product stewardship, and expanded polystyrene ban, as well as Jay's updates from "Outside the EPA" and updates from EELS leaders. I hope you enjoy clicking (or paging, if you've printed it out) through this issue of *The New York Environmental Lawyer*.

–Margaret

Message From the Issue Editor

Performative Anti-Racism and One Version of Environmental Law

By Keith Hirokawa

Folks who have historically benefited from laws tend to assume that such laws are just. This sense of "justice" results from failing to acknowledge that laws do not benefit everyone equally, or alternatively, that one's advantage may come at another's expense. In situations where the advantage is racial and by design—not just the design to maintain white advantage, but also to maintain people of color as politically powerless, economically immobile, and socially segregated—recognizing the costs to others becomes an imperative, at least for purposes of empowering democracy, inclusivity, justice and fairness.

Our professional community can be more actively anti-racist. The community of environmental lawyers, and environmental professionals more generally, is constantly and deeply engaged in disputes over public needs and well-being. The vocabulary and means of lifting up disadvantaged communities and individuals are familiar to us. The relevant questions in this context are whether we strive to create belonging, sense of place and safe space in our communities—not just for those who are well-off and politically active, but also for others. Are we adopting environmental and land use policies that benefit everyone, or a select few? Are we creating spaces that are accessible and safe for all? Perhaps most importantly, can everyone see themselves reflected in our laws?

In addressing these concerns, we are remiss when we avoid searching and self-critical questions about the values expressed in environmental law. We need to stop justifying the introduction of hazardous contaminants into economically disadvantaged communities by the unreflective refrains: the market allows it; the project will provide economic benefits to the community; if they don't like it, they can move. We need to stop ignoring that people of color are not reflected in shared spaces and environmental amenities. Instead, we can recognize that our professional community creates and maintains spaces that—from a BIPOC perspective—do not look like me, do not sound like me, do not include me, do not interest me, do not provide what I need, do not reflect my history. We need, in effect, to stop thinking that inclusive intentions are enough. We need to recognize that race-neutrality is a sinister tool that is used to mask social inequities.

Our Section can engage more authentically in the disruption of historical patterns of segregation and exclusion. We can do so without being apologetic, without fear of reprisal, but especially without remorse for committing ourselves to the work it takes to reverse racism. We can recognize the inherent evil in the bill currently before the Florida Legislature protecting white folks from feeling guilty about past and current acts of hate (the bill prohibiting teaching racialized histories and protecting the fragile sensibilities of those who cringe at the thought of admitting they benefited from slavery). We can likewise condemn the bill that discourages gay and trans kids from learning about their own identities and personhood and actively incentivizes intolerant parents to sue when such discussions occur in schools, elevating parental bullying over the self-fulfillment needs of their children (the so-called "don't say gay" bill). We can call out laws and policies that maintain displacement and diaspora. We can create a diverse sense of belonging in spaces and places that are historically white-dominated. We can reject the active erasure of history and identity as violent acts. We can recognize that we are all racists and that we are all unreflectively participating in a system that denies the humanity and identity of so many people.

Anti-racism requires that we constantly and consistently interrogate our own history and whiteness, especially the ways that whiteness is relevant to our individual and collective identities. It means asking whether particular actions illustrate a commitment to antiracism. It means recognizing that creation of shared spaces is not inclusive if we expect people to come to our (white) space. It means creating spaces for people of color, instead of patting ourselves on the back for inviting people of color to historically white spaces.

Keith Hirokawa is the Associate Dean of Research and Scholarship and Distinguished Professor of Law at Albany Law School.

Outside the EPA Update

By James L. Simpson

This Outside the EPA Update covers U.S. Environmental Protection Agency (EPA) activities from approximately September 1, 2021, through February 15, 2022. The article doesn't cover every single action taken by EPA during this time but attempts to summarize the highlights with a focus on EPA activities affecting New York.

The Outside the EPA Update should be read cafeteria style: take what you want and leave the rest. First, the column discusses some general EPA goings-on. Second, the article discusses climate change, an area of renewed focus for EPA. Third, the article discusses air issues, with a focus on MATS and other issues related to climate change. Fourth is a discussion of Superfund happenings. Last, but certainly not least, the article discusses important water updates during this time frame.

GENERAL EPA GOINGS-ON

EPA Announces Regional Administrator for Region 2

On November 18, 2021, EPA announced that President Biden appointed Lisa Garcia to become EPA Region 2's regional administrator.[1] Garcia has a strong environmental and climate justice background. Her appointment is a sign the agency will continue to make environmental justice (EJ) a priority. She served at EPA previously as an associate administrator and advisor to EPA Administrators Jackson and McCarthy where she helped lead EPA's first EJ plan and the design of EJSCREEN. Many will also recall she served as the director of EJ and Indian Affairs at the Department of Environmental Conservation and as Assistant Attorney General at the Attorney General's Environmental Protection Bureau.

CLIMATE CHANGE

EPA Finalizes Stringent Greenhouse Gas Standards for Cars

On December 20, 2021, EPA announced it was finalizing its most ambitious federal greenhouse gas (GHG) emissions standards ever for passenger cars and light trucks.[2] The final standards, for model years 2023 through 2026, are the most stringent from the proposed rule and are the most stringent GHG standards EPA has ever set.[3] EPA plans to initiation a separate rulemaking to establish multi-pollutant emission standards for model years 2027 and later "that will speed the transition of the light-duty vehicle fleet toward a zero-emissions future."[4]

EPA estimates that through 2050, the new standards will result in avoiding more than three billion tons of GHG emissions, or more than half the total U.S. CO_2 emissions in 2019.[5] EPA also estimates that the benefits of this rule exceed the costs by as much as $190 billion. These benefits include reduced impacts of climate change, improved public health from lower pollution, and cost savings for vehicle owners through improved fuel efficiency.[6] American drivers will save between $210 billion and $420 billion through 2050 on fuel costs.[7] The final rule became effective on February 28, 2022.[8]

EPA Report: U.S. Cars Achieve Record High Fuel Economy and Low Emission Levels as Companies Fully Comply With Standards

On November 19, 2021, EPA released its annual Automotive Trends Report that shows model year 2020 vehicles achieved record high fuel economy and record low emission levels.[9] In addition, EPA projects sales of hybrid and electric vehicles to more than double from 2020 to 2021. Highlights from the report show that since model year 2004, carbon dioxide (CO_2) emissions have decreased by 24% as fuel economy has increased by 32%.[10]

EPA Publishes Its 2021 Climate Adaptation Action Plan

On October 7, 2021, EPA released its Climate Adaptation Action Plan, which describes steps EPA will take to address the impacts of climate change on communities across the nation.[11] EPA also launched a new Climate Adaptation website that it hopes will be a hub for climate adaptation resources.[12]

The 2021 Climate Adaptation Action Plan establishes several priorities for EPA, including:

- Integrating climate adaptation and consideration of climate impacts into EPA's programs, policies, rulemaking processes, and enforcement;
- Consulting and partnering with Tribes; state, local, and territorial governments, and other federal agencies; community groups; scientists and adaptation experts; businesses; and other stakeholders to increase the resilience of the nation, with a particular focus on advancing environmental justice; and
- Implementing measures to protect the agency's workforce, facilities, critical infrastructure, supply chains, and procurement processes from the risks posed by climate change.[13]

EPA Report Shows How Climate Change Influences Seasonal Events

On December 21, 2021, EPA issued a new report showing how climate change is affecting seasonal events across the United States.[14] The report, Seasonality and Climate Change: A Review of Observed Evidence in the United States, documents longer growing seasons, more heat waves, earlier snowmelt, and changes in leaf and bloom dates.[15] The report uses long-term historical data tracking dozens of climate indicators to describe these changes and how they affect ecological and human systems.

EPA stated that many of the changes underway can lead to harmful impacts on the environment and human health. For example, more frequent heat waves can increase incidence of heat stroke, respiratory problems, and other adverse health conditions. Prolonged wildfire and pollen seasons can lead to increased exposure to unhealthy air quality and extra risks for people with asthma and allergies. Mountain snowpack plays a key role in the water cycle in the western U.S., and changes in mountain snowpack can affect agriculture, winter recreation, and tourism in some areas, as well as plants and wildlife. According to EPA, "While a few changes can be beneficial—such as longer growing seasons for crops or reductions in winter heating fuel costs—the vast majority of effects on the climate are detrimental to human health and society."[16]

EPA highlighted several documented changes in seasonality across the United States:

- Seasonal temperatures: All seasons have warmed in the U.S., with winter temperatures increasing by nearly 3°F since 1896.
- Spring snowpack: Since the 1950s, there has been widespread declines in spring snowpack across the West, and the timing of peak snowpack shifted earlier by an average of nine days between 1982 to 2018.
- Timing of spring runoff: In parts of the country where streamflow is strongly influenced by snowmelt, the timing of winter-spring flow carried by rivers and streams is happening at least eight days earlier since 1940.
- Growing Season: The average length of the growing season in the contiguous 48 states has increased by nearly two weeks since the beginning of the 20th century.
- Pollen Season: The season for ragweed pollen grew longer at eight of nine study locations in the Midwest since 1995.
- Heat Wave Season: The average heat wave season across 50 major U.S. cities is 47 days longer than it was in the 1960s."[17]

AIR ISSUES

EPA Revisits MATS Rule—Aims To Reaffirm Scientific, Economic and Legal Underpinnings of Limits on Toxic Air Emissions

MATS are back! Again. On February 1, 2022, EPA announced it would propose a rule to reaffirm "the scientific, economic, and legal underpinnings of the 2012 Mercury and Air Toxics Standards (MATS) for power plants, which require significant reductions of mercury, acid gases, and other harmful pollutants."[18] Specifically, EPA has proposed a rule to reaffirm its "appropriate and necessary" finding to regulate emissions from power plants.[19] Notably, the current emission standards would not change, only the appropriate and necessary finding. This proposal seeks to reverse a Trump-era rule that found it was not appropriate and necessary to regulate mercury and other hazardous air pollutants from power plants. This warrants some background.

Until 2012 there were no federal standards to control power plant emissions of toxic air pollutants like mercury and arsenic, despite the availability of control technology and despite EPA's well-established program for National Emission Standards for Hazardous Air Pollutants (NESHAP) under the Clean Air Act. The 1990 Clean Air Act Amendments required EPA to issue standards to reduce emissions of hazardous air pollutants (HAPs) from many sources and to study whether to do so from power plants. *See* 42 U.S.C. § 7412(n)(1)(A). In short, Congress wanted EPA to implement other provisions of the Clean Air Act first, and then decide whether it was still "appropriate and necessary" to regulate power plants directly.

EPA completed the required study in 1998. In 2000, EPA determined it was "appropriate and necessary" to regulate the emission of nearly 200 air toxics from power plants and added power plants to the Clean Air Act Section 112(c) source category list.[20] This is the list of emission sources to which HAPs apply. EPA reversed this finding in 2005, but in 2008 the D.C. Circuit vacated EPA's decision to remove power plants from the CAA Section 112(c) source category list. *See New Jersey v. EPA*, 517 F.3d 574 (D.C. Cir. 2008). Ultimately, and pursuant to a consent decree after additional litigation, EPA issued proposed standards for the control of HAPs from power plants on March 15, 2011.

The final Mercury and Air Toxics Standards for coal- and oil-fired power plants, finalized in 2012, are known as MATS.[21] According to EPA, reducing emissions of mercury and other HAPs from the electric power industry will also have significant co-benefits of reductions in SO_2 and $PM_{2.5}$, largely in reduced human mortality. EPA estimated high compliance costs of almost $10 billion, but monetized benefits of between $33 and $90 billion.EPA estimated the MATS rule would reduce power plant mercury emissions by 90%, and dramatically reduce emissions of other toxics like arsenic, nickel, dioxins and acid gases.

By a large margin, coal-fired power plants are the largest man-made sources of mercury emissions in the United States.[22] Mercury emissions make their way to waterbodies. Bacteria then convert it into the more toxic methylmercury (MeHg) where it bioaccumulates, especially in fish and shellfish. Eating these fish and shellfish (and the animals that eat the fish) is the largest source of human and wildlife exposure to organic mercury. Pregnant women are particularly susceptible because MeHg can cause neurological disorders in developing fetuses. In its appropriate and necessary finding, EPA found a "plausible link" between power plants' mercury emissions and MeHg in fish.[23] EPA also found "that about 7 percent of child-bearing age women are exposed to MeHg at levels capable of causing adverse effects to the fetus, and about 1 percent were exposed to 3 to 4 times that level."[24] By 2011, all 50 states had issued fish advisories for mercury, totaling 16.4 million lake acres and 1.1 million river miles.

In addition to mercury, coal-fired power plants emit carcinogenic HAPs such as arsenic, nickel, cadmium, and chromium. Other toxic pollutants released include lead and acid gases hydrogen chloride (HCl) and hydrogen fluoride (HF). According to EPA, these pollutants can cause lung irritations, central nervous system effects, kidney damage, and other acute disorders.[25]

Generally, the MATS rule applies to power plants larger than 25 megawatts that burn coal or oil for the purpose of generating electricity for sale and distribution through the national electric grid. EPA estimates the MATS rule impacts approximately 600 power plants, which include 1,100 existing coal-fired units and 300 oil-fired units. The rule includes numerical emission limits for mercury, particulate matter (PM), and hydrogen chloride (HCl) for existing and new coal-fired power plants, and numerical emission limits for PM, HCl, and hydrogen fluoride (HF) for existing and new oil-fired power plants, using a variety of technologies to achieve these limits. The MATS rule also establishes work practice standards, instead of numerical limits, to limit emissions of organic air toxics from existing and new coal- and oil-fired power plants.

The 2012 MATS rulemaking attracted a lot of public attention; EPA received close to one million public comments on the proposed rule, substantially more than any prior rulemaking.

In 2015 the Supreme Court held that EPA acted unreasonably when it deemed cost irrelevant in its MATS "appropriate and necessary" finding.[26] In response to this ruling, EPA interpreted this decision narrowly and did not alter the MATS rule issued previously but conducted a supplemental review and found that a consideration of costs does not change EPA's earlier appropriate and necessary finding. In this supplemental finding, EPA concluded that $9.6 billion annual costs of compliance should save at least $37 billion in co-benefits.[27]

During the Trump administration, EPA reversed course, found that the costs of compliance outweighed the benefits, and concluded that it was not appropriate and necessary to regulate hazardous air pollution from power plants.

Now, the Biden administration is once again reversing course on a Trump-era rule. In its February 1, 2022 announcement, EPA stated that "the MATS rule's public health improvements are especially important for children and particularly vulnerable segments of the population such as Indigenous communities, low-income communities, and people of color who live near power plants or are affected by hazardous air pollution."[28] This proposed rule would not change the current emissions standards but does seek information from the public on opportunities for additional pollution reductions. Moreover, industry has largely complied with the rule already.

EPA stressed the proven effectiveness of the MATS rule. EPA has estimated that by 2017, mercury emissions from power plants were reduced by 86%, acid gas emissions were reduced by 96%, and non-mercury metal emissions were reduced by 81% compared to pre-MATS levels in 2010.[29]

EPA Proposed New Source Performance Standards To Cut Methane from Oil and Gas Industry

On November 2, 2021, EPA announced a proposed rule to reduce methane emissions from the oil and gas industry, including reductions from existing sources.[30] EPA also sought comment on additional sources of methane to increase emission reductions from oil and gas operations. The proposed rule is large in scope and length (over 150 pages in the Federal Register).[31]

The proposed rule focuses on methane, a potent greenhouse gas that traps about 30 times as much heat as carbon dioxide over 100 years.[32] In the United States, the oil and natural gas industry is the largest industrial source of methane emissions. Oil and natural gas operations also emit smog-forming volatile organic compounds (VOCs) and toxic air pollutants such as benzene that harm public health, which the rule will also address.[33]

EPA estimates that the proposed rule would reduce 41 million tons of methane emissions from 2023 to 2035, a level more than the amount of carbon dioxide emitted from all U.S. passenger cars and commercial aircraft in 2019.[34] In 2030 alone, EPA predicts the rule would reduce methane emissions from sources covered in the proposal by 74% compared to 2005.

The proposed rule would require states to develop plans to limit methane emissions from hundreds of thousands of existing sources nationwide, expand and strengthen emissions reduction requirements for new and modified sources, and encourage cutting-edge technologies to detect and monitor methane.

EPA also is requesting information on additional sources of methane for the Agency to consider in developing a supplemental proposal to reduce emissions even further.[35] EPA plans to issue the supplemental proposal in 2022, and to issue a final rule before the end of 2022.[36]

EPA Finalizes Aim Act Regulations To Cut HFCs, and Acts on Petitions To Reduce HFCs

A final rule to implement the American Innovation and Manufacturing (AIM) Act became effective on November 4, 2021.[37] Congress enacted the AIM Act on December 27, 2020 to phase down the production and use of hydrofluorocarbons (HFCs), highly potent greenhouse gases commonly used in refrigerators, air conditioners, and many other applications.[38] The AIM Act directs EPA to sharply reduce production and consumption of these harmful pollutants by using an allowance allocation and trading program, similar to the successful program EPA used to address acid rain (i.e., cap and trade). It received broad, bipartisan support. EPA's final rule will decrease the production and import of HFCs in the United States by 85% over the next 15 years, and that a global HFC phasedown is expected to avoid up to 0.5°C of global warming by 2100.[39] The EPA estimates that in 2022 the annual benefits of this rule are $1.7 billion, and by 2036 the annual benefits will increase to $16.4 billion.[40]

In the 1990s, EPA began approving HFCs for use in refrigeration, in place of chlorofluorocarbons (CFCs). However, EPA's approval of HFCs as substitutes for CFCs is a classic case of unintended consequences. The Montreal Protocol, implemented through Title VI of the Clean Air Act, led to the phaseout of CFCs, which destroy the protective stratospheric ozone layer when released into the atmosphere. While HFCs pose a much lower risk for ozone depletion, their global warming potential is thousands of times higher than carbon dioxide.

Under § 608 of the Clean Air Act, EPA regulates appliances using ozone-depleting refrigerants. Clean Air Act § 608(c), commonly known as the "venting prohibition," prohibits knowingly releasing ozone-depleting refrigerants into the air during the maintenance, repair, or disposal of appliances.[41] Under EPA's regulations, HFCs are considered "substitute refrigerants," because they were originally developed as a safer substitute to CFCs and other ozone-depleting refrigerants.

EPA estimates that the total emission reductions of the proposal from 2022 to 2050 are projected to amount to the equivalent of 4.7 billion metric tons of CO2—nearly equal to three years of U.S. power sector emissions at 2019 levels.[42]

In addition, on October 8, 2021, EPA announced that it granted 11 petitions submitted under the AIM Act to restrict the use of HFCs in the refrigeration and air conditioning, aerosols, and foam sectors.[43] EPA will have two years to propose and finalize rulemakings addressing these petitions to transition to more climate friendly alternatives.

The AIM Act authorizes EPA to address HFCs in three main areas: (i) phasing down the production and consumption of listed HFC; (ii) minimizing releases of these HFCs and their substitutes in equipment such as refrigerators and air conditioners; and (iii) encouraging the transition to next-generation technologies by restricting the use of HFCs in particular economic sectors or subsectors.[44] The petitions fall under the third authority.

The AIM Act authorizes EPA to restrict the use of HFCs in sectors where they are used. To date, EPA has received over a dozen petitions from an array of stakeholder requesting that EPA promulgate rules to restrict the use of HFCs in more than 40 subsectors in the refrigeration and air conditioning, aerosols, and foams sectors.[45]

SUPERFUN(SIC) UPDATE

EPA Proposes To Add Meeker Avenue Plume in Brooklyn to the NPL

On September 8, 2021, EPA proposed adding Meeker Avenue Plume, Brooklyn, New York to the National Priorities List (NPL).[46] The New York State Department of Environmental Conservation (DEC) has been investigating the site for years, following investigation and remediation of an adjacent petroleum groundwater contamination location. The site covers several city blocks. Newtown Creek bounds the eastern area, and the Brooklyn-Queens-Expressway crosses the site. There are several hundred residential and commercial structures within the area. This area of Brooklyn housed historical petroleum refining and storage operations along the banks of Newtown Creek. Chlorinated volatile organic compounds (CVOCs) were found in subsurface soil and groundwater outside of the historic petroleum spill area, prompting DEC to conduct several environmental investigations.[47]

DEC's investigations found contaminants of CVOCs, including tetrachloroethylene (PCE) and trichloroethylene (TCE), in the subsurface and indoor air of occupied residential and commercial structures above the groundwater contaminant plume. DEC has installed some isub-slab depressurization systems, which direct hazardous vapors in the soil to a building's exterior. DEC continues to conduct additional investigations to identify sources of contamination and continues to offer sub-slab and indoor air sampling to property owners within the boundary of the Meeker Avenue site. The State of New York supports the inclusion of the site on the Superfund NPL.[48]

The NPL includes the nation's most serious uncontrolled or abandoned releases of contamination. EPA uses the list to prioritize Superfund cleanup funding. Only NPL sites are eligible to receive federal funding for long-term, permanent cleanup.

EPA Announces Plans to Use First $1B from Bipartisan Infrastructure Law Funds To Clear Out the Superfund Backlog

On December 17, 2021, EPA announced a $1 billion investment from the Bipartisan Infrastructure Law to initiate cleanup and clear the backlog of 49 previously unfunded Superfund sites and accelerate cleanup at dozens of other sites across the country.[49] The $1 billion investment is the first wave of funding from the $3.5 billion in the Bipartisan Infrastructure Law to help clean up Superfund sites.

Three of the sites slated to receive funding are in New York: (i) the Eighteen Mile Creek Superfund site in Lockport, (ii) the Facet Enterprises, Inc. Superfund site in the Village of Elmira Heights, and (iii) the Vestal Water Supply Well 1-1 Superfund site in Vestal.

At the Eighteen Mile Creek Superfund site, EPA will use the funds to excavate and dispose of lead and PCB contaminated sediment within the Creek Corridor and adjacent upland commercial properties.[50] The funds will also be used to excavate lead contaminated soil at certain residential properties on Mill Street and several other adjacent streets at the site.

At the Facet Enterprises, Inc. Superfund site in the Village of Elmira Heights, EPA will use funds to install vapor mitigation systems to address vapor intrusion of volatile organic compounds.[51] Vapor intrusion removes harmful vapor chemicals from the soil by applying a vacuum.

At the Vestal Water Supply Well 1-1 Superfund site in Vestal, EPA will use the funds for thermal soil treatment of VOC-contaminated soils, and excavation of soil contaminated with PCBs.[52]

EPA Completes Dredging and Capping Work at Grasse River Superfund Site, Massena

On November 18, 2021, EPA announced the completion of dredging and capping work at the Grasse River Superfund site in Massena, New York.[53] EPA removed a quarter million cubic yards of PCB-contaminated sediment from the Grasse River and capped over 200 acres of river bottom. EPA acknowledged its important partnership with the Saint Regis Mohawk Tribe and New York State.[54]

EPA's cleanup plan for the site called for removing contaminated sediment from near-shore areas in a 7.2-mile stretch of the lower Grasse River and placing a cap on the river bottom's main channel.[55] Capping material included sand and powdered carbon, which works to capture and chemically bind pollutants in place, as well as some stone and gravel. EPA expects to continue work to reconstruct habitat areas impacted by the project. The project's long-term monitoring plan requires fish, water, and habitat monitoring to track the recovery of the river over time. NYSDOH fish consumption advisories will remain in effect until PCB concentrations in fish are reduced. EPA will also monitor capped areas of the river bottom to ensure that the caps placed on the river bottom remain intact.[56]

In fall 2021 EPA also started a five-year review of the cleanup at the site. EPA expects this review to be completed by May 2022. The results will be shared with the public and will be available on the EPA's Grasse River site webpage.[57]

WATER

EPA and Army Try Again To Provide Certainty for the Definition of WOTUS

EPA Administrator Michael S. Regan summed this issue up best: "In recent years, the only constant with WOTUS has been change, creating a whiplash in how to best protect our waters in communities across America."[58]

On November 18, 2021, EPA and the Army Corps announced a proposed rule to re-establish the pre-2015 definition of "waters of the United States" (WOTUS) which had been in place for decades, updated to reflect consideration of Supreme Court decisions.[59] This has a déjà vu all over again feel to it. This proposed rule would support a stable implementation of "waters of the United States" while the agencies continue to consult with states, Tribes, local governments, and a broad array of stakeholders in both the implementation of WOTUS and future regulatory actions. In addition, EPA reviewed the Trump-era 2020 Navigable Waters Protection Rule (the Trump EPA's attempt to define WOTUS) and determined that the rule significantly reduced clean water protections.[60]

On August 30, 2021, a federal district court vacated the Trump-era definition of WOTUS.[61] Since then, EPA and the Corps have been applying the pre-2015 WOTUS definition nationwide.[62] This is the version of WOTUS that had been in place for decades. Previously, application of WOTUS had been a mess nationwide, with different definitions applicable in different states because of conflicting court decisions and different federal administrations. In this latest step, EPA has indicated it wants regulatory certainty. Moreover, the agency also announced it will continue to engage stakeholders on developing a better rule and has announced ten regional roundtables and lots of public outreach recognizing geographical differences and seeking a range of perspectives.[63]

EPA published its proposed rule on December 7, 2021.[64]

The Clean Water Act does not define the term "waters of the United States," but it is a threshold term establishing the geographic scope of federal jurisdiction under the Act. It has been defined by the EPA and the Army in regulations since the 1970s and jointly implemented in the agencies' respective programs. The WOTUS definition has significant reach and effect under the Clean Water Act, including: (1) water quality standards and TMDLs under CWA § 303; (2) oil spill programs under CWA § 311; (3) water quality

certifications under CWA § 401; (4) NPDES permits under CWA § 402; and (5) dredge and fill permits under CWA § 404. Many more regulations implementing these programs, and others, also rely upon the WOTUS definition.

EPA Confirms Habitat Improvements at Rochester Embayment Area of Concern in New York

On September 1, 2021, EPA announced that habitat for mink and bottom-dwelling aquatic plants and animals has improved to the point where the Degradation of Fish and Wildlife Populations Beneficial Use Impairment, or BUI, can be removed from the Rochester Embayment Area of Concern.[65] This means that 11 of 14 beneficial uses have now been restored. The Rochester Embayment is a broad bay on the south shore of Lake Ontario at the mouth of the Genesee River. It's a 35-square mile portion of Lake Ontario. Historically, manufacturing facilities in and near the Rochester Embayment caused sediment to contain PCBs, cyanide, dioxins, and other harmful substances.[66] EPA announced that after years of work by EPA, DEC and local partners, environmental monitoring shows that the removal criteria set by the State of New York has been met.[67] EPA stated that research shows healthy mink now reproduce in Rochester Bay and another study confirms that the habitat is also healthier for bottom-dwelling animals, plants, and organisms.

The work completed included:

- U.S. Army Corps of Engineers constructed a 1,695-foot barrier island at the mouth of Braddock Bay and restored 340 acres of marsh areas.
- U.S. Fish and Wildlife Service created 15.4 acres of pothole habitat and 16 acres of habitat mounds in the confluence of West and Salmon creeks, Lower Salmon Creek, Long Pond West, Buck Pond East and the north portion of Braddock Bay. In addition, 65 acres of wetland and 1,800 linear feet of open water channels were restored.
- Ducks Unlimited restored 175 acres of coastal marsh habitat, 40 acres of sedge meadow and seven acres of fish spawning pools at Buck Pond, Buttonwood Creek and Salmon Creek. Hydrological connectivity between these waterbodies and Lake Ontario was also restored.
- DEC dredged approximately 29,000 cubic yards of contaminated sediment from the Lower Genesee River and then capped the two dredged areas at Eastman-Kodak Business Park in Rochester.[68]

The EPA, the State of New York, and many partners are committed to restoring and protecting the Great Lakes as work continues to address the three remaining BUIs in Rochester Bay are: (i) degradation of aesthetics, (ii) loss of fish and wildlife habitat, and (iii) bird and animal deformities.[69]

Endnotes

1. EPA Press Release, *EPA Announces Appointments of Regional Administrators for Regions 2, 4, and 8,* (Nov. 18, 2021), https://www.epa.gov/newsreleases/epa-announces-appointments-regional-administrators-regions-2-4-and-8.
2. *See* EPA Press Release, *EPA Finalizes Greenhouse Gas Standards for Passenger Vehicles, Paving Way for a Zero-Emissions Future* (Dec. 20, 2021), https://www.epa.gov/newsreleases/epa-finalizes-greenhouse-gas-standards-passenger-vehicles-paving-way-zero-emissions.
3. *See id*; *see also* 86 Fed. Reg. 74434 (Dec. 30, 2021).
4. *Id*.
5. *See id*.
6. *See id*.
7. *See* 86 Fed. Reg. 74434, 74437 (Dec. 30, 2021).
8. *See* 86 Fed. Reg. 74434 (Dec. 30, 2021); for more information on the final rule, see: epa.gov/LDV.
9. *See* EPA Press Release, *EPA Report: U.S. Cars Achieve Record High Fuel Economy and Low Emission Levels as Companies Fully Comply with Standards* (Nov. 19, 2021), https://www.epa.gov/newsreleases/epa-report-us-cars-achieve-record-high-fuel-economy-and-low-emission-levels-companies.
10. *See id*; to read the full report, visit: https://www.epa.gov/automotive-trends.
11. *See* EPA Press Release, *EPA Publishes its 2021 Climate Adaptation Action Plan* (Oct. 7, 2021), https://www.epa.gov/newsreleases/epa-publishes-its-2021-climate-adaptation-action-plan.
12. To view the website see: https://www.epa.gov/climate-adaptation.
13. *See* EPA Press Release, *EPA Publishes its 2021 Climate Adaptation Action Plan* (Oct. 7, 2021), https://www.epa.gov/newsreleases/epa-publishes-its-2021-climate-adaptation-action-plan.
14. *See* EPA Press Release, *EPA's New Report Shows How Climate Change is Influencing Seasonal Events in the U.S. and Impacting Peoples' Health and Environment* (Dec. 21, 2021), https://www.epa.gov/newsreleases/epas-new-report-shows-how-climate-change-influencing-seasonal-events-us-and-impacting.
15. *See id*.
16. *Id*.
17. *Id*.; the report can be found here: https://www.epa.gov/climate-indicators/seasonality-and-climate-change.
18. EPA Press Release, *EPA Reaffirms Scientific, Economic, and Legal Underpinnings of Limits on Toxic Emissions* (Feb. 1, 2022), https://www.epa.gov/newsreleases/epa-reaffirms-scientific-economic-and-legal-underpinnings-limits-toxic-emissions.

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19. 87 Fed. Reg. 7624 (Feb. 9, 2022) (Proposed Rule–Revocation of the 2020 Reconsideration, and Affirmation of the Appropriate and Necessary Supplemental Finding).
20. *See* 65 Fed Reg. 79825, 27 (Dec. 20, 2000).
21. *See* 77 Fed. Reg. 9304 (Feb. 16, 2012).
22. *See* 76 Fed. Reg 24,977 (May 3, 2011) (proposed MATS rule).
23. 65 Fed Reg. 79825, 27 (Dec. 20, 2000).
24. 76 Fed. Reg 24,978.
25. *See* 76 Fed. Reg 24,978.
26. *See Michigan v. EPA*, 576 U.S. 743,760 (2015).
27. *See* 81 Fed. Reg. 24,247 (April 25, 2016).
28. EPA Press Release, *EPA Reaffirms Scientific, Economic, and Legal Underpinnings of Limits on Toxic Emissions* (Feb. 1, 2022), https://www.epa.gov/newsreleases/epa-reaffirms-scientific-economic-and-legal-underpinnings-limits-toxic-emissions.
29. *See id*.
30. *See* EPA Press Release, *U.S. to Sharply Cut Methane Pollution that Threatens the Climate and Public Health* (Nov. 2, 2021), https://www.epa.gov/newsreleases/us-sharply-cut-methane-pollution-threatens-climate-and-public-health.
31. *See* 86 Fed. Reg 63110, Proposed Rule, *Standards of Performance for New, Reconstructed, and Modified Sources and Emissions Guidelines for Existing Sources: Oil and Natural Gas Sector Climate Review*. (Nov. 15, 2021).
32. *See* EPA Press Release, *U.S. to Sharply Cut Methane Pollution that Threatens the Climate and Public Health* (Nov. 2, 2021), https://www.epa.gov/newsreleases/us-sharply-cut-methane-pollution-threatens-climate-and-public-health.
33. *See id*.
34. *See id*.
35. *See id*.
36. *See id*. For more information on this proposed rule, *see* https://www.epa.gov/controlling-air-pollution-oil-and-natural-gas-industry.
37. 86 Fed. Reg 55116, final rule, *Phasedown of Hydrofluorocarbons: Establishing the Allowance Allocation and Trading Program Under the American Innovation and Manufacturing Act*.
38. *See* EPA Press Release, *EPA Moves Forward with Phase Down of Climate-Damaging Hydrofluorocarbons* (May 3, 2021), https://www.epa.gov/newsreleases/epa-moves-forward-phase-down-climate-damaging-hydrofluorocarbons.
39. *See id*.
40. 85 Fed Reg 55116, 55119.
41. *See* Clean Air Act § 608(c).
42. *See* EPA Press Release, *EPA Moves Forward with Phase Down of Climate-Damaging Hydrofluorocarbons* (May 3, 2021), https://www.epa.gov/newsreleases/epa-moves-forward-phase-down-climate-damaging-hydrofluorocarbons.
43. *See* EPA Press Release, *EPA Acts on Petitions to Cut Climate-Damaging HFCs, Will Begin AIM Act Rulemaking Process* (Oct. 8, 2021), https://www.epa.gov/newsreleases/epa-acts-petitions-cut-climate-damaging-hfcs-will-begin-aim-act-rulemaking-process.
44. *See id*.
45. *See id*.
46. *See* EPA Press Release, *EPA Takes Action to Address Risks to Public Health by Proposing to Add Meeker Avenue Plume, Brooklyn, New York to the National Priorities List* (Sept. 8, 2021), https://www.epa.gov/newsreleases/epa-takes-action-address-risks-public-health-proposing-add-meeker-avenue-plume.
47. *See id*.
48. *See id*.
49. EPA Press Release, *EPA Announces Plans to Use First $1B from Bipartisan Infrastructure Law Funds to Clear Out the Superfund Backlog* (Dec. 17, 2021), https://www.epa.gov/newsreleases/epa-announces-plans-use-first-1b-bipartisan-infrastructure-law-funds-clear-out-0.
50. *See id*.
51. *See id*.
52. *See id*.
53. EPA Press Release, *Dredging and Capping Work Completed at Grasse River Superfund Site, Massena, NY* (Nov. 18, 2021), https://www.epa.gov/newsreleases/dredging-and-capping-work-completed-grasse-river-superfund-site-massena-ny.
54. *See id*.
55. *See id*.
56. *See id*.
57. *See id*; https://www.epa.gov/superfund/alcoa-aggregate.
58. EPA Press Release, *EPA and Army Take Action to Provide Certainty for the Definition of WOTUS* (Nov. 18, 2021), https://www.epa.gov/newsreleases/epa-and-army-take-action-provide-certainty-definition-wotus.
59. *See id*.
60. *See id*.
61. *See Pascua Yaqui Tribe v. EPA*, No. 20-00266 (D. Ariz. Aug. 30, 2021).
62. *See* EPA Press Release, *EPA and Army Take Action to Provide Certainty for the Definition of WOTUS* (Nov. 18, 2021), https://www.epa.gov/newsreleases/epa-and-army-take-action-provide-certainty-definition-wotus.
63. *See* EPA Press Release, *EPA and Army Select 10 Roundtables to Highlight Regional Implications of WOTUS* (Feb. 24, 2022), https://www.epa.gov/newsreleases/epa-and-army-select-10-roundtables-highlight-regional-implications-wotus.
64. *See* Proposed Rule: *Revised Definition of 'Waters of the United States* 86 Fed. Reg. 69372. For more information on the proposed rule and the process *see* www.epa.gov/wotus.
65. *See* EPA Press Release, *EPA Confirms Habitat Improvements at Rochester Embayment Area of Concern in New York* (Sept. 1, 2021), https://www.epa.gov/newsreleases/epa-confirms-habitat-improvements-rochester-embayment-area-concern-new-york.
66. *See* EPA, *Rochester Embayment AOC*, https://www.epa.gov/great-lakes-aocs/rochester-embayment-aoc.
67. *See* EPA Press Release, *EPA Confirms Habitat Improvements at Rochester Embayment Area of Concern in New York* (Sept. 1, 2021), https://www.epa.gov/newsreleases/epa-confirms-habitat-improvements-rochester-embayment-area-concern-new-york.
68. *See id*.
69. *See id*.

DEC Update

Recycling, Product Stewardship and Polystyrene Foam Ban

By Cristin M. Clarke, Phoebe Gittelson and Chris Horan

This edition of DEC Update highlights some New York State Department of Environmental Conservation (DEC) programs in the areas of recycling, product stewardship, and the reduction of expanded polystyrene (EPS) foam. DEC recently promulgated, or will soon finalize, rules in the areas of food donation and food scraps recycling, electronic waste recycling, and (EPS) foam reduction, while the paint recycling program is expected to begin later this year.

Food Donation and Food Scraps Recycling

New York State's Food Donation and Food Scraps Recycling Law[1] addresses climate change by mitigating methane production from wasted food, helps New Yorkers experiencing food insecurity by increasing the amount and variety of food available through relief organizations across the state, all while supporting businesses and institutions in processing excess food scraps through composting facilities.[2]

Wasted food has significant environmental, social, and economic impacts. Removing organics from landfills is a key recommendation under the Climate Action Council's Waste Panel to help achieve New York's ambitious Climate Leadership and Community Protection Act's goals to significantly reduce greenhouse gas emissions and put the state on a path to carbon neutrality economy-wide by 2050.[3]

The law and the regulations went into effect on January 1, 2022 and require all designated food scrap generators to donate excess edible food and send food scraps to an organics recycler if one is available within 25 miles of the generator.[4] The resulting increase in food donation will help New Yorkers in need and create jobs to assist the not-for-profits handling food donations. The law also requires generators to recycle food scraps by using organics recyclers (composting facilities, etc.) to reduce the amount of food scraps that would otherwise end up in landfills and ultimately produce methane, a potent greenhouse gas. Composting facilities and other organics recyclers produce beneficial organic soil conditioners that are needed to improve the quality of poor soils and reduce erosion.[5]

A designated food scrap generator is a business or institution that generates an annual average of two tons of wasted food per week or more.[6] These designated food scrap generators are required to (1) donate excess edible food; and (2) separate and recycle all remaining food scraps if they are within 25 miles of an organics recycler (composting facility, anaerobic digester, etc.).[7] Every June, beginning in 2021, DEC publishes a list of businesses that have been identified as designated food scraps generators.[8] Newly identified designated food scrap generators that are identified on the list will have until January 1 of the following year to comply with the requirements of the law.[9]

The law and regulations have exemptions for New York City (which already has a local law in place requiring the diversion of food scraps from disposal); hospitals; nursing homes; adult care facilities; K-12 schools; and farms.[10] DEC's website has information, including guidance and resources for food scraps transporters, food scraps recyclers, transfer facilities, landfills and combustion facilities, and ways local governments and organizations can get involved.[11]

Electronic Waste Recycling

The New York State Electronic Equipment Recycling and Reuse Act (EERRA) was signed into law on May 28, 2010 and has been in effect since April 1, 2011.[12] It requires manufacturers of covered electronic equipment to provide free and convenient recycling of electronic waste to most consumers in the state, including individuals, businesses, schools and government entities.[13]

Over the past decade, DEC found that consumers and other stakeholders faced electronic waste ("e-waste") recycling challenges and determined that regulations were needed to provide greater program consistency and clarity. After receiving comments on proposed regulations, DEC adopted amendments to 6 N.Y.C.R.R. Part 368—Product Stewardship and Product Labeling, which include the addition of Subpart 368-3, Electronic Waste Collection, Recycling, and Reuse.[14] The goals of these regulations are (1) to provide clarity to the existing provisions of the EERRA for all participating stakeholders, to improve overall program performance, and to increase recycling opportunities; (2) to strengthen key provisions of the EERRA to address the challenges faced by stakeholders; and (3) to emphasize the manufacturer's responsibility for all costs associated with the implementation of its acceptance program, including costs for the collection, handling, transportation, and recycling or reuse of e-waste incurred by all persons involved in the implementation of a manufacturer's acceptance program.[15] Subpart 368-3 strengthens the requirements for manufacturers to provide for all costs associated with the implementation of their acceptance programs; sets a procedure outlining manufacturers' responsibility regarding brand sale or transfer; requires retailer notification of brand registration annually and each time a manufacturer offers a new brand of CEE for sale with that retailer, and clarifies the registration withdrawal process.[16] The requirements for collectives, retailers, e-waste collections sites, consolidation facilities, recycling facilities, collectors, collection events, waste transporters, and waste management facilities are also addressed.[17] The full text of the express terms, supporting documents, and related information pertaining to the adopted regulations are available on DEC's website.[18]

Cristin M. Clarke received her J.D. from Albany Law School, earning a concentration in environmental law with honors. She is an associate attorney in the Office of General Counsel at the New York State Department of Environmental Conservation (DEC) in Albany, where she has handled solid waste, recycling, and product stewardship issues for almost 15 years.

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Chris Horan earned his J.D. from the University at Buffalo School of Law and joined DEC's Office of General Counsel in 2006. He is a senior attorney and currently works on solid and hazardous waste issues.

Postconsumer Paint Collection Program

In an effort to encourage postconsumer paint recycling throughout the state, New York enacted the Postconsumer Paint Collection Program in December 2019.[19] This law establishes a statewide program for the convenient return of waste latex and oil based postconsumer paints by requiring producers of architectural paint to implement a postconsumer paint collection and recycling program in accordance with a plan approved by DEC. Under a producer's plan, consumers must have convenient options for returning their waste paint, regardless of where they are located in the state.[20] The paint collection program is funded by a small fee applied to the price of covered products at the time of purchase.[21] PaintCare, Inc., a non-profit organization that represents paint producers in other states that have implemented similar programs, submitted a draft plan in July 2020, on behalf or producers who sell architectural paint in New York State.

For over a year, PaintCare worked with DEC as it made progress toward developing a plan that meets the law's requirements. On December 1, 2021, it submitted a revised plan that indicated additional work was necessary to establish a statewide collection network meeting the collection site criteria set forth in the law. DEC granted a conditional approval to PaintCare on the revised plan on January 6, 2022, in the interest of moving the program forward to the planned implementation date of May 1, 2022. The conditional approval letter contains monthly reporting requirements, and it is expected that PaintCare will satisfy the convenience requirements by May 1, 2022, when the program will be fully operational.[22]

Related to this, and to further encourage postconsumer paint recycling throughout the state, DEC plans to amend its universal waste regulations (6 N.Y.C.R.R. Parts 370, 371, 373, 374, and 376) to allow postconsumer paint and aerosol cans to be handled as universal wastes.[23] The Environmental Protection Agency (EPA) already includes aerosol cans containing hazardous wastes in its list of wastes that can be handled under its universal waste regulations.[24] While it has not given waste paint the same designation, it is a type of waste that authorized states can treat as a universal waste.[25] This will be beneficial to businesses and government agencies, which must currently treat oil-based waste paint as hazardous waste. The amendments will make the onsite management of this material more convenient, as they would allow more facilities to collect oil-based postconsumer paint without becoming subject to hazardous waste generator regulations.

Expanded Polystyrene Foam Ban

Under the New York State Expanded Polystyrene Foam Container and Polystyrene Loose Fill Packaging Ban,[26] effective January 1, 2022, no covered food service provider or store (retail or wholesale establishment) is allowed to sell, offer for sale, or distribute disposable food service containers that contain expanded polystyrene (EPS) foam,

and no manufacturer or store is allowed to sell, offer for sale, or distribute polystyrene loose fill packaging (commonly referred to as packing peanuts) in the state.[27]

The law does not apply to EPS foam containers for raw meat, pork, seafood, poultry, or fish sold for the purpose of cooking or preparing off-premises by the customer; prepackaged food filled or sealed prior to receipt at a covered food service provider;[28] and any city with a population of one million or more with a local polystyrene ban in place, which includes New York City.[29] Other local laws are preempted.[30] However, any county law will not be preempted if the local law provides environmental protection equal to or greater than the state law or regulations and the county files a written declaration with DEC of its intent to administer and enforce such local law.[31] Additionally, the law includes a waiver provision wherein covered food service providers and facilities meeting certain criteria may request a 12-month financial hardship waiver of ban's requirements from DEC.[32]

In September 2021, DEC proposed a new 6 N.Y.C.R.R. Part 353—Expanded Polystyrene Foam Container and Loose Fill Packaging Reduction setting forth the requirements of the ban on EPS foam containers and loose fill packaging; the financial hardship waiver application process; cost comparison analysis for alternative packaging; definitions of statutory terms, including "prepackaged," "single-use," "comparable cost" and "undue financial hardship"; and hardship waiver approval, renewal, and revocation criteria. Public comments were received from September 8, 2021 through November 22, 2021, and a virtual public hearing was held on November 15, 2021.[33] The DEC intends to adopt final Part 353 regulations in the near future.

Endnotes

1. N. Y. Environmental Conservation Law (ECL), Art. 27, Title 22, §§ 27-2201 to 27-2219.
2. *See* New York State Department of Environmental Conservation (hereinafter referred to as "DEC"), *DEC Announces New Regulations to Improve Food Scrap Recycling and Prevent Food Waste*, Aug. 11, 2021, https://www.dec.ny.gov/press/123575.html (last visited Feb. 15, 2022).
3. *See* DEC, *Climate Action Council Draft Scoping Plan*, https://climate.ny.gov/Our-Climate-Act/Draft-Scoping-Plan (last visited Feb. 15, 2022).
4. ECL §§ 27-2201 to 27-2219; N.Y. Comp. Codes R. & Regs. tit. 6, Part 350 (N.Y.C.R.R.).
5. *See* DEC, *DEC Announces New Regulations to Improve Food Scrap Recycling and Prevent Food Waste*, Aug. 11, 2021, https://www.dec.ny.gov/press/123575.html (last visited Feb. 15, 2022).
6. *See* ECL § 27-2201(1); 6 N.Y.C.R.R. § 350-1.2(e). Examples include grocery stores, restaurants, hotels, colleges and universities, and shopping malls.
7. *See* ECL § 27-2203; 6 N.Y.C.R.R. §§ 350-2.3, 350-2.4.
8. *See* ECL §27-2211; 6 N.Y.C.R.R. § 350-2.2.
9. *See* 6 N.Y.C.R.R. §§ 350-2.2, 350-3.1.
10. *See* ECL § 27- 2215; 6 N.Y.C.R.R. § 350-1.3.
11. *See* DEC's webpage at www.dec.ny.gov. The "Food Donation and Food Scraps Recycling Law" webpage has many resources available: https://www.dec.ny.gov/chemical/114499.html.
12. ECL Art. 27, Title 26, §§ 27-2601 to 27-2621.
13. *See* ECL § 27-2601(4); 6 N.Y.C.R.R. § 368-3.2(g) (defining the term "consumer"); ECL § 27-2605(8); 6 N.Y.C.R.R. § 368-3.5; § 368-3.2 (b), (x) (providing that a manufacturer must not charge consumers for the collection, handling and recycling and reuse of

electronic waste, provided that this prohibition does not apply to a charge on business consumers or to charges for premium services, and defining the terms "business consumer" and "premium services.").

14. The Notice of Adoption was filed with the New York State Department of State on Feb. 8, 2022 and published in the State Register on Feb. 23, 2022.
15. *See* Revised Regulatory Impact Statement, 6 N.Y.C.R.R. Part 368, Product Stewardship and Product Labeling.
16. *See* 6 N.Y.C.R.R. § 368-3.3 (manufacturer requirements); § 368-3.5 (electronic waste acceptance program).
17. *See* 6 N.Y.C.R.R. § 368-3.4 (collective requirements); § 368-3.7 (retailer requirements); § 368-3.8 (electronic waste collection site requirements); § 368-3.9 (electronic waste consolidation facility requirements); § 368-3.10 (electronic waste recycling facility requirements); § 368-3.11 (electronic waste collector requirements) § 368-3.12 (electronic waste collection event requirements); § 368-3.13 (waste transporter and waste management facility requirements).
18. DEC, *Proposed, Emergency, and Recently Adopted Regulations*, http://www.dec.ny.gov/regulations/propregulations.html#recent (last visited Feb. 15, 2022).
19. ECL §§ 27-2001 to 27-2007.
20. *See* ECL § 27-2003(3).
21. *See* ECL § 27-2003(3), (8).
22. Letter from David Vitale, Director of DEC's Division of Materials Management, to Andrew Radin, New York Program Manager, PaintCare New York LLC (Jan. 6, 2022), available at https://www.dec.ny.gov/chemical/120606.html (granting conditional approval of PaintCare's New York Paint Stewardship Program Plan, dated December 1, 2021).
23. *See* DEC, *Regulatory Agenda: January 2022 Regulatory Agenda, 3-Year Rule Review, and 5-Year Rule Review*, https://www.dec.ny.gov/regulations/36816.html (last visited Feb. 16, 2022).
24. *See* Increasing Recycling: Adding Aerosol Cans to the Universal Waste Regulations, 84 Fed. Reg. 67202-67220 (2019) (to be codified at 40 C.F.R. pts. 260, 261, 264, 265, 268, 270, 273); *see also* www.epa.gov for hazardous and universal waste regulations and information.
25. *See* 40 CFR 272 subpt. HH.
26. ECL Art. 27, Title 30, §§ 27-3001 to 27-3009.
27. ECL § 27-3003.
28. ECL § 27-3005(1).
29. ECL § 27-3007(3).
30. ECL § 27-3007(1).
31. ECL § 27-3007(2).
32. *See* ECL § 27-3005(2). A financial hardship waiver request form is available on DEC's webpage, *Go Foam Free: Polystyrene Foam Ban* at https://www.dec.ny.gov/chemical/120762.html. Education, outreach, guidance and other helpful resources, including alternative container and packaging guidance, are also available on this webpage.
33. *See* N.Y. St. Reg, Sept. 28, 2021, pp. 6-11.

Law School CORNER

By Gabriella Mickel and Dana McClure

This second edition of the Law School Corner highlights students and their work at six law schools: Albany Law School, Elisabeth Haub School of Law at Pace University, Brooklyn Law School, Benjamin N. Cardozo School of Law, New York University School of Law, Syracuse University College of Law (with cameos by Columbia and Fordham). Thank you to the Corner editors Gabriella Mickel (2L, Haub Law) and Dana McClure (3L, Haub Law), for curating the first two editions of the Law School Corner, and to students, faculty, and staff at the featured law schools for sharing information about their work. We hope to feature students' environmental and energy law work at law schools throughout New York in future editions of the Law Student Corner. If you know any law schools or students who would like to participate, please email gmickel@law.pace.edu.

Jena Rackerby

STUDENT HIGHLIGHT

Jena Rackerby, while serving in the military and deployed on an aircraft carrier, saw extreme environmental injustice resulting in harm to marine life and human health. She recalled how the ship dumped thousands of pounds of waste into the ocean every day. Her experiences overseas led her to conduct research into the burn pits in Afghanistan and to volunteer with veterans organizations to gain first-hand experience on the human health impacts on low-ranking individuals caused by harmful environmental decisions. To develop her environmental policy interests, Jenna interned with the Sabin Center for Climate Change Law at Columbia University where she developed a tracker to follow the progression of New York's implementation of climate laws.[1] Although she maintains an interest in policy, her focus shifted to the legal side the following year when her hometown burned down in Santa Rosa, California and the utility companies were not held liable.

Currently, Jenna is a 2L at Cardozo where she is vice president of the Environmental Law Society.[2] She also serves as a vice-chair for ABA SEER's Environmental Law Society Network.[3] This past year she sat on the board for United Solar Energy Supporters (USES), a nonprofit, where she focused on creating student development materials for undergraduate and graduate students to encourage engagement in the expansion of solar in New York. USES is a non-political clearinghouse of information for municipalities, landowners, and solar utilities that hosts webinars to educate on different issues around solar. After graduation, Jenna will join Holland & Knight LLP in New York City in their energy practice group. She hopes to focus on utilities and clean technologies.

EVENTS

NELMCC

The Elisabeth Haub School of Law at Pace University held the 34th Annual Jeffrey G. Miller National Environmental Law Moot Court Competition (NELMCC) in February 2022. Teams from New York schools Fordham University School of Law and Columbia Law School competed with over 50 other law schools and over 150 participants.

NELMCC

150 attorneys participated in grading briefs and serving as judges for the four-day competition.

Chaired by Christen Maccone (2L, Haub Law) NELMCC tests students' skills in appellate brief writing and oral advocacy and uses issues drawn from real cases to provide students with first-hand experience in environmental litigation while also providing a rigorous academic experience. The competition is distinctive in that three adverse teams argue the issues, reflecting the fact that environmental litigation frequently involves multiple parties—the government, a public interest group, and a member of the regulated industry.[4]

Law Review Symposiums and Colloquiums

NYU Law's *Environmental Law Journal* has become one of the leading environmental law journals in the nation and hosted its 2022 symposium, "Free the Land: Land Tenure and Stewardship Reimagined" this February. NYU Law's *Review of Law and Social Change* 2022 colloquium, "Resisting Settler Colonialism," examined the interaction of Indian law, land use policy, and histories of racial capitalism in the United States.[5] The *Pace Environmental Law Review* hosted its Symposium, "Labor and the Environment—Envisioning a Green New Deal," on April 1.[6]

WORK AND ADVOCACY

- In February 2021, for Professor Keith Hirokawa's Environmental Law course at Albany Law School, students submitted a petition to list the American bumble bee under the Endangered Species Act in collaboration with the Center for Biological Diversity.[7]
- Students at Albany Law School in Professor Keith Hirokawa's State and Local Environmental Law course took on four projects last semester: hosting a public workshop in Hudson, New York, to inform about the comprehensive planning process; hosting a public workshop in Hudson on the State Environmental Quality Review Act; drafting a tree protection ordinance for Troy, New York; and drafting portions of a natural resources inventory for North Greenbush, New York.
- NYU Law's Environmental Law Society (ELS) has focused its efforts this year on anti-pipeline advocacy work in Brooklyn, a university-wide fossil fuel divestment campaign, its environmental justice reading group, and food sustainability. The ELS also hosts panels where experts explain the ins-and-outs of internships, employment, classes, clinics, and journals to current students. The ELS's past work has included playing a major role in advancing sustainability measures on campus and advocating for more environmental law courses, including the addition of an environmental justice seminar. The environmental justice seminar has now been offered for the past two years. The course introduces students to environmental justice both as a sub-field of environmental law practice and a grassroots-led social justice movement. Emphasis is placed on thinking critically about the role of lawyers in supporting social movements. Topics covered include the origins of the environmental justice movement, movement lawyering, the use of evidence and science in environmental justice advocacy, cumulative impacts, climate justice, and current challenges and debates in advancing environmental justice.
- In collaboration with the Rensselaer Plateau Alliance (a land trust), Kathleen Anderson (3L, Albany Law) has been working on mapping benefit flows from creeks that begin on the rural Rensselaer Plateau and flow into the urban areas of Troy. The project seeks to illustrate the ways that communities relate to their local ecosystems and use ecosystem services as a basis for intercommunity communication.
- Olimata Jobe (2L, Albany Law) has prepared a report identifying opportunities for land trusts to incorporate reparations work into their land conservation programs, specifically focusing on situating BIPOC folks on farmlands through a variety of devices.

STUDENT PUBLICATIONS AND WRITINGS

- Flora Ho's (2L, Brooklyn Law) note on the environmental impacts of e-commerce will be published by the *Brooklyn Journal of Corporate, Financial & Commercial Law*.
- Stephanie Sioufas (recent grad, Haub Law) published "Eco-labels and Sustainable Viticulture to Avoid Environmental Impacts" in the *Environmental Claims Journal*.
- Maddie Shaff's (3L, Haub Law) "International Law and Climate Displacement: Why a Climate Justice Approach is Needed" will be published in the *Texas Environmental Law Journal* and calls for a reevaluation and expansion of key concepts such as the Good Neighborliness Principle, Transboundary Harm Principle, Common but Differentiated Responsibilities Principle, and the element of causation.
- Gabriella Mickel's (2L, Haub Law) "Gentrification: Remedies and Consequences—Using Land Use Authority to Combat Displacement" touches on climate and green gentrification and will be published in the *Urban Lawyer*.
- William West's (2L, Haub Law) "Racial Impact Assessment in Land Use Planning and Zoning" touches on environmental justice and will be published in the *Zoning and Planning Law Report*.
- Professor Mark Nevitt, Syracuse College of Law, noted two excellent student papers from his natural resource class: Emily Pascale's (2L, Syracuse Law) "Destructive Drilling: Why Offshore Drilling Bans Should Be Immune From Takings Liability" and Abigail Janik's (2L, Syracuse Law) "The Mountains Are Calling…and They're Tired: Overuse in the Adirondacks." He also noted a paper from his Law of the Global Commons class: Elyse Maugeri (2L, Syracuse Law), "What the Glasgow Climate Pact Missed: How to Better Address Climate Change Ahead of COP27."

Endnotes

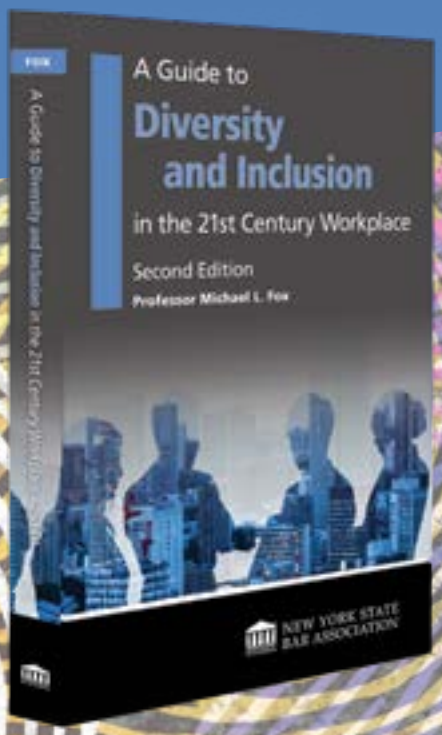
1. Columbia Law School, *New York State Climate Law Tracker*, https://climate.law.columbia.edu/content/new-york-state-climate-law-tracker (last visited March 22, 2022).
2. Cardozo Environmental Law Society, https://www.cardozo-envlaw.com/(last visited March 22, 2022).
3. American Bar Association, *Environmental Law Society Network*, https://www.americanbar.org/groups/environment_energy_resources/membership/law_student_resources/elsn/ (last visited March 22, 2022).
4. Pace University, *The Jeffery G. Miller National Environmental Law Moot Court Competition*, https://law.pace.edu/nelmcc (last visited March 22, 2022).
5. N.Y.U. Review of Law and Social Change, *Symposia*, https://socialchangenyu.com/symposia/ (last visited March 22, 2022).
6. Pace Environmental Law Review, *Call for Papers: Labor and The Environment - Envisioning a Green New Deal*, (Spring, 2022) https://digitalcommons.pace.edu/pelr/cfp_spring2022.pdf.
7. Center for Biological Diversity & Bombus Pollinators Association of Law Students, *Petition to List the American Bumblebee as an Endangered Species Under the Endangered Species Act* (Feb. 1, 2021) https://www.biologicaldiversity.org/species/invertebrates/pdfs/Center-et-al-2021-Petition-to-List-the-American-Bumble-bee.pdf.

NYSBA PUBLICATIONS

A Guide to Diversity and Inclusion in the 21st Century Workplace

2nd ed.

Author
Professor Michael L. Fox



This book provides the reader a concise reference on the major issues of diversity and inclusion by evaluating federal and New York State laws and regulations that protect against discrimination, retaliation and harassment in employment. Through this evaluation, attorneys, judges, and students will gain an understanding not just of the requirements of the law, but also a respect for diversity. Business professionals, particularly those in human resource management, can rely on this book to better understand their obligations, recognize potential issues, and articulate what they need to discuss with counsel.

The Second Edition includes coverage of the following topics:

- State and federal anti-discrimination, antiharassment and anti-retaliation provisions;
- The U.S. Supreme Court's groundbreaking decision in *Bostock v. Clayton County*, which addresses sexual orientation and gender identity;
- EEOC hearings and the importance of maintaining clear employer policies and concurrent paperwork;
- Federal and state leave laws;
- Website accessibility for those with disabilities;
- The impact of COVID-19 on employment practices.

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Member Profile: Justin Birzon

Our featured attorney for this issue is Justin Birzon, a member and former issue editor of this publication for more than 10 years. Justin is a vice president at the government relations and lobbying firm Albany Strategic Advisors (ASA), where he focuses on energy, environment, technology, and economic development issues. Prior to joining ASA, Justin was engaged in both private practice and government work.

At ASA, Justin provides government relations advice and counsel to help clients navigate the legislative and regulatory process. His firm represents renewable energy developers, alternative fuel producers, regulated utilities, generation resources that supply the electrical grid, and the builders of renewable energy projects. In addition to the bread-and-butter legislative aspect of lobbying, Justin provides regulatory and adjudicatory support throughout all phases of administrative engagement, ranging from the first Notice in the State Register, to consulting with outside counsel on Article 78 strategy.

Justin's previous experience with the state Legislature paved the way for his foray into government consulting. Having worked for several prominent committees in both houses of the Legislature, Justin built on the knowledge he gained as counsel to the committees on energy, judiciary, housing, and election law. Combined with his private practice experience in bankruptcy and general commercial law, Justin is able to synthesize his diverse legal experiences for the benefit of his clients.

He noted that modern environmental attorneys have enormous challenges and opportunities ahead of them. New York State has passed the most ambitious climate leadership law in the nation, and its implementation will be rolled out through a multi-year regulatory process. The Climate Leadership and Community Protection Act, passed in 2019, parts of which are codified in the Environmental Conservation Law and parts of which are codified in the Public Service Law. Some of the long-term planning resulting from this law can be seen in the Draft Scoping Plan released for public comment by the Climate Action Council. It has become apparent that health, economic, and transportation policies all converge with environmental conservation and planning. The resulting regulations and policies will have far-reaching and long-lived impacts on every individual and business in the state.

Outside of the office, Justin enjoys a rich and spirited life as a husband and father of two young energetic sons. He can be spotted outside sharing his passion for skiing, hiking, and biking with his wife and kids.

Justin studied environmental science at the University of Rochester, and earned a LLM in Environmental Law from Pace University School of Law. He is admitted to practice in the Northern District of New York and the state of Connecticut. He is a member of the NYSBA Environmental & Energy Law Section's committees on Legislation, Energy, and Water Quality.

–Aaron Gershonowitz

Report From the In-Person 2021 Fall Conference

By Linda R. Shaw

Was it good to be back in person for one conference! For those who could make it in person, the 2021 Fall Conference held at the Cornell University Statler Hotel in Ithaca New York was a real treat. The hotel is a training hotel for students at the university's Hospitality Management Program. This keeps the quality of the food and service from the students high because they are actually being graded while they work and the costs are low compared to other comparable hotels. We were also able to enjoy the beautiful upstate New York fall weather, explore the Cornell University grounds and also take in a field trip to Taughannock Falls State Park.

In addition to the great food, the conference proved to be quite educational. The all-African American environmental justice brownfield panel was particularly interesting as we heard from three developers performing active Brownfield Cleanup Program (BCP) projects throughout the state and the importance of the BCP and the tax credits to make the economics of their projects work. They also explained how the credits help leverage financing. It was moderated by our EJ Chair Jose Almanzar, now with Seyfarth Shaw.

With the siting of renewable energy and other natural resource intense projects increasing in upstate New York, and since this conference was a joint conference with the Municipal Law Section, we had another great panel of speakers from a number of small municipalities currently working on the approval of large-scale solar projects discuss their approval processes and whether the Host Community Benefit Agreements they are negotiating are helping to overcoming local NIMBY (Not In My Backyard) opposition. In some cases, the municipality explained that their residents will no longer have to pay any taxes. This panel was moderated by Dan Spitzer from Hodgson Russ.

With the deadline approaching at that time to opt in or out before the end of 2021 under the new Marihuana Regulation and Taxation Act, Chapter 92 of the Laws of 2021, we explored the choices local governments face whether to prohibit retail dispensary and delivery licenses through the adoption of a local law by December 31, 2021. Given that regulations governing license applications and operations were not anticipated to be finalized by the end of last year, we discussed why some municipalities may opt out, knowing that such decision can be reversed at any time in the future. Those not opting out will face decisions about whether to revise their zoning to accommodate license applications proposed for their jurisdiction. This panel was moderated by Telisport Putsavage from Putsavage PLLC.

What is an environmental conference without at least one panel on PFAS! At this conference, keeping with the joint municipal law theme, the City of Newburgh and its experts discussed how they have managed to obtain a clean water supply after learning their main water supply lake reservoir was contaminated with high levels of

PFAS migrating into their Lake Washington from a nearby airport. This panel was moderated by Amy Kendall from Knauf Shaw.

During dinner we did something we never did before and had a trivia contest. The table that was originally losing ended up winning in the final all-or-nothing round. It was a lot of fun and we must give credit to the Municipal Law Section for coming up with the idea of doing a trivia contest instead of having a dinner speaker.

On day two we had world-renowned international speaker from South Africa, Professor Tracy-Lynn Field, law professor at University of the Witwatersrand (Wits) School of Law, and an attorney/advocate of the High Court of South Africa, discuss how the energy transition of the Biden Administration has created a new landscape of opportunities and challenges for developing economies and the U.S., particularly as it relates to U.S. funding of natural gas as a transition fuel and infrastructural developments for renewable energy projects. Professor Field linked Wall Street and other U.S. financial institution funding of renewable energy projects in the U.S. and globally with their simultaneous funding of petroleum and mining companies, which is unfortunately perpetuating the global warming crisis. This panel was moderated by international energy trader and attorney Teraine Okpoko.

The Brownfield Opportunity Area (BOA) program was discussed for its beneficial planning monies but also lack of connection to the Brownfield Cleanup Program. The speakers explained ways the two programs can come together to assist the most difficult brownfield areas in the state. This panel was moderated by Helen Mauch of Mauch Mintzer.

Finally, our ethics CLE topic explored the ethical relationship between the in-house land use corporate counsels and engineers in a building emergency by focusing on the then recent Florida Surfside

building collapse. Experienced developer and engineer Peter Palazzo provided us with this evaluation of this building collapse, and informed us about some similar New York structural building issues and our ethical obligations as both attorneys and engineers if we find we have knowledge of a dangerous building condition.

We can only hope that 2022 will enable the Section to have another successful in-person conference this coming fall! This is another opportunity to thank our sponsors who made this conference feasible—Hodgson Russ, Knauf Shaw, Barclay Damon, Rigano LLC, Benchmark TurnKey, York Lab, GEI Consultants, Mitzner Mauch, Beveridge & Diamond, SESI Engineering and Roux Engineering.

Report From the 2022 Annual Meeting: The Cutting-Edge Issues!

By James P. Rigano

The Section's Annual Meeting was held on January 25, 2022 and addressed the cutting-edge environmental and energy issues in New York State. The renewable energy initiatives in the state that are leading the nation to a low carbon future were addressed. The details on offshore wind, solar and battery storage were discussed. As required by state law, massive renewable energy developments are in development, the most aggressive in the country.

Brownfield initiatives, especially in the municipal sector, were highlighted. Amendments to the state brownfield law were provided in the agency update on March 28. The state's new draft reporting obligations for subsurface contamination and associated reporting issues were also discussed. New draft DEC regulations substantially broaden the petroleum reporting obligations to include a number of new individuals potentially including attorneys, an issue that is of significant concern to Section members.

A dramatic new change to New York Environmental Law involved the recent Green Amendment to the New York State constitution. Professor Michael Gerrard from Columbia Law School moderated our prominent panel.

Professor Nicholas Robinson explained how the Green Amendment was authorized by a majority of voters in November 2021 to provide that "each person shall have a right to clean air and water, and a healthful environment." Professor Robinson explained that the green amendment should address a number of environmental and health concerns in the state and emphasized that asthma across the state has grown at alarming levels. The state Department of Health and Department of Environmental Conservation are not taking effective action.

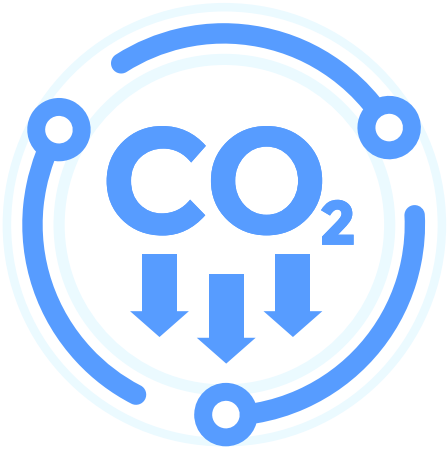
Professor Robinson explained that the administrative complexity of the Federal Clean Air Act deters asthma sufferers and others with respiratory illnesses from invoking federal citizen suit rights. He further emphasized the environmental justice issue since asthma rates for people of color are substantially higher and explained that New York's new Green Amendment ushers in a new error of environmental juris prudence. Professor Robinson explained that there is no federal analogue and very limited caselaw from other states that have environmental rights under their constitutions.

Professor Rebecca Bratspies from the City University of New York explained that the Green Amendment is now part of New York's Bill of Rights. The sweeping and simple language guarantees all New Yorkers the right to an environment that is safe, healthy and free of environmental conditions.

Professor Rebecca Bratspies explained that the amendment shifts the baseline for considering environmental injustice allowing for poor communities to have rights to protect their communities. Professor Bratspies also emphasized asthma concerns and that an African American child in New York State is 42% more likely to have asthma than a white child and eight times more likely to be hospitalized for asthma related ailments.

Of particular interest, Professor Bratspies explained that in much the same way that a permit is not a defense to a nuisance claim, a permit should not insulate a polluter from ongoing conduct under constitutional scrutiny.

Kevin Young of Young/Sommer offered the perspective of the business community, emphasizing that the major environmental issues have been addressed under existing statutes and regulations. Mr. Young explained that environmental concerns can be addressed under existing requirements and that the enforcement of regulatory requirements should address any continuing issues. Further, Mr. Young explained that the constitutional amendment is not expected to offer significant new environmental remedies.



Environmental & Energy Law Section Diversity and Inclusion Fellowship Reports

By Virginia C. Robbins, Nardos Girma and Tania K. Parra

Since 1992, the Environmental & Energy Law Section has sponsored a summer fellowship program designed to encourage law students from underrepresented groups to enter the field of environmental law. Underrepresented group members are persons who are African American, Latinx, Native American, Alaskan native, Asian, Pacific Islander, and LGBTQ+.

First-, second-, and third-year (evening only) law students are eligible for the fellowship program if they are either enrolled in a New York law school or are permanent residents of New York and enrolled in a law school in the U.S. To be eligible, applicants must demonstrate an interest in environmental and/or energy issues, strong academic records, outstanding personal qualities, and leadership ability.

Awardees receive a stipend of $7,500 to support working on legal matters for a government environmental or energy agency or public interest environmental organization in New York State. At the Annual Meetings in 2021 and 2022, the Section hosted wine and beer "Sip & Support" fundraisers and raised enough funds to support two summer fellows in each of those years.

After graduation, past fellows have practiced environmental and energy law in a variety of settings, including in private law firms, public authorities, EPA Region 2, U.S. Department of Energy, NYSDEC, and the Office of the New York State Attorney General.

In the following reports, Nardos Girma and Tania K. Parra reflect on their summer 2021 fellowships. Thank you to them for contributing these pieces.

–Virginia C. Robbins

Nardos Girma

Last summer I worked as a legal intern in the Environmental Justice Program at New York Lawyers for the Public Interest (NYLPI), a community-driven civil rights organization in New York City.

I wanted to intern at NYLPI because of my interest in urban environmental law, local government, and environmental justice. NYLPI's expertise in environmental justice issues and strong litigation record stood out to me. Additionally, I was particularly impressed by NYLPI's community-driven model and its multi-faceted approach, which combines litigation with community organizing and policy advocacy. My internship experience exceeded my expectations and I left with a better understanding of environmental law, community lawyering, and environmental justice issues in New York City. I also gained substantive skills that I expect to apply in my budding career.

Nardos Girma

Over the course of the summer, I conducted legal research on a variety of issues, including the Safe Drinking Water Act and statewide greenhouse gas reduction legislation. My principal project, however, was assisting with the preparation of a Clean Water Act (CWA) lawsuit against two polluting waste-transfer facilities in a predominantly Black environmental justice community. I worked on multiple components of the litigation, including pre-litigation research, client interviews, and assisting with the Notices of Intent to Sue, a prerequisite to citizen suits under the CWA. Although my internship was remote, I was fortunately able to visit the community and see the impacts of the facilities firsthand. These experiences grounded my work on the case and illustrated to me the very real quality-of-life impacts of environmental law and policy.

Being involved in the CWA case and in NYLPI's waste equity work more generally also gave me firsthand exposure to effective community lawyering. I learned how to communicate not only with other NYLPI staff but also with clients and community members, many of whom had, for

decades, advocated for more just and equitable environmental policies. I also quickly learned how powerful community lawyering could be when litigation, organizing, and policy advocacy came together. In one particularly memorable moment toward the end of my internship, community members and NYLPI staff successfully lobbied to block legislation introduced in the City Council that would have threatened hard-fought and recently-enacted waste reform laws.

My summer internship at NYLPI brought many of the topics I had studied in my environmental law classes, including the CWA and waste equity, to life. The knowledge, experience, and perspective I gained will guide me as I begin my legal career and beyond.

Tania K. Parra

Tania K. Parra

This past summer, with the support of the NYSBA Environmental & Energy Law Section's Diversity and Inclusion Fellowship, I worked for the Environmental Defense Fund (EDF) on the energy team. I am focused on a law career at a nonprofit advocacy organization and knew having the experience at EDF would be a strong building block. I admire everything that EDF stands for and its legal triumphs throughout the years, which have benefited the environment and human health.

Although my summer colleagues and I wished our world were not fighting a pandemic so that we would have had the opportunity to meet in person, my remote work at EDF was nonetheless a fulfilling experience. All the staff at EDF, including my supervisor, went above and beyond to make sure we got to know each other via team Zoom calls, Zoom bingo, and even Zoom paint and sip. The almost weekly educational Zoom panels and presentations were valuable. They focused not only on past and current laws and regulations, but also on strategies, for example, of specific ways of fishing that could make a huge difference in protecting our planet. I am immensely grateful that I was introduced to many aspects of environmental justice while at EDF.

While working with the energy team, I learned from attending one of NYSERDA's remote public hearings the extent of New York's ambition to achieve clean energy. I was asked to draft a potential public comment for my supervisor and although we did not submit the comment, the learning process was exciting and rewarding. The clean energy process for New York is still ongoing, and I am pleased that my research may assist my supervisor and EDF with their advocacy, especially in low-income and minority communities.

I appreciated the opportunity to use my legal training in the clean energy project and also in my personal life. My family and I are Mexican immigrants and were tenants in a multifamily home for many years. Everyone in my household was always too busy to stop and think about the environmental impact of our daily lives. The NYSERDA meeting made me realize how unaware I have been of the energy impact of home appliances. We had never considered the importance of replacing an old gas stove with a more efficient one. We were satisfied with a stove that worked so we could quickly cook our meals. I now realize the role homeowners will play in moving toward clean energy. I also learned about the efficiency of heat pumps. These experiences led me to understand just how much information I still need to learn about energy law and policy.

These assignments were my introduction to EDF's work and how it directly impacts the community. Although energy law was not my focus during law school, I enjoyed learning about a new field of environmental law. I learned some of the science, technical vocabulary, and law that comes with advocating for clean energy. My most significant project at EDF started as a general assignment, and as the summer went by it grew into several smaller research assignments. I focused on breaking down sections of the new Protecting Our Infrastructure of Pipelines and Enhancing Safety Act of 2020 for my supervisor and the Energy team. I quickly noticed that I was learning new things every day at EDF, which is my favorite part of the legal world. This means that throughout my legal career I will continue to accumulate knowledge. I also appreciated the efforts of my supervisor to give me helpful comments on my legal writing, which improved over the course of the summer.

My adventure last summer was everything I imagined and more working at EDF. I am grateful for the fellowship program. I learned that we can thrive economically and socially, while protecting our mother earth. Coming to the realization while at EDF that we really can coexist with nature and continue to thrive has been one of the best experiences of my life. I needed that vision to continue forward with my environmental law career.

New Unified Stormwater Rule in NYC: Why Now and What Developers Need to Know

By Karen Mintzer, Helen Mauch and Christine Morano

With the increasing frequency of intense rainstorms, there is a growing awareness among the general public of the need to manage stormwater during rainstorm events. In New York City, however, efforts by the New York State Department of Environmental Conservation (DEC) and the New York City Department of Environmental Protection (NYC DEP) to manage stormwater have been underway for years, and these efforts have most recently culminated in the adoption of the New York City's Unified Stormwater Rule (USWR) on February 15, 2022. The USWR applies throughout New York City to all development projects that involve the disturbance of 20,000 square feet or more of soil or the creation of 5,000 square feet or more of impervious surface, and to all projects requiring a new sewer connection. This article will discuss the recent history of stormwater management in the city and the requirements of the USWR.

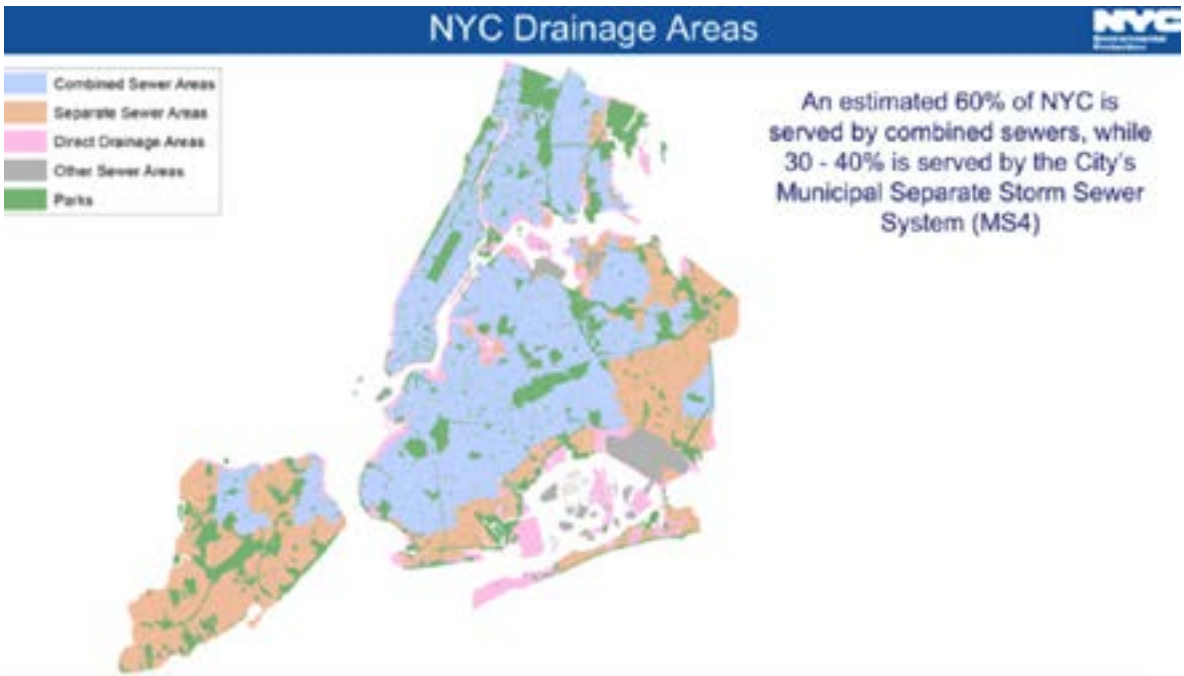
Background on Stormwater Management in New York City

The USWR is partially an outgrowth of requirements that were first imposed in 2019 by NYC DEP on the geographic areas of the city that were serviced by the city's municipal separate storm sewer system (MS4). The MS4, which covers approximately 30-40% of the city, collects and conveys stormwater through streets, ditches, catch basins and storm drains and ultimately directs runoff to local waterbodies. As stormwater flows over streets and other impervious surfaces, it collects pollutants that are ultimately discharged along with the stormwater. In 2015, as required under the federal Clean Water Act, DEC issued New York City its first MS4 permit. The permit requires the city to, among other things, reduce polluted stormwater runoff from its own property within the MS4 area and establish a construction and post-construction stormwater permit program to reduce polluted stormwater runoff from private development in the MS4 area.

Most of the remainder of the city that is not within the MS4 area is connected to a combined sewer system (CSS).[1] In a CSS, a single pipe carries both stormwater and sewage from buildings and this mix is ultimately conveyed to one of the city's wastewater treatment plants for treatment, during which contaminated sludge is removed and clean water is ultimately discharged into local waterbodies. During heavy rainstorms, the treatment plants are unable to handle the combined flow of stormwater and sewage, which often exceeds twice the design capacity of the treatment plants. As a result, a mix of stormwater and untreated sewage is discharged directly into the city's waterways—a combined sewage overflow (CSO).

The map below shows the various drainage areas within New York City, with blue representing areas within the CSS and orange representing areas within the MS4. Unsewered areas are represented in grey as "Other Sewer Areas."

In addition to the requirements of the MS4 permit, the city is subject to several ongoing consent orders with DEC that require the city to undertake various tasks to reduce



CSOs to improve the quality of the city's waterbodies. These tasks include making major upgrades to treatment plants, long term planning to monitor and control CSOs, and green infrastructure projects. However, controlling runoff from its own property and increasing the capacity of its water treatment plants will only take the city so far in tackling the negative impacts on water quality from both CSOs within CSS areas and polluted runoff within the MS4 area. With heavy rainstorms becoming more common, the challenge of managing stormwater in both MS4 and CSS areas is not going away. The USWR is a citywide approach to address this problem.

The USWR—Applicability and Requirements

The USWR sets uniform, citywide rules applicable to private property within the MS4 and CSS areas (i) for construction and post-construction stormwater practices to manage water quality and (ii) for volume requirements and maximum stormwater release rates for ***all*** new sewer connections in order to maintain optimal stormwater quantity and flow rates.[2] With the USWR, the city is stepping up requirements only recently applicable to development in the MS4 area and applying these stepped-up requirements to MS4 and CSS areas, with the goal of reducing negative impacts from stormwater overflow.

Under the USWR requirements set forth in Chapter 19, projects in the MS4 and CSS areas that involve either a soil disturbance of 20,000 square feet or more or the creation of 5,000 square feet of impervious surface must obtain a NYC DEP stormwater construction permit. To obtain a stormwater construction permit, the project must have a stormwater pollution prevention plan (SWPPP). Depending on the type of project, the SWPPP will have to include stormwater management practices (SMPs) to meet up to four requirements: Erosion and Sediment Controls (always required); Water Quality; Runoff Reduction; and No Net Increase of certain pollutants of concern. For example, the SWPPP for a commercial development project, institutional development such as a hospital, school or university, or an industrial development must have SMPs to meet Erosion and Sediment Controls, Water Quality and Runoff Reduction requirements during construction and then continue the Water Quality and Runoff Reduction stormwater practices post-construction. However, the SWPPP for a project involving the establishment of vegetated open space, or road construction disturbing less than one acre, for example, would only need SMPs to meet Erosion and Sediment Controls during construction.

Where Water Quality SMPs are required, infiltration and retention requirements must be satisfied in a hierarchy dictated by the NYC DEP's Stormwater Design Manual.[3] Under the hierarchy, vegetated retention practices, such as green roofs, rain gardens, vegetated swales, or constructed wetlands, must be used to the maximum extent practical. Where vegetated retention practices are not possible or cannot fully manage stormwater volume due to site constraints (e.g., soils with low permeability, soil contamination that would increase the risk of runoff contamination, or surface constraints such as land use rules requiring the use of paved surfaces), then non-vegetated retention practices must be used to the maximum extent possible. Non-vegetated retention practices include rain barrels, cisterns, permeable pavement, or sand or organic filters. The infeasibility of vegetated retention practices must be documented in the SWPPP. In cases where both vegetated and non-vegetated retention practices are not possible to meet runoff reduction requirements (as documented in the SWPPP), any remaining requirements for runoff reduction in CSS areas must be met using either vegetated or non-vegetated detention practices (e.g., constructed wetlands, ponds, detention tanks), and any remaining requirements for runoff reduction in MS4 areas must be met by using either vegetated or non-vegetated treatment practices (e.g., constructed wetlands, porous pavement, synthetic turf, sand or organic filters, ponds, or other systems with treatment capability).

Under Chapter 31, when a project proposes a new sewer connection, or New York City's building code requires a house or site connection, the project must be able to certify that it can provide specified stormwater detention volume and maximum stormwater release rates, which differ depending on whether the project is in a CSS or MS4 and involves a house connection or an entire site connection. Notably, the green infrastructure SMPs used to meet SWPPP requirements under Chapter 19.1 may achieve the detention volume and release rates required for a new sewer connection.

For a project that requires both a stormwater construction permit and a new sewer connection, the applicant must submit a SWPPP approval application to NYC DEP's Bureau of Environmental Planning and Analysis (BEPA). At the same time, the applicant must submit a Site Connection Proposal to NYC DEP's Bureau of Water and Sewer Operations (BWSO). Upon approval of the SWPPP and approval of the Site Connection Proposal certification, the applicant may apply to BEPA for a stormwater construction permit. Once BEPA grants a stormwater construction permit, construction may begin, and the applicant may thereafter apply to BWSO for a Site Connection Permit. Once that permit is granted, site connection work may begin. For projects with SWPPPs that require post-construction stormwater management practices, the applicant must apply for a post-construction permit supported by an as-built plan, and an operation and maintenance manual that designates the entity that will be responsible for the long-term maintenance of the SMPs set forth in the SWPPP. In addition, property owners may have to grant a maintenance easement to NYC DEP to allow the agency to inspect to determine compliance. Thereafter, the owner of the property must submit an annual certification to NYC DEP showing that the SMPs are being maintained and the post-construction permit must be renewed every five years. Note that while the NYC DEP is now the primary regulator of storm-

water within New York City, there remain some additional DEC stormwater requirements associated with construction activities that must be followed as well.

Conclusion

With the new USWR, some of the burden of managing New York City's stormwater is placed on the private sector. There is no longer a free pass for development in CSS areas. Private development projects in both MS4 and CSS areas must now meet stormwater management requirements during construction and post-construction to varying extents depending on the type of project and its location, and all projects requiring a new sewer connection must meet specified stormwater detention volume and maximum stormwater release rates.

Karen Mintzer and **Helen Mauch** are partners at Mintzer Mauch PLLC. **Christine Morano** is a law student clerk at the firm.

Endnotes

1. A small percentage of land within the city is a direct drainage area, meaning that stormwater flows over the land directly to surface waters. In addition, another small percentage of land within the city is unsewered, within private dry wells and septic systems.
2. The New York City Department of Environmental Protection's Unified Stormwater Rule is set forth within Title 15, Chapters 19.1 and 31 of the Rules of the City of New York.
3. NYC DEP, *New York City Stormwater Design Manual* (2022), https://www1.nyc.gov/assets/dep/downloads/pdf/water/stormwater/ms4/stormwater-manual-final.pdf.

Professor William R. Ginsberg Memorial Essay Contest 2021 Winners

We are pleased in this issue to feature the first- and second-place winners of the 2021 Professor William R. Ginsberg Memorial Essay Contest. In this 34th holding of the annual competition, two essays tied for first place, two essays tied for second place, and two essays tied for third place. The contest is open to all J.D. and LLM candidate students enrolled in a New York State law school. First place winners receive a $1,000 prize, second place winners will receive a $500 prize, and third place winners receive $250.

First Place (tie)

Ian Bennett, Columbia Law School

"Mitigating the Next Disaster: Strengthening the U.S. Chemical Safety and Hazard Investigation Board" *(see page 31)*

Andrew Shifren, Columbia Law School

"A Local Solution for a Global Problem: Technology-Forcing Municipal Ordinances to Promote Enhanced Efficiency Fertilizers" *(see page 46)*

Second Place (tie)

Adam Herron, Albany Law School

"Climate Change and the Water Trap: Considering Western Water Policy Through Socio-Ecological Trap Theory" *(see page 59)*

Susana Kondic, Columbia Law School

"Is a New York Carbon Tax Doomed Under the Dormant Commerce Clause?" *(see page 70)*

Third Place (tie)

Luther Caulkins, Columbia Law School

"Funding and Facilitating Participation at FERC: How Section 319 of the Federal Power Act Will Affect Grassroots and Technocratic Participation in FERC Proceedings"

Robert O'Connor, Elisabeth Haub School of Law, Pace University

"Returning the Power to the People: Addressing Discriminatory Siting by Expanding Regional Cooperation in New York State"

First Place (tie)

Mitigating the Next Disaster: Strengthening the U.S. Chemical Safety and Hazard Investigation Board

By Ian Bennett

This article draws attention to an agency overlooked by the legal community: the U.S. Chemical Safety and Hazard Investigation Board (CSB), which investigates industrial chemical accidents and provides recommendations to reduce the risk of future accidents. The CSB was harmed by an internal scandal in 2014 and the Trump administration more recently, but the CSB has an essential role in preventing chemical disasters. Its work is crucial, especially because climate change has increased the frequency of technological disasters caused by natural disasters (natechs), such as the Arkema plant explosion following Hurricane Harvey. This article assesses the CSB, compares its structure with like agencies in other countries, and argues that strengthening the CSB is essential to mitigating future chemical and natech disasters.

Introduction

The United States has an agency that works to prevent chemical disasters. It is an agency that costs millions of dollars but—for each major disaster its advice prevents—saves billions.[1] This agency fills a gap that exists in most regulatory structures,[2] and it is needed now more than ever because of the new dangers posed by a changing climate.[3] But five years ago, a scandal rocked the agency; a single chairperson occupies its five-member board, and its staff of highly trained experts is full of new recruits.[4] This agency is the U.S Chemical Safety and Hazard Investigation Board (CSB), and it must be rebuilt to bring chemical safety to America.

The CSB is an independent federal agency charged with investigating industrial chemical accidents and issuing recommendations to prevent future disasters.[5] And chemical safety has never been more crucial. Climate change is increasing the frequency of natural disasters and industrial plant accidents.[6] The European Union has coined the term "natech" to describe technological disasters caused by natural disasters.[7] In the United States, examples of these disasters include the Arkema Chemical plant explosion caused by Hurricane Harvey in 2017[8] and the Biolab chemical plant fire caused by Hurricane Laura in 2020.[9]

Despite the risks posed by climate change and the general hazards of chemical production, the CSB itself has been threatened. The Trump administration reduced the CSB's board to a single member,[10] called four times for the CSB to be eliminated, and proposed to scrap its budget entirely;[11] this has created a backlog of work that persists into the Biden administration.[12] The CSB has a tumultuous past that has belied the potential of its strong agency structure.[13] Even so, the CSB's recommendations have had a widespread impact on the chemical industry. Legal literature has largely ignored the CSB,[14] and this article will remedy that gap by analyzing the agency's effectiveness and recommending steps to strengthen the CSB's ability to mitigate disaster.

The CSB has investigated major industrial accidents that have cumulatively, and often individually, cost the United States billions of dollars.[15] Beyond the economic damage, chemical accidents have resulted in over 500 fatalities and 7,000 hospitalizations in the past decade.[16] When the CSB's work prevents a single major accident, it pays for its less than $12 million budget many times over.[17] Yet, there have been no reviews in legal academia of the agency since it began operating in 1998.[18] Early observers wrote about the CSB's slow start.[19] Legal[20] and scientific[21] academia frequently discuss the CSB's reports and recommendations. And occasionally, more extensive agency reviews cover the CSB.[22] But there have been no pieces focused on the CSB as an agency and its impact.

Part I of this article addresses the CSB's structure, operations, and regulatory power. It also presents a case study: the CSB's investigation and report after the hurricane-caused Arkema plant explosion near Houston, Texas. Part II reviews the CSB's recommendations and their effects. It attempts to assess the past two decades of the agency's operations and determine what has gone well

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and what has gone poorly. Part II will also look to other agencies in the United States and abroad to contrast the CSB with alternative hazard investigation organizations. Part III recommends different pathways to improve the agency.

I. Hazard Investigation's Impact on Chemical Safety

This Part will examine how Congress structured the CSB and how that structure has set up the agency to drive industrial chemical safety, despite its administrative and financial issues.[23] Section I.A describes the Congressional intent behind the design of the CSB to fill an investigation gap between regulators and the chemical industry. It also discusses how the CSB operates and how the chemical industry has responded to the CSB's role. Section I.B lays out the CSB's investigatory work using the Arkema plant fire as a case study. Section I.C introduces the effects of climate change and the risks that extreme weather events pose to the chemical industry to emphasize the need for chemical disaster mitigation.

A. The Independent Investigatory Agency

The CSB was a last-minute addition to the 1990 Clean Air Act Amendments, a response to the "World's Worst Industrial Accident" in Bhopal, India, 1984, which exposed over 600,000 people to 30 tons of toxic methyl isocyanate gas, killing 15,000.[24] To avoid repeat preventable accidents, the CSB conducts root cause investigations of and issues recommendations based on chemical incidents at fixed industrial facilities as well as more general investigations.[25] It is modeled after the National Transportation Safety Board (NTSB), an older agency that investigates transportation accidents.[26] The CSB does not assign blame for accidents but instead evaluates the causes of accidents, including chemical industry regulations.[27]

The CSB was the first independent chemical hazard investigation agency worldwide and has been celebrated as a model structure.[28] After the Clean Air Act passed, the CSB had a slow start: President Bush first nominated board members to the CSB in 1992, but they were never confirmed by the Senate.[29] President Clinton eventually nominated and had confirmed four board members in 1994, but they languished, doing nothing until the CSB secured full funding in 1998.[30] Currently, the CSB receives $12 million per year,[31] a drop against the EPA's yearly budget of $9 billion.[32] Most of the CSB's funding goes to its staff of 47 employees, half of whom are investigators.[33]

1. The CSB's structure

Congress created the CSB under the 1990 amendments to the Clean Air Act to investigate, determine, and report the cause of any serious accidental chemical release.[34] The CSB has the authority to regulate accident reporting but no other regulatory power.[35] The CSB's primary powers are to investigate accidental chemical releases into the ambient air and propose rules or orders for the Environmental Protection Agency (EPA) and Occupational Health and Safety Administration (OSHA) to enact. The EPA's Administrator and the Secretary of Labor must formally respond to CSB recommendations within 180 days.[36] The CSB also makes recommendations individually to other agencies and non-federal entities.[37] The CSB's five members are "appointed on the basis of technical qualification, professional standing, and demonstrated knowledge."[38] Their qualifications are essential as safety investigations are a highly technical enterprise.[39] The CSB is also unique in its independence; most hazard investigation agencies worldwide exist under the umbrella of a regulator, equivalent to the EPA or OSHA, although agencies similar to the CSB have emerged recently.[40]

Congress considered the independence of the CSB and its lack of regulatory authority as they structured the agency.[41] Before the CSB existed, if an industrial accident resulted in an employee's death or severe injury, the regulating agency, usually OSHA or the EPA, or the company—the parties most responsible for the accident—conducted the investigation. Congress realized that, for two reasons, the independence of the CSB from the regulators would be essential to its hazard investigation and prevention function. First, Congress determined, "it is unlikely that an agency charged both with rule-making and investigating functions would be quick to acknowledge that existing requirements were insufficient to prevent an accident."[42] Second, the CSB is "intended as an organizational stimulus to an appropriate amount of regulatory activity by the Environmental Protection Agency."[43] Under the amendments to the Clean Air Act, Congress gave the EPA additional authority to issue industry requirements to prevent accidents, but they worried if this power were discretionary, without stimulus from an agency such as the CSB, that the EPA would not use its authority.[44]

2. CSB investigations and industry expectations

The CSB has conducted more than 130 deployments and issued more than 800 recommendations over the past two decades.[45] It has broad authority to investigate any accidental chemical release that causes a fatality, serious injury, or substantial property damage.[46] High consequence chemical incidents result in billions of dollars of damage, disruption to local economics, and loss of life.[47] The CSB has often justified its own existence on economic grounds because if its "safety lessons prevent one catastrophic event, the costs avoided from damage . . . and loss of human life far outweigh the agency's annual budget."[48] The CSB believes "[s]trong safety programs are critical for the economic success of the many industries that use hazardous chemicals" because "[i]f we do not learn from previous incidents, Americans will continue to spend billions of dollars responding to new ones."[49]

Despite the Trump administration's persistent negative sentiment towards the CSB, the chemical industry overwhelmingly supports the agency's work.[50] One example of industry support is the lobbying effort by the American Chemistry Council (ACC) to keep the CSB operational.[51] The ACC is an organization that lobbies on behalf of chemical companies, including nearly every American company in the world's top fifty largest chemical producers.[52] In January 2020, executives of the ACC, the United Steelworkers Union, and the American Institute of Chemical Engineers testified to the value and importance of the CSB's work: "We believe that the CSB plays a critical role in keeping Americans safe and strengthening the performance of our industry."[53] Occasionally, the CSB may draw the ire of individual companies for its public safety advocacy and disclosures,[54] but the Trump administration was out of sync with industry desires in its attempt to eliminate the agency.[55]

B. Case Study: Hurricane Harvey

The CSB's most important work is to investigate chemical incidents and produce recommendations to mitigate the damage of future disasters. This section will review the CSB's investigation into the Arkema Plant Fire and subsequent recommendations as a case study. Hurricane Harvey is an example of a natech: a technological disaster created by a natural hazard.[56] Climate change has increased the frequency and severity of natural disasters, and the CSB's recommendations are America's first steps to mitigating future natechs.[57]

To conduct their hazard investigations, CSB investigators gather testimony from various witnesses; they collect, examine, and test chemical samples, equipment, and other physical evidence; they may also conduct community meetings to discuss preliminary findings and gather local testimony.[58] The investigators then draft a formal written report to present to the CSB board members to finalize.[59] The report considers all factors that may have led to a major incident: inadequate process design, training, maintenance, or engineering controls; or gaps in regulations or oversight.[60] The report contains recommendations based on the root causes of the accidents, and its purpose "is to do everything possible to make sure that similar accidents do not occur in the future."[61]

1. The Arkema disaster

Hurricane Harvey was the worst ever flood-producing storm in the United States.[62] On August 25, 2017, it hit Houston and southeast Texas as a Category 4 hurricane and poured down 30 to 50 inches of rain over the next five days.[63] The 24.5 trillion gallons of rainwater that fell across southeast Texas flooded 80,000 homes with at least 18 inches of floodwater and over 23,000 homes with more than five feet of floodwater.[64] The flood generated by Harvey catalyzed a series of events that caused an explosion and several injuries at a chemical plant. The CSB's investigation provides an understanding of what went wrong.[65]

The Arkema Inc. facility in Crosby, Texas, was one of nearly 3,000 chemical facilities in Harris County, population 4.7 million, where Houston is located.[66] It manufactured and stored organic peroxides, a class of materials that will self-combust if not kept below their Self-Accelerating Decomposition Temperatures.[67] The peroxides were stored in -20 ºF Low-Temperature Warehouses, but once the hurricane arrived, the rapidly rising floodwaters forced the ride-out crews to begin powering off the warehouses.[68] Arkema had refrigerated trucks available, and the crews successfully transferred 10,500 containers (350,000 pounds of product) into the refrigerated trucks, but too late.[69] The water became impassable and Arkema had to abandon three of nine trailers.[70] On the morning of Tuesday, August 29, 2017, four days after Hurricane Harvey hit Texas, Arkema called local emergency response and requested they evacuate the ride-out crew.[71] Arkema provided emergency responders with telemetry for the refrigerated trucks and told them they were in danger of losing power and that the peroxides would self-combust within a few days.[72]

Emergency responders implemented a 1.5-mile evacuation zone around the facility.[73] Unfortunately, Highway 90 was not closed until the last minute because of other ongoing hurricane relief and rescue needs, which exposed five police officers to chemical smoke when the trailers eventually caught fire.[74] The first low-lying trailer combusted on August 30, and the other two ignited on September 1.[75] On September 3, emergency responders entered Arkema and conducted a controlled burn of the six remaining organic peroxide trailers.[76] The incident resulted in multiple civil lawsuits and one criminal indictment,[77] although Arkema was acquitted of all criminal charges.[78] The civil plaintiffs plead damages for exposure to noxious smoke that caused difficulty breathing, headaches, and nausea, as well as property damage.[79] The civil lawsuits were consolidated and transferred to a Harris County district court in late 2020.[80]

2. The CSB's Arkema investigation recommendations

The above information comes from the summary portion of the CSB's Arkema investigation report. The report itself is a 154-page, in-depth analysis of all aspects of the incident:[81] CSB investigators examined all equipment and chemicals at the facility. They looked at flood information, flood design, existing flood planning guidance from various sources, and other major flooding incidents. They conducted a regulatory analysis of current OSHA and EPA rules and compared them to the European Union's approach. They researched natech risk best practices.[82] And finally, CSB investigators summarized their analysis with key recommendations. This section focuses on the CSB's recommendations because they are pertinent to the agency's primary power. But it is worth reflecting on the depth of information in the CSB's reports.

The CSB issued safety recommendations to the Arkema Crosby facility, Arkema Inc., the American Institute of Chemical Engineers Center for Chemical Process Safety (CCPS), and to officials of Harris County, Texas.[83] The CSB also reiterated a recommendation to the EPA to revise the Accidental Release Prevention Requirements, 40 C.F.R. § 68.[84] To the EPA, the CSB re-recommended that it revise its accidental release reporting requirements to include reactive hazards.[85] The CSB had previously issued this recommendation in 2002 and reminded the EPA of it in 2014.[86] The CSB believes that if Arkema had been required to identify the hazards associated with reactive chemicals, it might have identified the causal chain that led to this incident and prevented it from occurring.[87] Regulatory recommendations to the EPA by the CSB are an ongoing source of tension between the two agencies and are addressed more fully in Part II.[88] The EPA has still not acted on this recommendation.

CCPS, Arkema, and Harris County all responded promptly to their recommendations from the CSB. CCSP developed comprehensive guidance based on the report's recommendations to help all companies assess their United States' facilities risk from extreme weather events,[89] guidance that the CSB showcased was lacking in the United States.[90] Arkema developed a corporate policy for periodic natural hazard assessment to be conducted at all of its facilities that handle highly hazardous chemicals.[91] Harris County updated its existing protocols and revised its training curricula so that its first-responders will be prepared to respond to emergencies involving chemical disasters in the future.[92]

C. Climate Change and the Chemical Industry

Climate change has severe consequences for human health and welfare. Extreme weather and climate-related disasters have killed over 410,000 people in the past decade.[93] Another 1.7 billion people survived these disasters but have had their lives and livelihoods affected, straining the global humanitarian system.[94] Extreme-weather related disasters have cost the U.S. over $450 billion in the last three years alone.[95] Chemicals also pose a large risk to human health that is compounded by natural disasters. Chemical exposure kills over one million people per year,[96] and an estimated 2-5% of accidental exposures to chemicals are caused by "natural hazard events."[97] Natural hazard-caused exposures are likely to be underestimated because there is a lack of low-consequence accident reporting.[98] Natech disasters, technological failures caused by natural events, bring together climate disasters and the hazardous nature of chemicals and are becoming more likely as climate change worsens.[99]

There is no systematic tracking of natech accidents, which makes calculating natech trends difficult.[100] In the United States, there has been an increasing number of natechs, and growing evidence worldwide indicates natechs are on the rise.[101] The trend in natural disasters, however, is clear: natural disasters are increasing in frequency and severity.[102] In the past decade, there have been nearly 3,000 disasters triggered by natural hazards, and the overwhelming majority of them (83%) were caused[103] by climate- and weather-related events.[104] Logic dictates that the number of natech disasters will rise with the increase in natural disasters.[105] Several countries have implemented risk control regulations for natechs.[106] For example, the European Union's Seveso Directive, legislation on the prevention of major accidents involving dangerous substances, requires industrial companies to routinely identify and evaluate environmental hazards.[107] Some states have adopted legislation to address specific environmental hazards, such as the California Accidental Release Prevention Program's inclusion of earthquake risk, but unlike the EU, there is no overarching safety directive in the United States to address natechs.[108]

The CSB's work is essential to preventing future natech disasters in the United States. The CSB believes that if the EPA had acted on its Improving Reactive Hazard Management Investigation recommendation, the Arkema disaster might never have occurred.[109] Likewise, there was no robust flood risk guidance for industry in the United States before 2017.[110] But because the CCPS acted on the CSB's recommendation to create flood guidance, American industry has an expert resource they can rely on to prevent flood-related natech incidents at their facilities.[111] In 2020, the CSB launched an investigation into the natech caused by Hurricane Laura at BioLab's Lake Charles, Louisiana facility, which will yield more understanding and recommendations to prevent future disasters in the United States.[112]

II. State of the Chemical Safety and Hazard Investigation Board

The CSB has not been a favored agency. During the Clean Air Act's 1990 amendments, the Senate Committee on Environment and Public Works called the CSB the "most important" element of its proposal to reduce accidental releases.[113] Yet it took eight years from the CSB's creation for it to receive funding,[114] and recently, the Trump administration has placed its funding in jeopardy each fiscal year.[115] Further, there has been a lack of legal scholarship surrounding the CSB to support and critique its work.[116] This gap is amiss, however, because the CSB, although small, has made recommendations with enormous consequences for the entire chemical industry and the safety of communities near chemical plants.

This Part analyzes the CSB's past two decades of work: Section II.A will explore the CSB's recommendations for their long-term impact, focusing on recommendations to the EPA and OSHA, and it will look at the CSB's impact on hazard prevention and mitigation. Section II.B will produce an assessment of the CSB over the past two decades, looking at what went well and what went poorly. Finally,

section II.C will compare the CSB, the NTSB, chemical hazard investigation in other countries.

A. CSB Recommendations

When the CSB has the capacity to investigate an incident,[117] it has effectively driven the chemical industries' stakeholders to change. Congress intentionally did not give the CSB regulatory power, but despite that, more often than not, the chemical industry and OSHA follow the CSB's recommendations.[118] Although the Senate believed the CSB would focus its recommendations on the EPA and OSHA and state and local agencies,[119] the CSB issues recommendations to many different stakeholders, including government entities, safety organizations, trade unions, trade associations, corporations, emergency response organizations, educational institutions, and public interest groups.[120]

The CSB has completed 102 investigations, issued 841 recommendations, and closed 84% of them.[121] The CSB closes its recommendations when it has verified (1) the recommendee implemented the recommended action, (2) the recommendation is no longer applicable, or (3) the response was unacceptable, but the CSB cannot persuade the recommendee otherwise.[122]

For an agency that lacks enforcement authority, the CSB's recommendations are incredibly powerful.[123] Of the CSB's 841 recommendations, 83% (701) have been closed.[124] Of the closed recommendations, 82% (572) have been implemented as recommended, 19 actions actually exceeded the CSB recommendations, and 79 recommendations are no longer applicable or were reconsidered.[125] Only 4% (31) of the 701 closed recommendations have been ignored or implemented below a standard the CSB considers acceptable.[126]

In 2016, CSB highlighted six key recommendations it has made over the years to demonstrate the effects of its work.[127] For example, in response to the CSB's Dust Hazard Investigation, which ended in 2006, OSHA enacted a Special Emphasis Program on dust hazards in industry.[128] OSHA enacted four of the CSB's recommendations and continues to regulate combustible dusts in industry.[129] From 2009 to 2018, there was an average of 8.5 grain dust explosions per year, which is the lowest average in the last forty years.[130] Other highlights included having the International Code Council implement safe pipe cleaning methods to prevent natural gas explosions, getting New York City to revise its Fire Prevention Code for safer storage of hazardous materials, and working with the Accreditation Board for Engineering and Technology to add reactive hazard awareness to the chemical engineering undergraduate curriculum across the United States.[131]

The EPA and OSHA are the federal agencies Congress expected to cooperate most closely with the CSB;[132] Congress expected the CSB to drive the EPA and OSHA to regulate using the powers given to them in the Clean Air Act.[133] The CSB has recommended 25 actions to the EPA and 42 actions to OSHA.[134] The EPA has only implemented nine CSB recommendations, although the CSB has closed 15 EPA recommendations.[135] The EPA has only taken two regulatory actions in response to CSB recommendations, which is underwhelming given Congress's intent behind the CSB.[136] First, the EPA modified the 40 C.F.R. § 264.37 emergency planning requirements to ensure emergency responders know the type, approximate quantities, and locations of materials within the facility.[137] Second, beginning in 2013, the federal EPA participated in the California EPA joint regulatory program that the CSB recommended to coordinate oversight of oil refineries following a fire at a Chevron Plant.[138] Other recommendations the EPA has followed include issuing guidance documents, safety alerts, and participating in an investigation of reactive chemical process safety conducted by the CSB.[139]

OSHA is far more receptive to the CSB's recommendations. Out of the 42 recommendations they've received, OSHA has never failed to respond to the CSB.[140] OSHA has acted on 18 CSB recommendations, including many that required regulatory actions.[141] OSHA has revised its Chemical National Emphasis Program, implemented an emphasis program for oil refineries, strengthened enforcement of the OSHA Process Safety Management standard, revised its Hazard Communication Standard and translated it into multiple languages, and issued a Regional Emphasis Program of the Explosives and Blasting standard.[142]

B. An Assessment of the CSB

The CSB's primary goal is to investigate and understand the root causes of chemical accidents and, through knowledge, make recommendations and prevent future disasters.[143] When the CSB has performed investigations and made recommendations, it has been successful at accomplishing its mission. The CSB has been, however, chronically underfunded and had a leadership crisis in 2014 that led to experienced investigators and staff leaving the agency.[144]

1. What's gone wrong?

Historically the CSB has not even come close to investigating all the incidents that are within its purview. The 2016 report of the EPA OIG found that the CSB has *not* investigated at least 90% and as high as 98% of accidents with fatalities in the prior five years.[145] The CSB's enabling statute dictates the CSB "shall investigate . . . any accidental release resulting in a fatality, serious injury or substantial property damages."[146] The CSB is, therefore, not meeting its statutory duty, as the 2016 EPA OIG report notes.[147] Before 2013, the CSB incorrectly believed it had the discretion to select the accidental releases it investigates,[148] but since then, it has been unable to correct the issue because of its perpetual funding and staffing shortage.[149] Investigating more accidents while maintaining the thoroughness of its reports is a critical challenge for the CSB that might only be solved by more funding from Congress.

The CSB's funding issues have also delayed the implementation of another CSB duty. The Clean Air Act requires the CSB to promulgate accidental chemical release reporting regulations and to make accidental release reports available to the public.[150] The CSB solicited comments on a proposed rule in 2009 but never promulgated regulations.[151] In 2019, four environmental non-profits sued the CSB based on their lack of access to information because of the CSB's failure to make regulations.[152] The D.C. district court judge noted that "the CSB's only justification for its inaction is that it is 'a small agency with very limited resources' that has 'prioritized its investigatory activities over [] rulemaking,'" and held the CSB in violation of the Administrative Procedures Act for unlawful delay of the rule.[153] The CSB responded to the judgment with the promulgation of the Accidental Release Reporting rule, which became effective in March 2020.[154] It is problematic that the CSB has been so underfunded that it needed to be sued to create regulations it was mandated to by statute,[155] but the rule itself benefits the public.

The CSB is still recovering from a 2014 leadership crisis that resulted in the departure of many of the CSB's experienced staff. It also resulted in a congressional investigation and a damning report. The man at the center of the controversy was then-CSB Chairperson Rafael Moure-Eraso, appointed by the Obama administration in 2010.[156] The House Oversight and Government Reform Committee investigated the CSB and found that a "toxic work environment resulted in the departure of at least nine experienced CSB employees (almost 25 percent of its staff)."[157] Moure-Eraso was a longtime academic, a faculty member at the University of Massachusetts, Lowell, for 22 years before his appointment to the CSB.[158] The House Investigative Committee found his leadership style was "bullying" and "abusive."[159] It led to the resignation of experienced investigators, demoralized staff, and slowed down investigations.[160] He tried to unilaterally control board decisions and override the other members of the board.[161] He also tried to fire and replace the CSB's General Counsel for advising the board members that Moure-Eraso could not ignore their directives.[162] Moure-Eraso was removed when his actions came to light, but the CSB lost many seasoned investigators and was left in complete disarray.[163]

2. What's gone right?

When the CSB has the capacity to investigate accidents, the work it performs is commendable.[164] The CSB's success results in accidents avoided, so it can be difficult to quantify, but accidents and fatalities reported to the CSB have been declining over the past decade.[165] The CSB has completed 102 investigations and issued over 800 recommendations. The vast majority, nearly 600, of the CSB's recommendations have been implemented as the CSB recommended or even exceeding the CSB's recommendations.[166] The CSB has had a substantial impact on OSHA and a moderate impact on the EPA. The CSB is succeeding in taking a secondary look at regulations and making honest comparisons with better practices both in the United States and internationally.[167]

The Accident Reporting Rule discussed above is an essential tool for understanding the scale of chemical incidents in the United States. As such, the fact that CSB has promulgated the rule is a success, despite the fact that it took a judicial order to get it promulgated. The CSB used to investigate accidents primarily based on media reports, which is, unfortunately, how many agencies worldwide come by their data on the number of chemical incidents.[168] This approach only captures severe chemical accidents and leaves murky the actual dangers to workers. The CSB also used the National Response Center (NRC) data, which forwards chemical spills to them;[169] the CSB's database contains 1,923 chemical accidents that occurred between January 1, 2009, and July 15, 2019, but only 13% of the accidents the CSB identified through other means were reported to the NRC.[170] The CSB's Accident Reporting Rule will hopefully usher in the clarity required to understand what progress has been made in chemical safety.

C. The CSB, NTSB, and Other Countries: A Comparison

The CSB often compares American regulations and guidance to international regulations in its efforts[171] and it is useful to compare the United States chemical safety regime to international chemical safety organizations.[172] It is also useful to compare the CSB to the NTSB.

1. Comparing the CSB to the NTSB

The CSB is modeled on the National Transportation Safety Board, which is ten times larger and one of the most respected federal agencies.[173] The CSB is to OSHA what the NTSB is to the Federal Aviation Administration.[174] As directed by its enabling statute, the CSB set up a memorandum of understanding with the NTSB to prevent their performing duplicative investigations.[175] The NTSB is the lead agency for investigations into transportation-related accidental releases, and the CSB defers to the NTSB to investigate unless the NTSB requests its technical expertise.[176] The CSB's jurisdiction is in larger, fixed-facility chemical accidents involving the production, processing, handling, and storage of chemicals.[177]

A 2006 comparison showed the NTSB investigated 250 times as many accidents as the CSB with a budget only eight times larger.[178] The NTSB often relies on other agencies' investigative capacity, local officials, and emergency response.[179] A detailed examination of the structure and function of the NTSB observed five major factors that characterize the agency's success: "(1) [T]he governance structures that give rise to the agency's impartiality and singular focus; (2) the investigative 'Go Team' as a cohesive unit; (3) the collective intelligence of the NTSB's 'party system'; (4) effective media relations; and (5) employee satisfaction."[180] The "party system" involves designating "other organizations and external parties to participate in

[the NTSB's] investigations" so the NTSB can "focus on its core competencies of managing complex investigations and developing theories from myriad facts and data sources" because of "the resource constraints of the agency."[181] The "Go Team" is a team of several forensic engineers with different specialties who travel with a senior investigator to an accident scene as soon as the agency has notice of an accident.[182] The CSB can also quickly respond to chemical incidents, but uses internal expertise rather than external partners.

2. Comparing the CSB to hazard investigation agencies abroad

Countries investigate accidents in different ways, with many investigating accidents Destruction of Capital Based on Purchase Category through multiple bodies like the United States.[183] Some have investigative agencies like the CSB and the NTSB.[184] In some places, private companies perform their own accident investigations, and regulators only conduct investigations for enforcement purposes. In some countries, such as the U.K., the purpose of the investigations is to prosecute companies who have caused accidents.[185] In contrast, the CSB's recommendations and findings cannot be used for prosecutorial purposes, although its investigations themselves are likely admissible in court.[186]

The European Commission, the executive branch of the European Union, operates the Joint Research Centre (JRC), including the Major Accident Hazards Bureau, as part of the Seveso Directive, recent legislation to prevent major industrial accidents.[187] The JRC is not an investigative agency but aggregates data from EU member states and "focuses on lessons learned studies to understand causes and trends in industrial accidents in the EU and worldwide as an aid to enforcement and monitoring national authorities."[188] There is, however, no worldwide database of shared knowledge and lessons learned from industrial accidents.[189]

The Swedish Accident Investigation Authority (SHK),[190] the Finnish Safety Investigation Authority (SIA),[191] and the Dutch Safety Board,[192] might be the only investigative agencies analogous to the CSB worldwide.[193] But these agencies are mixed responsibility and have the authority to investigate transportation accidents, accidental releases, and other incidents. Both the Finnish and Swedish accident investigations authorities primarily report investigations into transportation accidents, although both are legally mandated to investigate all major accidents. Sweden, for example, only investigated transport or military related incidents in 2017, 2018, and 2019.[194] The Finnish SIA has only ever investigated three industrial incidents.[195] Other European nations, such as the United Kingdom, have an investigatory body but fail to use it[196] and instead rely on their companies to investigate their own accidents.[197]

There are a few main differences between the CSB and the SHK, SIA, and the Dutch Safety Board. The Finnish SIA and Dutch Safety Board both have a broader scope than the CSB. Besides transportation and industrial accidents, the SIA, for example, often investigates major fires in houses, schools, and hospitals and has even investigated structural failures and shootings.[198] The Dutch Safety Board is authorized to "conduct investigations in nearly every area and sector," including transportation, chemical industries, construction, health care, and military incidents at the Dutch Ministry of Defense.[199] In Sweden, SHK investigations are comprised of a chairperson (who is a former judge) and an investigator-in-charge, along with internal and external specialists as required.[200] The SHK brings a member of the regulating authority to observe without being a part of the investigation team.[201]

The CSB could learn from the European investigation agencies, and likely the opposite is true as well. The European agencies have a wide jurisdiction, whereas the CSB is limited to investigating accidental chemical releases under the Clean Air Act, which means only chemical emissions into the ambient air.[202] Congress could immediately expand the CSB's jurisdiction to accidental chemical releases to water. The CSB's investigative skillset is readily applicable, and the reasons Congress created a non-regulatory investigative body for chemical emissions to air hold for chemical spills. The CSB could also look at the Swedish example of bringing a member of the regulating body, e.g., the EPA, to foster a greater understanding of the CSB's recommendations and improve cooperation between the agencies.

III. Improving Chemical Safety Through Hazard Investigation

Agencies and inspectors have been calling for improvements in management and oversight of the CSB almost since its inception. In 2004, the appointed Department of Homeland Security inspector to the CSB reported, "The CSB's statutory and legislative history suggest that the CSB has a broader responsibility to study whether and how chemical accidents can be prevented."[203] The inspector made 11 recommendations to strengthen the CSB, some of which have only been implemented as recently as 2020.[204]

This Part will discuss how various interventions from Congress and the executive branch could strengthen the CSB. Section III.A will suggest provisions to improve the CSB that Congress could include in the Biden administration's anticipated climate change actions.[205] Preventing natech disasters is an essential part of building "a stronger, more resilient nation."[206] Section III.B lays out a path for strengthening the CSB through the executive branch alone. If Congress declines to pass legislation regarding the CSB, the Biden administration can still improve the agency.

A. Congress Strengthens the CSB

The majority of Americans believe that the federal government is doing too little to reduce the effects of global climate change.[207] Public sentiment in favor of climate action has been increasing over the past decade and will increase further as climate change affects local environments and as climate education continues to improve.[208] As part of its climate change mitigation efforts, Congress should pass a bill to broaden the mandate and increase the capacity of the CSB. As an alternative argument, Congress should pass legislation on the CSB solely in the interest of chemical safety.

First, Congress should increase the amount of funding available to the CSB to give it the capacity to investigate all the incidents within its purview. Its funding gap and lack of staff have been the CSB's main reason for failing to investigate chemical accidents and regulate accident reporting.[209] It is unacceptable that the CSB has never investigated more than 90% of chemical releases that have caused a fatality.[210] The CSB has barely begun to address the second part of its statutory mandate—incidents causing substantial property damage.[211] The CSB is also valued by industry for its safety advocacy and education, which is crucial secondary work that Congress envisioned the CSB performing but did not include in its statutory mandate.[212] Congress should increase the amount of funds allocated to the CSB to achieve its mandate and secondary activities.

Second, Congress should amend the CSB's enabling statute to add a provision instructing the CSB to work with other international organizations, such as the European Commission's Joint Research Center, to develop a worldwide database of chemical accidents. As mentioned, there is no comprehensive international database of chemical accidents; the global picture of accident investigation is fuzzy.[213] The data on natechs is especially opaque, and a global understanding of the effects of climate change on the chemical industry would help to address the issue.[214] Working cooperatively, agencies could proliferate recommendations within their own countries based on shared experience worldwide. Right now, the CSB reviews all materials available to it, including information produced by international organizations, but does not do so cooperatively.[215]

Third, Congress should expand the CSB's jurisdictions to cover other common safety issues that impact American lives, such as chemical releases into the waters of the United States. The current CSB legislation limits its jurisdiction to accidental releases into the ambient air.[216] The European safety investigation agencies analyzed in Part II have much broader jurisdiction than the CSB. For example, the CSB was allowed to investigate the Deepwater Horizon oil spill only because of the Fifth Circuit's arguably broad statutory reading.[217] The Dutch Safety Board investigates construction, health care, and military incidents.[218] The Finnish Safety Investigation Agency has conducted investigations into major fires and structural failures.[219] Congress should not limit the CSB to investigating accidental releases under the Clean Air Act. By allowing the CSB to investigate chemical releases into bodies of water that result in fatalities, severe injuries, or significant damage, Congress will improve the chemical industry's understanding of the spill's engineering or administrative failures and perhaps prevent similar chemical accidents in the future.[220] Congress could also look to other major accidents that do not have comprehensive federal investigatory coverage or would benefit from investigations by an agency without enforcement powers.[221]

B. The Executive Branch Strengthens the CSB

Although the CSB does not have regulatory powers, the EPA, OSHA, and other federal agencies can and should regulate based on the CSB's recommendations.[222] Currently, in response to CSB recommendations, the EPA and OSHA must either initiate a rulemaking or issue orders or decline to act.[223] If they refuse to implement a recommendation in full, the EPA or OSHA must issue "a statement . . . setting forth the reasons for such determination."[224] This has allowed the EPA to respond to the CSB in short, private inter-agency letters rejecting regulations based on disagreements.[225]The President should issue an executive order asking agencies to promulgate regulations outlining what a response to CSB recommendations must contain and requesting the EPA revisit those recommendations that the CSB believes could immediately save lives. The responses should also be made public so that observers can understand the reasons for the lack of implementation.

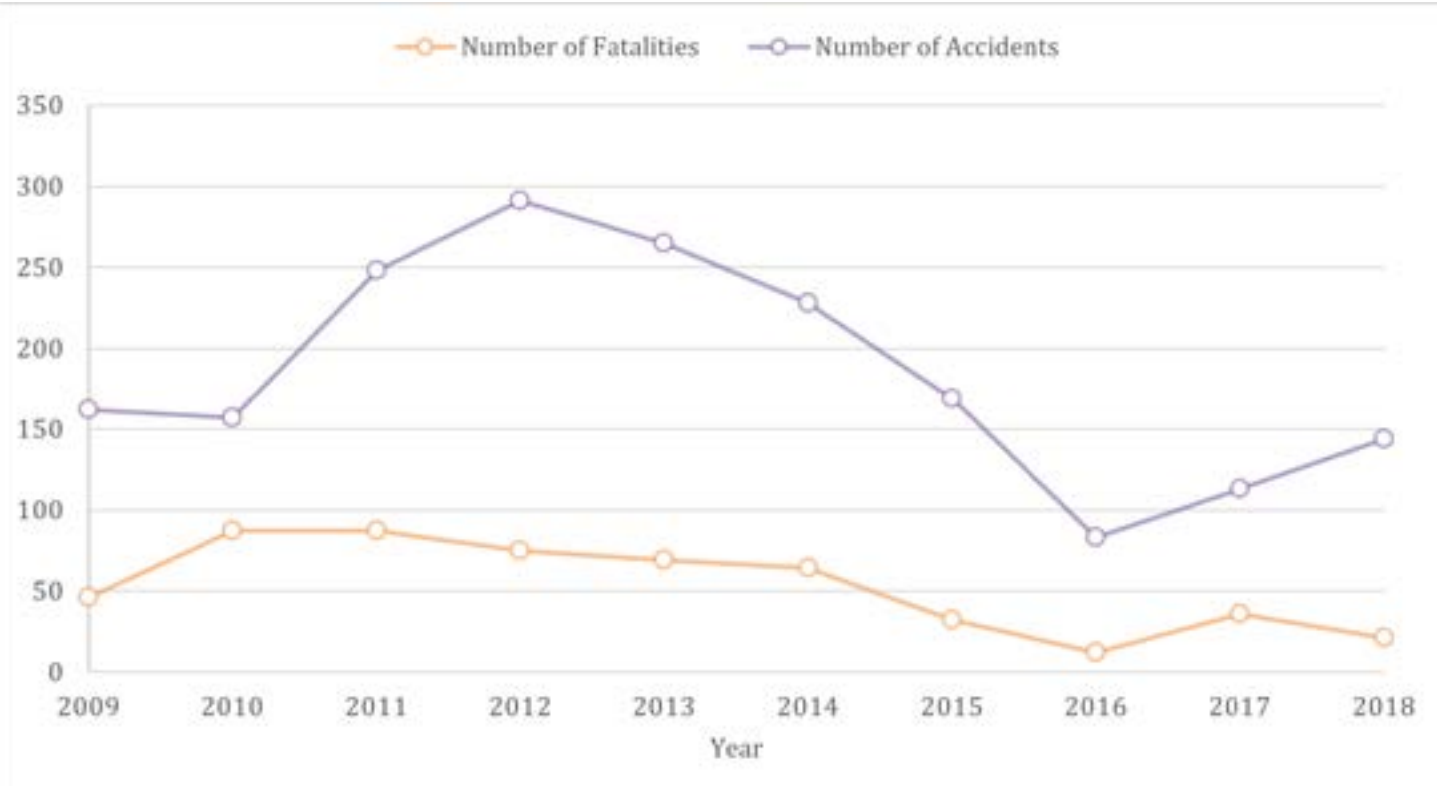
Finally, the executive branch should increase transparency at the CSB. Now that the CSB has promulgated its accident reporting rule, it should make the data it obtains public without the need for Freedom of Information Act requests.

Conclusion

The CSB is a small agency with an enormous impact on chemical safety in the United States. Chemical disasters create billions of dollars in economic damage and cost the health and lives of those working and living nearby. The CSB should be strengthened to fulfill its statutory purpose and to help mitigate future disasters. Congress and the executive branch should prioritize filling the CSB's board and allocating the funds needed to cover the CSB's budget and enable its disaster mitigation mission. These measures will not prevent climate change from impacting chemical plants, but the CSB's work will reduce the frequency of disaster. And stopping even one major chemical accident is worth the CSB's small cost.

Appendix

Figure 1 Chemical Incidents Reported to the CSB[226]



Endnotes

1. *See infra* text accompanying notes 15–17.
2. *See* Jeff Johnson, *The Uneven World of Chemical Accident Investigation*, Chem. & Eng'g News (Aug. 29, 2016), https://cen.acs.org/articles/94/i34/uneven-world-chemical-accident-investigation.html [hereinafter Johnson, The Uneven World] ("The rest of the world is jealous of the CSB . . . . We wish we had one because its purpose is to investigate and understand what happened—not because of community pressure or for the purpose of prosecution." (quoting Trish Kerin, Australian Dir. of the Inst. of Chem. Eng'rs Safety Ctr.)); *infra* section I.A.1.
3. *See infra* section I.C.
4. *See infra* section II.B.1.
5. About the CSB, CSB, https://www.csb.gov/about-the-csb [hereinafter About the CSB] (last visited Jan. 15, 2020).
6. *See* Alex Fox, *U.S. Breaks Record for Billion-Dollar Climate Disasters in 2020* (Jan. 14, 2021), https://www.smithsonianmag.com/smart-news/us-breaks-record-billion-dollar-disasters-2020-180976750 ("The record number of climate change-exacerbated weather disasters this year drives home the fact that . . . the impacts of climate change are no longer subtle . . . ."); *Billion-Dollar Weather and Climate Disasters: Overview*, Nat'l Ctrs. for Env't Info., https://www.ncdc.noaa.gov/billions (tracking the number of billion-dollar climate events in the United States and noting record-breaking number of disasters—twenty-two) (last updated Jan. 8, 2021).
7. *See* European Comm'n, NATECH Accidents (2012), https://ec.europa.eu/jrc/sites/jrcsh/files/natech-leaflet.pdf [hereinafter European Comm'n, Natechs].
8. *See* Jeff D. Colgan, *Harvey Caused a Chemical Plant Explosion. Is that the Next Face of Climate Change?*, Wash. Post (Sept. 6, 2017), https://www.washingtonpost.com/news/monkey-cage/wp/2017/09/06/harvey-caused-a-chemical-plant-explosion-is-that-the-next-face-of-climate-change; *see also infra* section I.B.
9. *See* Steven Mufson & Darryl Fears, *Wind, Rain and a Chemical Fire. Hurricane Laura Was Gone But the Crisis Wasn't Over*, Wash. Post (Aug. 27, 2020), https://www.washingtonpost.com/climate-environment/2020/08/27/hurricane-laura-fire-biolab.
10. Jeff Johnson, *US Chemical Safety Board Remains Short-Staffed*, Chem. & Eng'g News (May 4, 2020), https://cen.acs.org/safety/industrial-safety/US-Chemical-Safety-Board-remains/98/web/2020/05.
11. Bruce Rolfsen, *Senate Confirms New Chair for Chemical Investigation Board*, Bloomberg Law (Mar. 24, 2020), https://news.bloomberglaw.com/bloomberg-law-news/senate-confirms-new-chair-for-chemical-investigation-board; *see also* Tom Conway, *Why is Trump Trying to Kill a Small Agency With a Big Impact on Public Safety?*, Nation of Change (Feb. 28, 2020), https://www.nationofchange.org/2020/02/28/why-is-trump-trying-to-kill-a-small-agency-with-a-big-impact-on-public-safety.
12. Jim Morris & Andrew Maykuth, *The U.S. Chemical Safety Board Was Slashed By Trump. Its Backlog is Piling Up*, Ctr. for Pub. Integrity (Mar. 26, 2021), https://publicintegrity.org/environment/chemical-safety-agency-backlog-refinery-explosion.
13. *See infra* section II.B.
14. *See infra* note 20–22 and accompanying text.
15. Jennifer Busick, *The Cost of Catastrophe: Is There a Business Case for Chemical Safety*, EHS Daily Advisor (May 15, 2017), https://ehsdailyadvisor.blr.com/2017/05/cost-catastrophe-business-case-

chemical-safety (finding it "relatively simple to make the case that prevention is a far more cost-effective option"); *see also* Fox, *supra* note 6 (discussing the twenty-two billion-dollar disasters of 2020).

16. Calculated by the author from the chemical incidents tracked by the CSB between 2009 and 2019. *See* Chem. Safety & Hazard Investigation Bd., Copy of CSB Incidents 2009-8.2019DocketPost (Dec. 12, 2019), https://www.regulations.gov/document?D=CSB-2019-0004-0023 [hereinafter Copy of CSB Incidents].

17. *See* Busick, *supra* note 15.

18. *See* History, CSB, https://www.csb.gov/about-the-csb/history (last visited Oct. 10, 2020).

19. *See, e.g.*, Gary J. Edles, *The Almost Accidental Start of A New Federal Agency*, 47 Fed. Law. 32, 33 (2000).

20. *See, e.g.*, Jane F. Barrett, *When Business Conduct Turns Violent: Bringing BP, Massey, and Other Scofflaws to Justice*, 48 Am. Crim. L. Rev. 287 (2011); Jacqueline L. Weaver, *Offshore Safety in the Wake of the Macondo Disaster: The Role of the Regulator*, 36 Hous. J. Int'l L. 379 (2014); Lauren Mulhern, Note, The Arkema Chemical Facility Incident: How the Regulation of Reactive Chemicals and the Incorporation of Climate Change Risks in Emergency Response Planning Could Mitigate and Prevent Future Accidental Chemical Releases, 30 Colo. Nat. Resources, Energy & Env't L. Rev. 143 (2019).

21. *See, e.g.*, Mark Kaszniak, *Oversights and Omissions in Process Hazard Analyses: Lessons Learned From CSB Investigations*, 29 Process Safety Progress 264 (2010); Mary Beth Mulcahy, Alice Young, James Gibson, Cheri Hildreth, Peter Ashbrook, Robin Izzo, & Bruce Backus, *College and University Sector Response to the U.S. Chemical Safety Board Texas Tech Incident Report and UCLA Laboratory Fatality*, 20 J. Chem. Health & Safety 6 (2013); Ronald J. Willey, *West Fertilizer Company Fire and Explosion: A Summary of the U.S. Chemical Safety and Hazard Investigation Board Report*, 49, Pt. B, J. Loss Prevention Process Indus. 132 (2017).

22. *See, e.g.*, Kirti Datla & Richard L. Revesz, *Deconstructing Independent Agencies (and Executive Agencies*), 98 Cornell L. Rev. 769 (2013); Daniel Richardson, Note, Congressional Control of Agency Expertise, 105 Va. L. Rev. 173 (2019).

23. *See infra* section II.B.1.

24. *See* Edles, *supra* note 19, at 33; Alan Taylor, Bhopal: The World's Worst Industrial Disaster, 30 Years Later, Atlantic (Dec. 2, 2014), https://www.theatlantic.com/photo/2014/12/bhopal-the-worlds-worst-industrial-disaster-30-years-later/100864.

25. About the CSB, *supra* note 5.

26. Clean Air Act Amendments of 1989, S. Rep. No. 101-228, at 228, 1990 U.S.C.C.A.N. 3385, 3612 (1989); *see also infra* II.C.1.

27. *See* About the CSB, *supra* note 5.

28. *See infra* section II.C.

29. *See* Edles, *supra* note 19, at 33–34.

30. The Clean Air Act amendments contained an appropriation of $1 million for the EPA to establish the CSB. *Id.* No more funding was appropriated, however, once board members were nominated, not until the slow progress by OSHA and the EPA of an investigation into a New Jersey chemical incident that killed five workers prompted Sen. Frank Lautenberg of New Jersey to urge the inclusion of $4 million for the CSB into a 1998 appropriations bill. *Id.*

31. *See* CSB, *Harwood Grants Back on the Chopping Block in Trump Administration FY 2021 Budget Proposal*, Safety + Health, https://www.safetyandhealthmagazine.com/articles/19428-csb-harwood-grants-back-on-the-chopping-block-in-trump-administration-fy-2021-budget-proposal.

32. *See* EPA's Budget and Spending, EPA, https://www.epa.gov/planandbudget/budget (last visited Sept. 19, 2020).

33. *See* Budget Request, U.S. Chem. Safety & Hazard Investigation Bd., 3 (2020), https://www.csb.gov/assets/1/6/justification_2020.pdf [hereinafter CSB, Budget Request FY 2020].

34. *See* 42 U.S.C. § 7412(r)(6) (2018); *infra* section II.B.2.

35. *See* 42 U.S.C. § 7412(r)(6)(C).

36. *Id.* § 7412(r)(6)(I)–(J). The Administrator should "respond by issuing the proposed regulation or order or stating why implementation of the recommendation would not be appropriate." Clean Air Act Amendments of 1989, S. Rep. No. 101-228, at 208, 1990 U.S.C.C.A.N. 3385, 3592 (1989).

37. 42 U.S.C. § 7412(r)(6)(I)–(J).

38. *See id.* § 7412(r)(6)(B); Edles, *supra* note 19, at 33 ("The typical statute governing multi-member agencies contains no professional qualifications for membership.).

39. *See* Kaszniak, *supra* note 21, at 264–66 (describing process hazard analysis and its role in hazard prevention).

40. *See* Selection of Sources of Investigation Reports and Analyses of Chemical Accidents, European Comm'n, https://minerva.jrc.ec.europa.eu/en/shorturl/minerva/chemical_accident_investigation_reports (last updated Nov. 11, 2017) [hereinafter European Commission, Sources of Investigation Reports] (linking to various hazard investigation board reports); National Chemical Safety Program—Incident Investigation Reports, Mary Kay O'Connor Process Safety Ctr., http://psc.tamu.edu/resources/ncsp-reports (last visited Sept. 19, 2020) (linking to other hazard investigation agencies); *infra* section II.C.2.

41. Clean Air Act Amendments of 1989, S. Rep. No. 101-228, at 229–30, 1990 U.S.C.C.A.N. 3385, 3613–14 (1989).

42. *Id.* at 229, 1990 U.S.C.C.A.N. at 3613.

43. *Id.* at 229–30, 1990 U.S.C.C.A.N. at 3613–14.

44. *Id.*

45. CSB, Budget Request FY 2020, *supra* note 33, at 3.

46. *See* 42 U.S.C. § 7412(r)(6)(L)(ii) (2018). The courts have upheld the CSB's subpoena powers when challenged by companies. See, e.g., *United States v. Exxon Mobil Corp.*, 943 F.3d 1283 (9th Cir. 2019) (reversing the district court and granting the CSB's subpoena requests under a "generous relevance standard").

47. CSB, Budget Request FY 2020, *supra* note 33, at 4 (highlighting seven chemical disasters since 2010, which resulted in billions of dollars of damage).

48. *Id.*

49. *Id.*

50. Jeff Johnson, *The Chemical Safety Board Faces an Uncertain Future Despite Strong Backing*, Chem. & Eng'g News (Jan. 30, 2020), https://cen.acs.org/safety/industrial-safety/Chemical-Safety-Board-faces-uncertain/98/i5; *see also* Conway, *supra* note 11 ("When Trump cut the CSB out of his 2018 budget, a vice president at Tesoro, Stephen Brown, called for sparing the agency . . . . 'I don't think anyone in the industry wants to see the Chemical Safety Board be abolished,' . . . .").

51. *See* Scott Jensen, *ACC Expresses Support for Chemical Safety Board and Urges Congress and White House to Fill Board Vacancies*, Am. Chem. Council (Jan. 29, 2020), https://www.americanchemistry.com/Media/PressReleasesTranscripts/ACC-news-releases/ACC-Expresses-Support-for-Chemical-Safety-Board.html (expressing support for the CSB and urging nominations to the board).

52. Of the 13 American headquartered companies in the top 50 chemical producers, the ACC represents 10. Compare Member Companies, Am. Chem. Council, https://www.americanchemistry.com/Membership/MemberCompanies (last visited Oct. 16, 2020) (listing ACC membership) with Alexander H. Tullo, C&EN's Global Top 50 Chemical Companies of 2018, Chem. & Eng'g News (Jul. 29, 2019), https://cen.acs.org/business/

finance/CENs-Global-Top-50-chemical/97/i30 (listing the top 50 chemical producers by sales).

53. Stakeholder Perspectives on the Importance of the U.S. Chemical Safety and Hazard Investigation Board Before the S. Comm. on Env't & Pub. Works, 116th Cong. __, 21 (2020), https://www.epw.senate.gov/public/index.cfm/hearings?ID=AC86E1F2-3A8A-473E-80BB-7F338CAC16F6#RelatedFiles [hereinafter Hearing on CSB Stakeholder Perspectives] (statement of Shakeel Kadri, Exec. Dir., Ctr. for Chem. Process Safety, Am. Inst. of Chem. Eng'rs)).

54. *See, e.g.*, Jeff Johnson, *Former US Chemical Safety Board Member Kristen Kulinowski Reflects on her Term*, Chem. & Eng'g News (June 21, 2020), https://cen.acs.org/safety/industrial-safety/Former-US-Chemical-Safety-Board-member-Kristen-Kulinowski-reflects-on-her-term/98/i24 [hereinafter Johnson, Kristen Kulinowski Reflects] ("The board's investigation findings frequently raise the ire of regulators, industrial companies, and a host of other bodies that are responsible for maintaining safe workplaces.").

55. George Zornick, *Why Does Trump Want to Stop Investigating Chemical Accidents*, The Nation (Mar. 23, 2017), https://www.thenation.com/article/archive/why-does-trump-want-to-stop-investigating-chemical-accidents.

56. *See* European Comm'n, Natechs, *supra* note 7.

57. *See infra* section I.C.

58. Fact Sheet, U.S. Chem. Safety & Hazard Investigation Bd., https://www.csb.gov/assets/1/6/csb_fact_sheet.pdf [hereinafter CSB, Fact Sheet] (last visited Oct. 12, 2020); see also Joseph M. Schreiber, Vorys Sater Seymour and Pease LLP, Working With the Chemical Safety Board After a Major Accident (July 7, 2012), https://www.lexology.com/library/detail.aspx?g=b130e65a-e1f7-4ece-a7f7-2ea8432fb52f (describing what to do when CSB agents arrive, "CSB and its outside experts will be professional, learned, and tenacious . . . . They will want documents, safety videos, procedure manuals, proof that employees have read and signed the procedure manuals, and access to employees to conduct interviews. CSB has subpoena power and will use it.").

59. CSB, Fact Sheet, *supra* note 58.

60. *Id.*

61. *Id.*

62. Andrea Giampetro-Meyer & Nancy Kubasek, *Harvey: Environmental Justice and Law*, 31 Fordham Env't. L. Rev. 37, 37 (2020).

63. *Id.* at 37–38.

64. *Id.* at 41–42.

65. *See* Correa, *infra* note 66, at 52–53 & nn. 112–19 (discussing the Arkema disaster through citations to the CSB's investigation); Mulhern, *supra* note 20, at 147–51 & nn. 10–55 (same).

66. *See* Melissa Correa, *There Are Around 3,000 Registered Facilities that House Chemicals in Harris County. Which Ones Are Near You?*, KHOU (Jan. 24, 2020), https://www.khou.com/article/news/local/there-are-around-3000-registered-facilities-that-house-chemicals-in-harris-county-which-ones-are-near-you/285-8e855b40-5e29-4740-8c8c-046a522f7453.

67. *Id.*; *see also* @jschanna, Self Accelerating Decomposition Temperature, YouTube (Nov. 2, 2008), https://youtu.be/98jOeCr06Xs.

68. CSB, Organic Peroxide Decomposition, Release, and Fire at Arkema Crosby Following Hurricane Harvey Flooding 10 (2018), https://www.csb.gov/arkema-inc-chemical-plant-fire- [hereinafter CSB, Arkema Investigation Report].

69. *Id.*

70. *Id.*

71. *Id.*

72. *Id.*

73. *Id.*

74. *Id.* at 12–13.

75. *Id.*

76. *Id.*

77. Walter D. James, III, Climate Change Consequences in the Here and Now: Arkema, Inc. and Hurricane Harvey (Sept. 20, 2019), https://www.americanbar.org/groups/business_law/publications/committee_newsletters/environmental/2019/201909/fa_2; *see also* Short Wave, Fueled By Climate Change, Hurricanes Are Causing Industrial Accidents. Who's Liable, NPR (Sept. 29, 2020), https://www.npr.org/2020/09/25/916862969/fueled-by-climate-change-hurricanes-are-causing-industrial-accidents-whos-liable (discussing the Arkema incident and legal consequences in a podcast and interviewing scientists, Harris County attorneys, and Arkema's attorneys).

78. Samantha Ketterer, High-Profile Arkema Trial Ends With No Convictions as Harris County Judge Acquits Final Defendants (Oct. 1, 2020), https://www.houstonchronicle.com/news/houston-texas/crime/article/Arkema-trial-judge-defendants-no-convictions-15612235.php (last updated Oct. 2, 2020).

79. *See* Consolidated Plaintiff's First Amended Complaint at 12, *Graves v. Arkema Inc.*, No. 4:17-cv-03068 (S.D. Tex. Aug. 26, 2019).

80. *See Order of Multidistrict Litigation Panel, In re Arkema Inc. Litig.*, 2020 Tex. LEXIS 839 (July 10, 2020).

81. CSB, Arkema Investigation Report, *supra* note 68, at 8–128.

82. The CSB uses the European Commission definition of a natech, "a technological disaster triggered by any type of natural disaster." *Id.* at 122, n.a.

83. CSB, Arkema Investigation Report, *supra* note 68, at 98, 126–27; *see also* Recommendations, CSB, https://www.csb.gov/recommendations/?F_InvestigationId=3594 (last visited Oct. 15, 2020) (tracking the Arkema recommendations).

84. CSB, Arkema Investigation Report, *supra* note 68, at 126.

85. *Id.* at 101–02, 126.

86. U.S. Chem. Safety & Hazard Investigation Bd., Recommendations Status Change Summary, Improving Reactive Hazard Management 1–3 (2014), https://www.csb.gov/assets/recommendation/status_change_summary-_reactives_r3.pdf [hereinafter CSB, Improving Reactive Hazard Management Recommendation] (discussing the reasons why the EPA response to the CSB's hazard reporting recommendation is unacceptable).

87. *Id.* at 102.

88. *See infra* section II.A.

89. CCPS Monograph: Assessment of and Planning For Natural Hazards, Ctr. for Chem. Process Safety (2019), https://www.aiche.org/sites/default/files/html/536181/NaturalDisaster-CCPSmonograph.html. The CSB was able to put out a safety alert before the 2020 hurricane season recommending chemical facilities heed the new guidelines. U.S. Chem. Safety & Hazard Investigation Bd., 2020 Hurricane Season: Guidance for Chemical Plants During Extreme Weather Events 1 (2020), https://www.csb.gov/assets/1/6/extreme_weather_-_final_w_links.pdf.

90. The CSB compared flood planning guidance from the United Kingdom Environment Agency to United States' based sources and concluded that there is a lack of robust flood risk guidance available to industry in the United States. CSB, Arkema Investigation Report, *supra* note 68, at 88–98. The suggested guidance included addressing common-mode failures of critical safeguards that could be caused by extreme weather events, evaluating facility susceptibility to extreme weather events, and bringing professional disciplines together for extreme weather risk assessments. *Id.* at 172.

91. U.S. Chem. Safety & Hazard Investigation Bd., Recommendations Status Change Summary, Arkema, Inc. Chemical Plant Fire (Recommendation 2), at 1 (2020), https://www.csb.gov/assets/

recommendation/status_change_summary__arkema_inc_(arkema_r2)__c-aa.pdf.

92. U.S. Chem. Safety & Hazard Investigation Bd., Recommendations Status Change Summary, Arkema, Inc. Chemical Plant Fire (Recommendation 5), at 2 (2019), https://www.csb.gov/assets/recommendation/status_change_summary__harris_county_(arkema_r5)__o-arar.pdf. The CSB found that training could have prevented the personnel who policed the Arkema evacuation perimeter from being exposed to noxious chemical smoke. CSB, Arkema Investigation Report, *supra* note 68, at 127.

93. Int'l Fed'n of Red Cross & Red Crescent Soc'ys, World Disasters Report 2020, Come Heat or High Water 19, 90 (2020), https://media.ifrc.org/ifrc/wp-content/uploads/2020/11/20201116_WorldDisasters_Full.pdf [hereinafter IFRCS, World Disasters Report 2020]; *see also* Nick Watts et al, The 2020 Report of The Lancet Countdown on Health and Climate Change: Responding to Converging Crises, The Lancet, Dec. 2, 2020, at 1, 2, 7–8, 23, 34, 36 (reviewing the health burden from climate change including millions of deaths and billions of work-hours lost).

94. Int'l Fed'n of Red Cross & Red Crescent Soc'ys, *supra* note 93, at 19, 94.

95. Han Li, *Climate Change Isn't Material?: How* People of the State of New York v. Exxon Mobil Corporation *Highlights the Need for Mandatory Greenhouse Gas Emission Disclosures*, Minn. L. Rev. De Novo Blog (Apr. 26, 2020), https://minnesotalawreview.org/2020/04/26/climate-change-isnt-material-how-people-of-the-state-of-new-york-v-exxon-mobil-corporation-highlights-the-need-for-mandatory-greenhouse-gas-emission-disclosures; *see also* NOAA, *supra* note 6 ("The U.S. has sustained 285 weather and climate disasters since 1980 where overall damages/costs reached or exceeded $1 billion (including CPI adjustment to 2020). The total cost of these 285 events exceeds $1.875 trillion.").

96. *See* World Health Org., Public Health Impact of Chemicals: Knowns and Unknowns 6 (2016), https://www.who.int/publications/i/item/WHO-FWC-PHE-EPE-16.01-eng.

97. World Health Org., Chemical Releases Cause by Natural Hazard Events and Disasters 2 (2018), https://apps.who.int/iris/bitstream/handle/10665/272390/9789241513395-eng.pdf.

98. *Id.*

99. *See* Scientific Consensus: Earth's Climate is Warming, NASA, https://climate.nasa.gov/scientific-consensus (last updated Nov. 5, 2020).

100. *See* Elisabeth Krausmann, Serkan Girgin & Amos Necci, *Natural Hazard Impacts on Industry and Critical Infrastructure: Natech Risk Drivers and Risk Management Performance Indicators*, Int'l J. Disaster Risk Reduction, Nov. 2019, at 1, 2 ("Where there are no legal obligations for reporting accidents, information will be unavailable for learning lessons."). One article showed that although pipeline accidents decreased overall, the number attributable to natech events remained stable and were much more severe than other incidents. *Id.*

101. *See* Ana Maria Cruz, Laura J. Steinberg, Ana Lisa Vetere Arellano, Jean-Pierre Nordvik & Francesco Pisano, State of the Art In Natech Risk Management 2 (2004), https://www.unisdr.org/files/2631_FinalNatechStateofthe20Artcorrected.pdf

102. *See* IFRCS, World Disasters Report 2020, *supra* note 93, at 51–83.

103. The interactions between climate change and extreme weather events, such as hurricanes, storms, droughts, floods, heatwaves, and wildfires, are complicated, but scientists have developed methods of "extreme event attribution" that allow researchers to determine how much climate change increased the risk of an extreme weather event occurring. Chelsea Harvey, Scientists Can Now Blame Individual Natural Disasters on Climate Change, Scientific American (Jan. 2, 2018), https://www.scientificamerican.com/article/scientists-can-now-blame-individual-natural-disasters-on-climate-change ("[W]hat scientists can do is investigate the *extent* to which climate change has influenced a given event."); *see also* Comm. on Extreme Weather Events and Climate Change Attribution, Nat'l Academies of Scis. Eng'g Med., Attribution of Extreme Weather Events in the Context of Climate Change 23 (2016), https://www.nap.edu/read/21852 ("[I]t is now possible in some cases to provide quantitative information about how climate change may have impacted the probability or intensity of an individual event and to cast this within a probabilistic causal framework."). On the science of climate change attribution in the law, *see generally*, Michael Burger, Jessica Wentz & Radley Horton, *The Law and Science of Climate Change Attribution*, 45 Colum. J. Envtl. L. 57, 63 (2020) ("This Article offers a comprehensive, of-the-moment survey of the roles attribution science plays in climate change law and litigation.").

104. IFRCS, World Disasters Report 2020, *supra* note 93, at 38.

105. *See* Marleen C. de Ruiter, Anaïs Couasnon, Marc J. C. van den Homberg, James E. Daniell, Joel C. Gill & Philip J. Ward, *Why We Can No Longer Ignore Consecutive Disasters*, Earth's Future, Mar. 2020, at 1, 6 ("[C]ountries did recognize the relation between the increased potential of Natech events and their impacts, and the effects of climate change.").

106. Krausmann et al., *supra* note 100, at 4–5.

107. *Id.*; *see also* The Seveso Directive—Summary of Requirements, European Comm'n, https://ec.europa.eu/environment/seveso/legislation.htm (last updated Sept. 14, 2020).

108. Krausmann et al., *supra* note 100, at 5.

109. *See supra* notes 85–87 and accompanying text.

110. CSB, Arkema Investigation Report, *supra* note 68, at 98.

111. *See supra* notes 89–90 and accompanying text.

112. *See* Bio Lab Chemical Fire and Release, CSB (Aug. 27, 2020), https://www.csb.gov/bio-lab-chemical-fire-and-release-; *see also*, Tristan Baurick, Chemical Fire Near Lake Charles Finally Out After 3 Days; Investigation Into Cause Begins (Aug. 31, 2020), https://www.nola.com/news/environment/article_6227ac8a-ebbc-11ea-92f2-67f719ac6c7c.html.

113. Clean Air Act Amendments of 1989, S. Rep. No. 101-228, at 209, 1990 U.S.C.C.A.N. 3385, 3593 (1989).

114. *See* Edles, *supra* note 19, at 33–34.

115. *See* Conway, *supra* note 11.

116. *See supra* notes 18–22 and accompanying text.

117. *See generally infra* section II.B.1 (discussing how the CSB's chronic lack of funding has prevented it from investigating the vast majority of accidents within its statutory duties).

118. The EPA has less often accepted the CSB's recommendation. *See infra* notes 134-139 and accompanying text. The CSB's frequently asked questions include, "Do recipients follow CSB recommendations?" To which CSB responded, "Yes. Although CSB recommendations are not mandatory, they provide realistic and effective solutions for protecting environmental and workplace safety and health. Recipients generally understand that complying with CSB recommendations can help prevent similar incidents." Frequently Asked Questions, CSB, https://www.csb.gov/recommendations/faq/#do-recipients-follow-csb-recommendations (last visited Oct. 16, 2020).

119. Clean Air Act Amendments of 1989, S. Rep. No. 101-228, at 208, 1990 U.S.C.C.A.N. 3385, 3592 (1989) ("The Board has the power to compel testimony and inspect facilities in the conduct of its accident investigations . . . . The Board may make recommendations to the Administrator of the Environmental Protection Agency for action to prevent or mitigate chemical hazards, either through regulation or by the issuance of administrative orders.")

120. *See* Recommendations, CSB, https://www.csb.gov/recommendations (last visited Sept. 19, 2020) [hereinafter CSB, Recommendations] (tracking each safety recommendation made by the CSB).

121. *See* Investigations, CSB, https://www.csb.gov/investigations (last visited Jan. 13, 2021).

122. Frequently Asked Questions, CSB, https://www.csb.gov/recommendations/faq/#what-do-the-status-designations-for-each-recommend [hereinafter CSB, Status Designations] (last visited Oct. 16, 2020).

123. In 2015, the CSB did a follow-up survey of 10% of the recommendations it closed between 2009 and 2014 and found that every one of its recommendations surveyed was still in effect. *See* Veronica Tinney, Closed Recommendations Follow-Up Report 7 tbl.1 (2015), https://www.csb.gov/assets/1/6/qq_survey_2015_final_9-24-2015_(2)1.pdf.

124. *See* CSB, Recommendations, *supra* note 120.

125. *See id.* The data was taken from the CSB recommendations tracker.

126. *See id.* Additionally, there are 21 recommendations that are open with an unacceptable response. These are recommendations for which no acceptable planned response has been received within 270 days from CSB making the recommendation. The CSB believes, however, the recommendee will act after further dialogue or advocacy. CSB, Status Designations, *supra* note 122.

127. *See* U.S. Chem. Safety & Hazard Investigation Bd., Key CSB Successes 1, https://www.csb.gov/assets/1/6/csb_key_successes.pdf [hereinafter CSB, Key Successes] (last visited Nov. 14, 2020); *see also* Faced With Elimination, Chemical Safety Board Highlights Its Responsibilities, Safety + Health (Mar. 27, 2017), https://www.safetyandhealthmagazine.com/articles/15497-faced-with-elimination-chemical-safety-board-highlights-its-responsibilities.

128. *See* CSB, Key Successes, *supra* note 127. Between 1980 and 2005, dust explosions killed 119 and injured 718 workers. U.S. Chem. Safety & Hazard Investigation Bd., Investigation Report, Combustible Dust Hazard Study 1 (2006), https://www.csb.gov/combustible-dust-hazard-investigation.

129. *See* Benjamin D. Briggs, Brent I. Clark, Adam R. Young, Matthew A. Sloan & Craig B. Simonsen, *Updated Combustible Dust NFPA Industry Consensus Standard Gives OSHA New Tool to Cite Employers: Does Your Facility Comply?*, Env't Safety Update (Apr. 26, 2019), https://www.environmentalsafetyupdate.com/osha-compliance/updated-combustible-dust-nfpa-industry-consensus-standard-gives-osha-new-tool-to-cite-employers-does-your-facility-comply.

130. Holly Demaree-Saddler, *US Grain Dust Explosion Decline in 2019* (Mar. 5, 2020), https://www.world-grain.com/articles/13368-us-grain-dust-explosions-decline-in-2019.

131. *See* CSB, Key Successes, *supra* note 127.

132. *See* 42 U.S.C. § 7412(r) (2018).

133. *See* Clean Air Act Amendments of 1989, S. Rep. No. 101-228, at 229–30, 1990 U.S.C.C.A.N. 3385, 3613–14 (1989).

134. *See* CSB, Recommendations, *supra* note 120.

135. *See* CSB, Recommendations, Recipient: EPA, https://www.csb.gov/recommendations/?F_RecipientId=4846 [hereinafter CSB, EPA Recommendations] (last visited Oct. 17, 2020).

136. *See id.*

137. *See id.* ("Ensure that the emergency response planning required for permitted hazardous waste treatment, storage, and disposal facilities (40 CFR 264.37) includes providing written information to state and local emergency response officials on the type, approximate quantities, and locations of materials within the facility . . . .")

138. *See id.*; U.S. Chem. Safety & Hazard Investigation Bd., Interim Investigation Report: Chevron Richmond Refinery Fire 56 (2012), https://www.csb.gov/chevron-refinery-fire.

139. *See id.*

140. *See* CSB, Recommendations, Recipient: OSHA, https://www.csb.gov/recommendations/?F_RecipientId=4884 [hereinafter CSB, OSHA Recommendations] (last visited Oct. 18, 2020). There are, however, seven open responses listed as "Unacceptable Response/No Response Received." *Id.*

141. *See id.*

142. *See id.*

143. *See* About the CSB, *supra* note 5. The CSB's data shows the number of chemical incidents and fatalities in the United States is trending down, although the data is statistically insignificant and cannot necessarily be attributed to the CSB's work. *See infra* Figure 1.

144. *See infra* section II.B.1.

145. Off. of Inspector Gen., U.S. Env't Prot. Agency, FY 2016 U.S Chemical Safety and Hazard Investigation Board Management Challenges 3 tbl.1 (2016), https://www.epa.gov/office-inspector-general/report-csbs-fiscal-year-2016-management-challenges [hereinafter OIG, CSB Management Challenges FY 2016].

146. 42 U.S.C. § 7412(r)(6)(C)(i) (2018) ("The Board shall—(i) investigate (or cause to be investigated), determine and report to the public in writing the facts, conditions, and circumstances and the cause or probable cause of any accidental release resulting in a fatality, serious injury or substantial property damages . . . .").

147. OIG, CSB Management Challenges FY 2016, *supra* note 145, at 3–4 ("42 U.S.C. § 7412(r)(6) is not ambiguous with regard to the issue of the scope of cases to be investigated, stating that CSB 'shall' investigate." (citing *City of Arlington, Tex. v. F.C.C.*, 569 U.S. 290 (2013)).

148. *Id.*

149. *See* Morris & Maykuth, *supra* note 12.

150. *See* 42 U.S.C. § 7412(r)(6)(C)(iii), 7412(r)(6)(Q).

151. *See* Comment Sought on Reporting Accidental Chemical Releases to the Chemical Safety Board, 19 Air Pollution Consultant 2.67 (2009) [hereinafter CSB, Comment Sought].

152. *Air All. Houston v. U.S. Chem. & Safety Hazard Investigation Bd.*, 365 F. Supp. 3d 118, 131 (D.D.C. 2019), appeal dismissed sub nom. *Pub. Employees for Envtl. Responsibility v. U.S. Chem. Safety & Hazard Investigation Bd.*, No. 19-5089, 2019 WL 4565521 (D.C. Cir. Aug. 26, 2019).

153. *Id.* at 121, 132 (calling the CSB's defense "half-hearted").

154. *See* Accidental Release Reporting, 85 Fed. Reg. 10,074, 10,074 (Feb. 21, 2020) (to be codified at 40 C.F.R. pt. 1604).

155. *See supra* note 152.

156. Robin Bravender, *Chemical Safety Board 'The Agency is Broken. It Needs to be Rebuilt'—Former CSB Member*, E&E News (June 20, 2014), https://www.eenews.net/stories/1060001714.

157. OIG, CSB Management Challenges FY 2016, *supra* note 145, at 1; *see also*, Staff of U.S. H. of Reps., 113th Cong., Whistleblower Reprisal and Management Failures at the U.S. Chemical Safety Board 7 (2014), https://republicans-oversight.house.gov/wp-content/uploads/2014/06/CSB-FINAL-REPORT-Redact-version.pdf.

> The mission of CSB is to investigate chemical accidents . . . and ensure that its recommendations are implemented. Moure-Eraso's leadership style—which includes an utter disregard for the collegial tradition of the Board—drove away all the experienced investigators, effectively rendering the CSB unable to issue any recommendations and fulfill its mission.

158. Staff of U.S. H. of Reps., 113th Cong., *supra* note 157, at 7.

159. *See* Staff of U.S. H. of Reps., 113th Cong., *supra* note 157, at 5.

160. *Id.* at 16–24.

161. *Id.* at 42–50.

162. *Id.* at 60–61.

163. *See* Kevin Bogardus & Corbin Hiar, *Trump DOJ Passes on Perjury Prosecution of Ex-Chairman*, E&E News (Feb. 8, 2018), https://www.eenews.net/greenwire/2018/02/08/stories/1060073315 (listing a timeline of the Moure-Eraso investigation).

164. *See, e.g.*, Hearing on CSB Stakeholder Perspectives, *supra* note 53 (testifying to the CSB's value to both the chemical industry and workers' unions); CSB, Key Successes, *supra* note 128 (detailing six key recommendations).

165. *See infra* Figure 1.

166. *See supra* section II.A.

167. *See supra* section I.B.2.

168. *See* CSB, Comment Sought, supra note 151, at 2.67 ("The CSB indicates that media reports are the sole source of information for approximately two-thirds of screened incidents."). The European Commission gave the CSB a two on a scale of five for its accident information coverage, which was average for the databases it ranked. *See* M. Wood, M. Hailwood, Z. Gyenes, L. Allford, Chemical Accident Risks in Europe and Beyond—Where Are We Now? (2017), https://www.unece.org/fileadmin/DAM/env/documents/2016/TEIA/OECD_WGCA_24-27_OCT_2016/Maureen_Wood_EU_27_Oct_OECD_JRC_Oct2016_2_Seminar.pdf.

169. *See* Welcome to the National Response Center, U.S. Coast Guard, http://nrc.uscg.mil.

170. *See* Accidental Release Reporting, *supra* note 154, at 10,081. The Bureau of Labor Statistics also reports accidents that result in injury to workers. *See* Chemical Manufacturing: NAICS 325, U.S. Bureau of Labor Stats., https://www.bls.gov/iag/tgs/iag325.htm (last updated Oct. 15, 2020).

171. *See, e.g.*, CSB, Arkema Investigation Report, *supra* note 68, at 98–101 (comparing the United States flood risk regulatory approach to the EU approach); *id.* at 107–09 (discussing the International Atomic Energy Agency's investigation of the Fukushima nuclear disaster caused by an earthquake and tsunami).

172. Others have done this for various chemical statutory regimes. *See, e.g.*, Adam D.K. Abelkop & John D. Graham, *Regulation of Chemical Risks: Lessons for Reform of the Toxic Substances Control Act from Canada and the European Union*, 32 Pace Envtl. L. Rev. 108, 110–11 (2015) (discussing how the U.S. Toxic Substances Control Act is outdated when compared with Canada, the EU, Japan, China, and South Korea); Maryam Tabatabai, *Comparing U.S. and EU Hazardous Waste Liability Frameworks: How the EU Liability Directive Competes with CERCLA*, 34 Hous. J. Int'l L. 653, 660–62 (2012) (comparing the U.S. hazardous waste regulatory frameworks with those in the EU).

173. *See* Eric Fielding, Andrew W. Lo & Jian Helen Yang, The National Transportation Safety Board: A Model for Systemic Risk Management 1 (Nov. 14, 2020) (unpublished manuscript), http://ssrn.com/abstract=1695781 ("With its reputation for independence and objectivity, the NTSB is widely regarded as an authoritative voice in transportation safety, and one of the most admired agencies in the federal government."); Jeff Johnson, CSB Seeks Small Budget Increase (Mar. 12, 2012), https://cen.acs.org/articles/90/i11/CSB-Seeks-Small-Budget-Increase.html.

174. Schreiber, *supra* note 58.

175. National Transportation Safety Board and Chemical Safety and Hazard Investigation Board—Memorandum of Understanding, Av. L. Rep. 23,933 (Dec. 19, 2002), 2015 WL 8452813.

176. *See id.*

177. *Id.*

178. U.S. Gov't Accountability Office, Chemical Safety Board: Improvements in Management and Oversight Are Needed 6 (Aug. 22, 2008), https://www.gao.gov/new.items/d08864r.pdf.

179. *Id.* The CSB has the statutory authority to use information gathered by others but does not. *Id.*

180. Fielding et al., *supra* note 173, at 1.

181. *Id.* at 6.

182. *Id.* at 10. Each specialist in the Go Team heads a subcommittee filled by the accident investigation's external parties and internal members. *Id.*

183. *See* European Commission, Sources of Investigation Reports, *supra* note 40.

184. *Id.*

185. *See* Johnson, The Uneven World, *supra* note 2

> Our investigations can lead to legal proceedings against the company, and investigations are a key part of our regulatory system . . . . I am reluctant to separate accident investigation from regulations. Big accidents, like those . . . in the U.S . . . . are extremely rare in the U.K. and are investigated by special commission.

186. 42 U.S.C. § 7412(r)(6)(G) (2018) ("No part of the conclusions, findings, or recommendations of the Board relating to any accidental release or the investigation thereof shall be admitted as evidence . . . .").

187. *See* The Joint Research Centre's Major Accident Hazards Bureau, European Commission, https://minerva.jrc.ec.europa.eu/EN/content/minerva/c76dfa82-97a9-435f-8e0e-39a435aeec3a/who_we_are [hereinafter JRC, Major Accident Hazards Bureau] (last updated Oct. 13, 2020); The Seveso Directive—Technological Disaster Risk Reduction, European Commission, https://ec.europa.eu/environment/seveso (last updated Jan. 29, 2020).

188. JRC, Major Accident Hazards Bureau, *supra* note 187 (emphasis removed).

189. Maureen Heraty Wood & Luciano Fabbri, Challenges and Opportunities For Accessing Global Progress in Reducing Chemical Accident Risks, 4 Progress in Disaster Science 100,044, at 3 (2019).

> As a whole, there are very little publicly available data on chemical accidents worldwide . . . . [A]n official international database for analysing global chemical accident trends does not exist and is unlikely to be established any time soon. Relatively few countries and industry organisations around the world maintain dedicated chemical accident databases . . . .

190. About SHK, Swedish Accident Investigation Authority, https://www.havkom.se/en/om-shk (last visited Oct. 18, 2020).

191. Role and Function, Safety Investigation Authority, https://www.turvallisuustutkinta.fi/en/index/otkes.html [hereinafter SIA, Role and Function] (last visited Oct. 18, 2020).

192. About the Board, Dutch Safety Board, https://www.onderzoeksraad.nl/en/page/12263/dutch-safety-board (last visited Oct. 18, 2020).

193. *See* European Commission, Sources of Investigation Reports, *supra* note 40 (listing all known sources of investigation reports).

194. *See* Swedish Accident Investigation Authority, Annual Report 8–28 (2019), https://www.havkom.se/assets/reports/%C3%A5rsredovisningar/SHK-annual-report-2019.pdf.

195. Industrial, Safety Investigation Authority, https://www.turvallisuustutkinta.fi/en/index/tutkintaselostukset/other/tutkintaselostuksetaihealueittain/industrial.html (last visited Oct. 20, 2020).

196. *See* Investigation Reports, Health and Safety Executive, https://www.hse.gov.uk/comah/investigation-reports.htm (last visited Oct. 18, 2020) (showing that no investigation report has been made by the COMAH Competent Authority since 2005).

197. *See* Investigating Accidents and Incidents, Health and Safety Executive (2004), https://www.hse.gov.uk/pubns/hsg245.pdf (giving a step-by-step guide for businesses to carry out their own health and safety investigations).

198. *See* Investigation Reports by Field, Safety Investigation Authority, https://www.turvallisuustutkinta.fi/en/index/tutkintaselostukset/other/tutkintaselostuksetaihealueittain.html [hereinafter SIA, Investigation Reports by Field] (last visited Oct. 18, 2020).

199. Dutch Safety Board, *supra* note 192.

200. Sweden Accident Investigation Authority, Investigation Process, https://www.havkom.se/en/om-shk/utredningsarbetet (last visited Oct. 18, 2020).

201. *Id.*

202. 42 U.S.C. § 7412(r)(2)(A) (2018).

203. Memorandum from the Robert L. Ashbaugh, Assistant Inspector Gen., Dep't of Homeland Sec., to Carolyn W. Merritt, Chairman/CEO, U.S. Chem. Safety & Hazard Investigation Bd. (Jan. 7, 2004), https://www.oig.dhs.gov/sites/default/files/assets/Mgmt/OIG_04_04_CSB_Continuing_Development.pdf.

204. *See id.*; Accidental Release Reporting, 85 Fed. Reg. 10,074 (Feb. 21, 2020) (to be codified at 40 C.F.R. pt. 1604).

205. *See* The Biden Plan for a Clean Energy Revolution and Environmental Justice, Biden Harris, https://joebiden.com/climate-plan (last visited Nov. 18, 2020).

206. *Id*; *see also supra* section I.C.

207. Cary Funk & Brian Kennedy, *How Americans See Climate Change and the Environment in 7 Charts*, Pew Research Ctr. (Apr. 21, 2020), https://www.pewresearch.org/fact-tank/2020/04/21/how-americans-see-climate-change-and-the-environment-in-7-charts ("Two-thirds of U.S. adults say the federal government is doing too little to reduce the effects of global climate change.").

208. *See id.* ("Compared with a decade ago, more Americans say protecting the environment and dealing with global climate change should be top priorities for the president and Congress.").

209. *See supra* notes 145–155 and accompanying text ("The 2016 report of the EPA OIG found that the CSB has *not* investigated at least 90% and as high as 98% of accidents with fatalities in the prior five years.").

210. *See* OIG, CSB Management Challenges FY 2016, *supra* note 145.

211. *See* Accidental Release Reporting, 85 Fed. Reg. 10,074, 10,086.

212. Clean Air Act Amendments of 1989, S. Rep. No. 101-228, at 208–09, 1990 U.S.C.C.A.N. 3385, 3592–93 (1989).

> The Board is not a regulatory agency, but is to function as a source of expertise at the center of the chemical accident prevention and response programs of the Federal Government . . . . The Board may also serve as a point of communication among the various Federal agencies . . . .

213. *See supra* notes 188–189 and accompanying text.

214. *See supra* section I.C.

215. *See, e.g.*, CSB, Arkema Investigation Report, *supra* note 68, at 101, 107.

216. 42 U.S.C. § 7412(r)(2)(A) (2018).

217. *See United States v. Transocean Deepwater Drilling, Inc.*, 767 F.3d 485, 496 (5th Cir. 2014) (holding a dynamically positioned vessel is a stationary source).

218. *See* Dutch Safety Board, *supra* note 192.

219. *See* SIA, Investigation Reports by Field, *supra* note 198.

220. For example, the CSB could investigate chemical tank leaks, such as one that caused a massive fish kill and has the potential to contaminate drinking water. *See* Laurence Hammack, *Recovery on Tinker Creek Could Take Years After Chemical Spill Caused Massive Fish Kill*, Roanoke Times (Aug. 2, 2017), https://roanoke.com/news/local/recovery-on-tinker-creek-could-take-years-after-chemical-spill-caused-massive-fish-kill/article_bccca221-729f-56dc-ab79-5b2987763086.html ("It took just a few hours for a chemical spill to cause what is believed to be one of the worst fish kills ever recorded in Virginia.").

221. *See supra* section I.A.1; *see also* Clean Air Act Amendments of 1989, S. Rep. No. 101-228, at 229, 1990 U.S.C.C.A.N. 3385, 3613 (1989) ("[I]t is unlikely that an agency charged both with rule-making and investigating functions would be quick to acknowledge that existing requirements were insufficient to prevent an accident.").

222. *See supra* section II.A.

223. 42 U.S.C. § 7412(r)(6)(I)–(J) (2018).

224. *Id.*

225. For example, admitting that a statute's general duty clause is not as "easy to apply as a regulation" would be, but still refusing to adopt regulations. *See* Letter from Mathy Stanislaus, Assistant Admin., Env't Prot. Agency to Rafael Moure-Eraso, Chairperson, U.S. Chem. Safety & Hazard Investigation Bd. 2 (Jun. 6, 2014), https://foiaonline.gov/foiaonline/api/request/downloadFile/CSB%20Response%20Signed%206-6-14%20AX-14-000-7844.pdf/9d76a9d2-4344-4a5d-ac43-a90c8c51a418.

226. Data from the CSB's public docket. *See* Copy of CSB Incidents, *supra* note 16.

First Place (tie)

A Local Solution for a Global Problem: Technology-Forcing Municipal Ordinances to Promote Enhanced Efficiency Fertilizers

By Andrew Shifren

Summary

Nitrogen pollution is one of the most pressing environmental problems in the U.S. today, with grave implications for human health and climate change. Agricultural activities release the most nitrogen pollution of any industry in the form of nitrogen oxides, ammonia, and nitrous oxide in the air, and nitrate and ammonium in the water.[1] A combination of prescriptive regulation of farmers and voluntary adoption of best practices has not solved the problem. Municipal ordinances encouraging the sale of Enhanced Efficiency Fertilizers (EEFs) could be a new approach to tackle nitrogen pollution.

EEFs most effectively raise crop yields and reduce the amount of fertilizer required on those croplands where farmers apply traditional fertilizers most inefficiently. Eleven and a half million acres of corn farms, largely in Illinois, Minnesota, Michigan, Nebraska, and Ohio, have fertilizer applied so wastefully that more than 40% of nitrogen added to fields is lost to the environment instead of contributing to the growth of the crop.[2] These states make up about 50% of all U.S. corn production.[3] Including city, township, and county governments, there are about 9,000 municipalities in these states that could realize the most benefits in the form of lowered costs for farmers and higher revenues for fertilizer companies from EEFs.[4]

This article will lay out the problem of nitrogen fertilizer pollution in the U.S., provide the reasoning behind a municipal minimum sales share EEF ordinance, and propose a sample ordinance that a municipality in Illinois, Minnesota, Michigan, Nebraska or Ohio could adopt to manage the most serious effects of nitrogen pollution problems on citizens and the environment. The article will then analyze the history of ordinances that municipalities have passed in order to regulate certain products similar to nitrogen fertilizers. The litigation that ensued after these ordinances passed illuminates the likely legal hurdles that an EEF ordinance would face. The end of the article will propose specific solutions that a municipality could use to make its ordinance more likely to succeed.

I. Background

Nitrogen fertilizers increase crop growth and underpin global economic and population growth worldwide. Between 1950 and 1990, their global use increased tenfold, from 14 to 143 million tons, and crop yields increased in the same period, with average bushels/acre of corn rising from 30 to 130 bushels per acre.[5] But adding nutrients to crops so zealously has resulted in diminishing additional returns and created serious environmental consequences.[6] Second only to climate change, nitrogen pollution might be the most significant environmental threat on earth. Modern agricultural practices release thousands of tons of nitrogen fertilizer into the environment every day, causing environmental damage in the form of toxic algal blooms, fish kills, marine dead zones, harm to the ozone layer, and greenhouse gas emissions.[7] The effects on human well-being are just as severe. U.S. tourism and fishing industries in the Gulf of Mexico lose billions of dollars annually from a vast dead zone spanning thousands of square miles.[8] And polluted groundwater has forced homeowners across the Midwest to stop using wells, while utilities must pay increasingly more to remove nitrogen from polluted wa-

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terbodies.[9] Left unfiltered, drinking water with nitrates above the legal limit of 10 ppm can cause deadly blue baby syndrome in infants.[10] Higher rates of colon, kidney, and stomach cancers are associated with drinking water nitrate levels even as low as 5 ppm.[11]

Strong U.S. environmental laws, including the Clean Water Act (CWA), the Clean Air Act (CAA), and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), regulate many of the pollutants that threaten human and environmental health. But it has been difficult to regulate nitrogen fertilizers due to agricultural exceptions that exist in many significant environmental regulatory schemes. The CWA expressly exempts from regulation "agricultural storm water discharges and return flows from irrigated agriculture," while the CAA gives the EPA wide discretion to "exempt entirely" from regulation any substance used as a nutrient in agriculture.[12] Agricultural interests, through lobbying and litigation, have adeptly channeled the respect for farmers that is deeply rooted in American culture to prevent regulation of many nitrogen fertilizers.[13]

Farm groups vehemently oppose environmental regulation of farms in any form except voluntary incentives. Therefore, a growing portion of U.S. Farm Bills, which appropriate money for agriculture every few years, focus on incentives to motivate farmers to voluntarily adopt practices that are less polluting.[14] Although support for these programs is growing, there is little evidence that they have meaningful effects on the nitrogen pollution problem.[15]

With prescriptive federal regulation of farms thus far ineffective and incentives-based voluntary regulation of farms largely inadequate, a strategy that focuses on the fertilizer industry would be another important approach in the fight against nitrogen pollution. In contrast to the approximately two million farms in the U.S., only a handful of corporations dominate the U.S. fertilizer market.[16] Just five companies control 84% of U.S. production of urea and ammonia, the basic forms of nitrogen fertilizers.[17] That level of market consolidation suggests the possibility of successful environmental regulation. The Montreal Protocol's banning of CFCs and the Corporate Average Fuel Economy (CAFE) standards that increased car fuel efficiency are both examples of successful environmental regulations that changed the behavior of a few companies that controlled a market.[18]

Although the U.S. fertilizer industry only indirectly controls how farmers apply nitrogen fertilizer, many fertilizer companies already have products that render application more effective.[19] Enhanced Efficiency Fertilizer (EEF) is a blanket term for any fertilizer that either slows the release of nutrients (a controlled release, coated fertilizer) or alters the chemical conversion of nutrients into other forms that are less likely to be lost to the environment (an inhibitor).[20]

Worldwide, agricultural practices today are staggeringly inefficient, wasting more than 50% of the nitrogen fertilizer applied to crops.[21] Crops, and the farm animals that eat them, lose the benefit of this powerful growth nutrient to runoff, while the fertilizers degrade the environment. In the U.S., EEFs only make up 12% of the fertilizer market.[22] According to a study by David Kanter and Timothy Searchinger, increasing that percentage could engender economic benefits for both farmers and the fertilizer industry while protecting public health and the environment at the same time.[23] Their study estimated that if EEF use in areas where nitrogen fertilizer application is most inefficient increased from 12% of the fertilizer market today to 30% by 2030, industry profits would increase 7% because of the higher prices paid for EEFs.[24] The rate at which crops utilize fertilizers, Nitrogen Uptake Efficiency, would increase average farm yields and could, on average, offset the higher cost of EEFs compared to normal fertilizers.[25] Most importantly, a 30% level of EEF use would also mitigate $5 billion in environmental damages and human harm because of multiple benefits including smaller anoxic deadzones,[26] lower N_2O emissions,[27] higher levels organic matter in soil[28] and more water-retention capacity in the ground.[29]

This article will explore the legal feasibility of a technology-forcing approach for fertilizer companies, increasing their sale of EEFs through municipal ordinances.[30]

A. The Current Fertilizer Application Regime

Today, the dominant paradigm in U.S. fertilizer management is the "4 Rs" system.[31] The 4 Rs stand for the right source, the right rate, the right time and the right place.[32] The scientific community, in partnership with agricultural industry groups, developed this concept in the 1980s in light of the fact that agricultural systems are complex, with no one-size-fits-all solution.[33] There is no single best management practice that could encompass 30,000 different soil types with different crops and different climate conditions.[34]

The "right source" of nutrients is one that has balanced levels of all the essential plant nutrients, nitrogen, phosphorus, and potassium, considering those nutrients that are already present in the soil.[35] A farmer determines the "right rate" by considering soil nutrient supply and plant demand. The "right time" considers natural cycles of both crop nutrient uptake and risk of nutrient loss. For example, nutrients are more likely to run off of fields when the ground is frozen, militating against applying fertilizer in the late fall in Minnesota. The "right place" is about the spatial variability of a field due to hills or root-soil dynamics.[36]

Advocates of the 4 Rs hope farmers become "researchers on their own fields," experimenting "with various programs to determine which is best for them using their own management skills."[37] Those in the industry who champion the 4 Rs system recognize that a public perception of the

fertilizer industry as "only interested in increased profits through unwarranted fertilizer sales" will drive "policymakers towards regulating nutrient management, water quality guidelines, total daily load limits and other policies or practices aimed at restricting or eliminating the use of fertilizer."[38] If farmers closely adhere to the 4 Rs, they produce less nutrient pollution and lessen the motivation to regulate. Unfortunately for both the fertilizer industry and the environment, the 4 Rs have not had a great impact on fertilizer pollution. The failure of the 4 Rs is attributable to many factors including a reluctance on the part of farmers to invest in research and ineffective knowledge and technology transfer.[39] Another kind of approach is needed that does not rely on voluntary action.

Although there are still open questions about what types of EEFs are most effective in what climactic conditions, metanalyses of EEF research indicate that EEFs on average have multiple benefits over traditional fertilizers.[40] They tend to increase fertilizer nitrogen uptake in plants, increase yields, and decrease N_20 emissions.[41] While there are still unknowns about why some EEFs work better than others, a legal mechanism to increase their use is a promising alternative to the current voluntary 4 Rs approach.

It is crucial that in ameliorating the nitrogen pollution problem, EEFs do not create a new problem. There are researchers who have concerns that nitrification inhibitors, one of the two types of EEFs, might be toxic.[42] Some nitrification inhibitors, such as the products, Piadin and Vizura have been demonstrated to be toxic, harming some aquatic species as well as root development in plants.[43] It is important that any municipality encouraging EEFs through a legal mechanism knows any toxic effects of the substance. Luckily, the most common formulations of nitrification inhibitor, with the active ingredient dicyandiamide, have been shown to be non-toxic in multiple tests.[44]

B. Minimum Sales Share Requirement for EEFs

A minimum sales share approach would be markedly different from the voluntary 4 Rs paradigm today. It would require fertilizer manufacturers to increase their sales of EEFs over time as a percentage of their total sales of fertilizer. This approach is conceptually parallel to the corporate average fuel economy (CAFE) standards.[45] The CAFE standards aim to enhance fuel efficiency by regulating a handful of motor vehicles manufacturers rather than by regulating hundreds of millions of drivers.[46] Similarly, a minimum EEF sales share program would regulate companies rather than farmers by requiring that EEFs comprise a moderate percentage of nitrogen fertilizer sales. The minimum sales share would start with a low requirement (10% for example) and move toward a more stringent requirement with subsequent reassessments based on developing information and technological progress.

Fertilizer companies could drive larger sales through marketing and collaboration with USDA agencies like the Natural Resources Conservation Service (NRCS) or agricultural extension schools.[47] Ohio passed a novel rule in 2014 that all licensed fertilizer applicators on commercial farms must take a training course or pass a test every three years. Similarly, New Jersey and Maryland passed laws regulating turfgrass fertilizer application, which requires professional fertilizer applicators to obtain a fertilizer application certification.[48] The certification process might be an ideal opportunity to spread knowledge of EEFs. Many cities already require that fertilizer applicators train in a city certified program, so a city could design or contract out an applicator training addendum to the main training, solely about EEFs, with money provided by fertilizer companies.[49] This would increase company revenue while simultaneously raising EEF awareness among farmers and applicators.[50]

The benefit of a minimum sales requirement is its ease of administration.[51] States already require sellers to acquire licenses to sell fertilizer, and some cities further regulate fertilizer applications and fertilizer content through local ordinances in addition to state regulations. For example, Forest Lake City, in Minnesota, forbids anyone from applying liquid fertilizer within the city which contains more than a certain amount of phosphate. It also bans fertilizer applications within 10 feet of any wetland or water resource.[52] These bans are effective because they force companies to modify their products, positively affecting municipalities that don't themselves have bans.[53] However, a complete ban on non-EEF fertilizers would severely harm farmers. A better solution, and one more acceptable to communities, would be to create a legal framework of local ordinances where a city could condition fertilizer sales licenses on verification of satisfying minimum EEF sales requirements.

The most significant downside to a minimum sales share approach is that sales are not necessarily tied to fertilizer efficacy. Once a fertilizer qualifies as an EEF, a company will have little incentive to further improve the fertilizer.[54] However, a municipality could solve this problem by setting levels for more effective EEFs. For example, EEF products that are especially efficient could be rated as silver or gold.[55] A company would then be required to sell a smaller percentage of gold EEFs than silver EEFs to meet its minimum sales share requirement. No matter what details a municipality adds to its EEF ordinance, using a minimum sales share requirement would likely be the simplest way to make an ordinance work.

II. The History of Municipal Phosphorus Regulation

Litigation over municipal ordinances that banned phosphorus in detergents in the 1970s mirrors legal battles in the early 2000s over municipal ordinances regulating phosphorus in fertilizer. Both histories shed light on possible municipal regulation of nitrogen pollution today.

A. Detergents

By the mid-1960s, eutrophication had degraded approximately 10,000 lakes in the U.S.[56] Sewage systems do not filter out phosphorus in wastewater effluent, so the phosphorus from detergents were flowing into lakes and rivers. Because of increasing phosphorus loads, smelly green algae covered shorelines and fish stocks plummeted due to anoxic zones.[57] There was a growing public outcry, pushing cities, states, the federal government, and companies to curb phosphates in detergents that accounted for 50% of wastewater phosphorus nationwide.[58]

The three largest detergent manufacturers at the time accounted for 80% of detergent production and intended to find a compound that would replace phosphorus' cleaning properties.[59] While they were still testing and seeking approval for a new detergent formulation, industry groups attempted to head off a patchwork of state and local regulations by agreeing to reduce phosphorus concentrations in detergent to 8.7% in 1970.[60] Despite industry efforts, municipalities in New York, Florida, Indiana, Michigan, Minnesota, Vermont, and Wisconsin passed ordinances banning phosphates from detergents altogether.[61] Industry groups sued to enjoin the municipal ordinances until they could find a suitable phosphate substitute. The result was a mass of caselaw in favor of municipalities' right to pass detergent regulation to prevent water pollution.

In *Soap & Detergent Association v. Clark*, a business association sued the board of Dade County, Florida in 1971 for passing an ordinance that completely banned detergents with phosphates from being sold.[62] Plaintiffs argued that the ordinance was an "unreasonable burden on interstate commerce" and violated the commerce clause, rendering it unconstitutional.[63] In holding for Dade County, the court emphasized that "the question of safety and health is one for legislative determination, and mere economic injury to an affected industry will not counterbalance the avowed public intent of the local ordinance."[64] The court also found it favorable to the county's argument that the Dade County Pollution Control Hearing Board had the power to "grant variances and extensions of time" for strict compliance in a situation where there is "no technically feasible, economically reasonable means of compliance."[65] The court observed that this "safety valve" made the ordinance more reasonable and more likely to be constitutional.[66]

In the same year, Colgate-Palmolive sued Erie County, New York, for its ordinance that limited and then later banned the sale of detergents with phosphates.[67] Plaintiffs' legal theory was that the ordinance was an unreasonable burden to interstate commerce and a violation of the commerce clause. The court rejected that argument for the same reason as the court in *Soap & Detergent* did and held for the defendant county, noting also that the ordinance allowed "a reasonable time for the change-over by the detergent industry and gave Colgate as well as the other suppliers of detergents over nine months' time to put their affairs in order in Erie County."[68] This extra time added to the reasonableness of the ordinance and was another reason that the court found for the county.

In *Procter & Gamble Co. v. Chicago*, industry plaintiffs sued Chicago in 1975 for violating the commerce clause with its phosphate detergent ban, claiming that "the burden imposed on such commerce is clearly excessive in relation to the putative local benefits."[69] The court held that in order to find a commerce clause violation, plaintiffs had to show "convincingly that limiting the quantity of phosphorus can never be the key to the problem," and despite some evidence showing that eliminating phosphates from detergent would not completely solve the eutrophication problem, plaintiffs did not meet that evidentiary burden.[70] A second important holding from the case was that "Chicago has a legitimate interest in banning phosphate detergents as an example for other communities," meaning that even if the ordinance did not have any effect on eutrophication in the lake, setting an example for neighboring municipalities would still be a constitutionally justifiable goal.[71]

Due in large part to municipal—and later state—phosphate detergent laws, phosphorus content in sewage quickly declined. Phosphorus concentrations in wastewater treatment plant effluent were about 3 mg/L of phosphorus in the 1940s, climbed to 11 mg/L at the apex of phosphate detergent use in the 1970's, and—largely due to state and local restrictions—dropped to 5 mg/L by 1999.[72] But phosphorus from other sources was still harming the health of lakes and rivers.

B. Phosphorus Fertilizers

Once phosphorus from detergents in sewage effluent declined, fertilizers made up most of the remaining phosphorus pollution in lakes and rivers. Legal battles over phosphorus-free fertilizers also hint at a framework for how to use municipal ordinances to motivate the industry to increase EEF market share.

In 2004, Dane County and the city of Madison, Wisconsin passed ordinances banning phosphorus in lawn and turf fertilizers with few exceptions.[73] Excess phosphorus use had caused toxic algal blooms for decades in the region, harming human and environmental health. Fertilizer industry plaintiffs attempted to strike down the ordinance by filing a complaint in federal court in Wisconsin alleging state law preemption, federal law preemption, and violations of the commerce clause, equal protection clause, and due process.[74] *Croplife Am., Inc. v. City of Madison* resulted in defendant municipalities winning the case on summary judgement. Plaintiffs appealed to the 7th Circuit on the state law preemption claim. An opinion written by Judge Richard Posner affirmed the lower court's decision.[75] The court's response to each cause of action hints at how the draft ordinance below might fare against legal challenges from the fertilizer industry.

After the court upheld Madison's ordinance in *Croplife*, fertilizer companies required phosphorus-free fertilizers

in order to compete in the greater Madison market. The industry has adapted well since 2004. Minnesota counties and cities began passing similar ordinances between 2002 and 2005.[76] A state-sponsored report on the effectiveness of the phosphorus restrictions found in a sampling of stores that 97% stocked phosphorus-free fertilizers, and 82% of all fertilizers used for gardening and lawns were phosphorus-free by 2006, without increasing consumer cost.[77] The county and city ordinances succeeded without harming gardeners or the fertilizer industry, so Minnesota adopted a statewide bill restricting phosphorus in fertilizers.

Today, 12 states now have phosphorus bans or restrictions in place for non-agricultural fertilizers. It appears that more states have not passed similar bills because the industry shifted its practices even in areas without phosphorus restrictions.[78] A leading fertilizer company, Scotts Miracle-Gro, removed phosphorus altogether from one of its flagship fertilizer products and other companies have followed suit.

III. Defending an EEF Municipal Ordinance

Lessons from past phosphate litigation were at the forefront when drafting the municipal EEF ordinance below. Any plaintiff that seeks to limit or strike down the ordinance through litigation will likely attack it with state preemption claims, federal preemption claims, commerce clause claims, equal protection claims, and due process claims. This section will analyze probable challenges to the EEF ordinance below using the *Croplife* litigation as a guide, and will describe how the ordinance stands up to each of those claims in turn.

> (a) It shall be unlawful for any person, firm or corporation to sell, offer or expose for sale, give or furnish any nitrogen fertilizer, whether in the form of anhydrous ammonia, ammonium nitrate, ammonium sulphate, calcium nitrate, or any other form, in the City of _____ from and after February 1, 2022, unless at least 10% of the seller's revenue from within the municipality's limits was derived from the sale of EEFs in the prior year.
>
> a. An EEF is either a controlled release fertilizer or nitrification/urease inhibitor as defined by the Association of American Plant Food Control Officials:[79]
>
> *i. Controlled-release fertilizer*: A fertilizer containing a plant nutrient in a form which delays its availability for plant uptake and use after application, or which extends its availability to the plant significantly longer than a reference 'rapidly available nutrient fertilizer' such as ammonium nitrate or urea, ammonium phosphate or potassium chloride.
>
> *ii. Nitrification inhibitor*: A substance that inhibits the biological oxidation of ammoniacal-N to nitrate-N
>
> *iii. Urease inhibitor*: A substance that inhibits hydrolytic action on urea by the enzyme urease
>
> (b) The _____ City Department of Natural Resources shall have the power and authority to grant variances and extensions of time for compliance with the requirements of this ordinance. The Department may grant such variances or extensions only if it is affirmatively established by competent factual data and information that strict compliance with the requirements of this chapter is impossible or inappropriate because of conditions beyond the control of the person, firm, or corporation involved.
>
> (c) A person, firm, or corporation that did not meet the minimum sales share in the prior year may apply to the _____City Department of Natural Resources with a feasible plan to sell a greater share of EEF fertilizer in the upcoming year in order to begin or continue selling fertilizer within municipality limits.

A. State Law Preemption

State preemption will likely be the most significant legal hurdle in passing an EEF ordinance. Municipal legislation is preempted if it "expressly contradicts state law or if it runs counter to the legislative intent underlying a statutory scheme."[80] Since the explosion of municipal phosphate fertilizer ordinances in the early 2000s, many states have passed legislation to expressly "occupy the field" of fertilizer regulation and prevent more municipal action.[81] State statutes in Wisconsin, Illinois, Michigan, Minnesota, Nebraska, and Ohio are analyzed below.

***Wisconsin*:** In the *Croplife* litigation concerning the Dane County phosphorus ordinance, Plaintiffs/appellants argued that a Wisconsin statute that forbade a city or county to "prohibit the use of or otherwise regulate pesticides" preempted municipal action on mixed fertilizers.[82] Because many "mixed fertilizers" on the market combine both fertilizers and pesticides into one product, plaintiff's argument was that an ordinance regulating the fertilizer in a mixed fertilizer also regulated the pesticides. If this were the case, the state statute would preempt the local ordinance. The 7th Circuit, through a plain reading of the Wisconsin statutory definition of fertilizer, held that "the definition of both 'pesticide' and 'fertilizer' as including a mixture of the two preserves both state regulation of pes-

ticides and local regulation of fertilizers."[83] This holding was in line with the conventional understanding of Wisconsin fertilizer management up to that point, leaving it to "local regulation of phosphorus because the effects differ from county to county depending on the number and importance of a county's lakes."[84] Because the EEF ordinance will not regulate pesticides in particular, mixed fertilizer should not pose a legal problem in Wisconsin.

***Illinois*:** Illinois law does not explicitly preempt municipalities from regulating fertilizers. **"**The Department has the power to execute and administer the Acts and rules regulating the manufacture, sale, and distribution of fertilizers."[85] Although the state law seems to occupy the same field as the EEF ordinance, if they do not clash there may not be state preemption.[86] In *City of Davenport*, a city ordinance permitted the use of an automated traffic enforcement system, which plaintiff claimed conflicted with the comprehensive state scheme for traffic enforcement. The court held for defendant city because "the state statute and the municipal action must be *irreconcilable*" and that was not case.[87] Here, the state's authority over sale of fertilizers and a municipal EEF ordinance are not necessarily irreconcilable if, for example, "the Acts and rules" referred to only speak to regulation of phosphorus fertilizers.

***Michigan*:** Michigan expressly "preempts any local ordinance, regulation, or resolution that would duplicate, extend, or revise in any manner" state law having to do with fertilizer regulation.[88] However, Michigan also reserves a specific preemption exception. "A local unit of government may adopt an ordinance prescribing standards different from those contained in this part and rules promulgated under this part and that regulates the manufacturing, storage, distribution, sale, or agricultural use of a product regulated by this part only under [. . .] the following circumstance:

> (a) Unreasonable adverse effects on the environment or public health will otherwise exist within the local unit of government, taking into consideration specific populations whose health may be adversely affected within that local unit of government."[89]

324.8517(a) is Michigan's recognition that a municipality should play a role in managing the harmful effects of fertilizers within its borders. In those municipalities with dangerously high nitrate levels in drinking water, there is arguably an "unreasonable adverse effect" on the public health and an EEF ordinance would be regulating the sale of fertilizers to solve the problem.[90] An ordinance adopted through 324.8517(a) by a municipality may not be enforced "until approved by the commission of agriculture."[91] Instead of a municipality defending its EEF ordinance in court, the Michigan commission of agriculture would make the final decision and in case of denial would have to "provide a detailed explanation of the basis of a denial within 60 days."[92] Even if the Michigan commission denied an EEF ordinance, the explanation would still provide a useful lesson in how a similar ordinance could be drafted to survive.

***Minnesota*:** Minnesota law expressly occupies the field of phosphorus fertilizer regulation. A municipality "may not adopt or enforce any ordinance that prohibits or regulates, and may not in any other way prohibit or regulate, the distribution, sale, handling, use, or application of *phosphorus* [emphasis added] fertilizers and *phosphorus* [emphasis added] fertilizer products that are applied or will be applied to land used for growing crops or any other agricultural use."[93] It is an open question whether Minnesota occupies the field for nitrogen fertilizer regulation as well.

A party defending the EEF ordinance in court might interpret the state statute using the *expressio unius est exclusion alterius* canon of construction, arguing that because Minnesota exclusively names phosphorus fertilizer legislation, nitrogen fertilizer legislation is purposely left out and legal for municipal ordinances to regulate.[94] Additionally, the *City of Davenport* argument that state phosphorus law and a municipal nitrogen ordinance are not irreconcilable might be persuasive.[95] A party opposing the EEF ordinance would counter that the Minnesota law has revealed the state's intent to occupy the whole field of fertilizer regulation, precluding a municipal ordinance concerning nitrogen fertilizer.[96] Although the final result is uncertain, a court would likely take into account Minnesota's earlier history with municipal phosphorus ordinances and conclude that the state Legislature passed this statute to specifically preempt municipal phosphorus fertilizer ordinances, leaving nitrogen fertilizer to municipal regulation.

***Nebraska*:** Nebraska preempts a municipal EEF ordinance, but explicitly carves out a role for local control of water pollution. "The Nebraska Commercial Fertilizer and Soil Conditioner Act and any rules and regulations adopted and promulgated thereunder shall supersede and preempt any ordinance, rule, regulation, or resolution enacted by any political subdivision of the state regarding the regulation of fertilizer and soil conditioners."[97] There is a clause that reserves a role for local regulation, however. "Nothing in this section shall be construed to preempt or otherwise limit the authority of [. . .] any natural resources district to enforce the Nebraska Ground Water Management and Protection Act."[98] Nebraska has endowed 23 Natural Resource Districts that cover the entire state with the responsibility for "Pollution Control" and "Development, Management, Utilization, and Conservation of Groundwater and Surface Water."[99] The districts are made up of locally elected directors that make environmental decisions within the district boundaries.[100] Although a city or county in Nebraska would be preempted from passing an EEF ordinance, it is within the power of any one of the 23 Natural Resource Districts to do so.

***Ohio*:** Ohio law expressly occupies the field and preempts a municipal EEF ordinance. "No political sub-

division shall regulate the registration, packaging, labeling, sale, storage, distribution, use, or application of fertilizer."[101] Nor shall any political subdivision "enact, adopt, or continue in effect local legislation relating to the registration, packaging, labeling, sale, storage, distribution, use, or application of fertilizers." Because the proposed EEF ordinance regulates the sale of fertilizer, it would be preempted by this law and struck down in court.

Each state has its own unique fertilizer law regime, producing different results in response to a state preemption challenge to a municipal EEF ordinance. With the exception of Ohio, there are strong arguments in each state that the ordinance could overcome a state preemption challenge. In Illinois, a municipality could argue that the state and municipal laws are not irreconcilable. A Michigan municipality could argue that nitrogen pollution is a "unique adverse effect" that merits municipal regulation. A Minnesota municipality could argue that the state's fertilizer regime only covers phosphorus, meaning there is no conflict with municipal nitrogen regulation. In Nebraska, a municipality would pursue a different strategy, encouraging the ordinance to be passed by one of Nebraska's unique natural resource districts.

B. Federal Law Preemption

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) is the only federal statute that might preempt a municipal EEF ordinance. FIFRA prohibits states from imposing on pesticides "any requirements for labeling or packaging in addition to or different from those required under [FIFRA]."[102] In *Croplife America, Inc. v. City of Madison*, Plaintiffs argued that an ordinance conflicted with FIFRA because it added a requirement for application of mixed fertilizers (thereby regulating the pesticide portion) that users must "water such lawn and turf fertilizer into the soil where it is immobilized and generally protected from loss by runoff."[103] The court held that additional language in the ordinance which stated that "the person applying the product is to water the fertilizer only when doing so is consistent with the product's label instructions," meant FIFRA did not preempt the municipal ordinance.[104]

Because an EEF ordinance will focus on the behavior of fertilizer sellers rather than the behavior of fertilizer applicators, this federal preemption question will not arise. Furthermore, the proposed municipal ordinance only affects the sale of the fertilizer portion of mixed fertilizers, so sale of pesticides is unaffected and a FIFRA challenge would not succeed.

C. Constitutional Claims

Commerce Clause/Equal Protection Clause: A state or local law violates the federal government's right to regulate commerce between the states if it mandates "differential treatment of in-state and out-of-state economic interests that benefits the former and burdens the latter."[105] A law violates the equal protection clause if it irrationally discriminates against a party.[106] In *Croplife*, Plaintiffs argued that the Dane County ordinance mandated differential treatment between states and irrationally discriminated against them because it exempted the Milwaukee Metropolitan Sewerage District's biosolid fertilizer, Milorganite. The Sewerage District repurposed sewage sludge into a phosphorus fertilizer called Milorganite, which was indeed exempted from the county ordinance.[107] The court held that there was no discriminatory purpose or differential treatment because the ordinance exempted "all biosolids, not just those produced within the state." Because there was a rational basis for the ordinance (in this case, encouraging the "beneficial use of municipal sewerage waste" rather than incineration), and because neither the intent nor the effect was to favor any one state or party over another, it was constitutional.[108] If a municipality has some *conceivable* basis for an ordinance, then the ordinance is rational, regardless of whether it is the best way to achieve the goal.[109]

Opponents of an EEF ordinance will likely argue that a law favoring EEFs over normal fertilizers is unconstitutional because it benefits companies that produce EEFs and hurts those that do not. Like the *Croplife* plaintiffs, they may also argue that the ordinance favors states that produce more EEFs over states that do not. But the *Croplife* holding suggests that any incidental advantage that an ordinance would give a company or state over others would not defeat the ordinance. Companies or states with a higher capacity to produce and sell EEFs will benefit more from an EEF ordinance, however this secondary result does not detract from the rational basis of reducing nitrate pollution in drinking water.

The fact that the court used rational basis review is crucial for any future EEF ordinance. There are uncertainties about how effective an EEF ordinance passed in a single small city will be.[110] Undoubtedly some level of nitrogen pollution will persist even if many EEF ordinances pass.[111] Opponents of an EEF ordinance will point to these failings to suggest that the ordinances are irrational and benefit some companies over others, violating the equal protection clause. But the *Croplife* court held that despite plaintiff's considerable evidence that phosphorus fertilizer bans were unwise and ineffectual, an ordinance need not "resolve the entire problem it is designed to attack" or "attack the problem in the most effective way" in order to survive rational basis review.[112]

Due Process: The *Croplife* Plaintiffs also argued that the ordinance was too vague to be constitutional, but the court held that the ordinance was clear enough with its requirements for fertilizer labelling, sale, and application, that there was no due process issue.

Vagueness is a difficult flaw to contend with in writing an EEF ordinance because it is not governed by clear judicial rules. The guideline is that the ordinance should be clear enough that "regulated parties should know what

is required of them so they may act accordingly; and precision and guidance are necessary so that those enforcing the law do not act in an arbitrary or discriminatory way."[113]

An EEF ordinance would have to avoid the due process pitfall that the city of Toledo, Ohio met, when the 6th Circuit struck down its Lake Erie bill of rights ordinance. The court held in that case that an ordinance granting Lake Erie the right not to be polluted violated the due process clause because it was not clear how residents could comply or officials could enforce it.[114] In invalidating Toledo's ordinance, the court held up Madison's phosphorus-free fertilizer ordinance as a constitutional approach to protecting a municipality's waters.[115] An EEF ordinance must hew closer to the Madison bill than the Toledo bill in terms of specificity to survive a challenge.

While the *Croplife* holding will only be persuasive authority in most jurisdictions, it still provides valuable insight into how judges think about these kinds of local environmental questions. Preparing to defend an EEF ordinance form state preemption claims, federal preemption claims, commerce clause claims, equal protection claims, and due process claims will be crucial for any municipality interested in pursuing this solution.

D. Home Rule Municipalities

Home-rule municipalities, also known as charter municipalities, would have the best chance to defeat state preemption challenges of municipal fertilizer ordinances. A home-rule municipality has the power to preempt states from regulating "municipal affairs," although they still may not regulate issues of "statewide concern."[116] Even if state law preempts an EEF ordinance in a municipality created the standard way through state legislation, there are hundreds of home-rule municipalities that would have a better chance of defending an EEF ordinance in court. Illinois has 217 home-rule communities, Ohio has 234, Minnesota has 107, Nebraska has two and Michigan has two.[117]

There is no precise test that courts use to determine what is a "municipal affair," but many courts grant a presumption of validity to a municipal ordinance when there is "a significant local interest to be served which differs from one locality to another."[118] Nitrate pollution rates widely vary between municipalities, as does the effectiveness of EEFs, so any home-rule municipality that passed an EEF ordinance could argue in response to a state preemption challenge that it is regulating a municipal affair.[119] State courts are inclined to "harmonize the provisions of the charter with the provisions of the statute relating to the same matter" if there is any resolvable conflict.[120]

A 7th Circuit case from 1995 illustrates the power of home-rule municipalities. In *Nat'l Paint & Coatings Ass'n v. City of Chicago*, a business association sued Chicago for passing an anti-graffiti ordinance that banned the sale of spray paint and jumbo indelible markers within city limits, arguing that Chicago had violated "the dormant commerce clause and principles of substantive due process, and that it also exceeds Chicago's home-rule powers."[121] The court held that Illinois provides that "home-rule units be given the broadest powers possible" to "regulate for the protection of the public health, safety, morals and welfare."[122] After determining that this ordinance did not exceed home-rule powers, the court held that in spite of spray paint being easily accessible outside of Chicago borders, the ordinance was still rational and therefore constitutional.[123]

National Paint suggests that a home-rule community has more power to pass an EEF ordinance and avoid preemption than a normal municipality. This is especially important for Ohio, which explicitly preempts agricultural fertilizer regulation from municipalities. The holding also undermines a likely argument from opponents of an EEF ordinance, that because non-EEF fertilizers can be bought outside of municipality limits and used within, the ordinance is irrational and therefore unconstitutional. The 7th Circuit rejected that argument in *National Paint* and courts would likely reject it here.

Home-rule municipalities, with their broad powers to regulate "municipal affairs," could provide a stronger legal defense for a municipal EEF ordinance. Although states construe home-rule powers differently, the extra power that a home-rule municipality holds can only benefit the ordinance and, in some cases, may be the differences between a legal and an illegal ordinance.

IV. Adopting an EEF Ordinance

A. What Factors Would Motivate a Municipality to Pass an EEF Ordinance?

The EPA regulates more than 150,000 public and private drinking water systems through the Safe Drinking Water Act (SDWA).[124] So long as a water system has at least 15 connections or serves at least 25 people, it must adhere to the drinking water standards set by the EPA.[125] If a municipality's drinking water nitrate levels are 10 ppm or higher, that exceeds the EPA standards and could lead to either state or EPA enforcement measures and penalties.[126] So, along with responding to constituents who demand clean water, a municipality might pass an EEF ordinance to avoid state and EPA penalties.

Benefits of EEF use are most pronounced in areas that exceed the "criterion rate" for Nitrogen Uptake Efficiency. The criterion rate is reached when nitrogen fertilizer input is 40% higher than the nitrogen that leaves fields in the form of grain, suggesting highly inefficient fertilizer use.[127] Approximately 11.5 million acres of corn cropland exceed the criterion rate and are located largely in Nebraska, Illinois, Minnesota, Michigan, and Ohio. Including city, township, and county governments, these states contain about 9,000 municipalities that could realize the most benefits in the form of lowered costs for farmers and higher profits for fertilizer companies due to passing an EEF ordinance.[128]

The threshold question in assessing what municipality might pass a technology-forcing ordinance is asking which local governments would have the most incentive to do so. Recent litigation suggests that municipalities in Iowa are searching for novel solutions to the fertilizer pollution issue, motivated by increasing filtration costs being shouldered by public utilities and taxpayers. As nitrogen pollution increased, the Des Moines public water utility, the Board of Water Works (BWW), had to filter steadily more nitrates out of drinking water.[129] The BWW estimated it would need to spend between $76 million and $183 million to construct and operate a new nitrate-removal facility and keep up with the pollution. Unable and unwilling to sue individual farmers, the BWW instead sued drainage districts responsible for draining the water from swamps and flooded farmland into waterbodies in *Bd. of Water Works Trs. of City of Des Moines v. Sac Cty. Bd. of Supervisors*.[130] Although the suit failed for a variety of reasons, it revealed the enormous costs associated with nitrate pollution and the willingness of municipal officials to search for novel legal solutions.

Those cities or counties that are considering costly upgrades to their water filtration systems would have an incentive to pass an EEF ordinance. This calculus will occur wherever nitrates levels in drinking water sources are near the 10 ppm limit set by the EPA in 2012.[131] Communities throughout Nebraska are particularly vulnerable. A citizen science water monitoring campaign in central and eastern Nebraska found that 40% of the 197 surface water sites tested had nitrate levels above the 10 ppm nitrate limit.[132] Faced with the exorbitant costs of upgrading the water filtration systems of its public utility, a municipality will be more likely to consider an EEF ordinance. Importantly, a community will be far more likely to consider an EEF ordinance if its drinking water source is within its jurisdiction. In Nebraska, 20% of drinking water comes from private wells which are within the municipality.[133] But if a municipality imports water from outside its borders, an EEF ordinance is less appealing because it would have no effect on the drinking water supply.

Municipalities far smaller and less wealthy than Des Moines are grappling with nitrogen fertilizer pollution. Water filtration is more effective when scaled up, so smaller cities that consume less water pay more per gallon of water filtered.[134] The EPA recommends either an ion exchange or reverse osmosis treatment system to filter nitrates from drinking water. Depending on the choice of system and the concentration of nitrates in the water, filtration costs can rise to exorbitant heights.[135] Nitrate levels in Hiawatha, Kansas, a town of 3,300, reached 11 ppm in 2017.[136] The town government decided, after issuing multiple public drinking water warnings, to build an ion exchange plant at the cost of $3.5 million. Although federal and state funding is often available for these projects, cities frequently balk at the cost of installing water meters to secure funding, and instead finance filtration systems on their own.[137] And once the systems are built, local taxes rise to pay for their operation. A University of California, Davis study estimated that, for cities with populations between 500 and 3,300 people, the cost of building and operation of an ion exchange plant would be between $47 and $378 per person per year.[138] While this estimate does not take federal grant money into account, taxpayers are ultimately footing the bill and local residents bear the costs of operation.

Hundreds of municipalities in corn farming regions could benefit from increased use of EEFs. An EEF ordinance might be an especially attractive strategy for those cities, towns, or counties that have been forced to issue water quality alerts due to nitrogen pollution or are considering expensive upgrades to their water filtration systems.

B. Solutions

As outlined above, a minimum sales share municipal EEF ordinance will face multiple legal challenges, so a municipality pursuing this strategy should pass the ordinance from the strongest possible position. Ideally, a home-rule municipality will pass the ordinance. With the power to regulate "municipal affairs," the municipality will be able to better defend its EEF ordinance against a state preemption claim. While home-rule powers would be important in any state, in Ohio in particular the state preemption challenge will gravely threaten any ordinance regulating fertilizer. Passing it in one of Ohio's 234 home-rule municipalities might be the only way for an EEF ordinance to survive in the state.

Reasonableness will be a critical factor in defending the ordinance, so when drafting it, a municipality should add qualifications that make the ordinance easier for a company to obey. One of the simplest ways to add to the ordinance's reasonableness is to phase in the rules slowly. In *Colgate-Palmolive Co. v Erie* the court observed that the phosphate ordinance gave a "reasonable time for the change-over by the detergent industry and gave Colgate as well as the other suppliers of detergents over nine months' time to put their affairs in order in Erie County."[139] It would be wise for a municipality to delay implementation of the ordinance for a year to allow sellers within its borders to adjust to the new regulations. A possible provision is drafted below:

> (a) It shall be unlawful for any person, firm or corporation to sell, offer or expose for sale, give or furnish any nitrogen fertilizer, whether in the form of anhydrous ammonia, ammonium nitrate, ammonium sulphate, calcium nitrate, or any other form, in the City of _____ from and after February 1, 2022, unless at least 10% of the seller's revenue from within the municipality's limits was derived from the sale of EEFs in the prior year.

Another way to enhance the reasonableness and therefore the defensibility of an EEF ordinance is through a provision for granting exceptions. In *Soap & Detergent,* the court rejected the industry plaintiffs' argument that the

phosphate detergent ban was an "unreasonable burden on interstate commerce."[140] In assessing the ordinance's reasonableness, the court emphasized that it provided for "variances and extensions of time" for strict compliance in a situation where there is "no technically feasible, economically reasonable means of compliance."[141] An EEF ordinance should have its own "safety valve" that will strengthen it against any attacks of unreasonableness. A municipality could grant its town council, department of natural resources, or some other body the power to give variances or extensions to those companies struggling to comply with the ordinance. The risk of the law being struck down altogether is more severe than the risk of a noncompliant business evading regulation. A possible provision is drafted below:

(a) The _____ City Department of Natural Resources shall have the power and authority to grant variances and extensions of time for compliance with the requirements of this ordinance. The Department may grant such variances or extensions only if it is affirmatively established by competent factual data and information that strict compliance with the requirements of this chapter is impossible or inappropriate because of conditions beyond the control of the person, firm, or corporation involved.

There is a complication with an EEF ordinance that was not present in simple bans of phosphate detergent products. This ordinance will function by banning the products of those businesses that do not sell a baseline amount EEFs, rather than just banning a certain product across the board. The ban will operate on the basis of the number of EEFs sold in the previous year. This means that if a business fails to sell enough EEFs one year, with no other provisions added to the ordinance, the seller will be locked out of the municipality's fertilizer market with no means to sell products and achieve compliance with the ordinance. To enhance the reasonableness of the ordinance and ensure that all sellers have the same opportunity to enter the market, the ordinance should contain a provision that allows a seller to show how it will meet the EEF sales threshold in the future in order to continue selling within municipal boundaries. A possible provision is drafted below:

(b) A person, firm, or corporation that did not meet the minimum sales share in the prior year may apply to the _____City Department of Natural Resources with a feasible plan to sell a greater share of EEF fertilizer in the upcoming year in order to begin or continue selling fertilizer within municipality limits.

Conclusion

American mayors today assert themselves on the national stage, cooperating on issues of global importance like COVID-19, energy, and climate change.[142] Municipalities are laboratories of innovation, and local governments could have a vital role to play in tackling the serious global issue of nitrogen pollution. Although a municipal EEF ordinance will likely face opposition from industry groups, cities, towns, and counties have in the past fought for the right to fix their environmental problems and won. Litigation in the 1970s over phosphate detergents, and phosphorus fertilizer litigation in the early 2000s, suggests that municipalities have vital roles in handling their own public health and environmental problems. In Illinois, Michigan, Minnesota, Nebraska and Ohio, where farmers use nitrogen fertilizer most inefficiently, an EEF ordinance could deliver financial, health, and environmental benefits that today's voluntary 4 Rs regime cannot.

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Second Place (tie)

Climate Change and the Water Trap: Considering Western Water Policy Through Socio-Ecological Trap Theory

By Adam Herron

Introduction

"Property rights serve human values."[1] While that maxim continues to hold water, the issue of which human values should be served in a future impacted by climate change is less clear. The path may be relatively self-evident when the competing values are between the right of a landowner to exclude social workers and the rights of a migrant farm worker to access legal resources;[2] however, the arguments muddy when the competing rights implicate food production and drinking water.

In the arid American West, the risk of catastrophic drought has increased significantly under a changing climatic regime due to rising global temperatures brought on by anthropogenic greenhouse gas forcing.[3] Under the prior appropriation doctrine, the allocation of surface waters in this drought prone region grants rights of priority use of surface water in times of scarcity on a "first in time, first in right" basis. In much of the West, agriculture use makes up an overwhelming majority of priority rights holders, often being allocated 80% or more of surface waters in a state.[4] This leaves little water instream for other uses in a region in which urban growth is projected to support a projected population increase of 68%, 94 million people, by 2050.[5] Necessarily, there is a significant call to reform the western water allocations to more adequately supply these growing populations with basic drinking water and other municipal needs.[6]

This paper examines the growing tension between municipal and agricultural water users as borne out by the nexus of prior appropriation and climate change. Further, this paper argues that while municipal water use is critical for sustaining the growing urban population in the West, the shift from agriculture to urban may only exacerbate resource issues under the future climate. From the premise that growth should occur in a manner limited by factors including ecology, climate, hydrology, and economics, on both regional and national scales, this paper argues that the systemic growth patterns of the western United States are potentially trapping its populations in a future characterized by socio-ecological degradation under extreme drought. This paper examines the cultural and historical context of present water use tensions through a socio-ecological trap perspective and posits that the urbanizing West should reconsider large scale transfers of water to meet future demands, as continually feeding population growth may have disastrous costs.

Part I describes the concept of socio-ecological traps in an effort to provide perspective on the development of the urban West. Part II will give background explanation of western water allocation doctrine, a basic history of its development and implementation. Part III will focus on the changing population dynamics of the West. Part IV will discuss projected changes to the climate and what impacts those changes will have on western water supplies. Part V discusses the potential conflict between agricultural and urban water uses and its context. Part VI considers the nexus of the changing urban population and climate change through a modern socio-ecological traps perspective.

I. Socio-Ecological Trap Theory: A Primer

The basic concept of a trap is rather intuitive: something enters the trap and cannot escape. This basic concept is applied across science disciplines through various frameworks, depending on the starting point. Generally, however, all trap frameworks share a basic premise: there is a mismatch between the response of an entity to the so-

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cial or ecological conditions which triggered the response which is self-reinforcing.[7]

As applied to wildlife, the basic concept of ecological trap theory is that populations unknowingly choose habitats of low fitness based on habitat cues that are no longer accurate due to human induced rapid environmental changes.[8] These low quality habitats appear highly attractive, but are ultimately unable to sustain populations due to their inability to adapt to unforeseen rapid environmental changes, resulting in significant population loss.[9] A classic example of an ecological trap is a hay field attracting nesting birds due to the requisite grassland habitat, only to result in extreme nest mortality when the field is mowed for hay before fledging occurs.[10]

Pertinent to this paper is the application of the trap framework in social sciences. So called "socio-ecological traps" aim to describe social rigidity in the face of ecological processes which leads to trap situations resulting in environmental and social strife.[11] Socio-ecological (SE) traps may be particularly useful when examining "dilemmas of common action" typified by the "tragedy of the commons."[12] The basic tenant of these dilemmas is that the communal use of a non-exclusive resource will lead to the degradation of that resource so long as the individual gain of using the resource is greater than their share of the collective cost.[13] The understanding of common action dilemmas has become more nuanced in recent decades and it is now understood that degradation of common pool resources is not a constant but rather a function of social rigidity.[14] SE traps therefore occur when highly rigid social responses fail to solve dilemmas of common action, resulting in the reinforcing of unsustainable social and ecological outcomes.[15]

The word "trap" may infer a *results*-based model, as in, the titular "trap" is inescapable resource degradation flowing from reinforced maladaptive decisions. However, it is more appropriate to consider traps as a *process* model.[16] SE traps are "unplanned and unintended process" which involves interdependent human action and environmental changes as well as interdependent *phases* of social change.[17]

Socio-ecological traps have antecedent conditions that are ripe under certain conditions to lead to social and ecological degradation.[18] If certain social trajectories—such as policy decisions regarding natural resources, immigration, or food production—are engaged at critical junctions, populations may get locked in to land-use feedback loops which can lead to rapid degradation upon changing ecological conditions.[19] An example of major policy decisions which have interacted in ways that create trap like conditions include the "gilded lobster" trap of the North Eastern U.S.[20]

First discussed in 2011, the gilded trap of the Maine lobster fishery describes the process in which the Maine coastal fishery was transformed from a diverse multi-species fishery, to a mono-culture, lobster dominated fishery, both economically and ecologically.[21] The term "gilded trap" is used to describe traps in which "social drivers (e.g. population growth, globalization, and market demand) increase the value of natural resources as the ecological state moves closer to a tipping point."[22] Further, gilded traps exist where "the perceived lucrative value of a natural resource drives stakeholders and managers to overlook risks of its unexpected decline and the associated negative social and ecological consequences."[23]

The fishery in the coastal waters of Maine was historically diverse, reflecting the variety of abundant finfish and mollusks.[24] As demand on the fishery increased, the fishery intensified on dwindling predatory finfish, especially cod.[25] At this critical junction, the U.S. Government decided to meet the rising demand by protecting Maine fisherman through the informal adoption of the United Nations Convention on the Law of the Sea ("Law of the Sea")[26] and through subsidies to modernize fishing fleets.[27] Among its many provisions, the Law of the Sea sets the limits of a nation's maritime enforcement zones, generally 200 miles out from shore, what is referred to as the "Exclusive Economic Zone."[28] Instead of taking a conservation first approach, Maine and other New England states utilized this new exclusive access structure as a means to rapidly increase fishery production amidst historic declining fishery stocks.[29] This led to a overfishing and rapid collapse of predatory finfish stocks, paving the way for the historical prey species, lobster, to become the dominant species and effectively creating a "monoculture" in the Gulf of Maine.[30] The modern fleet then shifted to almost exclusively relying on lobster, which created total economic dependence on the fishery for the coastal region.[31]

Herein lies the gilded trap, with economic forces making it advantageous to reinforce the system given the high demand and price for lobster.[32] However, the monoculture is highly vulnerable and susceptible to crashing.[33] Evidence indicates that various ecological factors, including ocean warming due to climate change, could lead to disease and mass destruction of the lobster population, along with the economy of coastal Maine.[34]

The critical elements of Maine's gilded lobster trap are total socio-economic reliance on a singular resource, a resource which grows increasingly fragile as the nexus of reliance and climate change grows. Part VI discusses how these elements are potentially present in the arid west.

II. Western Water Allocation

Since 1848, when the California gold rush gave birth to the basic principles of the western prior appropriation system, a right to use water has been acquired by applying water to a beneficial use. The right continues only as long as the beneficial use continues, without waste. Nonuse results in forfeiture, and wasteful use is prohibited.[35]

The prior appropriation doctrine, which governs almost all water allocation west of the Mississippi River, was

born out of the successive western mining rushes of the 19th century and is anchored in the concepts of chronological priority and "beneficial use."[36] In contrast to the riparian doctrine, which generally informs water law east of the Mississippi River, prior appropriation rights are not tied to streamside landownership.[37] The climate in the arid West is such that precipitation alone cannot support mining production and other uses, including agriculture, when they are not located directly adjacent to a stream.[38] Therefore, the diversion of water to inland mining claims was necessary to put a claim into production, and miners developed a common law of notice and priority to protect that diversion.[39] This integrated a priority system to adapt to the reality of droughts, where the first user to divert water on a stream had first priority to that water in times of scarcity, regardless of the type of use or the location of its' diversion along a stream.[40] To stem the fear of water speculation in the settlement of the West, the concept of "beneficial use" was incorporated.[41] In order to establish a right to divert a certain quantity of water, the diverter had to put the water to actual beneficial use without waste, generally understood to be mining and agriculture, which prevented monopolization of the critical resource.[42] Eventually, prior appropriation became statutorily adopted by the western states,[43] which resulted in a protected property interest in the use of a given quantity of surface water.[44]

Early estimates for many western streams were too generous in determining yearly flow rates resulting in over-appropriation, meaning that on an average year, there is not enough water available for a portion of the junior priority users to receive water.[45] This forecloses appropriation for other needs, regardless of necessity, and therefore has significant implications in the face of projected increasing drought. The doctrine seemingly has a potential mitigation measure built in, by requiring beneficial use *without waste*.[46] Essentially, the principle of waste holds that "[n] o water user is entitled to more water than is reasonably needed to accomplish his or her particular beneficial use" and waste can be generally defined as the amount of flow diverted in excess of reasonable needs as determined by a custom.[47] In theory, water appropriations can be reduced through forfeiture of flows equal to the amount unreasonably lost under a specific use.

Agricultural irrigation makes up 80% or more of water diversions in the West under prior appropriation.[48] While, much progress has been made in recent years to increase the efficiency of irrigation systems, there is still a significant portion of water diverted that is lost through leakage, evaporation, and more. Persistent use of open ditch, gravity fed irrigation systems contribute a majority of this loss, with efficiency averaging to approximately 25–35% loss, with historical uses ranging beyond 50%.[49] California irrigates the most acres of any state in the nation and 43% of this acreage is irrigated through this least efficient method.[50] Determination to define this loss as waste is severely lacking, as courts favorably interpret "customary use" so as to include all but the outer fringes of inefficient use, and water resource managers lack resources or direction to make meaningful enforcement.[51] Additionally, because irrigators pay very little (if anything) for diverted water, it is argued that their agricultural production is artificially inflated, resulting in inefficient waste of a scarce resource.[52]

III. Urban Expansion and the Hydrologic Trap

Settlement of the western U.S. did not begin out of ignorance of the relatively harsh landscape dominating much of the region. Expeditions beyond the Mississippi River frontier in the early 19th century returned descriptions of the Southwest as a harsh and inhospitable, arid landscape. The explorer Zebulon Pike in 1810 likened the arid West to the African Sahara, and regarded it as a barrier to westward migration.[53] Major Steven Long in his expedition to the Rocky Mountains in 1820 declared the Southwestern plains as the "Great American Desert" which was widely reproduced on maps there afterward.[54]

Westward expansion would not be contained by aridity however—likely due in part to the discovery of gold in California in 1848—and by 1852, over 100,000 Americans would travel West.[55] With fortunes to be made by common people, and the realization of the vast resource potential beyond precious metals, westward migration became policy, spurred on by the manifest destiny laws of the 1860s including the Pacific Railroad Act and the Homestead Act.[56]

Set amongst the westward call, the explorer John Wesley Powell cautioned against westward expansion in his report from the first expedition down the Colorado River in 1869, claiming that in most of the western arid regions, "disastrous droughts will be frequent."[57] This warning went unheeded however, replaced instead by the belief that "rain follows the plow" and similar adherence to technological optimism.[58] This concept was bolstered by the Desert Lands Act of 1877 which granted large tracts of arid public lands for nominal fees to any settlers who occupied and irrigated the land for three years.[59] The hubris of these policies is aptly reflected in a popular novel of the time, *The Mysterious Island*, by Jules Verne, published in America in 1875.[60] In the novel, the protagonists escape the American Civil War only to be stranded on a barren desert island, which they transform into a paradise through engineering and irrigation.[61] However, much like Mr. Verne's tale, rain following the plow turned out to be fiction as well, and the Reclamation Era of federally subsidized water supply projects in the 20th century were born to feed the populations built on these false pretenses.

The urban West is a federal creation, grown out of the desire to settle and exploit vast natural resources, and made possible only through extensive federal infrastructure projects to move water and electricity across arid desert lands.[62] In 1902, the Bureau of Reclamation was created by Congress to meet the water needs of the growing western populations and industries.[63] The Bureau was tasked with harnessing and diverting as much water as practicably possible in an effort to make productive and beneficial

use out of what was seen as natural wasting of a precious resource.[64] The Bureau's perspective of its reclamation mission during the early 20th century is aptly summed up by its report to Congress in 1946 on its dam projects on the Colorado river,

> Yesterday the Colorado River was a natural menace. Unharnessed it tore through deserts, flooded fields, and ravaged villages. It drained the water from the mountains and plains, rushed it through sun-baked thirsty lands, and dumped it into the Pacific Ocean—a treasure lost forever. Man was on the defensive. He sat helplessly by to watch the Colorado River waste itself, or attempted in vain to halt its destruction.
>
> Today this mighty river is recognized as a national resource. It is a life giver, a power producer, a great constructive force. Although only partly harnessed by Boulder Dam and other ingenious structures, the Colorado River is doing a gigantic job. Its water is providing opportunities for many new homes and cities and for the growing of crops that help feed this nation and the world. Its power is lighting homes and cities and turning the wheels of industry. Its destructive floods are being reduced. Its muddy rivers are being cleared for irrigation and other uses.[65]

Ultimately, by the end of the Reclamation Era,[66] the Bureau had constructed more than 600 dams and reservoirs in the West, providing water for several millions of the rural and urban populations, and irrigating more than 10 million acres of farmland.[67] In effect, the Reclamation policies of the United States directly subsidized and encouraged the rapid expansion of industry including agriculture and mining, and the present urban population explosion in the West as well.[68]

Many of these urban areas are located in watersheds remote from the ones in which they receive major portions of their water supply.[69] For example, the urban Southern California region, including Los Angeles and San Diego (not located along a significant source of fresh surface water), get the majority of its water supply from the San Joaquin River and Tulare Lake Basins, the Mono Lake and Owens Valley Basin, and the Colorado River Basin.[70]

These basins represent a range of past and potential issues regarding water use in the West. The San Joaquin valley is home to an agricultural industry which grows one quarter of the nation's produce, including 40% of all fruits and nuts.[71] In Owens Valley, agriculture in 260,000 acres has been taken out of production or precluded, as most water in the valley was appropriated by Los Angeles in the early to mid-20th century.[72] The juxtaposition of these two valleys demonstrates an extreme scenario in which California's agrarian past, gives way to the demands of the state's urban growth.

The Colorado Basin represents yet another issue, in which cities located along a watershed or water project must compete for supply to sustain their booming populations.[73] The Colorado River Basin, a municipal water source for 40 million people, is overallocated, and has faced demands exceeding supply.[74] Along its reach lies several cities including Denver and Salt Lake City at the top, and Las Vegas, Los Angeles and Phoenix at the bottom.[75] Municipalities along the upper Colorado are likely facing a coming curtailment, as flows in the upper basin are reaching lows which threaten water rights downstream, including California, the senior priority holder in the lower basin.[76]

The lower basin municipalities have undertaken great strides in reducing demand through conservation measures in recent years; however, flows to Lake Mead, the main water source in the lower basin are still exceeded by withdrawals.[77] While lower basin municipalities are withdrawing less than their full allotment, this reduction is not enough to overcome evaporation and system loss, pushing the lake towards the "dead pool" level where water can no longer be effectively pumped.[78] The elephant in the room here is the projected drier climate which will likely drive up demand and evaporation, but also the fact that most of the actual water volume coming from the lower basin is devoted to agriculture, not municipal uses.[79]

The projected population growth in the western United States in the coming decades is verging on astronomical. The southwestern United States is the fastest growing region in the nation, with the population expanding by 37% between 1990–2010, compared to 24% nationally.[80] In California alone, the most populated state in the nation, it is projected that by 2030, the state will increase its population by one-third, whereas the Southwest region as a whole will likely increase in population by 69% to 94 million people by 2050.[81] Most of the growth will occur in the urban and suburban lands of the West, with urban land projected to double by 2050 and suburban lands projected to increase by up to 41%[82] The urban and suburban footprint will mirror this expansion, spreading across approximately 14 million more acres by 2050.[83]

Water demand from the urban West is projected to increase substantially despite conservation efforts.[84] Unfortunately, there is little available water left to meet this growing demand as most western surface water has been appropriated beyond capacity, even before accounting for environmental demands. Essentially, water use in the West has entered a zero-sum game where meeting demand will likely mean reducing demand by a competing user. In principle, given the amount of water used by agriculture, and its concomitant inefficient irrigation systems, there is the potential for great gains in supply for urban uses through transfer.[85] This seems more likely a necessity in the future

as the projected climate change in the region will have disastrous effects for the western water availability.

IV. Climate Projections in the West

In general, climate change will likely lead to a significant decrease in available surface water in the western U.S., especially the Southwestern region. While the region has been getting hotter since the 1950s, the average temperature will rise somewhere between 2.5–5.5 degrees Fahrenheit by the mid-21st century.[86] This increase will lead to a concomitant increase in evaporation and lower soil moisture, and increase the likelihood of multi-decadal droughts in the region.[87] Further, precipitation patterns will shift, with increases in intense precipitation events punctuating long severe droughts.[88] The timing and nature of precipitation will also likely shift with increased rains during winter months leading to a decrease in snowpack, earlier spring melt off, and therefore, less snow fed streamflow in the hottest months of the summer.[89] This will likely result in the repeat of drought conditions seen in the beginning of the 21st century, which resulted in a 60% reduction of water volume in Lake Mead since 2000.[90]

As it stands, projected demands in the Southwest will not be met unless there is a 30% reduction in irrigation use in most basins.[91] Reduced flows in most basins, which will only continue to decrease, mean supply must shift to accommodate, and it is generally accepted that the shift will come from transferring water from agriculture.[92] It does not appear that agriculture poses a direct risk on urban areas through the holding of higher priority rights, because most urban centers have found alternative water sources and agreements to transport large quantities of water across basins.[93] The issue lies more with agriculture flows not being available due to perpetual use rights granted under prior appropriation.[94]

Considering the proportion of water used by agriculture in the West in comparison to urban use,[95] and the proliferation of inefficient irrigation practices, it would seem that agriculture must give way and has room to do so.[96] Further, it is likely that water marketing will play a dominant role in the transfer of water from agriculture to urban uses, as the marginal benefit from obtaining water for rapidly expanding cities eclipses the costs to transfer and transport water off of lesser valued farmlands.[97] While it appears regularly accepted that agriculture will give way and urban growth will continue, it must be considered whether continued growth is appropriate and absolute, or whether the time has come for limitations.

V. Barriers to Change

The expansionist ancestry of the West and the urban growth projections are likely setting up a conflict with non-urban water users, namely agriculture, in the face of some relatively catastrophic climate projections. The socio-economic philosophies behind the inertia of change perhaps underlie the policy barriers which either prevent or actively discourage growth limitations. The caution for western population growth had a champion in John Wesley Powell,[98] who advocated that western settlement should be constrained by, and organized around, limited irrigation districts which could be sustainably supported by existing surface flows.[99]

There has been an outgrowth of proponents of Powell's perspective, who espouse that the carrying capacity and landscape use should be dictated and limited by the arid western climate.[100] This reflects a Malthusian[101] understanding about population growth in regard to western water supplies, where allowing the latter to dictate the former is seen as the best course of development instead of the reverse. Malthus spoke generally about catastrophes that would occur when population growth outpaced the ability to supply food, but as water is the condition precedent for food, the concept likely applies, especially in the arid West.[102] It follows that as populations begin to butt up against resource limits, solutions are sought to increase supply and alleviate hardship. Catastrophe is said to occur when populations fail to recognize these resource shortages as a growth limiter, and instead respond by increasing population growth until there is no more ability to increase resource supply, resulting in overshoot of population growth and ultimately severe hardship.[103]

The Powell perspective is less fatalistic than Malthus and appears to merge closer to the concepts of ecology as a means to plan and adapt western populations in accordance with the realistic limitations of their natural support systems.[104] However, the actual urban development policies of the West appear to have taken the contra tack. These policies align closer with the counter theory to Malthusianism, which asserts that societies will always rise to resource scarcity through technological innovation and market processes.[105]

Historically, some western states, including Arizona and California, considered long term water supply to be an urban entitlement, which imposes a duty on municipal utilities to maintain.[106] The nexus of public utility law, the prior appropriation doctrine, and municipal exemption from anti-speculation principles under prior appropriation have created a "super preference" to provide for unlimited urban growth.[107] A further barrier to constraining growth based on existing hydrologic regimes of the area is the fact that until very recently, water management and land use planning were disconnected.[108] As the new reality of water under a changing climate has begun to render prior duties impracticable, cities and states have begun to limit growth out of necessity[109] but generally, limitations are only lawful until supply can be increased.[110]

VI. Do Shifting Uses Signal a Trap?

A. Overview

While urban growth may be coming up against current water supply barriers, it is likely that these will not

be permanent growth limiters, but rather will accelerate a shift of water from agriculture to urban municipal use. Given the sheer amount of water appropriated by agriculture in the West[111] and the relative waste associated with outdated and low value crop irrigation in many areas,[112] agriculture represents a significant supply boost. This is especially true given the relative value of urban land use in the West in comparison to agriculture use.[113] That is to say, that the transfer of water from agriculture to urban uses is likely preordained, especially given the projected population growth in the coming decades.[114]

Is this transfer a Malthusian catastrophe in the waiting? What will be the costs of propping up western cities on stilts made from water in the face of the coming extreme droughts? On paper, shifting resource use from low density agriculture, to high density urban use in the face of extreme drought seems to suggest that urban growth is trapped in a potentially catastrophic feedback loop.

The antecedent conditions of the western "hydrologic trap" is the arid climate and vast natural resources. Prior appropriation can be considered the critical choice sparking a feedback loop leading to the reclamation policies which shored up water supply for a potential urban West. The inclination of the West to urbanize and the urban super-preference, was the social rigidity which led to the current trap conditions of a rapidly expanding urban population, built in a desert facing extreme drought under climate change. This positions western populations in a fragile state and will require acceptance of the growth limitations of the West, or dramatic resource reallocation and innovation, to prevent potential socio-ecological degradation under projected extreme drought.[115] The prevailing contra perspective of the water limitations will see the latter as the only viable alternative, along with faith in water management innovation as the solution to the Malthusesque trap scenario above.[116] But while the ability of the urban West to provide water to future populations is likely realistic, the costs to do so will be dramatic, as most water will come from the irrigation ditch.[117]

Western agriculture has a significant role in the food security of the United States, and its growth is relatively self-limiting because of its two dimensional nature.[118] Its low density, high acreage land use also means there is low societal costs to abandonment under potential extreme drought conditions, as opposed to urban sprawl, being readily convertible to natural habitat.[119] Further, while agriculture has had a significant negative impact on the instream ecology of the West, there is a potential for significant mitigation innovation, while increased urbanization may grow as a major source of environmental degradation.[120] Building out urban populations at the expense of high valued agricultural lands will only further entrench western populations within the above trap scenario and increase the potential for climate crisis.

B. Utah's Water Use . . . "Hardly a Water Crisis"

> Far from running out, Utah's municipal water supply is actually growing. Not only is Utah NOT running out of municipal water, the state's municipal water supply is increasing. As Utah continues to pave its irrigated farmland (at the rate of 30 acres per day according to the American Farmland Trust), the water no longer being used to water crops can be transferred to new uses.[121]

> As the state of Utah continues to experience a drought—100% of the state is experiencing moderate drought, and 90% of the state experiencing extreme drought—Salt Lake City officials are preparing to give an update on the city's water conservation [March 24, 2021].[122]

The quotes above demonstrate the acknowledgement of three key issues existing in the West today. First, that western populations are growing at a rapid rate, (paving farmland at 30 acres a day).[123] Second, that supplies are not meeting growing demands due to continued drought conditions.[124] Lastly, that reducing irrigation to water urban populations is increasingly seen as a solution to the problem.[125] Conspicuously absent is any discussion about whether subsidizing the growth of urban populations is the best, or even the least hazardous thing to do. Is this a hydrologic trap in the making?

Approaching Utah as a model of potential western water traps under the SE trap-theory[126] seems to indicate that there is a significant risk that the West is in—and will further entrench itself—in hazardous and self-perpetuating negative feedbacks regarding water resource allocation.

To begin applying the trap framework, we must first pose the basic question at the heart of the analysis, is there a mismatch between the response of Utah to social or ecological conditions which may trigger a hazardous negative feedback loop?[127] Much like the Maine lobster trap scenario, Utah appears to be ripe for a "gilded trap" in that the rising value of water is driving water managers to potentially overlook risks of its unexpected decline.[128]

Applying the SE trap model, we must first discern if there are antecedent conditions which make Utah susceptible to trap-like negative feedback loops which can result in significant social and ecological degradation. The antecedent conditions in the Utah scenario are—as described in Parts II and IV—a dry, desert climate characterized by regular severe drought,[129] the occurrence of which has increased in the last century.[130] As with much of the rest of the South Western U.S., average temperatures in Utah are projected to increase significantly, precipitation is projected to decrease or shift towards rain which will reduce freshwater availability, and droughts are projected to increase in intensity over the next fifty years.[131]

From the social perspective, the other antecedent condition is the proliferation and adoption of the prior appropriation doctrine in Utah,[132] which created a quasi-property rights framework of exclusive use of most water in Utah and the West by few users.[133] The combination of these two conditions, the appropriation and exclusive right to a small, dwindling supply of water, put the western U.S.—including Utah—on a path with few options.[134] SE traps often have a critical juncture, a social choice which induces a self-reinforcing path, and in this scenario, the critical juncture appears to occur when the U.S. institutes the reclamation policies of the early 20th century.[135] Whereas, faced with the options of curbing western population growth, or accommodating it, the federal government dove headfirst into the artificial increase of the water supply on a geologic scale.[136] "Each step along a particular path produces consequences which make that path more attractive for the next round. As such effects begin to accumulate, they generate a powerful . . . cycle of self-reinforcing activity."[137]

After the signing of the Colorado River Compact in 1922, which divided water usage rights of the Colorado River among the several western states, Utah began planning what would become the largest Reclamation project in the state's history, the Central Utah Project.[138] This project, officially started in 1956, would come at tremendous costs economically, amounting in the billions of dollars to complete over several decades.[139] When arguing for support of the project in the U.S. Senate, the Utah Senator Arthur Watkins exclaimed the project "could double the population of the state and create jobs which would keep young people in the state to give Utah a return on its education investment."[140]

The project, which ultimately resulted in inter-basin transfers of over one hundred thousand acre-feet of water from the Colorado Basin,[141] helps to quench the demands of the state of Utah, which receives 60% of its water from the Colorado and has experienced the highest population growth in the nation in the last decade.[142] Incentivizing population growth through the draining of western rivers has been a boom for these western economies, making the path of water reclamation and population growth more attractive, reinforcing the cycle.

The inclination towards economic and population growth is an apparent strong reinforcing element of this western hydraulic trap, and as Utah has faced increasing drought and the driest years on record,[143] the state has issued a rebuke of water limitations that would have been familiar to John Wesley Powell.[144] The state recently enacted a statute Creating the Colorado River Authority of Utah (CRAU), an agency whose purpose is to "protect, conserve, use and develop Utah's waters of the Colorado River System."[145] The authority comes endowed with a $9 million dollar legal defense fund to help ensure the Authority can "develop a management plan to ensure that Utah can protect and develop the Colorado River System."[146]

The main purpose of the CRAU appears to implement a plan and defend the use of the full allotment of water it is apportioned, as per the Colorado River Compact.[147] Under that agreement, the Colorado River Basin is split between the upper and lower basin states, with water apportionment being split equally among the division.[148] Utah had previously not used its entire allotment, and as demand rises while supply has decreased, there are growing fears among the Utah Legislature, that if the state does not assert that right, they will lose it to lower basin states.[149] In passing the legislation, one Utah state senator, Stuart Adams, exclaimed that "[Utah's] limiting factor for growth is water" while another senator, Don Ipsen declared, "[i]t's our water. They're making moves every day to posture in the surrounding states to take our water right away from us."[150]

The impetus to create the authority may come in part from the battle over a 140-mile water pipeline from the Lake Powell Reservoir on the Colorado.[151] The pipeline would serve the city of St. George, one of the fastest growing metropolitan areas in the nation, which uses twice the amount of water as Los Angeles per capita, located squarely within Don Ipsen's legislative district.[152] As of this writing, the water level in Lake Powell is 36% full, and approaching the lowest level since it was first filled in the 1960s.[153] In September 2020, six Colorado Basin states wrote a letter to the U.S. Secretary of the Interior, threatening a "high probability of multi-year litigation" unless the Secretary not allow the project to move forward.[154] It is within this context that Utah chose to create the CRAU and endow it with a multi-million dollar litigation fund, rather than consider the ecological factors as growth limiting.

Where then does that decision lead to in the coming decade, after growth has been induced, and billions of dollars are spent on infrastructure and development in service of that growth? Where will water be found for those populations when the Colorado and Lake Powell evaporate under forecasted catastrophic droughts under a changing climate regime? Utah demonstrates the self-reinforcing process of incentivized growth that can lead to catastrophe as contemplated by the SE trap concept, specifically because the socio-political response is mismatched with the ecological conditions. Utah's growth is incentivized and limited by the availability of water, or the lack thereof; but while the region grows increasingly dry, the state grows increasingly thirsty. If Utah and other western states choose to persist with appropriating significant volumes of water from existing agricultural use and the surrounding landscape to feed population growth, they would be prudent to consider disaster preparedness when the mismatch between increasing demand and increasing catastrophic drought is actualized.

Conclusion

Amidst the growing reality of the changing climate in the arid West, calls to redistribute the large proportion of agricultural waters to meet growing municipal demands appears to be a reasonable sentiment. Western agriculture takes the majority of water, and wastes much of it through inefficient, less valued uses. The choice between vineyards or drinking water appears to be relatively straightforward. The choice between human values however is more complicated, when the seemingly just choice potentially serves to further human peril in the long run. Many western populations are locked in a feedback loop of growth preference which is rapidly confronting its limitations. If these limitations are not considered in the continued expansion of the urban West, satiating growing populations from the irrigation ditch will likely only further trap them in socio-ecological crisis in a future dominated by extreme drought.

It could be easy to write off these concerns by saying that with the amount of water available through agricultural transfers and irrigation reform, the necessity has not yet arrived. However, this sentiment is the trap at work, the perpetuation of the feedback loop. Just as with other problems related to human induced climate change, the time to make corrective actions will have long since passed when the social and ecological degradation begins in earnest.

Endnotes

1. *State v. Shack*, 277 A.2d 369, 372 (N.J. 1971).
2. *See id.* at 369–71.
3. Regional average temperatures are projected to increase 5.5 degrees by 2070 while droughts are projected to increase in intensity and duration in many river sheds. *See* U.S. Global Change Research Program, *Regions: Southwest: Introduction*, Nat'l Climate Assessment (2014), https://nca2014.globalchange.gov/report/regions/southwest
4. *See* Robin Kundis Craig, *Drought and Public Necessity: Can a Common Law "Stick" Increase Flexibility in Western Water Law?*, 6 Tex A&M L. Rev. 77,80 (2018).
5. Nat'l Climate Assessment, *supra* note 3.
6. *See, e.g.,* Craig, *supra* note 4 (arguing for an application of the common law doctrine of public necessity to reallocate water toward municipal and industrial uses during times of water crisis).
7. *See* Wiebren J. Boonstra et al., *Human Responses to Socio-Ecological Traps*, 11 Sustainability Sci. 877, 877 (2016).
8. *See* Robin Hale and Stephen E. Swearer, *Ecological Traps: Current Evidence and Future Directions*, 283 Proc. Biological Sci. 1824, 1825 (2016).
9. *See id.*
10. *See* Theresa M. Donovan and Frank R. Thompson III, *Modeling the Ecological Trap Hypothesis: A Habitat and Demographic Analysis for Migrant Songbirds*, 11 Ecological Applications 871, 871–72.
11. *See* Wiebren J. Boonstra and Florianne W. de Boer, *The Historical Dynamics of Social–Ecological Traps,* 43 Ambio 260, 260 (2013).
12. *See id.*
13. *See id.* The modern theory of the "tragedy of the commons" was first described in an essay by biologist Garrett Hardin in 1968 in which he determined that the combination of population growth and communal resources would lead to social and environmental degradation unless control over the resource was made exclusive. *See* Garrett Hardin, *The Tragedy of the Commons*, 162 Science 1243 (1968).
14. *See* Johan Enqvist et al., *Against the Current: Rewiring Rigidity Trap Dynamics in Urban Water Governance Through Civic Engagement*, 11 Sustainability Sci. 919, 919–20 (2016).
15. *See* Boonstra et al., *supra* note 7; Boonstra and de Boer, *supra* note 11.
16. *See* Boonstra and de Boer, *supra* note 11, at 261.
17. *Id.* at 262–63.
18. *See id.* at 263.
19. *See id.*
20. *See id.* at 265, 268.
21. *See* R.S. Steneck et al., *Creation of a Gilded Trap by the High Economic Value of the Maine Lobster Fishery*, 25 Conservation Biology 904, 905–06 (2011).
22. *Id.* at 905.
23. *Id.*
24. *See id.* at 906.
25. *See id.*
26. *See* Convention on the Law of the Sea pt. V, Dec. 10, 1982, 1833 U.N.T.S 397 [hereinafter *Law of the Sea*].
27. *See* William E. Schrank, Food & Agric. Org., Introducing Fisheries Subsidies § 2, 2003.
28. *See Law of the Sea*, *supra* note 26..
29. *See* Boonstra and de Boer, *supra* note 11, at 266.
30. *See* Steneck et al., *supra* note 21, at 906. A monoculture is a term widely used in agriculture to describe a system of growing the same species year after year, which can have transformative effects on environments and lead to increase and susceptibility of disease. *See* Serajus Salaheen and Debabrata Biswas, Organic Farming Practices: Integrated Verses Monoculture § 2.4 (2019). This risk of widespread disease is often exhibited in aquaculture as well and has been exhibited in wild lobster fisheries where the ecosystem has monoculture characteristics. *See* Rosamond L. Naylor et al., *A 20-Year Retrospective Review of Global Aquaculture*, 591 Nature 551, 557 (2021); Steneck et al., *supra* note 21, at 907.
31. *See Id.* at 906 (referring to the Gulf of Maine as a "domesticated ecosystem" similar to an aquaculture system).
32. *See* Boonstra and de Boer, *supra* note 11, at 266.
33. *See* Steneck et al., *supra* note 21, at 906.
34. *See id.* at 908–09. In 1998, record high lobster populations in eastern Long Island Sound crashed 70% due to disease outbreak brought on by higher than average water temperatures and low oxygen resulting in calls for a five year moratorium on lobster harvests. *See id.* at 907.
35. Janet C. Neuman, *Beneficial Use, Waste, and Forfeiture: The Inefficient Search for Efficiency in Western Water Use*, 28 Envtl. L. 919, 921 (1998).
36. A. Dan Tarlock, *Western Water Law, Global Warming, and Growth Limitations*, 24 Loy. L.A. L. Rev. 979, 983 (1991); Chennat Gopalakrishan, *The Doctrine of Prior Appropriation and its Impact on Water Development: A Critical Survey*, 32 Am. J. Econ. Soc. 61, 63 (1973).
37. *See* Lynda L. Butler, *Allocating Consumptive Water Rights in a Riparian Jurisdiction: Defining the Relationship Between Public and Private interests*, 47 U. Pitt. L. Rev. 95, 106 (1985).
38. *See* Gopalakrishan, *supra* note 36, at 62.
39. *See id.*
40. *See* Gopalakrishan, *supra* note 36, at 63–64.

41. *See* Neuman, supra note 35, at 963–64.

42. *See id.* at 923–24.

43. *See e.g.*, Ariz. Rev. Stat. Ann. § 45-151 (stating that any person "may appropriate unappropriated water for domestic, municipal, irrigation, stock watering, water power, recreation, wildlife, including fish, nonrecoverable water storage pursuant to . . . or mining uses, for his personal use or for delivery to consumers" and that "[t]he person, the State of Arizona or a political subdivision thereof first appropriating the water shall have the better right.").

44. *See generally,* Tarlock, *supra* note 36, at 986 ("[A]ppropriation rights are fully transferable usufructuary property rights. The original vision of the West as a land of small irrigators assumed that water rights should be tied to the soil. Most states, however, have rejected this principle, and water rights are transferrable property rights"); *but see* Steven J. Shupe, *Waste in Western Water Law: A Blueprint for Change*, 61 Or. L. Rev. 483, 492 (arguing that the protected right is the right to benefits accrued from water crops, not the use in and of itself).

45. *See, e.g., id.* at 1398 ("many rivers in Oregon are overappropriated–the sum of the water rights is greater than the average flow of the river at any particular time"); Neuman, *supra* note 35, at 960 (stating that efficiency and forfeiture efforts would have little impact because "many western rivers and streams are already overappropriated").

46. Neuman, *supra* note 35, at 933.

47. *Id.*

48. *See* Craig, *supra* note 4.

49. *See* Renee Johnson and Betsy A. Cody, California Agricultural Production and Irrigated Water Use, 21–22 (Congressional Research Service 2015); Neuman, *supra* note 35, at 935.

50. *See* Johnson and Cody, *supra* note 27, at 20.

51. *See* Neuman, *supra* note 35, at 947. *See also Tulare Irr. Dist. v. Linsay-Strathmore Irr. Dist.*, 45 P.2d 972, 997, 1010 (Cal. 1935) (ruling, "an appropriator cannot be compelled to divert according to the most scientific method known" and that an appropriator is not bound "to adopt the best method for utilizing the water or taking extraordinary precautions to prevent waste. He is entitled to make reasonable use of the water according to customs of the locality, and, as long as he does so, other persons cannot complain about his acts."). Rulings such as these have essentially made inefficient wasteful use non-actionable so long as it is customary in the locality. *See* Neuman, *supra* note 35, at 947.

52. *See id.*, at 967.

53. *See* Richard H. Dillon, *Stephen Long's Great American Desert*, 111 Proc. Amer. Phil. Soc. 93, 93 (1967).

54. Major Long was part of an expedition directed by the Federal Secretary of War, John C. Calhoun, with the specified purpose of reinforcing the potential strategic gains identified in the Lewis and Clark expedition of 1804. *See id.*

55. *See* Karen Clay and Randall Jones, *Migrating to Riches? Evidence from the California Gold Rush*, 68 J. Econ. Hist. 997, 999 (2008).

56. *See* Roger D. Billings, *Homestead Act, Pacific Railroad Act and Morrill Act*, 39 N. KY. L Rev. 699, 700 (2012). The Pacific Railroad Act vested the creation of a trans-continental railroad with two companies, and granted vast amounts of public lands as right of ways for the route; the Homestead Act gave large tracts of western public lands to settlers for nominal fees provided they successfully cultivate and habitate the land for 5 years. *See id.* at 705–06, 714.

57. John Wesley Powell, Report on the Lands of the Arid Region of the United States, 3 (2d ed. 1879).

58. *See* A. Dan Tarlock, *A Brief Examination of the History of the Persistent Debate About Limits to Western Growth*, 14 Hastings W.-Nw. J. Envtl. L. Pol'y 1309, 1314 (2008).

59. *See generally* Elinor Ostrom, *Reflections on "Some Unsettled Problems of Irrigation"*, 101 Amer. Econ. Rev. 49, 55–56 (reviewing a seminal critique of agricultural expansion written by Kathrine Coman in 1911 and applying modern concepts of collective action analysis).

60. Some of Jules Verne's other notable works of fiction include, *20,000 Leagues Under the Sea* (1870), and *Around the World in Eighty Days* (1872).

61. Jules Verne, The Mysterious Island (1875).

62. *See* Stephanie Pincetl et al., *Urban Areas*, *in* Assessment of Climate Change in the Southwest United States: A Report Prepared for the National Climate Assessment 267, 278–79 (Monica Gilchrist ed. 2013).

63. *See About us-Mission*, Bureau of Reclamation (October 30, 2020), https://www.usbr.gov/main/about/mission.html.

64. *See* Bureau of Reclamation, U.S. Dep't of Interior, The Colorado River: A Natural Menace Becomes a National Resource 25 (1946).

65. *Id.*

66. There remains some debate regarding the actual end of the Reclamation Era; however, Tarlock makes a strong case that the era passed on in the late 1960s and early 70s following a series of policy and legislative shifts, including the passage of the Wild and Scenic Rivers Act. *See* Tarlock, *supra* note 58 at n. 21.

67. *See* Bureau of Reclamation, *supra* note 65.

68. *See* Tarlock, *supra* note 58, at 1310.

69. *See, e.g.,* Brianna R. Pagan et al., *Extreme Hydrological Changes in the Southwestern U.S. Drive Reductions in Water Supply to Southern California by Mid Century*, 11, Envt'l. Res. Letters 1, 1 (2016); Jim Robbins, *In an Era of Drought, Phoenix Prepares for a Future Without Colorado River Water*, Yale Sch. Env't. (Feb. 7, 2019), https://e360.yale.edu/features/how-phoenix-is-preparing-for-a-future-without-colorado-river-water.

70. *See* Pagan, *supra* note 69.

71. *California's Central Valley*, U.S. Geological Surv., https://ca.water.usgs.gov/projects/central-valley/about-central-valley.html (last visited Nov. 29, 2020).

72. Los Angeles had to purchase the majority of farmland to gain the associated water rights in Owens Valley because the basin was fully appropriated by the twentieth century. The resulting diversion of water through a pipeline resulted in dustbowl conditions in the valley and conflict ultimately leading to the pipeline being dynamited several times. *See* Gary D. Libcap, *Chinatown Revisited: Owens Valley and Los Angeles–Bargaining Costs and Fairness Perceptions of the First Major Water Rights Exchange*, 25 J.L. Econ. Org. 311, 312–14; Neuman, *supra* note 35, at 972.

73. *See* Bradley Udall, *Water: Impacts, Risks, and Adaptation*, *in* Assessment of Climate Change in the Southwest United States: A Report Prepared for the National Climate Assessment 198, 202-03 (Gregory J. McCabe ed. 2013).

74. *See id.*

75. *See id.*; Los Angeles and Phoenix are not actually located on the bank of the Colorado, but both make significant diversions through associated water projects. *See* Robbins, *supra* note 69.

76. *See* Lawrence J. MacDonnell, *Arizona v. California* Revisited, 52 Nat. Resources J. 363, 412–14 (2012).

77. *See* Brett Walton, *Remarkable Drop in Colorado River Water Use a Sign of Climate Adaptation*, Circle of Blue (Jun. 17, 2020), https://www.circleofblue.org/2020/world/remarkable-drop-in-colorado-river-water-use-a-sign-of-climate-adaptation/. California imposed a water conservation plan in the face of severe drought which led to a 25% reduction per capita by 2017. *See* Patrick Gonzalez et al., *Southwest, in* Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Vol. II 1101, 1104 (Cristina Bradatan ed. 2018)

78. *See id.* Las Vegas, one of the fastest growing cities in the U.S., gets 90% of its water from Lake Mead. *See* Robbins, *supra* note 69.

79. *See Colorado River Basin Focus Area Study: Water Use*, U.S. Geological Surv., https://www.usgs.gov/mission-areas/water-resources/science/colorado-river-basin-focus-area-study-water-use?qt-science_center_objects=0#qt-science_center_objects (last visited Nov. 30, 2020).

80. *See* David M. Theobald et al., *The Changing Southwest*, *in* Assessment of Climate Change in the Southwest United States: A Report Prepared for the National Climate Assessment 37, 43 (G. Garfin et al. eds. 2013).

81. *See id.* at 43, 45.

82. *See id.* at 51.

83. *Id.* at 50.

84. *See* Thomas C. Brown et al., *Adaptation to Future Water Shortages in the United States Caused by Population Growth and Climate Change*, 7 Earth's Future 1, 8 (2019).

85. *See id.*

86. *See* Daniel R. Cayan et al., *Future Climate: Projected Average*, *in* Assessment of Climate Change in the Southwest United States: A Report Prepared for the National Climate Assessment 101, 106 (Matthew Barlow ed. 2013).

87. *See* Gonzalez, *supra* note 77, at 1109.

88. *See id.*

89. *See id.* at 1111–12.

90. *See id.* at 1104.

91. *See* Brown et al., *supra* note 86 at 9–10.

92. *See* A. Dan Tarlock, *The Future of the Prior Appropriation Doctrine in the New West*, 41 Nat. Resources J. 769, 775 (2001).

93. *See* A. Dan Tarlock and Sarah B. Van de Wetering, *Western Growth and Sustainable Water Use: If There Are No "Natural Limits," Should We Worry About Water Supplies?*, 27 Pub. Land & Resources L. Rev. 33, 50 (2006).

94. *See* Tarlock, *supra* note 92, at 772, 782.

95. Approximately 80/20 but as high as 90/10 in some areas. *See supra* Part II.

96. *See id.*

97. *See* A. Dan Tarlock, *Western Water Law and the Challenge of Climate Disruption*, 48 Envtl. L. 1, 26 (2018).

98. *See supra* Part III.

99. *See* Tarlock and Van de Wetering, *supra* note 92, at 68–69.

100. *See id.* at 69-74.

101. Thomas Malthus was an 18th century economic and theology philosopher who studied the dynamics of population and food supply, giving rise to the concept of carrying capacity. *See* Jorg Friedrichs, Who's Afraid of Thomas Malthus? 68 (Manfredo and Reckhemmer eds. 2014).

102. *See id.* at 68–69.

103. *See id.* at 70.

104. *See* Erling Holden and Kristin Linnerud, *The Sustainable Development Area: Satisfying Basic Needs and Safeguarding Ecological* Sustainability, 15 Sustainable Dev. 174, 176–77 (2007).

105. This concept is most famously espoused by the cornucopian economist Julian Simon, who made a bet with the neo-classical Malthusian scholar, Paul Ehrlich, in 1980. The wager consisted of following the change in price of a group of raw materials over a period of 10 years. Under Malthusian theory, it was expected that the price would increase with population growth, but the price actually fell by 36%. *See* Yannick Glemarec and Jose A. Puppim De Oliveira, *The Role of the Visible Hand of Public Institutions in Creating a* Sustainable *Future*, 32 Pub. Admin. Dev. 200, 201–02 (2012).

106. *See* Tarlock and Van de Wetering, *supra* note 93, at 61; *Lukrawka v. Spring Val. Water Co.*, 146 P. 640, 647 (1915) (ruling that municipal water utilities have a duty under a clear and perfect right of "the inhabitants of the municipality to compel water service to them."

107. *See* A. Dan Tarlock, *How Well Can Water Law Adapt to the Potential Stresses Of Global Climate Change*?, 14 Denv. Water L. Rev. 1, 34–35 (2010).

108. *See id.* at 34.

109. *See Redrock Valley Ranch, LLC v. Washoe Cty.*, 245 P.3d 641, 645 (Nev. 2011) (a county may limit water use "as long as those restrictions are consistent with the relevant long-term comprehensive plans, Nevada law, and notions of public welfare") (quoting *Serpa v. Washoe Cty.*, 901 P.2d 690, 693 (Nev. 1995)).

110. *See* Tarlock and Van de Wetering, *supra* note 93, at 57.

111. Agriculture uses 80% or more of surface waters in western states. *See supra* Part II.

112. In many regions of the west, open ditch, gravity fed irrigation dominates agriculture, and can be up to 50% inefficient. *See id.*

113. California's technology industry was worth over $385 billion in 2017, making up 16% of the state's economy and employing over 1.7 million people. *See California Tech Industry Adds More than 43,000 Jobs in 2017, Contributing more than $385 Billion to State's Economy*, CompTIA (Mar. 27, 2018), https://www.comptia.org/newsroom/2018/03/27/california-tech-industry-adds-more-than-43-000-jobs-in-2017-contributing-more-than-$385-billion-to-state-s-economy. The median single-family home price in the Silicon Valley area where a large portion of the tech industry is based has risen by $600,000 since 2009 to $940,000. *See* Sebastian Herrera and Abigail Summerville, *California Fostered America's Tech Industry. It Is Becoming a Great Adversary.*, Wall St. J. (Aug. 11, 2019), https://www.wsj.com/articles/california-fostered-americas-tech-industry-it-is-becoming-a-great-adversary-11565532002.

114. *See generally* Brown et al., *supra* note 84, at 9 (consisting of a study of the likelihood of significant water shortages in 204 western watersheds, concluding that projected water demand and climate change will primarily necessitate transfer of water from agriculture to prevent shortages to growing populations above other alternatives such as efficiency improvements.

115. *See* Tarlock and Van de Wetering, *supra* note 93, at 73–74.

116. *See id.* at 47.

117. *See* Vincent C. Tidwell et al., *Mapping Water Availability, Projected Use and Cost in the Western United States*, 9 Envtl. Res. Letters 1, 4 (2014).

118. *See id.* at 10; Annemarie Schneider et al., *Impacts of Urbanization on Ecosystem Goods and Services in the U.S. Corn Belt,* 15 Ecosystems 519, 535 (2012)

119. *See* Emma Bryce, *Abandoned Farms Could be Transformed Into Millions of Hectares of Conservation Reserves*, Anthropocene Mag. (Dec. 20, 2019), https://www.anthropocenemagazine.org/2019/12/abandoned-farms-could-be-transformed-into-millions-of-hectares-of-conservation-reserves/.

120. *See* Scott J. McGrane, *Impacts of Urbanisation on Hydrological and Water Quality Dynamics, and Urban Water Management: A Review*, 61 Hydrological Sci. J., 2295, 2295-96, 2298-22305 (2016).

121. *Are We Running Out of Water?*, Utah Rivers Council, https://utahrivers.org/are-we-running-out-of-water (declaring that, "Farming and ranching accounts for about 85% of Utah's water use, while indoor use by residents (a water need) consumes a mere 3–4%. In other words, even if our population doubled, our indoor water needs would still only amount to 6–7% of Utah's total water use—hardly a water crisis." Between 2007-2017, Utah lost over 280,000 acres of farmland, much of it converted to urban developed land. *See Utah Data and Statistics*, Farmland Information Center, https://farmlandinfo.org/statistics/utah-statistics/.

122. Addy Brink, *Salt Lake City Enters Stage 1 of Water Shortage Contingency Plan*, ABC4 (March 24, 2021), https://www.abc4.com/news/local-news/salt-lake-city-officials-discuss-water-shortage/.

123. *See* Farmland Information Center, *supra* note 121.

124. As of April, 27, 2021, 90.2% of Utah is impacted by what the U.S. Drought Monitor categorizes as "Extreme Drought." *See Current U.S. Drought Monitor Conditions for Utah*, Drought.gov (Apr. 27, 2021), https://www.drought.gov/states/utah.

125. *See* Utah Rivers Council, *supra* note 121.

126. *See supra* Part I.

127. *See* Boonstra et al., *supra* note 7, at 877.

128. *See* R.S. Steneck et al., *supra* note 21.

129. Utah historically experiences regular multi-year droughts and receives the second-least amount of precipitation in the U.S. behind Nevada. *See* Chris D. Wilkowske et al., *Drought Conditions in Utah During 1999-2002: A Historical Perspective*, U.S. Geological Survey (2003).

130. The 21st century has been the hottest period on record in Utah. *See State Climate Summaries: Utah*, NOAA Nat'l Ctr's. Envtl. Info. 1 (2019), https://statesummaries.ncics.org/downloads/UT-screen-hi.pdf.

131. *See id.* at 3-4. *See also* Erin Alberty and Kelly Cannon, *Climate Study Predicts in 30 Years, Salt Lake City Weather Will Be Like the Nevada Desert's is Today*, Salt Lake Trib. (July 19, 2019), https://www.sltrib.com/news/2019/07/11/are-you-ready-this-by/ (explaining that average highs in Salt Lake City are likely to rise 10 degrees in the coming 50 years).

132. *See* Utah Code Ann. § 73-3-1 (LexisNexis 2021); § 73-1-4 (LexisNexis 2021).

133. *See supra* Part II.

134. *See generally* Boonstra and de Boer, *supra* note 11, at 263 (discussing the concept of path dependency where antecedent conditions determine options available in later situations and the related concept of process tracing which links outcomes to key events or processes that created the outcome).

135. *See supra* Part III.

136. In Utah alone, the Bureau of Reclamation has 15 projects, including 25 dams, including the Central Utah Project. *See Projects and Facilities: Utah*, U.S. Bureau of Reclamation, https://www.usbr.gov/projects/facilities.php?state=Utah.

137. Paul Pierson, *Increasing Returns, Path Dependence, and the Study of Politics*, 94 Am. Pol. Sci. R 251, 253 (2000).

138. *See* U.S. Bureau of Reclamation, *supra* note 136.

139. *See* Jeffrey Ashley and Robert L. Jones, *The Central Utah Project*, 22 J. Land, Resources, & Envtl. L. 273, 291 (2002).

140. *Id.* at 276.

141. *See The Central Utah Project—An Overview*, U.S. Dept. Interior, https://www.doi.gov/cupcao/Overview.

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Second Place (tie)

Is a New York Carbon Tax Doomed Under the Dormant Commerce Clause?

By Susana Kondic

The U.S. is currently experiencing the early effects of climate change.[1] The West is battling record wildfire seasons, the Southeast is bracing itself against increasingly stronger storms, and the coasts are learning to live with sea level rise.[2] It is evident that bold action is urgently needed to set the nation on a decarbonization track to avoid the worst case scenarios. One potential tool to do that is the carbon tax, which would force markets to take into account the social costs of the activities that contribute to climate change. New York State is a national leader in climate change adaptation and mitigation, and it has recently put forth two proposals for a statewide carbon price scheme. This paper addresses the almost reflexive question about whether either carbon tax plan would be allowed under the Dormant Commerce Clause. Part I explains the basic mechanism of a carbon tax and describes the two proposed approaches, which are still in development. Part II then surveys the current Dormant Commerce Clause jurisprudence and analyzes the New York plans as both regulations and taxes. This paper concludes that as expressed in the current bill, the Parker-Cahill plan would likely survive Dormant Commerce Clause challenges. A constitutional analysis of the New York Independent System Operator (NYISO) plan hinges on how the plan would be integrated into the state's regulatory framework, but in the abstract, it also has a strong case against a Dormant Commerce Clause challenge.

I. Background

A. What Is a Carbon Tax?

A carbon tax[3] is a fee that assigns a price to greenhouse gas (GHG) emissions that contribute to global warming.[4] In economic terms, climate change can be considered a massive externality of the fossil fuel-dependent modern economy.[5] Activities powered by fossil fuels release GHG as a byproduct and contribute to the overaccumulation of CO_2 in the atmosphere.[6] However, the cost of those externalities is not incorporated into the costs of producing and buying these goods.[7] By placing a per-unit price on carbon emissions, a carbon tax encourages prices to reflect the true social costs of their products' emissions.[8] An increase in the price of GHG-emitting activities will lead businesses and consumers to rely less on those activities and invest in low or zero emission alternatives.[9] The monetary expression of all the costs and benefits of emitting one additional ton of carbon dioxide emissions is also known as the "social cost of carbon" (SCC).[10]

Recently, the social cost of carbon attracted attention as the subject of one of President Biden's first executive orders. He ordered agencies to consider the SCC when conducting regulatory cost benefit analysis and reformed the Interagency Working Group on Social Cost of Carbon. This Working Group formed during the Obama administration and put forth SCC estimates ranging from $12 to $128 per ton of carbon dioxide emissions, with a central estimate of $43 for 2020 in 2007 dollars.[11] During the Trump Administration, the EPA decided to increase the discount rate and only consider domestic climate impacts in its calculations, which resulted in the much lower estimate of $1 to $7 per metric ton of CO_2.[12] President Biden's recent Executive Order returns the SCC to the estimates established during the Obama Administration, settling on a central figure of $51 to guide policy decisions.[13]

Determining what the SCC should be is a highly technical process, laden with normative assumptions, that has resulted in a wide range of estimates. The estimates can vary based on decisions about how to account for cumulative GHG contributions, the cost of climate change disasters, and how to account for harms on future generations, among others.[14] One global study, for example, finds that $48 per ton of CO_2 would be appropriate for the U.S., given its past contributions to climate change and socioeconomic conditions.[15] Some expert economists advocate for a SCC in the upper end of the $50–100 range in order to place a sufficiently high number to encourage rapid and urgent climate adaptation.[16]

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Carbon pricing has wide support among economists and politicians across the political spectrum.[17] In 2019, 3,489 U.S. economists published a statement in support of a gradually increasing carbon tax that returns all revenue directly to U.S. citizens through rebates.[18] This was the largest public statement of economists in history and it included signatures from 28 Nobel Laureates, four former Chairs of the Federal Reserve, and fifteen former chairs of the Council of Economic Advisors from across the political spectrum.[19] High-ranking officials in the Biden Administration, such as Treasury Secretary Janet Yellen and Climate Czar John Kerry,[20] and Republican leaders such as Senator Mitt Romney and former Secretary of State James Baker support a carbon tax.[21] Recently, even the American Petroleum Institute has expressed support for a carbon tax as an alternative to federal regulation.[22] Despite this long-running theoretical support, the Biden Administration's early actions on climate change do not seem to include plans around a federal carbon price. Political analysts conclude that the chances of passing a federal, bipartisan carbon pricing mechanism is slim.[23]

After decades of inertia from the federal government on climate change as the problem intensifies, the Trump Administration reversed more than 100 environmental protection rules.[24] The last four years also saw a flurry of state activity to reduce carbon emissions. As of June 2020, eleven states have active carbon-pricing programs in the form of cap and trade.[25] Those states are California and the ten Northeast states that comprise the Regional Greenhouse Gas Initiative (RGGI). [26] To date, fourteen states have seen proposals for a state-level carbon tax.[27]

B. New York's Plans

With the passage of the Climate Leadership and Community Protection Act (CLCPA) in 2019, New York set a goal of a 40% reduction of 1990 carbon emission levels by 2030 and an 85% reduction by 2050.[28] The Act does not introduce any mechanisms to reduce emissions but instead requires the Department of Environmental Conservation (NYSDEC) to promulgate binding rules by 2024 to ensure compliance with these goals.[29] A carbon tax in New York could catalyze progress towards these emissions goals while state agencies promulgate rules and provide funding for other objectives in the CLCPA. Pursuant to the timeline in the Act, NYSDEC recently released a SCC estimate of $125 per metric ton of carbon dioxide (CO_2) emissions.[30] The NYSDEC released this number as a regulatory tool and not to propose any specific fee or carbon price.[31] To date, two carbon pricing mechanisms have been proposed in New York to complement its participation in RGGI and accelerate the state's progress towards its decarbonization goals. This section describes these two proposals as essential background for a discussion about potential constitutional challenges.

1. Cahill-Parker

The carbon tax proposal in the New York State Legislature is the Parker-Cahill bill.[32] It proposes a carbon tax of $35 per metric ton of carbon dioxide that increases by $15 annually until reaching $180 per ton.[33] The law would impose a tax on "the distribution or sale of carbon-based fuels" and would charge NYSDEC with administering it. NYSDEC would determine the total taxable emissions for each distributor or utility based on information they provide about the amount of carbon-based fuel or electricity they sell within the state each year. The tax would be levied against distributors and utilities based on the amount of carbon-based fuels they sell to consumers in New York state or import and to produce electricity that is sold within New York.[34] Fossil fuel energy produced in New York then sold out of state would not be taxed.

The bill proposes the creation of a carbon emissions fund that returns 60% of the carbon tax revenues to "very low to moderate income residents of the state in the form of tax credits in order to offset the regressive nature of such fees." The credit would be progressively issued across income levels starting with the "very low income" category, defined as fifty percent of the median income in the state, up to the "moderate income" category, defined as 80–115% of the median income.[35] The New York State Department of Housing and Urban Development would provide the median income estimate.[36] The remaining 40% of the carbon emission fund's revenues would be used to support the state's clean energy transition, which could include investments in mass transit, infrastructure, and emergency preparedness.[37] The bill is currently in committee in the New York Senate.[38]

a. Environmental justice concerns

In theory and in practice, carbon pricing schemes have been criticized for their potential to create a disparate impact on environmTental justice communities.[39] Some environmentalists object to market approaches for controlling emissions on moral grounds, arguing that polluting is an ethical wrong and that companies should not be allowed to pay to do it.[40] Others object because of the consequences that market mechanisms may have on economically vulnerable individuals.[41] Opponents to California's cap-and-trade program, for example, cite the incentives for polluting companies to concentrate their emitting activities and create "toxic hotspots" near environmental justice communities.[42] Given how relatively recent California's program and RGGI are, more time and research are needed to determine whether these potential effects have materialized. It is important to note that the environmental justice concerns for carbon pricing and cap trade programs overlap but are distinct. For a carbon tax, the primary concern is the regressivity of a flat price per ton of carbon, which would disproportionately burden households in lower income brackets.[43]

New York's Parker-Cahill aims to counteract this by directly returning 60% of the tax's revenues to low and moderate income residents. In theory, this would effectively shield those groups from any potential increases to electricity prices as a result of the tax and have a redistributional effect. An effectively priced carbon tax will also likely decrease emissions of co-pollutants that result from fossil fuel combustion.[44] Less co-pollutant emissions would lead to cleaner ambient air in environmental justice communities near refineries or electricity generation units.[45] This proposal also aligns with the CLPCA's requirement that the 35–40% of the funds used under the Act are invested to benefit disadvantaged communities.[46]

2. NYISO proposal

New York's grid operator, the New York Independent System Operator (NYISO), has proposed a carbon pricing scheme for the state's wholesale electricity market.[47] Such a scheme would be the first of its kind in the nation.[48]

In the New York electricity market, power generators place bids hourly to sell their electricity.[49] To meet the demand at a given time, buyers select the lowest bids first and continue selecting bids until the electricity need is met.[50] The bid selected last sets the "market clearing price," which is the price that all generators are paid in the end.[51] Under the proposed carbon pricing scheme, NYISO would impose a fee on power generators that pollute, which would raise all the bid prices.[52] This will benefit the non-polluting generators (such as renewable energy facilities) who would not be subject to the fee but would still get paid at the higher market clearing prices.[53] So, the carbon fee on polluting generators will incentivize the production of more electricity from lower-emitting sources.[54] The amount of the carbon fee would be based on the Gross Social Cost of Carbon set by the New York Public Service Commission with adjustments for RGGI allowance prices for suppliers that hold RGGI emissions allowances.[55]

The NYISO plan includes a distribution of the fees collected from the carbon fee to ensure that the scheme does not affect consumer prices.[56] NYISO would transfer 100% of the fees it collects from polluting generators to the wholesale electricity buyers to offset the new higher prices they would pay due to the higher market clearing prices.[57] Another external analysis group has found NYISO's proposal would be low risk for consumers while efficiently integrating New York's electricity market with state-wide climate adaptation goals.[58] The plan has enjoyed wide support from environmental, policy, and energy groups across New York.[59] NYISO is still awaiting approval from New York state to move forward with the plan, and if it is granted, NYISO will need to file for changes under Section 205 of the Federal Power Act.[60]

a. Leakage

A perennial concern with carbon pricing mechanisms is leakage, which refers to the movement of emissions-causing activities out of the regulated area in response to the higher prices caused by the carbon fee.[61] NYISO's proposal acknowledges that applying a carbon charge to only internal resources would likely cause energy production to shift out of New York, which would run counter to the state's energy and environmental goals.[62] To address these concerns, the NYISO proposal includes "border adjustments," so that the fee is essentially invisible at the borders between New York and other states.[63] Imports would earn the higher market clearing price without being subject to the carbon fee and exports similarly would buy energy at the same price without the carbon fee. An external analysis of the proposal found that the drawback to this approach to transactions at the border is that it does not incentivize cost-effective carbon abatement outside of New York.[64] The alternative solution for leakage that NYISO considered would charge importers the carbon fee based on the marginal emissions of their transactions with the New York electricity market. In theory, this could incentivize lower-carbon electricity generation in the region, but analysts have found a lack of low-emitting resources around New York that would be able to increase output in response to this scheme.[65] NYSIO proposes moving forward with the invisible border approach, with the option to adjust if leakage or other distortions appear.[66]

II. Dormant Commerce Challenges

The Commerce Clause of the U.S. Constitution grants Congress the power "[t]o regulate commerce with foreign nations, and among the several states, and with the Indian Tribes."[67] It both grants Congress an affirmative authority to regulate interstate commerce and imposes a negative power on states, by restricting their ability to engage in purposeful economic protectionism or favor in-state commerce at the expense of out-of-state interests.[68] The U.S. Supreme Court has adopted a broad view of what qualifies as "interstate commerce" subject to scrutiny under the Commerce Clause.[69]

Because New York buys and sells electricity from other states and a state carbon tax may affect those transactions, any carbon pricing scheme in the state may be vulnerable to dormant commerce clause challenges. Several aspects of the modern dormant commerce clause jurisprudence may be implicated by either of New York's proposed carbon pricing plans. The tests that courts would apply to determine a carbon tax scheme's constitutionality would depend on whether it is analyzed as a regulation or a tax, which despite being policy alternatives in the environmental sphere, are analyzed differently in the courts.[70] This section will conduct the doctrinal analysis for these two potential scenarios of a Dormant Commerce Clause challenge to New York's proposed carbon pricing schemes.

A. Regulation

The first step in analyzing whether a regulation violates the Dormant Commerce Clause is determining if it is discriminatory. Courts must decide whether the regula-

tion "regulates evenhandedly with only 'incidental' effects on interstate commerce, or discriminates against interstate commerce either on its face or in practical effect."[71] Discrimination simply means differential treatment of in-state and out-of-state interests.[72] Discriminatory regulations are *per se* invalid.[73] Courts are not bound by the labels that the state applies to the regulation and they are free to determine the practical impact of the law for themselves.[74] The Ninth Circuit, for example, found that California's Low Carbon Fuel Standards regulation ("Fuel Standard") was not discriminatory because the regulation did not base its treatment on a fuel's origin, even though it did assign carbon intensities to different ethanol fuels partly based on their sources.[75] So, even though the Fuel Standard did consider a fuel source's location to arrive at its carbon intensity figure, it did not favor California or protect its fuel producers from competition.[76] When conducting this analysis, the Ninth Circuit noted that while "countering a trend towards increased GHG output and rising world temperatures, it [California] cannot ignore the real factors behind GHG emissions."[77]

A state can save a discriminatory statute that would otherwise be struck down if it shows the discrimination is justified by "a valid factor unrelated to economic protectionism."[78] The Supreme Court requires courts to consider these cases under "strict scrutiny."[79] The party challenging the regulation has the burden of showing discrimination.[80] Once it's shown, the state has the burden to "justify it both in terms of the local benefits flowing from the statute and the unavailability of nondiscriminatory alternatives adequate to preserve the local interests at stake."[81] This is a heavy burden and the Supreme Court has noted that facial discrimination may be a "fatal defect" no matter how good of a justification is provided.[82] Yet, the Supreme Court has upheld facially discriminatory statutes after determining the local interests at stake could not be served as well with alternative regulations, such as when it upheld Maine's ban on the importation of live baitfish to protect its native fisheries.[83]

If a regulation does not discriminate on its face or in practical effect, then courts turn to the balancing test established by *Pike v. Bruce Church*.[84] The *Pike* test allows courts to uphold regulations "unless the burden imposed on commerce is clearly excessive in relation to the putative local benefits."[85] It is essentially a fact-specific inquiry that considers the harms on interstate commerce against the benefits of the regulation, and it requires a "low level" of scrutiny.[86] Courts first find a legitimate local purpose then consider the regulation's incidental burdens on commerce in pursuit of that purpose. Then, the analysis "becomes one of degree."[87] At a minimum, for the balance to tip in favor of invalidation, the challenged regulation must burden interstate commerce in a way that is "qualitatively or quantitatively different from that imposed on intrastate commerce."[88]

If the Parker-Cahill plan were to be challenged as a regulation under the Dormant Commerce Clause, a court would first ask if the law is discriminatory. The plan, as expressed in the current version of the bill, would only impose the carbon fee on distributors and utilities based on the carbon-based fuel and electricity they sell in New York.[89] Carbon-based fuel that is extracted in other states and imported to be sold as electricity to New York customers would face the same fee as if the fuel was extracted in the state.[90] All distributors or utilities selling fossil fuel-based electricity to New York customers would face the same fee, based on the information they provide to state regulators and according to the same statutory fee schedule.[91] So if discrimination is defined as different treatment of in and out-of-state interests, the Parker-Cahill bill would not be discriminatory. If an out-of-state distributor imports electricity into New York that is more carbon-intensive than in-state electricity, then the out-of-state distributor would accordingly face a higher carbon tax. This would be a similar situation to the one addressed in *Rocky Mountain*, where the Ninth Circuit found a lack of discrimination because the Fuel Standard based its regulatory standard on carbon intensity and not on state borders.[92]

Once Parker-Cahill passes the discriminatory threshold, a court would turn to the more favorable *Pike* balancing test. Given the imminent nature of climate change and its effects on New York, namely through sea level rise and more increased storms, it is likely that New York could make a strong showing of the local benefits of its carbon pricing scheme. The District Court in *Rocky Mountain* held that reducing the risks of global warming was a legitimate local purpose under this analysis,[93] despite finding that the Fuel Standard ultimately violated the Dormant Commerce Clause, which was later overturned. Moreover, to overturn a regulation under the *Pike* balancing test requires a showing of burdens on interstate commerce that outweigh the benefits. It is likely that New York can strongly articulate the benefits of Parker-Cahill, including accelerating progress towards the CLCPA, unlocking more funding for environmental justice communities, and reducing state GHG emissions. It would be difficult for a challenging party to show a burden extreme enough to outweigh those benefits.[94]

Turning to the NYISO proposal, it is important to note that NYISO is a not-for-profit independent company unaffiliated with any state agency.[95] Acting on its own, no NYISO action would implicate the Dormant Commerce Clause because NYISO is not a state. But, it needs permission from New York to implement its proposed carbon charge. How New York or the Federal Energy Regulatory Commission (FERC) approves the scheme or else how it intertwines with the state's regulatory agenda may implicate state action and affect the constitutional analysis. This paper will set that question aside and conduct a doctrinal analysis of the NYISO plan in the abstract.

The NYISO proposal may have a harder time passing the discrimination analysis. NYISO proposes to apply carbon charges or credits to external transactions to the extent that they compete with internal resources, so that in the end, it is as if there was no carbon charge in New York at all.[96] Because NYISO would have to differentiate between out-of-state and in-state electricity in order to allocate the charges and credits, a court could potentially find facial discrimination. Yet, NYISO could defend it by highlighting the treatment of imports and exports is not based on state borders or motivated by an interest to promote New York electricity over out-of-state electricity. Rather, the point of the carbon price is to incentivize lower-emitting electricity, wherever it originates within the NYISO power system, and the border adjustments are necessary for the proper functioning of the market. Similarly to the *Pike* analysis for Parker-Cahill, NYISO can draw on the several benefits of incorporating a carbon price within its electricity market. Determining the plan's burden on interstate commerce will likely depend on how well the border adjustments function and whether out of state electricity providers can articulate a strong disadvantage from reduced competitiveness within the NYISO market.

B. Taxes

There is a different, although overlapping, constitutional analysis for taxes challenged under the Dormant Commerce Clause.[97] The Supreme Court and scholars have confirmed these separate doctrinal lines, but it remains unclear why taxes and regulations are distinguished at all, given that states often use them as substitutes to achieve policy outcomes.[98]

The Supreme Court established the modern test for determining the constitutionality of taxes under the Dormant Commerce Clause in *Complete Auto Transit, Inc. v. Brady*. To survive the *Complete Auto* test, a tax has to 1) apply to an activity with a substantial nexus with the taxing state, 2) be fairly apportioned, 3) not discriminate against interstate commerce, and 4) be fairly related to the services by the State.[99] The Court subsequently weakened the fourth prong of fair relation to mean only that "the *measure* of the tax be reasonably related to the extent of the taxpayer's contact with the State," and stating that the appropriate rate of taxation "is essentially a matter for legislative, and not judicial, resolution."[100] The Court also recently clarified that the first prong does not require a physical presence in the state for the state to collect a sales tax on a seller.[101] A "substantial nexus" is found when the entity subject to the tax "avails itself of the substantial privilege of carrying on business" in the taxing state.[102] The fairly apportioned prong asks whether the tax applies to all firms in the same way. The Court includes consideration of internal and external consistency of a tax under this prong. Internal consistency means that if every state in the U.S. imposed an identical tax, there would be no multiple taxation.[103] The next step to the apportionment prong is external consistency, which considers the economic justification of a state's

claim over what is taxed and whether the value taxed is fairly attributable to the economic activity within the taxing State.[104]

The remaining prong, of discrimination on interstate commerce, tracks closely to the discrimination analysis at the first step of the test for regulations.[105] Similarly to the analysis of regulations, a facially discriminatory tax is likely to be per se invalid.[106] However, the Supreme Court established a three part test in *Oregon Waste Systems, Inc. v. Department of Environmental Quality* that could save a facially discriminatory tax. The test requires the taxing state to 1) identify the intrastate tax burden for which the state is attempting to compensate, 2) ensure the tax on interstate commerce roughly approximates the tax on intrastate commerce, and 3) establish that the transactions subject to the taxes are substantially equivalent.[107] This test is also labelled the "compensatory tax doctrine."[108]

If the Parker-Cahill proposal were to be challenged as a tax, a court would automatically begin the *Complete Auto* test. One distinction between the analysis for regulations is that a court does not start with the question of discrimination and then move onto other considerations, but rather, considers all four *Complete Auto* prongs at the same time. Starting with the substantial nexus prong, it is highly likely that a state that produces fossil fuel energy out of state and then imports it to sell to New York consumers would easily satisfy the low threshold requirement of this prong.[109] If a company is importing electricity or fuel into New York, it can meet a minimum contacts standard. This prong tracks closely with the "fair relation" prong, which just establishes a threshold requirement that the tax relates to the services provided by the state and the taxpayer's "consequent enjoyment of the opportunities and protections which the State has afforded' in connection with those activities."[110] An out of state electricity distributor subject to the Parker-Cahill tax could bring a challenge under this prong, arguing that it does not enjoy any of the services provided by New York. But, the Court seems hesitant to place much weight in this prong and has stated that "a tax is not an assessment of benefits;" and the taxpayer is only constitutionally entitled to the benefit of "living in an organized society."[111]

Parker-Cahill would also likely pass the fair apportionment prong because it proposes to tax both in and out of state electricity producers the same way, by imposing a per carbon ton tax based on the information they submit to NYSDEC. This is similar to the way states administer their corporate income taxes.[112] The bill's formulary apportionment approach bases a tax on both in and out of state distributors based on the carbon intensity of the electricity they sell to New York customers, similarly to California's fuel standard. New York can likely make a strong case that this apportionment formula is reasonable and applies to all companies equally.[113]

As opposed to the deference that courts grant states in the other prongs, the discrimination prong of the *Complete Auto* test is scrutinized with "considerable vigilance."[114] Still, it's likely that Parker-Cahill will survive this step so long as it shows that it does not discriminate between in and out of state electricity producers, but rather, applies the same carbon fee to everyone based on the same formula. It is likely that a court would not even need to reach the compensatory tax doctrine here, because there is no additional burden on out-of-state producers that their in-state counterparts do not face. There may be complicating factors here, depending on how NYSDEC calculates the carbon tonnage subject to the tax based on the information distributors and utilities provide. If the agency takes into account fuel source location, as California did with its Fuel Standard regulation, there may be more room for challenges, but given the *Rocky Mountain*[115] precedent, they would be unlikely to succeed.

An analysis of the NYISO proposal tracks closely to the *Complete Auto* application to Parker-Cahill for the substantial nexus, fair relation, and fairly apportioned prongs. Because of NYISO's proposed use of credit and charge adjustments to at New York's borders, there is slightly more potential for a court to find discrimination under the remaining prong. It would likely depend on the method that NYISO uses to apply the credits and charges and whether out of state electricity sellers are able to participate as fully in the NYISO market as they were prior to the carbon fee.

There would be a much stronger case for discrimination, however, if NYISO applied different carbon fees to out of state producers based on the carbon intensity of their fuel sources. That would likely be *per se* discrimination. NYISO's proposal aims to reward electricity providers that use renewable energy, by granting them the higher prices for their bids without subjecting them to the carbon fee. If states other than New York do not have as many renewable energy electricity providers ready to increase their production in response to the new scheme, they may struggle to compete with the renewable energy electricity providers in New York. This may open the door for a discrimination in practical effect challenge, if New York has the most renewable providers that benefit from the proposal. Indeed, an external analysis of the NYISO proposal found a lack of "underutilized low-emitting resources whose output could increase if only offered a higher price" among the out-of-state participants in the NYISO market.[116] A challenger could draw on cases such as *C & A Carbone, Inc v. Town of Clarkstown*, where the Supreme Court invalidated an ordinance that required all waste collected in the city to be processed in a particular transfer station before leaving the town.[117] The statute did not discriminate based on where the waste came from or where it was headed, but the Court found that the ordinance had a protectionist effect in practice.[118] NYISO and the state would be able to defend the proposal based on a lack of protectionist motive and methodology that aims to preserve the "status quo" within the electricity market.[119] Even if a court found the

NYISO proposal discriminated in practical effect, it's likely the scheme would pass the compensatory tax test in *Oregon Waste Systems*, so long as NYISO ensures the out-of-state and in-state producers face the same tax.

In conclusion, based on the high-level details currently expressed in the bill, it seems that the Parker-Cahill bill would be able to withstand challenges under the Dormant Commerce Clause. It remains to be seen how the NYISO plan would eventually integrate into the state's regulatory framework, which would dictate its openness to constitutional challenges. New York has set some of the most ambitious climate change goals in the nation. Either the Parker-Cahill plan or the NYISO scheme would accelerate progress towards these goals and continue New York's record of leadership on climate change.

Endnotes

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Facts on the Ground

44 Posted 10/27/21

California went from one extreme, drought and wildfires, to another, heavy rain, flooding, landslides and wind in the Bay Area and blizzard and heavy snowfall in the Sierra Nevada. Meteorologists spoke of a "bomb cyclone" and an "atmospheric river" to drive home just how unusual this late October storm was.

The vast storm covered Marin County to the area just south of Big Sur to southern British Columbia. After heavy rainfall in Santa Barbara County residents that were not told to evacuate were advised to shelter in place and go to inner rooms or higher floors because of life-threatening flash flooding and debris flows in the Alisal Fire burn area. Where drought and fire had destroyed vegetation, there was nothing to hold back rushing mud, rocks or vegetation that may sound like a freight train. Such dangers existed in many areas including Fresno and Madera counties as heavy rainfall made the ground susceptible to slides in the Creek Burn scar area. About 100,000 customers were without power in California, according to PowerOutage.US, a site that tracks outages.

Oregon and Washington experienced winds up to 61mph which caused at least two deaths near Seattle, where a tree fell on a car. About 38,000 customers lost power in Washington, PowerOutage.US reported and a few thousand customers in Oregon were without power as well.

"The atmospheric river is aiming a fire hose, if you will, into our area," said Sean Miller, a meteorologist for the Weather Service in Monterey, California. An atmospheric river is a concentrated plume of moisture that extends over the ocean, typically in the troposphere, the lowest layer of the atmosphere, Miller said. The current trough was angled toward the North Bay, he said.

In the Pacific Northwest, a bomb cyclone was expected to push the atmospheric river south, affecting areas south of San Francisco, Miller said. It's true name is "explosive cyclogenesis" which refers to a storm where pressure drops 24 millibars in 24 hours—and in this case it dropped that much in nearly 12 hours—and brings heavy rain and hurricane-force winds.

"This is more typical of something we tend to see in December or January," he said, pointing out that the confluence of the two meteorological phenomena was "anomalous."

In British Columbia, nearly 7,000 customers in the Lower Mainland and Sunshine Coast lost power as did 5,500 Vancouver Island customers as wicked winds battered B.C.'s southern coast. More than 3,300 homes were without power in Surrey and Langley. B.C. Hydro says its customers in Sechelt, Texada, Gambier, and Keats Island were without power overnight. Cortes Island will remain without power due to downed wires and the lack of ferry service to the island.

The incredibly intense low-pressure system and heavy winds created monster swells that caused a Victoria-bound cargo ship to lose 40 containers overboard. The MV Zim Kingston is moored off the coast of Victoria and caught fire.

Buoys near the storm reported waves in excess of 12 metres (40 feet). A buoy off Tofino recorded a pressure of 942.6 mb, which is a new Pacific Northwest low pressure record. The previous record was 943 mb, which was recorded during post-tropical cyclone Harriet in 1977.

Hurricane Ida was an exceptional storm. It lasted from August 28 until September 4, it reached Category 4, with sustained winds of 150 miles an hour (and a max of 172mph) it caused damage in Cuba, Venezuela, Jamaica, Colombia, Cayman Islands, Louisiana and most of the East Coast of the U.S. It caused many deaths along its long path. It was the second-most damaging and intense hurricane to make landfall in Louisiana (behind Hurricane Katrina in 2005). About one million people lost power and much of New Orleans was without electricity as all eight transmission lines that deliver power to the city were knocked out of service. The storm caused catastrophic flooding across the Northeastern U.S. including the drowning deaths of 11 inhabitants of basement apartments in Queens, New York. It was the sixth-costliest storm on record, having caused at least $65.25 billion in damages, of which $18 billion was in insured losses in Louisiana, and $584 million was from agriculture damage in the U.S. It caused $16 to $24 billion in flooding damage in the Northeastern U.S., making it the costliest storm to hit the region since Hurricane Sandy in 2012. On August 29, the 16th anniversary of Hurricane Katrina, Ida made landfall near Port Fourchon, Louisiana, devastating the town of Grand Isle. Nearby hospitals were already full of COVID-19 patients in a state with one of the lower rates of vaccinations.

People fled to shelters where the fear of transmission of the highly contagious Delta variant was high.

The storm continued north and east, leaving over 100,000 in Mississippi without power and causing flooding, power outages and destruction up to New England. It arrived in New York City on September 1, delivering record-breaking rains that disrupted much of the area's transportation for two days and stranded thousands of travelers as the area airports canceled dozens of flights.

Local officials noted that under-river tunnels were strengthened after Superstorm Sandy in 2012. The next step will be to improve coastline resiliency to mitigate floods and prevent them from overwhelming street drains.

Scientists say that unusually warm Atlantic surface temperatures have helped to increase storm activity. "It's very likely that human-caused climate change contributed to that anomalously warm ocean," said James P. Kossin, a climate scientist with the National Oceanic and Atmospheric Administration. "Climate change is making it more likely for hurricanes to behave in certain ways." Wind intensity has increased and storm surge is higher given sea level rise. For every degree Celsius air warms, it can hold about 7% more water vapor leading to heavier rainfall. There has been a 25% increase in rainfall in the U.S. as storms are moving more slowly, perhaps due to changes in atmospheric wind patterns. The warming planet is producing more intense storms more rapidly. We can expect future storms to produce higher amounts of rainfall and greater death and devastation.

Wildfires, too, continued to devastate much of the western U.S. The Alisal fire, near Santa Barbara, forced evacuations and consumed 6,000 acres in 24 hours. Residents awoke on October 12 to an order: "Please leave the area immediately."

Alisal is one of the latest fires in California where four 100,000-acre-plus mega-fires were burning in October, including the Dixie fire, which began in July and has consumed more than 963,000 acres. Nine of the 20 largest fires in California have occurred since 2020, according to Cal Fire. Wildfires are a regular occurrence throughout the West, but scientists say that the prolonged periods of abnormally high temperatures this summer that have contributed to the devastating fires are in keeping with the expected effects of climate change and will worsen.

The world has already begun to experience increases in heat waves, droughts and other types of extreme weather over the past several decades as the atmosphere has warmed, and most climate models predict those kinds of events will increase as warming continues.

It has been a busy few months for meteorologists as the arrival of the peak 2021 hurricane season—August through November—led to a run of named storms that formed in quick succession, bringing stormy weather, flooding and damaging winds to parts of the U.S. and the Caribbean.

Tropical Storm Mindy hit the Florida Panhandle on September 8, just hours after it formed in the Gulf of Mexico. Hurricane Larry, which formed on September 1, strengthened to a Category 3 storm two days later. It struck

Canada as a Category 1 hurricane and caused widespread power outages in Newfoundland.

Not long before them, in mid-August, Tropical Storm Fred made landfall in the Florida Panhandle and Hurricane Grace hit Haiti and Mexico. Tropical Storm Henri knocked out power and brought record rainfall to the Northeastern U.S. on August 22. Hurricane Nicholas hit Texas as a Category 1 hurricane knocking out power to hundreds of thousands of customers.

In southwest Louisiana, many homes were still covered in blue tarps after Hurricane Laura tore the roofs off in 2020. More than 52,000 state residents have requested free installation of durable tarps through Blue Roof, a program funded by the Federal Emergency Management Agency.

As bad as the hurricanes and wildfires have been, the greatest killer in New Orleans wasn't Hurricane Ida, it was the heat. The storm knocked out power so even those with air conditioners could not use them. For days. People died in their over-heated apartments and homes. Ten of the 14 people killed by Ida died from heat exposure. Experts say there are probably more. All 10 people were in their 60s and 70s, and they died during four broiling days, the last of which was September 5, a full week after the storm.

"Heat is a hazard that we simply haven't given sufficient attention to," said David Hondula, a professor at Arizona State University who studies the effects of sweltering temperatures. "All cities are in the early stages of understanding what an effective heat response looks like."

Heat most likely contributes to more deaths each year than are officially recorded, Professor Hondula said. Though the Centers for Disease Control and Prevention reports fewer than 700 heat-related deaths a year, some studies suggest there have been 5,000 to 12,000. Last month, *The New York Times* found that 600 more people died in Oregon and Washington during the heat wave the last week of June, than normally would have, a number three times the state officials' estimates of heat-related deaths.

The 2018 National Climate Assessment, a major scientific report by 13 federal agencies, notes that the number of hot days is increasing, and the frequency of heat waves in the U.S. increased from an average of two per year in the 1960s to six per year by the 2010s. The period from June through August this year was the hottest on record in the U.S., exceeding even the Dust Bowl summer of 1936, as per NOAA.

The average temperature this summer in the contiguous U.S. was 74F, slightly exceeding the record set in the summer of 1936, when heat led to the death of thousands of Americans and catastrophic crop failure.

Five states—California, Idaho, Nevada, Oregon and Utah—reported their warmest summers on record, while 16 other states reported "a top-five warmest summer on record," the agency said.

Despite the fact that the cost of wind and solar energy has fallen so far so fast, areas such as New Orleans beholden to the oil and gas industry are still building gas power plants. In New Orleans East, tens of thousands of residents help fund through their monthly bills to Entergy, the city's sole electric utility, a 128-megawatt gas power plant. It cost $120 million and went online last year with a promise that it would provide quick, reliable start-up power in event of another powerful storm. It didn't.

More than a week after the Category 4 storm destroyed transmission lines and cut the city off from the power grid, many in New Orleans were still sitting in dark, humid homes and many died. The coroner said, after the city's new power plant's failed "black start," a quick delivery of power in the middle of a blackout, that the prolonged heat was too much to endure. Louisiana is forecast to suffer dangerously hot temperatures on 115 days a year by 2050, more than triple the current number.

Residents and environmentalists had pushed the city to diversify its energy approaches, including investing in bulk battery storage and solar energy, hardening transmission infrastructure and minimizing overall demand. After the storm passed and the sun shone, solar panels could have delivered power and so could batteries.

"We, the citizens and the ratepayers that were against the plant, were correct," said Dawn Hebert, the president of the East New Orleans Neighborhood Advisory Commission. In exchange for accepting another industrial plant in their neighborhood, she said, New Orleans East residents had been promised they would have more reliable power. Instead, when Ida hit, "New Orleans East was not powered up."

That the City Council had the sole authority to approve the plant was mystifying: that should have been the job of the Louisiana Public Service Commission. An internal city watchdog found in 2015 that New Orleans was the only city in the U.S. charged with regulating an investor-owned energy utility in a state where there was an existing state agency that could do so. Thus, Entergy avoids direct oversight by energy regulation experts.

Residents opposed the construction of the plant, but the City Council heard testimony in support of the plant. Such testimony was due, in part, to a firm hired by Entergy that paid actors $60 apiece to go to Council meetings and pretend to support the development, an illegal tactic that led to a $5 million fine.

Entergy officials have continued to insist that relying on locally generated renewable power to tide the city through a hurricane remains a pipe dream. They argue that gas and oil are more dependable; meanwhile, 90% of New Orleans customers waited nearly two weeks for the power to be restored, and for nearly 421,000 of Entergy's customers outside of the city, they remained without power in excess of two weeks, according to the utility.

In Nepal and India the monsoon season generally slows and storms tend to weaken by mid-October. Not this year. The water in the Bay of Bengal was unusually warm and higher ambient temperature added more water vapor to the atmosphere which produced unseasonably heavy rainfall that destroyed crops, washed away bridges and killed dozens of people. Landslides and flooding damaged homes and stranded thousands of tourists flocking to vacation spots and pilgrimage sites during Hinduism's festive season, which coincides with the fall harvest.

"Historically October is the start of post-monsoon," said R.K. Jenamani, a senior scientist from India's meteorological department. "But this time what happened was that western disturbances were very, very intense."

In the northern Indian state of Uttarakhand, days of heavy rainfall—in one place, the most since 1897—killed at least 46 people and stranded hundreds more with flooded lakes swamping roads.

South Asia's monsoons have always been strong, but the recent scenes of death and destruction in the region are additional reminders of the urgency of climate change, experts say.

More than 40 people in Kerala drowned or were killed in the recent landslides and floods, said Neethu V. Thomas, a hazard analyst at Kerala's disaster management agency.

Landslides and floods also struck Nepal with at least 50 people killed in flooded villages. Hundreds of hillside-houses were swept away. Highways were blocked, and a regional airport, its tarmac submerged, canceled flights.

Heavy rain damaged rice paddies ready for harvest, causing Nepal's farmers to despair and raising fears of a food crisis in one of the world's poorest countries.

"Rainfalls in October were reported in the past, too, but not to this intensity," said Ajaya Dixit, an expert on climate change vulnerability in Nepal. "Climate change is real, and it is happening."

Two meetings addressing twin existential threats are of note: climate change and biodiversity collapse. Environment officials, diplomats and other observers from around the world met online in mid-September, and a small group assembled in person in Kunming, China, for the 15th United Nations biodiversity conference. Countries are gathering to address the on-going biodiversity collapse that threatens the existence of over 1 million species and could alter life on earth as we know it.

Because of the pandemic, the conference has been broken into two parts. The virtual portion was largely about summoning political will. National leaders will meet again in China in the spring to ratify a series of targets to stem biodiversity loss. The goal is to adopt a pact for nature akin to the Paris Agreement on climate change, said Elizabeth Maruma Mrema, the executive secretary of the convention.

The U.S. is the only country in the world besides the Vatican that is not a party to the underlying treaty, the Convention on Biological Diversity, due to Republican opposition. American representatives participate on the sidelines of the talks, as do scientists and environmental advocates.

The second meeting will involve 20,000 government leaders, journalists, activists and celebrities from around the world meeting in Glasgow, Scotland beginning October 31, for a climate summit.

The stakes at the two meetings are equally high, many leading scientists say, but the biodiversity crisis has received far less attention. "If the global community continues to see it as a side event, and they continue thinking that climate change is now the thing to really listen to, by the time they wake up on biodiversity it might be too late," said Francis Ogwal, one of the leaders of the working group charged with shaping an agreement among nations.

Because climate change and biodiversity loss are interrelated, they must be addressed together, scientists say. But their current global summits are separate, and one overshadows the other. "Awareness is not yet where it should be," said Hans-Otto Pörtner, a biologist and climate researcher who has helped lead international research into both issues. He calls them "the two existential crises that humankind has elicited on the planet."

Increasing numbers of religious groups and environmentalists call the twin threats the moral crises of today. But the threats are existential because without a healthy ecology, the future of human survival is at risk. "The diversity of all of the plants and all of the animals, they actually make the planet function," said Anne Larigauderie, an ecologist who directs the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. "They ensure that we have oxygen in the air, that we have fertile soils."

Ecosystems will stop working after a certain level of disruption. The average abundance of native species in most major terrestrial biomes has fallen by at least 20%, mostly since 1900, according to a major report on the state of the world's biodiversity published by Dr. Larigauderie's panel.

Climate change is a complicated driver of biodiversity loss but more direct causes on land is habitat destruction via activities like farming, mining and logging. At sea, it's overfishing. There are many other causes, including pollution and introduced species that drive out native ones.

"When you have two concurrent existential crises, you don't get to pick only one to focus on—you must address both, no matter how challenging," said Brian O'Donnell, director of the Campaign for Nature, an advocacy group. "This is the equivalent of having a flat tire and a dead battery in your car at the same time. You're still stuck if you only fix one."

Last year, officials reported the global failure to achieve the targets of the previous global agreement on biodiversity, made in 2010. If the new commitments are not translated into "effective policies and concrete actions," Mrema said, "we risk repeating the failures of the last decade."

The working draft includes 21 targets that act as a blueprint for reducing biodiversity loss. They include, in summary:

- Create a plan, across the entire land and waters of each country, to best locate areas for activities like farming and mining while also retaining intact areas.
- Ensure sustainable hunting/fishing.
- Reduce agricultural runoff, pesticides and plastic pollution.
- Use ecosystems to limit climate change by storing GHGs in nature.
- Reduce subsidies and other financial programs that harm biodiversity by at least $500 billion per year, the estimated government support for fossil fuels and questionable agricultural practices.
- Safeguard at least 30% of the planet's land and oceans by 2030. (Recently, nine philanthropic groups donated $5 billion to the effort, known as 30x30.)

With the global human population still increasing, scientists say that transformational change is required for the planet to be able to sustain us. "We actually need to see every human endeavor, if you will, through the lens of biodiversity and nature," Dr. Larigauderie said. Since everyone depends on nature, she noted, "everyone is part of the solution."

Washington

As of this writing, it is still unclear what climate action will be included in the twin bills pending in Congress. They include a $1 trillion infrastructure package with bipartisan support that passed the Senate, and a $3.5 trillion budget package proposed by House Democrats alone that is likely down to under $2 trillion now.

Biden has framed this moment as the country's best chance to save the planet. That Biden is serious about including as much as possible is clear: "The nation and the world are in peril," he said in Queens, after 11 people drowned in floodwaters from Hurricane Ida. "And that's not hyperbole. That is a fact. They've been warning us the extreme weather would get more extreme over the decade, and we're living in it real time now."

The twin bills, as originally drafted, contain what would be the most significant climate action ever taken by the U.S. And, because Democrats could lose control of Congress after 2022 and because Republicans disdain climate legislation, it could be years before another opportunity arises—a delay that scientists say the planet cannot afford.

The intent of the bills is to quickly transform energy and transportation, the country's two largest sources of GHGs, from fossil fuel-based systems (gas, oil and coal) to carbon-free systems (sun, wind and nuclear power).

But Sen. Joe Manchin has killed such a transformation. Despite a precipitous decline in the U.S., the coal industry still carries clout in West Virginia. Manchin has personal financial interests in the industry; he owns stock valued at between $1 million and $5 million in Enersystems Inc., a coal brokerage. Last year he reported earnings of $491,949 in dividends from this stock.

Plan B appears to be a proposed carbon tax that would likely target producers of petrochemicals and diesel, but not gasoline, to shield most American drivers at the pump. The carbon tax would affect polluting industries that would pay a fee based on the amount of CO2 they emit. This tax is seen by economists as the most effective way to cut the fossil fuel emissions that are heating the planet. Stay tuned.

A White House official said that staff members were still engaging with members of Congress and had not yet agreed to a final version of climate provisions.

The cut to the climate change program could be among the first consequential decisions in what will very likely be a painful process for Democrats as they pare their ambitious $3.5 trillion domestic policy package. Manchin and another Democrat, Senator Kyrsten Sinema of Arizona, have said they will not support that spending level. The White House will negotiate with Democrats over cuts to dozens of programs, as lawmakers try to whittle the original bill down.

Biden and Democratic leaders on Capitol Hill have set a deadline of October 31 for a deal that would enable Democrats to pass the bill with their razor-thin majorities in both chambers of Congress.

Congress "cannot afford to gut" the climate provisions in the bill, Representative Alexandria Ocasio-Cortez, Democrat of New York, wrote on Twitter. "This issue is bigger than ideology. It is a moral imperative for humanity and our planet's future to reduce and eventually eliminate emissions," she wrote. "There are many ways to do it, but we can't afford to give up."

Senator Jeff Merkley, Democrat of Oregon, has been involved with the "No climate, no deal" rallies. "Listen, my state is burning up. We're losing our snowpack, the ocean's acidifying, affecting our shellfish." "This is a code red."

The tax would be applied directly to coal mining companies, large natural gas processing plants and oil refiners, based on the emissions associated with their products, with one exception: Oil refiners would very likely be

charged for producing diesel fuel and petrochemicals, but, as noted above, not gasoline.

An important part of the policy, Wyden said, will be to use the revenue for tax rebates or checks for poor and working-class Americans—particularly those employed in the fossil fuel industry. "You've got to show workers and families, when there's an economy in transition, that they will get their money back," he said. "They will be made whole."

Biden is eager to have something to show the leaders of the other 195 nations who will be meeting in Glasgow, Scotland, at the climate summit. World leaders have been struggling for decades to take meaningful action and so far have utterly failed to propose action that would keep the planet from warming beyond 1.5C. The U.S. has contributed more to global warming than any other nation and is intent on seizing a leadership role that was abdicated by Trump. Scientists warn that if we exceed this threshold then the dangers of global warming, deadly heat waves, water shortages, crop failures and ecosystem collapse, grow immensely. The world has already warmed 1.1C and is on track to warm over 3C.

"The whole world is watching," said Rachel Kyte, dean of the Fletcher School at Tufts University and a climate adviser for the United Nations Secretary General. "If these bills don't come to pass," she said, "then the U.S. will be coming to Glasgow with some fine words" but "not much else. It won't be enough."

Biden does have some momentum going into Glasgow as 32 nations have joined with the U.S. in pledging to reduce methane emissions. Methane is the second-largest driver of global warming after CO2 emissions. It is the main component of natural gas and is released in enormous quantities during fracking as well from landfills, livestock and thawing permafrost. The pledge, developed with the European Union, commits nations to cut emissions from methane 30% by 2030.

The four largest emitters of methane (China, India, Russia and Brazil) have not joined the pledge, but nine of the world's top 20 methane polluters have (U.S., the EU, Canada, Indonesia, Pakistan, Mexico, Nigeria, Argentina and Iraq).

But, once again, Manchin stands in the way. He has pushed Democrats to drop or weaken a second major climate change provision from the sweeping social policy and environmental spending bill that the White House hopes to finalize. He wants to remove or modify the provision that would impose a fee on methane emission.

Analysts have found that it would be technically possible, although difficult, for the U.S. to meet its goals without passing the clean electricity legislation that Manchin killed. The broader spending package still includes about $300 billion in tax credits for wind and solar energy, which analysts say could get the U.S. about halfway to Biden's target. But removing the methane fee legislation could further weaken his case in Glasgow.

It's not dead yet (October 25). "The methane fee is not out of the package," said Rachel Levitan, a spokeswoman for Senator Thomas Carper, the Delaware Democrat who leads the Senate Environment Committee. "Chairman Carper is working to get robust climate provisions in the reconciliation bill and is in active negotiations to ensure that the bill meaningfully reduces greenhouse gas emissions."

Separately, EPA is expected to release a draft regulation shortly that would compel oil and gas producers to monitor and plug methane leaks from existing oil and gas wells. Among Manchin's objections to the fee is that it could be duplicative of those rules.

Biden also intends to reduce emissions of another GHG, hydrofluorocarbons by 85% by 2035. EPA has finalized a rule to phase down the use of HFCs in air-conditioners and refrigerators. HFCs were used to replace ozone-depleting chlorofluorocarbons in the 1980s but are now known to be a significant driver of global warming as they have a thousand times the heat-trapping potency of CO2.

Experts said the rule would go a long way in helping the U.S. achieve Biden's pledge to cut U.S. GHG emissions 50 to 52% below 2005 levels by the end of the decade. Environmental groups and the business community have supported phasing out HFCs as well as a 2016 accord signed in Kigali, Rwanda, in the last days of the Obama administration, and bipartisan legislation passed by Congress in December. Biden is expected to send the Kigali accord to the Senate for ratification.

Biden has created The Office of Climate Change and Health Equity. It will be the first federal program focused at understanding how planet-warming GHG emissions from burning fossil fuels affect human health and their disproportionate effects on poor communities. It will be part of the Department of Health and Human Services.

"The health of the American people is falling through the cracks because there hasn't been a targeted focus on climate risk," said Aaron Bernstein, interim director of the Center for Climate, Health and the Global Environment at the Harvard T.H. Chan School of Public Health. "This is the opportunity to plug that hole."

In 2009, scientists warned in the medical journal The Lancet that global warming would harm crop yields, cause tropical diseases to appear in new parts of the world and lead to water shortages. In 2020, the journal said those threats had arrived.

"Climate change is fundamentally a health threat," said Gina McCarthy, the White House national climate change adviser. She said part of the mission of the office would be to encourage doctors to talk to their patients

about protecting themselves from things like heat waves, wildfire smoke and other air pollution.

Experts said more needs to be done to understand how extreme weather affects older people as well as communities of color, where families are more likely to live in areas hardest hit by disasters.

To aid in the transition away from fossil fuels, Biden is promoting solar and wind power. The Energy Department issued a report in September outlining how the U.S. could move from deriving 4% of our energy from solar to 45% by 2050 which would also require vast upgrades to the electric grid (addressed in the pending twin bills).

Such an increase is consistent with what most climate scientists say is needed to avoid the worst effects of global warming. Renewable energy is growing fast and it provides about 20% of the country's electricity (natural gas and coal account for about 60%). In February, a division of the Energy Department projected that the share of electricity produced by all renewable sources, including solar, wind and hydroelectric dams, would reach 42% by 2050 based on current trends and policies.

The good news is that the cost of solar panels has fallen dramatically over the last decade, making solar the cheapest source of energy in many parts of the country. The growth of solar and wind energy has exceeded government and independent analysts' predictions.

"One of the things we're hoping that people see and take from this report is that it is affordable to decarbonize the grid," said Becca Jones-Albertus, director of the Solar Energy Technology Office in the Energy Department. "The grid will remain reliable. We just need to build."

Some recent natural disasters have been compounded by weaknesses in the energy system. Ida, as noted above, knocked out the electric grid in Louisiana, where hundreds of thousands of people were without power for days. Last winter, a storm left much of Texas without electricity for days, too. And in California, utility equipment has ignited several large wildfires, killing scores and destroying thousands of homes and businesses. Solar and wind power likely would have been up and running much faster as there would have been no wait for fuel deliveries, nor would it spark fire or pollute groundwater.

Jennifer M. Granholm, Biden's energy secretary, said part of the administration's strategy would focus on its Clean Electricity Payment Program, which would reward utilities for adding renewable energy to the electric grid, including rooftop solar. Many utility companies have fought against rooftop solar panels because of the perceived threat to their business and would rather build large solar farms that they own and control.

"Both have to happen, and the utilities will be incentivized to take down the barriers," Granholm said. "We've got to do a series of things."

Building and installing enough solar panels to generate up to 45% of the country's power needs will strain manufacturers and the energy industry, increasing demand for materials like aluminum, silicon, steel and glass. The industry will also need to find and quickly train tens of thousands of workers. Some labor groups have said that in the rush to quickly build solar farms, developers often hire lower-paid nonunion workers rather than the union members Biden supports.

Challenges like trade disputes could also complicate the push for solar power. China dominates the supply chain for solar panels, and the administration has blocked imports connected with the Xinjiang region of China over concerns of forced labor. While many solar companies say they are working to shift away from materials made in Xinjiang, energy experts say the import ban could slow the construction of solar projects throughout the U.S. in the short term.

Yet, energy analysts said it would be impossible for Biden to achieve his climate goals without a big increase in the use of solar energy. "No matter how you slice it, you need solar deployments to double or quadruple in the near term," said Michelle Davis, a principal analyst at Wood Mackenzie, an energy research and consulting firm. "Supply chain constraints are certainly on everyone's mind."

Administration officials pointed to changes being made by state and local officials as an example of how the country could begin to move faster toward renewable energy. Regulators in California, for example, are changing the state's building code to require solar and batteries in new buildings.

Another big area of focus for the administration is greater use of batteries to store energy generated by solar panels and wind turbines for use at night or when the wind is not blowing. The cost of batteries has been falling but remains too high for a rapid shift to renewables and electric cars, according to many analysts.

"Last year alone, our country experienced 22 major natural disasters costing Americans a record-shattering $95 billion in damages—figures that represent more than double the historical average, but which still don't reflect the cost of lost jobs or the trauma of families losing their homes," said Representative Frank Pallone, Democrat of New Jersey, chairman of the House Energy and Commerce Committee, which will draft the central climate provisions of the budget bill. "The climate crisis is here, and the cost of inaction is already staggering."

The House Energy Committee will debate other climate provisions in the budget bill, including $13.5 billion to construct charging stations for EVs and promote the electrification of heavy-duty vehicles. Another program

would spend $9 billion on updating the electric grid, to make it more conducive to transmitting wind and solar power, and to make it more resilient to the extreme temperatures, flooding and fires that scientists say are now unavoidable. Another provision would spend $17.5 billion to reduce the CO2 emissions from federal buildings and vehicles. The budget bill could also assess a fee from oil and gas companies for leaks of methane, a potent GHG. The government would use the revenue from those fees to pay for climate mitigation programs.

Regarding wind power, Interior Secretary Deb Haaland said that the Department of the Interior will begin to identify, demarcate and attempt to lease federal waters in the Gulf of Mexico, Gulf of Maine and off the coasts of the Mid-Atlantic States, North Carolina and South Carolina, California and Oregon, to wind power developers by 2025. This follows the approval of the nation's first major commercial offshore wind farm off the coast of Martha's Vineyard in Massachusetts and the initial review of a dozen other potential offshore wind projects along the East Coast. On the West Coast, the administration has approved opening two areas off the shores of Central and Northern California for commercial wind power development.

Taken together, the actions represent the most forceful push ever by federal government to promote offshore wind development. "The Interior Department is laying out an ambitious road map as we advance the administration's plans to confront climate change, create good-paying jobs, and accelerate the nation's transition to a cleaner energy future," said Haaland. "This timetable provides two crucial ingredients for success: increased certainty and transparency. Together, we will meet our clean energy goals while addressing the needs of other ocean users and potentially impacted communities."

Biden has pledged to build 30,000 MW of offshore wind in the U.S. by 2030.

In Congress, Biden is pushing for passage of a major spending bill that includes a $150 billion program that would pay electric utilities to increase the amount of electricity they purchase from zero-carbon sources such as wind and solar and penalize those that don't.

Still, there is no guarantee that companies will lease space in the federal waters and build wind farms. Once the offshore areas are identified, they will be subject to lengthy federal, state and local reviews. If the potential sites could harm endangered species, conflict with military activity, damage underwater archaeological sites, or harm local industries such as tourism, the federal government could deem them unsuitable for leasing.

As they have in response to other offshore wind farms, commercial fishing groups and coastal landowners will likely try to stop the projects. In the Gulf of Mexico, where oil and gas exploration is a major part of the economy, fossil fuel companies could fight the development of wind energy as a threat to not only their local operations but their entire business model.

"To be making these announcements, and making them in ways that are very political, without looking at what that means, what area, when we still don't know what the effects are going to be of these projects is really problematic," said Anne Hawkins, executive director of the Responsible Offshore Development Alliance, a coalition of fishing groups. "In an ideal world, when you welcome a new industry, you do it in phases, not all at once."

Interior Department officials said they intend to take such considerations into account. "We are working to facilitate a pipeline of projects that will establish confidence for the offshore wind industry," said Amanda Lefton, director of the Interior Department's Bureau of Ocean Energy Management. "At the same time, we want to reduce potential conflicts as much as we can while meeting the administration's goal."

John Kerry's trip in September to India ended without a commitment from the world's third largest GHG emitting country that it would raise its ambitions to fight climate change. He ended a recent trip to China, the top emitter, similarly empty-handed. China plans to develop 247 gigawatts of coal power domestically, nearly six times Germany's entire coal-fired capacity. Brazil, which plans to continue burning coal for the next 30 years and where deforestation of the Amazon is a major contributor to climate change, skipped a virtual climate meeting convened by Biden in September.

Earlier this year Canada, South Korea and Japan raised their climate targets, in large part because of prodding from the U.S. And several administration officials said that Biden's announcement that he intends to double aid on climate change to developing countries was a result of direct conversations with Kerry who argued that increasing climate finance will be critical to the success of the Glasgow summit.

Kerry insisted he is "hopeful" that the biggest economies will take meaningful climate action in Glasgow, if not because of the scientific imperative but because of market forces. Capital is shifting away from fossil fuels and towards new global investment in wind, solar and other renewable energy that does not emit GHGs, he said. About 70% of the $530 billion spent worldwide on new power generation this year is expected to be invested in renewable energy, according to the IEA. Technology is improving, the costs of clean energy are dropping and markets are moving.

Facts on the Ground

45 Posted 12/9/21

Storm Arwen, a pre-winter, late November, snow-storm killed at least 3 people in the UK (from fallen tress), knocked out power and stranded travelers as 3' of snow closed roads for days in North Yorkshire, more than 200 miles northwest of London.

The prior week, Vancouver experienced heavy rains and flooding which forced 17,000 people from their homes, emptying entire towns and inundating farms. Roads and rail links to the rest of the country were cut off by washed-out bridges and landslides. It was the second time in six months that the province had endured a major weather-related emergency.

British Columbia has suffered through record-breaking heat, wildfires and floods in 2021. Hundreds of people were killed by these disasters, including three in the recent rains which caused hundreds of millions of dollars in damage to homes and infrastructure. The economic impacts were felt across Canada due to the loss of roads and rails and disruption to the port of Vancouver, which is vital to the country's economy.

"In the last six months, B.C. has both burned and drowned," said Merran Smith, the executive director of Clean Energy Canada, a climate program at Simon Fraser University in Vancouver. "So there's really no greater evidence of climate change right now than here in British Columbia."

An increasingly common weather event known as an "atmospheric river" led to the province's devastating flooding and set numerous rainfall records. This river acts as a moisture conveyor belt, known as the Pineapple Express. It is a relatively narrow but very long band of fast-moving, moisture-laden air that forms in the Pacific Ocean near Hawaii. Normally, such systems release that moisture as intense rain once they reach BC's coastal mountains and peter out before they enter the dry interior region on the other side. But this atmospheric river was different, said Armel Castellan, a meteorologist with the weather service at Environment and Climate Change Canada. "This had so much potency to it that it was able to ride up those mountains and really unleash into what is otherwise the dry belt," he said.

Alex Hall, a professor of atmospheric science at U.C.L.A., said the phenomenon was notable for its scale. The town of Hope received 11.6" of rain in 52 hours, about a third more than the amount of rain it usually receives in all of November.

BC has been a leader in mitigation efforts, said Barry Prentice, a professor at the University of Manitoba. In 2008, it introduced North America's first carbon tax. Smith of Clean Energy Canada said that Prime Minister Justin Trudeau's government had a credible and ambitious climate plan, but it is undermined by the oil and gas industry, particularly the oil sands operations based largely in Alberta. "We need to reduce the emissions from the oil and gas sector; it is one of Canada's biggest challenges," she said. "All of these other good policies, we need to see them implemented without delays. There's a lot of inaction that gets disguised as flexibility, and we're past that time."

Earlier in November, heavy rain and flooding forced the evacuation of over 1,000 homes and emergency rescue of residents of Abbotsford, one of the largest cities in BC, after hundreds of people were stranded on highways by torrential rains. Cars were overturned and roadways were impassable due to flooding and mudslides. Abbotsford borders the town of Sumas, in Washington State, where highways were also inundated.

In early December, the Hawaiian Islands were flooded by an intense seasonal cyclone. Flash flood warnings were issued in Oahu and Honolulu with power outages in Maui which had received over 12" of rain with more to come. Gov. David Ige of Hawaii signed an emergency declaration, as did the mayor of Hawaii County, Mitchell Roth, which freed state funds to be used for losses caused by flooding and other cyclone damage.

This type of cyclone is called a kona low, which typically stalls, drops large amounts of rain in one location and comes from a southerly direction, bringing moisture to areas that do not usually get much rainfall. It is rare for a kona low to stall directly over the Hawaiian Islands, according to meteorologists. "This is an extreme weather event," said Adam Weintraub, a spokesman for the Hawaii Emergency Management Agency.

All the islands were on a flood watch, several public schools canceled classes and Governor Ige warned residents on Twitter, "now is the time to make sure you have an emergency plan in place and supplies ready should you need to move away from rising water."

In mid-November, a pilot crashed and died while fighting the fast-moving Kruger Rock fire in northern Col-

orado. Several rounds of evacuation orders, both mandatory and voluntary, were issued to residents and businesses. Parts of Rocky Mountain National Park were closed because of the fire.

In 2021 Colorado has had multiple wildfires including the Oil Springs fire (which burned nearly 13,000 acres), and the Morgan Creek fire (nearly 8,000 acres). "One of the things that is a change of paradigm is Colorado used to talk about a fire season," Gov. Jared Polis said, adding that the phenomenon was now year-round.

Wildfire experts see the signature of climate change in the dryness, high heat and longer fire season that have made these fires more extreme. "We wouldn't be seeing this giant ramp-up in fire activity as fast as it is happening without climate change," Park Williams, a climate scientist at U.C.L.A., said. "There's just no way."

Strobe-light like lightning led to fierce storms and flooding in Egypt, which had a bizarre effect: 100s, maybe 1,000s of 4-inch long scorpions, called Deathstalkers due to the toxicity of its venom, were swept from their burrows and into villages (Aswan) and homes stinging over 500 people (causing severe pain but no deaths). Three people died from the storm, and local officials said 103 homes were partly or fully destroyed, though residents said the real toll was far greater.

The rains were the heaviest in seven years, but flooding had rarely, if ever, touched residential areas before. The storm's intensity led Egyptian meteorologists to speculate publicly that it was connected to climate change, which has hurt Egypt's olive and date harvests, turned vast areas of farmland into desert and made the country's already blazing summers even hotter.

More locally, also in mid-November, a storm brought quarter-sized hail and wind gusting to 60mph to NEW YORK CITY, New Jersey and Long Island. Tornado warnings were issued for Commack, Levittown and Melville on Long Island. About 11,000 customers of the utility PSEG on Long Island lost power.

In late October, a large, slow-moving storm, brought some of the highest tidal surges of the past two decades to the mid-Atlantic region. The storm and flooding affected cities and towns along northern coastal Virginia up through the Chesapeake and Delaware Bay areas, to coastal New Jersey. Waters surged into Annapolis, Md., and Alexandria, Va., and waterways surrounding Washington, D.C., and Philadelphia swelled. In Baltimore, the Inner Harbor was underwater.

Maryland's capital city, which lies on the Chesapeake Bay, now confronts regular tidal surge flooding, which forced the city to purchase a pumping system to prevent high-tide flooding. But it was no match for the surge.

"We're used to flooding, and this is kind of flooding beyond that," David Mandell, deputy director of the Office of Emergency Management said. Coastal flood records were broken along the shores of the Potomac River and Chesapeake Bay in Solomons Island and Straits Point in Maryland, and Dahlgren, Va. Water levels along the Delaware River and upper Delaware Bay approached record highs. Heavy winds along parts of the Atlantic coast reached 60mph, according to the National Weather Service, toppling trees and power lines. In New Jersey, about 4,000 households lost power.

From 2000 to 2015, the incidence of high-tide flooding in the Mid-Atlantic doubled to an average of six days per year from three days, according to a 2018 report from the National Oceanic and Atmospheric Administration.

The storm came just days after a Nor'easter battered coastal New England with hurricane force winds, cutting electricity to hundreds of thousands of households. It continued north with hurricane-force winds after battering the New York area and causing wide-spread power outages across New England including almost 425,000 customers in Massachusetts, nearly 80,000 in Rhode Island and about 25,000 in Maine, according to PowerOutage.us. The Weather Service in Boston warned coastal residents, "For your safety indoors, stay away from windows!" It also said Nantucket had experienced a bomb cyclone, an explosive deepening of pressure that can lead to powerful wind.

Flood warnings were issued across the region, including Saddle River in Lodi, New Jersey, the Ramapo River in northern New Jersey and Orange and Rockland Counties, New York. Joseph Fiordaliso, who leads New Jersey's utility board, said "Someday maybe we'll just have a regular rainstorm. We don't seem to get those much anymore," adding, "Climate change is real, and we have to work to mitigate as much of it as we possibly can."

The two main stories: The House of Representatives passed the Infrastructure Bill and world leaders met in Glasgow. The legislation was passed on November 5 and signed into law November 15. It includes about $1 trillion to rebuild the country's aging public works system and addresses climate change:

- Transportation: tens of billions of dollars is intended for improvements to roads, bridges and transportation programs. About 80% is directed to highways and road projects and much of the rest to public transit. Felicia Park-Rogers, the director of regional infrastructure projects for the Tri-State Transportation Campaign noted that "Given that we're staring down a climate catastrophe, this is not what we would like to see." The Department of Transportation will send money to the states to move highways out of flood-prone areas. Amtrak may get its largest cash infusion ever. And funds may go to programs for safe commutes for pedestrians.

- Electric Vehicles are featured in a $7.5 billion initiative intended to build 500,000 high-speed charging

stations across the U.S. by 2030. Currently, there are about 43,000 charging stations, according to the U.S. Department of Energy.

- Climate: to address the impacts of global warming, money will go to the Forest Service to reduce the effects of wildfires, and $73 billion is intended to modernize the nation's electricity grid to allow it to carry renewable energy.
- Underserved communities: a $2 billion grant program is expected to expand transportation projects in rural areas and should increase support for Native American communities via the allotment of $216 million to the Bureau of Indian Affairs for climate-resilience and adaptation efforts. More than half of that money, $130 million, is intended to move groups of Indigenous Americans away from vulnerable areas.

Some money will be channeled through various federal agencies, like the Department of Transportation. Other funds will go to state entities, like the New York Department of Transportation or New Jersey Transit. The states will then decide which projects to prioritize.

Several of the 13 Republicans in the House and 19 in the Senate who voted for the bill heard from angry constituents. Of the House Republicans who supported the bill, four were from New York and two from New Jersey. On Long Island, a man was arrested after making death threats against Representative Andrew Garbarino.

The New York Region has its wish-list of projects which includes replacing polluting school and commuter buses with cleaner vehicles. In New York City, the Second Avenue subway may be extended, and plans may be developed to build a new rail tunnel linking New York and New Jersey. State agencies have some flexibility in spending and could use highway funds to expand bike lanes, said Kate Slevin, the executive vice president of the Regional Plan Association.

The bill also focuses on social equity concerns by seeking to reverse the harm past infrastructure projects have inflicted on low-income and Black communities. "Cities like Newark, East Orange, New Haven, they were really ripped apart from interstate highway construction and urban renewal projects," Slevin said.

Infrastructure dollars could advance long-planned projects to redesign streets and reduce New York City's vulnerability to climate-related flooding. In East Harlem, trees may be planted along with rain gardens and street drainage improved. The Army Corps of Engineers considered spending $119 billion to protect the city from flooding. In 2019, Mayor de Blasio said $10 billion was needed just to protect the eastern edge of Lower Manhattan.

Kevin Corbett, president and chief executive of New Jersey Transit, which operates one of the nation's largest fleet of commuter buses, said the federal funds will help accelerate the purchase of electric buses and the electrification of bus depots. About $5 billion was earmarked to replace older school buses, which generate harmful emissions, with electric or low-emission versions.

Some $47 billion is designated for climate resilience and helping communities prepare for the new age of extreme fires, floods, storms and droughts that scientists say are worsened by human-caused climate change.

"There's a lot of good stuff in the infrastructure bill to help us prepare for climate upheaval, but that package does very little to affect emissions, and therefore won't prevent climate upheaval," said Senator Sheldon Whitehouse, D-RI, a prominent champion of climate action in Congress. "It's significant that we could get a significant bipartisan measure that recognized that climate change was real, and we need to protect our infrastructure against its impacts," he said. "But it's not enough to just do repair work. We need to prevent the worse scenarios."

The spending falls far short of the levels of government action that scientific reports have concluded is needed to either prevent or prepare for the worst impacts of climate change. In 2018, the federal government's National Climate Assessment estimated that adapting to climate change could cost "tens to hundreds of billions of dollars per year."

Senator Bill Cassidy, R-LA, an author of the climate resilience provisions, will see money flow to his state. In September, Hurricane Ida killed at least 82 people and left millions without power in Louisiana, in the wake of a storm that scientists say offered a clear picture of the types of devastation we can expect from climate change. He called the bill "the largest investment in infrastructure and coastal resiliency in the history of Louisiana."

"There's people living in Livingston Parish, for example, flooded in 2016, whose lives—everything in their life was destroyed," he said. "The pictures of their children, the wedding dress in which they married, the home in which they lived, which had never flooded before—the fact that we are helping our fellow Americans avoid that gives me an incredible sense of satisfaction."

Climate impacts are being felt throughout the U.S. There were 22 climate disasters that cost at least $1 billion each in the U.S. in 2020, shattering the previous record of 16 events, which occurred in 2017 and 2011, according to NOAA.

That record is on track to be broken again this year. This summer, the hottest on record in the nation, saw record wildfires devastate millions of acres in California and a deadly heat wave bake the Pacific Northwest. Once-in-200-year flash floods killed dozens of people in New York and New Jersey.

The Army Corps of Engineers is to receive $11.6 billion in construction funds for flood control and river dredging. That's more than four times the amount Congress gave the Corps last year for construction.

The Federal Emergency Management Agency also will address damage from flooding by buying or elevating at-risk homes. That program will see its annual budget more than triple, to $700 million.

NOAA will receive $492 million to map and forecast inland and coastal flooding, including "next-generation water modeling activities." It will also get $50 million to predict, model and forecast wildfires.

The Department of Agriculture is to receive $500 million for "wildfire defense grants to at-risk communities," money that could help people make changes to their homes or landscape to make them less vulnerable to fires.

Climate experts caution that all that spending should just be a down payment; absent billions of dollars of additional money and aggressive action to sharply reduce CO2 emissions, the costs of adapting to the new realities of global warming will only climb in the coming years.

"Fifty billion dollars for resilience is both transformational and totally inadequate," said Shalini Vajjhala, executive director of the San Diego Regional Policy & Innovation Center. "If you compare the total to some of the largest resilient infrastructure projects being planned in the U.S., it's tiny," Vajjhala said. "This is progress, not perfection."

The leaders of 120 countries met in Glasgow in early November at the 26th Convention of the Parties (COP26). There were some notable deals. At least six major automakers, including Ford, Mercedes-Benz, General Motors and Volvo, 30 national governments and two states pledged to work toward phasing out sales of new gasoline and diesel-powered vehicles worldwide. These automakers account for roughly one-quarter of global sales in 2019. The agreement states that automakers will "work toward reaching 100 percent zero-emission new car and van sales in leading markets by 2035 or earlier." Toyota, Volkswagen and Nissan-Renault did not join the pledge. Nor did the U.S., China and Japan, three of the largest car markets.

The 30 countries that joined the coalition included Britain, Canada, India, the Netherlands, Norway, Poland and Sweden. India is the world's fourth-largest auto market, and this is the first time it has committed to eliminating auto emissions on a specific timeline.

California and Washington State also signed the pledge. Last year, Gov. Gavin Newsom of California signed an executive order saying that only new zero-emissions vehicles would be sold in the state by 2035, though regulators have not yet issued rules to make that happen. Washington had not previously made such a formal pledge.

Two dozen vehicle fleet operators, including Uber and LeasePlan, also joined the coalition, vowing to operate only zero-emissions vehicles by 2030.

Worldwide, transportation accounts for roughly one-fifth of humanity's CO2 emissions that are responsible for climate change, with a little less than half of that coming from passenger vehicles such as cars and vans.

The other two automakers that signed the pledge were BYD, a Chinese automaker that has made major inroads selling EVs in Europe, as well as Jaguar Land Rover.

Some of the major automakers that did not sign the agreement are nonetheless investing heavily in EV technology. Volkswagen, which six years ago confessed to criminally concealing illegally high emissions from its diesel cars, now plans to spend tens of billions of dollars to build six battery factories, install a global network of charging stations and offer more than 80 new electric models by 2025.

Toyota, the world's best-selling automaker in 2020, was notably absent from the deal, but it announced plans this year to sell 15 EV models around the world by 2025. The Japanese automaker had not committed to EV technology as it considered alternatives like hydrogen-powered fuel cell vehicles. But in early December it announced that it planned to build a factory employing 1,750 people to make batteries in North Carolina. It will be built outside Greensboro and is expected to be complete by 2025 at a cost of $1.29 billion, making battery packs for 200,000 cars a year.

Leaders of more than 100 countries vowed to reduce deforestation by half by 2030. This will affect a wide range of companies that use products linked to deforestation, such as palm oil and wood. "Almost every sector of our economy is part of the crime of deforestation," said Mindy Lubber, who heads Ceres, a nonprofit that works with companies and investors to address their environmental effects. The world's forests are crucial to absorbing CO2 and slowing the rise in global warming.

The pact includes Brazil, Russia and China, encompassing about 85% of the world's forests. Putin pledged to expand reforestation programs in Russia, which is home to 20% of the world's forests. Putin's pledge to be carbon neutral by 2060 is largely dependent on using its forests to absorb GHG. Skeptical climate scientists say the country is unable to properly monitor its vast forests and it continues to invest in producing more oil, gas and coal. (And see below.)

Biden said he would work with Congress to deploy up to $9 billion to the global effort through 2030. Additionally, governments committed $12 billion through 2025, and private companies pledged $7 billion to protect and restore forests, including $1.7 billion for Indigenous peoples. More than 30 financial institutions also vowed to stop investing in companies responsible for deforestation.

But similar prior efforts have failed. In 2014, an accord was reached to halve deforestation by 2020 and end it entirely by 2030. Instead, by 2020, the areas deforested annually had grown dramatically worse.

Some environmentalists predicted that the same will happen this time. "It allows another decade of forest destruction and isn't binding," said Carolina Pasquali, the executive director of Greenpeace Brazil. "Meanwhile, the Amazon is already on the brink and can't survive years more deforestation."

If tropical deforestation were a country, it would be the third-biggest emitter of GHGs in the world, according to the World Resources Institute, after China and the U.S. Much of the world's deforestation is driven by commodity agriculture to clear land for cattle, soy, cocoa and palm oil.

Biden went to Glasgow without the passage of legislation proving that the U.S. is serious about acting on climate change. But he did go with an achievement on methane emissions reduction. At Glasgow, he announced that 70 countries had joined a coalition led by the U.S. and EU to cut global methane levels at least 30% by 2030. The countries that signed the Global Methane Pledge include half of the world's top 30 methane-emitting countries, and U.S. officials expect the list to grow. Biden called it the "single most effective strategy we have to slow global warming in the near term" and achieve his goal of cutting U.S. emissions 50 to 52% below 2005 levels by 2030.

Methane is the second most abundant GHG after CO2, and it's responsible for more than a quarter of the warming the planet is currently experiencing. It dissipates from the atmosphere faster than CO2 but is more powerful at heating the atmosphere in the short run.

The United Nations says that a global effort to reduce methane emissions from the fossil fuel, waste and agricultural sectors could achieve a 45% reduction by 2030 and help avoid nearly 0.3C of global warming as early as the 2040s.

Post-Glasgow, the bottom line is that the stated goal of keeping global warming under 1.5C is unlikely to be met. World leaders from nearly 120 countries pledged to cut GHG emissions, but still the planet is on track to warm around 2.4C by the year 2100 compared to preindustrial times, with catastrophic implications regarding the future of human civilization. Warming will lead to more destructive and deadly storms, droughts, wildfires, and sea-level rise as well as social and economic upheaval including millions of environmental refugees pushed by the widening climate crisis.

Recognizing the stakes and the urgency of the climate crisis, the conference closed with an agreement that the countries will return next year with stronger emissions-reduction targets and promises to double the money available to help countries cope with the effects of global warming. It also mentions by name, for the first time in a quarter century of global climate negotiations, the main cause of climate change: fossil fuels.

The call to return next year, as opposed to every five years as agreed to in the Paris accord, was lead in part by Mohamed Nasheed. He is the former president of the Maldives, and leader of a group of countries called the Climate Vulnerable Forum that includes atoll nations like his as well as developing countries like Ethiopia and Bangladesh. Five years, Mr. Nasheed said, "is a very long time. And we might not exist."

Nasheed has been arrested over a dozen times for his activism. He has twice been tortured in prison and recently he survived an assassination attempt. "You cannot give up," he said flatly.

In 2009, before the international climate summit in Copenhagen, as the Maldivian president, he held a meeting with 13 of his cabinet members in scuba suits 13' under water. It made the point that many countries could be under water if major polluting nations do not move away quickly from fossil fuels.

Nasheed observed that some conservative leaders have embraced climate action, including Prime Minister Boris Johnson of Britain. "The people have actually decided that when they vote, they will look for those who are thinking of saving the planet," he said. "People are realizing that we are moving to a doomsday situation. People do understand that the planet is losing its balance. And that shouldn't be left to happen."

He fights because inadequate pledged emissions reductions are an existential threat to low-lying island nations like the Maldives. He sees world leaders unable to act because of what he called the influence of the fossil fuel industry. But he believes that will soon diminish. "The whole idea about politics is to lead, not to follow," he said. "We must talk to the people. We must tell them what's happening, and we must point out the morality of the issue."

Questions and hurdles abound. President Xi Jinping of China, Vladimir V. Putin of Russia and Jair Bolsonaro of Brazil didn't even bother to show up. Prime Minister Scott Morrison of Australia did show up, but pledged an emissions target that experts said falls far short of what's needed.

Leaders in Washington, Beijing and New Delhi face a complex combination of pressures. In the U.S., Biden faces heavy resistance not only from Republicans, but from key senators within a divided Democratic party. In China, Xi Jinping, recently elevated to the pantheon of Communist Party leaders alongside Mao Zedong, may be unwilling to push provincial leaders to reduce their use of the coal that has powered China's economic rise. India's Prime Minister, Narendra Modi allowed his representatives to weaken the final agreement's language on coal at the 11th hour. Will he honor his pledge to increase renewable energy sources fivefold by 2030? Is there any reason to believe Brazil will

keep its pledge to join other countries in reversing deforestation in the Amazon?

In Russia, Putin has expressed his interest in development in Siberia where permafrost is melting and in utilizing year-round Arctic shipping with specially designed "ice class" container vessels as an alternative to the Suez Canal. Russia is the world's fourth-largest emitter of GHG and a major producer of fossil fuels. It sees vast economic opportunities in a warming world. That in and of itself could doom the efforts of the rest of the world.

In Britain, the birthplace of the Industrial Revolution and one of history's largest emitters of GHG, Prime Minister Johnson pledged to reduce emissions by 68% by 2030, compared with 1990 levels. By 2017, coal had fallen to 7% of Britain's electricity generation from 40% in 2013. But new roads and airports are under construction and oil and gas extraction continue in the North Sea. Mikaela Loach, a young Briton who has sued the British government over an oil and gas project there, labelled the summit outcome "#CopOut26."

Greta Thunberg, the young climate activist, criticized the U.S. for its sales of offshore oil leases. The Interior Department is set to auction over 80 million acres in the Gulf of Mexico for oil and gas leasing, the largest U.S. lease sale ever. The sale comes just days after Biden pledged at COP26 to reduce climate emissions.

"The Biden administration is lighting the fuse on a massive carbon bomb in the Gulf of Mexico. It's hard to imagine a more dangerous, hypocritical action in the aftermath of the climate summit," said Kristen Monsell, oceans legal director at the Center for Biological Diversity.

One of the biggest fights at the summit concerned climate justice, whether, and how, the world's wealthiest nations should compensate poorer nations for the damage caused by rising temperatures.

Oil and gas companies in the U.S. and abroad are not retreating from their core businesses even though the burning of fossil fuels was noted in agreement as the cause of the climate crisis. The leaders of these companies say that they need revenue from fossil fuel to fund alternative energy investments, especially when oil and gas prices are so high. "We are a cash machine at these types of prices," said Bernard Looney, chief executive of BP.

Maisa Rojas, a climate modeler at the University of Chile, said researchers need to better quantify the effects of climate change on vulnerable people and communities. That will help address the contentious issue of "loss and damage," or the question of what is owed to people who have barely contributed to global warming but are most harmed by it. But rich countries merely agreed to a "dialogue" on the compensation issue in the future.

Simon Stiell, the environment minister from Grenada, argued that simply offering disaster relief, as some countries including the U.S. have suggested, is insufficient. Loss and damage funding is also required for the slow attrition of land due to sea-level rise and for agricultural losses from long running droughts. "There needs to be outcomes beyond a dialogue," he said.

Many of the tens of thousands of youth activists who protested outside the conference said the promises didn't go nearly far enough to address the problems they are already living with. Mitzi Jonelle Tan, an activist from the Philippines said the outcome felt like "a stab in the back from those who call themselves leaders."

Despite the scientific consensus of the need for immediate reductions in fossil fuel use, such use is expected to continue for years. But clean energy technologies such as wind turbines, solar panels and EVs are advancing so rapidly that perhaps the global use of fossil fuels may peak by the mid-2020s and then start declining, as noted by the International Energy Agency. For that to happen, the agency said much stronger action is necessary from governments around the world to reduce their planet-warming CO2 emissions over the next few years.

The IEA's annual World Energy Outlook, which forecasts global energy trends to 2050, was issued shortly before the climate summit. The new report notes significant gains: wind and solar power are now the cheapest source of new electricity in most markets and growing briskly. Sales of EVs worldwide hit records last year. Across the globe, approvals for new coal-fired power plants have slowed dramatically in recent years as governments and banks have increasingly refused to finance them (but see below).

Governments are also stepping up their pledges to curb emissions. The EU has increased the price it charges large polluters to emit CO2. For the first time, India joined the growing list of nations pledging to reach "net zero" emissions, (although it set the deadline at 2070). One of the world's largest consumers of coal, India also announced that it would significantly expand the portion of its total energy mix that comes from renewable sources, and that half of its energy would come from sources other than fossil fuels by 2030. China has said it would stop financing new coal plants overseas.

The IEA projects that global coal use may fall between now and 2050, despite increased industrial activity in China. Global oil demand is expected to begin a permanent decline by the 2030s with the switch to EVs. By 2035, wealthy countries must shut down virtually all fossil-fuel power plants in favor of cleaner technologies. A turning point is now in sight, the report says.

Still, this shift is inadequate to avert some of the horrific consequences of climate change, the agency warned. Current energy policies still put the world on track to heat up roughly 2.6C (4.7F) by 2100 compared to preindustrial levels. Last month, the U.N. warned that such an outcome

would be "catastrophic," noting that countries are already suffering more deadly heat waves, droughts, floods and wildfires after just 1.1C of global warming to date.

Many world leaders still hope to limit average global warming to around 1.5C. To meet that goal, the IEA said we must do more than allow global emissions to simply peak and then ease into a decline in the decades ahead, as currently expected. Instead, the world's nations must expedite the emissions reductions nearly in half this decade and cease CO2 emissions entirely by around 2050.

Earlier this year, the agency detailed the road map for what the effort should look like. By 2030, EVs must constitute more than half of new car sales globally, up from just 5% today. By 2035, wealthy countries must shut down virtually all fossil-fuel power plants in favor of cleaner technologies like wind, solar or nuclear power. By 2040, all the world's remaining coal plants must be retired or retrofitted with technology to capture and bury their carbon emissions. That technology is developing but not available at scale.

Nations must triple their investment in clean energy over the next decade, to roughly $4 trillion per year, the agency said. Most of that increased spending must go to developing countries, which have been generating most of the emissions growth in recent years but struggle to gain financing.

"So far only about 20% of clean energy investments are going to emerging countries," said Fatih Birol, the IEA's executive director. "That needs to change. This is a race that no one wins unless everyone finishes the race."

The report noted that more than 50 countries, including China and the U.S. as well as the EU, have announced targets to get to "net zero," meaning no additional CO2 emissions to the atmosphere over the next few decades. If such intentions were realized, the world could still potentially warm a catastrophic 2.1C by 2100, the report found. But few countries have enacted policies to achieve such a goal.

"This needs to happen quickly," the report said, "or global energy markets will face a turbulent and volatile period ahead." Not to mention potential societal collapses.

A coalition of the world's biggest investors, banks and insurers that collectively control $130 trillion in assets pledged to use that capital to hit "net zero" emissions targets in their investments by 2050. That push would make limiting climate change a central focus of many major financial decisions.

In Europe, many companies have already adjusted their business models for the next decade to align with European Union laws unveiled last summer which include high carbon taxes that apply to a widening group of industries.

Just how much CO2 each nation needs to cut remains unresolved. Rich countries are disproportionately responsible for global warming, but some leaders have insisted that poorer nations must accelerate their shift away from fossil fuels.

Private equity funds continue to invest billions in fossil fuel projects. These entities are secretive investment companies actively buying offshore platforms, building new pipelines and extending lifelines to coal power plants.

Exactly the actions that must stop but won't if profits can be made.

Since 2010, the private equity industry has invested at least $1.1 trillion into the energy sector. The overwhelming majority of those investments was in fossil fuels, according to data from Pitchbook, a company that tracks investment, and a new analysis by the Private Equity Stakeholder Project, a nonprofit that pushes for more disclosure about private equity deals.

Only about 12% of investment in the energy sector by private equity firms went into renewable power, like solar or wind, since 2010, according to Pitchbook.

Private equity investors are taking advantage of the pressure being exerted on the oil industry by environmental groups and their own shareholders to move away from fossil fuels. Thus, many oil companies have sold some of their dirtiest assets many of which have been purchased inexpensively by private equity-backed firms. These assets gain a second life despite being some of the most polluting wells, coal-burning plants and other inefficient properties in operation. That adds GHGs to the atmosphere.

Banks too are being pressured to reduce investments in fossil fuels and have reduced financing the industry, opening the way for private equity.

In its report, the Private Equity Stakeholder Project found that about 80% of the investments made by the top 10 private equity firms since 2010, including giants Blackstone, KKR and Carlyle, were in oil, gas and coal. This while many of those firms tout their sustainable investments.

Private equity firms are not required to disclose much information, so obtaining insight into their holdings or their environmental practices is difficult. Still, some of the largest emitters of methane in the U.S. are oil and gas producers backed by investment firms. For example, in 2017, Hilcorp, a private company backed by the private equity giant Carlyle, bought $8.6 billion worth of oil and gas assets and is now the largest known emitter of methane in the U.S., reporting almost 50% more emissions from its operations than the country's largest fossil fuel producer, Exxon Mobil. And Blackstone acquired a project to build a new oil pipeline and export terminal in Louisiana that could emit 500,000 tons of GHGs per year.

The private equity industry manages $7.4 trillion in global assets and clients include public pension funds, which on average allocate about 20% of their investments in private equity.

"Any private equity fund is obsessed with one thing, and one thing only: How much money can we make in any given investment?" said Ludovic Phalippou, professor of financial economics at University of Oxford's Saïd Business School. "And when these largely anonymous firms collapse, you don't even know who to be angry at, because you don't even know who they are."

A new report from the United Nations Environment Program, with researchers at the Stockholm Environment Institute, reveals the despite all the pledges to reduce fossil fuel emissions, many countries are planning to produce twice as much oil, gas and coal through 2030 than the limit required to keep global warming to 1.5C (2.7F) above pre-industrial levels.

The report looked at future mining and drilling plans in 15 major fossil fuel producing countries, including the U.S., Saudi Arabia, Russia, Canada, China, India and Norway. By 2030, the report found, the world's nations are planning to produce 240% more coal, 57% more oil and 71% more natural gas than would be necessary to limit warming to 1.5C.

"The world's governments must step up, taking rapid and immediate steps to close the fossil fuel production gap and ensure a just and equitable transition," said Inger Andersen, executive director of UNEP.

Even as countries like China and the U.S. are expecting to cut back on coal extraction in the decades ahead, that would be offset by plans for new mining in Australia, India and Russia.

Oil and gas producers in the U.S., the report found, are expected to increase productivity until 2030. The Biden administration has vowed to pause and reform leasing programs for oil and gas drilling on federal lands, but such efforts are in litigation. (And see above.)

The world is currently experiencing a severe energy crunch, with Europe, Asia and Latin America all seeking additional supplies of natural gas to supplant their renewable power. The IEA warned that nations need to significantly increase their investment in clean energy to overcome these problems, but the disruptions lead to calls for more fossil fuel production. China's government, for example, recently ordered coal companies to increase their mining output to address an electricity shortage that has led to rolling blackouts nationwide.

The report notes that over half of fossil fuel production worldwide is run by state-owned companies, which are often insulated from market pressures and can be legally required to maintain production to maintain tax revenues. But even countries that depend on private companies to mine for coal or drill for oil often subsidize operations which keeps fossil fuel output artificially high.

To address these challenges, the new report calls for closer international coordination "to ensure that declines in fossil fuel production are distributed as equitably as possible, while minimizing the risks of disruption."

John Kerry, the U.S. special envoy for climate change, denounced measures taken by governments that artificially lower the price of coal, oil or gas. Speaking at the summit, Kerry called for rapidly phasing out the subsidies. The U.N. Development Program recently calculated that

the world spends $423 billion each year to subsidize oil, gas and coal, about four times the amount needed to help poor countries address climate change. "That's a definition of insanity," Kerry said, adding that underwriting oil, gas and coal allows governments "to feed the problem we're here to cure. It doesn't make sense."

Tina Stege, the climate envoy for the Marshall Islands, a South Pacific nation threatened by rising sea levels, said, "Fossil fuel subsidies are paying for our own destruction."

New York State's Climate Action Council Co-Chairs, Department of Environmental Conservation Commissioner Basil Seggos and New York State Energy Research and Development Authority President and CEO Doreen Harris, announced that the Council has reached a milestone toward the goals of New York's Climate Leadership and Community Protection Act.

The Council's seven advisory panels, Transportation, Agriculture and Forestry, Land Use and Local Government, Power Generation, Energy Efficiency and Housing, Energy Intensive and Trade Exposed Industries, and Waste have, along with the Just Transition Working Group, submitted their recommendations for the council to consider in the development of the draft Scoping Plan that will guide progress toward the Climate Act's goals to significantly reduce GHG emissions, ramp up renewable energy development, and help the State reach carbon neutrality economy-wide by 2050.

The draft Scoping Plan will be released for public comment and the subject of six public hearings in 2022. In addition, State agencies are meeting other requirements of the Climate Act, including:

- Releasing the Value of Carbon guidance to aid state agencies estimate the value of reducing carbon and other GHG emissions in decision-making;
- Finalizing regulations to reduce GHG emissions statewide including reductions of GHGs 40% by 2030, and 85% by 2050;
- Adopting regulations to strengthen the Regional Greenhouse Gas Initiative and ensure that benefits go to disadvantaged communities;
- Finalizing regulations to significantly reduce potent hydrofluorocarbon substances, and emissions of methane and volatile organic compounds; and,
- Expanding the state's landmark Clean Energy Standard to increase renewable energy use in New York from 50% to 70% by 2030 and of offshore wind from 2,400 MW by 2030 to 9,000 MW by 2035.

Also, in New York State, 68.9% of the voters passed the Green Amendment thereby amending the State Constitution to state in Section 19, Article 1: "Environmental rights. Each person shall have a right to clean air and water, and a healthful environment." Congratulations!

Washington

In a major push to reduce methane emissions, in addition to the 70-country deal Biden achieved in Glasgow, EPA will publish proposed regulations to reduce methane emissions. The regulations should have broad application, cover low and marginal producers and include frequent monitoring.

An additional effort to reduce methane emissions may appear in the reconciliation package in the form of a "methane fee." Sen. Joe Manchin III, D-W.Va., has opposed this tact and Democrats are unlikely to gain any Republican support, so his vote is crucial.

Advocates of climate action are looking to replace the failure of the proposed $150 billion Clean Electricity Performance Program that would have paid power companies to switch to renewable energy sources and fined utilities that moved too slowly away from fossil fuels.

But Republicans in Congress said Biden's promises in Glasgow would hurt Americans at home. "The president wants to kill abundant and affordable U.S. energy sources like oil, natural gas and coal that Americans depend on," Sen. John Barrasso, R-WY, said. He called the White House plans "a recipe for disaster" that would lead to a shortage of affordable energy.

The oil and gas industry is united against a separate effort in Congress to impose a fee on methane leaks from oil and gas wells as part of a broader budget bill. The methane fee is designed both to raise revenue and to lower GHG pollution. Experts said that the double-pronged approach was necessary to shut down methane emissions.

The proposed regulations will create a monitoring program under which companies will be required to find and fix methane leaks ("fugitive emissions") at new and existing well sites and compressor stations. The regulations would limit the methane coming from about one million oil and gas rigs across the U.S.

Mark Brownstein, a senior vice president at the Environmental Defense Fund, said the technology to reduce methane emissions exists. Operators can install vapor recovery systems in storage tanks, make sure pressure relief valves don't get stuck open and replace leaking pipes. "This is not about rocket science," Brownstein said. "This is auto mechanics."

"It's going to be next to impossible to remove enough carbon dioxide to get any real benefits for the climate in the first half of the century," Drew Shindell, a professor of earth science at Duke University, said. "But if we can make a big enough cut in methane in the next decade, we'll see public health benefits within the decade, and climate benefits within two decades."

Facts on the Ground

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Extreme weather is now a fact of life on a scale humanity has never experienced with such ferocity and frequency. The new year continued where 2021 left off. There were three tornado reports in northern Georgia on New Year's Eve, near Worthville, Magnet and Villa Rica and a tornado struck Newton County, Georgia too. Half-dollar-sized hail fell in Kentucky while heavy winds in Alabama blew the roofs off chicken coops and brought down trees and power lines. Kentucky Governor Andy Beshear issued a state of emergency due to the damage done by two prior long-track tornadoes.

A tornado hit west of Elkton, Tennessee, and others may have touched down near Hopkinsville and Olmstead, Kentucky, damaging a grain silo and several buildings in downtown areas. The National Weather Service confirmed that an EF-1 tornado (Enhanced Fujita Scale, 3-second gusts of winds 86-110mph) hit Madison County, Kentucky with 90 mph winds. An EF-0 Tornado (65-85 mph) hit Bowling Green with maximum wind speed of 85 mph.

Rainfall shattered records particularly in Lexington, KY (2.27") breaking the old January 1 record of 1.44" set in 1966. Bowling Green also set a record with 2.59" on New Year's Day, also breaking a 1966 record of 2.45." Record rainfall was recorded in Zanesville, OH, and Cape Girardeau, MO, on New Year's Day.

Two record-breaking snow storms slammed the East coast in the first week of January with blinding snow, high winds and below-zero temperatures. AccuWeather senior meteorologist Joe Lundberg called it the first bomb cyclone of 2022 (which is defined as a storm whose central pressure plummets 24 millibars in 24 hours, it's basically a winter hurricane).

In late December a storm shut down 81 miles of interstate 80 in the Sierra Nevada mountains of California while temperatures plunged to record lows in Seattle. On State Route 89, an avalanche closed the road from Tahoe City, California, to near Palisades Tahoe. The storm shattered records for snowfall and low temperatures across the West. At a research station operated by the Central Sierra Snow Lab of the University of California, Berkeley, the snowfall for December surpassed 193" besting the previous record of 179" set in 1970. In California, over 115,000 people lost power.

Seattle had record lows two consecutive days. At the Seattle-Tacoma International Airport, it was 17F on December 27. That broke the record of 20 for the day in 1968. December 26 it was 20F at Sea-Tac, breaking the record of 22 in 1948.

In mid-December two spectacularly powerful storms decimated large portions of the mid-U.S. Six states had a string of deadly tornadoes during record high temperatures (74F in Des Moines). The winds destroyed homes, knocked out power and spread wildfires. "In the middle of December, it's obviously extraordinary, unprecedented," said Mike Fowle, a meteorologist for the National Weather Service. Dating back to 1950, there had been only five confirmed tornadoes in the month of December in Iowa, but on December 15 alone, there were at least five tornadoes across the state. Tornadoes also damaged parts of Kentucky and five other states, killing at least 88 people.

Days later, another ferocious storm system swept across the Midwest leaving hundreds of thousands of customers without electricity in Michigan, Wisconsin and Iowa, with countless houses, barns and buildings damaged and five people dead in Iowa, Kansas and Minnesota.

The National Weather Service confirmed that a tornado had hit north of Neillsville, Wisconsin, near Stanley and that there had been over 55 wind gusts of at least 75 mph across the country.

In the West and Plains regions, dust storms whipped through Colorado and Kansas, and a tornado hit Lincoln, Nebraska. Damage extended to hangars and small planes at the Santa Fe Regional Airport in New Mexico. The storm system also spawned wildfires and winds of up to 100mph in Kansas. As storms moved through South Dakota, the Weather Service office in Sioux Falls issued its first tornado warning on record for the month of December. In Iowa, where schools closed early and some areas saw wind gusts of up to 90 mph, high temperatures reached the lower 70s. On average, high temperatures in December throughout much of the state are in the 30s.

In Arkansas, a supercell, a strong thunderstorm with a rotating updraft, produced a ferocious storm with astonishing, unprecedented, staying power. The path of destruction from this single tornado covered 260 miles and included Tennessee and Kentucky (164 of those miles were in Kentucky, making it the largest in state history), leaving many communities almost entirely leveled. At least 1,000

families were left homeless or struggling to repair severely damaged properties; thousands more had no electricity.

"This tornado event was certainly an oddity in many ways," said Jason Naylor, a professor at the University of Louisville who studies tornado formation, duration and intensity. For one thing, he said, "It's freakishly long." And there was the timing: "The fact it occurred in December is pretty odd."

Alaska was whip-sawed by record high (67F) temperature in late December and then a brutally fierce wind storm in early January, Rick Thoman, a climate specialist with the Alaska Center for Climate Assessment and Policy in Fairbanks, said "In late December, I would not have thought such a thing possible."

Record heat in Alaska is especially notable because the state is known for its bitter cold and its proximity to the Arctic. Alaska is generally warming faster than the rest of the U.S. and already suffers from flooding, erosion and other signs of a changing climate.

The recent heat wave in some parts of Alaska was driven by a mass of high-pressure air, known as a heat dome, that hovered over the northeastern Pacific Ocean.

Some parts of Alaska, including Fairbanks, have also experienced record amounts of rain in December. That is a problem in part because it will leave water on roads that could stay frozen until March.

By early January, tens of thousands of people lost electricity due to fierce windstorms as the wind chill dipped to 35F below zero. Winds reached 88 mph, knocking out power to 22,000 buildings. Gov. Mike Dunleavy declared the storm a state disaster allowing families to apply for disaster-recovery grants. Repair crews were unable to work in such conditions as people tried to stay warm in their darkened homes. The American Red Cross of Alaska opened shelters in Wasilla and Palmer for residents without power.

Steve Carrington, the mayor of Palmer, Alaska, said "You could definitely feel the house shaking" due to hurricane strength winds. His home had no electricity for three days, he said, adding that the wind ripped a chunk of his roof off and stripped an outer door from its hinges. "This could cause dangerous life-threatening conditions for those without power, as frostbite can develop in as little as 15 minutes in these conditions," the National Weather Service said.

Buffalo had over 14" of snow on January 17. "Heavy snow at the Buffalo airport this morning has already established a record for the date," the National Weather Service tweeted.

In the South, Nashville received 1-2" per hour making January 6 the snowiest day in Nashville since January 22, 2016, when 8" of snow fell in one day, according to AccuWeather. Police reported dozens of wrecks on the roads, including a fatality.

In the Upper Midwest, parts of Michigan got over a foot of snow. Minnesota and Wisconsin had wind chills of minus 25F to minus 35. Dangerously cold temperatures enveloped North Dakota with wind chill readings of minus 59 in Bowbells in Burke County.

Also in early January, in and around Washington, D.C., more than a foot of snow fell in some places. Crews in Virginia worked to unclog a 50-mile traffic jam on I-95 that trapped dozens of drivers in their cars for more than 24 hours. Gov. Ralph Northam declared a state of emergency and summoned the Virginia National Guard. The storm hit several Mid-Atlantic states and caused at least five deaths (including a 5-year old boy and a 7-year old girl who died in their homes when trees fell on them). Parts of Virginia received more than 15" of snow, and more than 270,000 residents lost power. Tens of thousands of outages were reported in Maryland, North Carolina and Tennessee. Huntingtown, MD, got 15.5" of snow, Glendie, VA, 14.6", Ellendale, DE, 14.5."

In mid-January, fierce storms brought cold and snow to the Southeast. Central Mississippi got over 6" while Tennessee and Alabama received a mixture of snow and freezing rain. In Georgia, nearly 90,000 customers lost power, 95,000 in South Carolina and 35,000 in North Carolina. The governors of Virginia, Georgia and North Carolina all declared states of emergency.

On January 29-30, at least four people were killed and more than 120 000 customers lost power after a powerful Nor'easter hit the east coast. More than 16 million people were placed under winter weather alerts. The storm reached bomb cyclone status with heavy snowfall and hurricane-force winds. Stoughton, Massachusetts, about 20 miles southwest of Boston got 30.9."

Snowfall rates in Boston reached 2-4" per hour, with higher rates registered in Norfolk County. Many locations broke daily snowfall records on January 29, including Boston which tied the record with 23.6." Its previous daily snowfall record for January 29 was 3.7" in 1928.

Atlantic City, New Jersey crushed its all-time January snowfall record with 33.2" for the month. The previous record of 20.3" was set in 1987. Final snowfall reports from the January 28-29, 2022, blizzard listed by highest totals by state: NY–Islip 24.7", RI–Warren 24.6", CT–Norwick 22", ME–Veazie 22", NJ–Bayville 21", DE–Lewes 14.2", NH–Rye 13.5", and VA–Wallops Island 9.5."

At least four people died and more than 120 000 customers lost power in these East coast storms. The entire Northeast was covered in snow before the event was over. Three of the dead were found in the snow next to their shovels on Long Island, New York, while a snowplow driver found an elderly woman dead inside her vehicle overnight in Uniondale, New York. The total number of

flight cancellations within, into, or out of the U.S. exceeded 5,000.

In early February another major storm blocked highways, closed schools and canceled flights across much of the central U.S. with nearly a foot of snow piling up in parts of the Midwest. The system left drifts in Chicago, St. Louis and Kansas City. Michael Dossett, the director of Kentucky Emergency Management warned, "The approaching storm front is forecast to be one of the most dangerous events in our recent history of record-breaking disasters…"

The storm disrupted life across three time zones, closing courtrooms in New Mexico, blocking highways in Missouri and causing crashes in Indiana. Temperatures dropped below freezing in Arkansas (falling 10-15F in a 30-minute span in some places), where the National Guard was deployed.

Amtrak paused train service across the Midwest and the South. Around Dallas and Oklahoma City, some schools canceled classes. Judge Clay Jenkins of Dallas County filed a disaster declaration, which expedites additional supplies and personnel to emergency workers. In Texas, snow fell in the Panhandle and sleet and freezing rain fell southeast of Lubbock.

Looking back at 2021, many temperature records were set including record cold in Bottineau, ND, -50.98F breaking the previous low set in 1893, Superior, NE (-32.98, 1905), Wallace, KA (-25.06, 1905), and Decatur, TX (-7.06, 1905) and the heat-wave in the NW reached 111.02 in Vernonia, OR breaking its prior high set in 1899, and numerous other records. Other records were shattered by the largest margins, including Franklin, NE, -27.94 which was 11.88 lower than the prior record set in 2016, Mineola, TX (-7.96, 10.98 lower than in 2018), and Taylor, NE (-31.00, 10.08 lower than in 2016). And record increases in high temps: Salem, OR (116.96, 9.00 higher than in 1981), and Forks, WA (109.94, 7.92 higher than in 1981), and many others.

In fact, temperatures in the U.S. in 2021 set more all-time heat and cold records than any other year since 1994. By NASA's records, which go back to 1880, Earth's seven warmest years were the past seven. Nineteen of the world's 20 warmest years have occurred this century; last year effectively tied 2016 as the hottest on record. Earth's temperature has risen by 0.14F (0.08C) per decade since 1880, and the rate of warming over the past 40 years is more than twice that: 0.32F (0.18C) per decade since 1981. There is no reason to think this trend will change anytime soon.

"We do not live in a stable climate now," said Robert Rohde, the lead scientist at Berkeley Earth, an independent organization focused on environmental data science. "We will expect to see more extremes and more all-time records being set."

Climate change has exacerbated the historic drought in the U.S. southwest. The past two decades were the driest in the region in at least 1,200 years, scientists said. The drought began in 2000 and has reduced water supplies, devastated farmers and ranchers and fueled wildfires across the region.

Julie Cole, a climate scientist at the University of Michigan cited the role of temperature, more than precipitation, in driving exceptional droughts. Precipitation amounts vary, but as human activities continue to pump GHGs into the atmosphere, temperatures are generally rising. As they do "the air is basically more capable of pulling the water out of the soil, out of vegetation, out of crops, out of forests," Cole said. "And it makes for drought conditions to be much more extreme."

In Pakistan, a heavy snowstorm killed 21 people at a popular tourist site just outside Islamabad, Pakistan's capital. Motorists were stranded in their cars froze to death and others died from carbon monoxide poisoning. Soldiers rescued people from at least 24,000 vehicles, while other snowbound drivers and their passengers were given blankets and food.

Record floods killed at least 20 people and drove over 50,000 from their homes in Northeast Brazil in late December. "We've had other floods, other disasters with deaths, but nothing, absolutely nothing, with this territorial extension, with this number of cities hit at the same time and with the number of people impacted by this storm," said Rui Costa, the governor of Bahia State. The sudden flooding followed five years of drought.

The floods destroyed homes as well as two dams. "There are more than 116 municipalities in a state of emergency," said a Brazilian congressman from Bahia, Valmir Assunção. "The rains destroyed bridges, roads and houses in our state."

Natalie Unterstell, president of the Institute Talanoa, a climate policy think tank in Brazil, pointed out that the latest United Nation report offered "robust evidence" that such weather extremes are the result of climate change.

"The warming of the ocean is particularly relevant to this," she said. "In 2020, data showed that 80 percent of the seas suffered maritime heat waves, and this boosted disasters such as the one in Bahia."

Unterstell urged governments like that of Brazil to take climate change into account when rebuilding. "Brazil is built to a climate that no longer exists," she said.

The flooding may also set back Brazil's fight against the pandemic. Costa, the Bahia governor, said a few cities in his state had lost all their supplies of drugs and vaccines against COVID-19.

A huge storm (named Eunice) with life-threatening winds slammed northern Europe in early February. Winds reaching 122mph were recorded on the Isle of Wight, off the south coast of England, which was the country's highest ever according to Britain's national weather service, the

Meteorological Office. It issued rare red weather warnings, indicating a threat to life, for southern England and parts of Wales. Belgium and the Netherlands also issued severe weather warnings. Flights and train service were canceled and disrupted and more than 140,000 customers in Britain lost electricity, according to PowerOutage.com.

Scientists urge the world community to do three things: 1) reduce carbon emissions; 2) remove carbon from the atmosphere; and 3) convert from fossil fuels to carbon-free energy production. Immediately.

While nearly 200 nations have pledged to reduce carbon emissions, atmospheric levels continue to rise. U.S. GHG emissions fell a record 10% in 2020 due to the pandemic but emissions rose 6.2% in 2021 as the economy began recovering.

Biden's goal is to reduce U.S. GHG emissions 52% below 2005 levels by 2030, which is roughly the amount that scientists say humanity must achieve to prevent global warming of 1.5C (2.7F) above preindustrial levels and minimize the risk of catastrophic effects. The planet has already warmed 1.1C over the past century.

U.S. emissions are now just 17.4% below 2005 levels. Studies show that the U.S. likely will not achieve Biden's goal absent major new policies to speed up the transition to wind, solar and other clean energy.

The Build Back Better Act which contains $555 billion in spending and tax incentives for renewable power, EVs and other climate programs appears dead. Senator Joe Manchin III of West Virginia, a crucial Democratic swing vote, has refused to support it. But Democrats will try other means while Republicans uniformly oppose the bill.

Researchers at Princeton University found that the bill, if passed in its current form or component parts, could mostly achieve Biden's goal, by tripling or quadrupling the pace of wind and solar power installations, accelerating EV sales and spurring utilities to retire more coal plants over the next decade.

Transportation, the nation's largest source of GHG emissions increased 10% in 2021 after a 15% decline in 2020. Much of the increase was due to a rise in diesel-fueled trucks carrying goods to consumers as e-commerce surged, with freight traffic climbing above pre-pandemic levels last year.

Coal, the most polluting of all fossil fuels, also made a big comeback last year, with emissions from coal-fired power plants rising 17% in 2021 after declining 19% in 2020. While America is burning less coal than it was a decade ago, the fuel is still in use.

Prior to the pandemic, U.S. electric utilities had retired hundreds of coal plants, replacing them with cheaper and cleaner natural gas, wind and solar power. But, in 2020, electricity demand decreased so utilities reduced use of expensive coal. In 2021, natural gas prices nearly doubled due in part to a cold winter and rising exports, and utilities resumed burning coal. Burning coal for electricity produces twice as much CO2 as burning natural gas, though producing and burning natural gas also releases GHGs, mostly methane.

A recent report from the U.S. Energy Information Administration projected that coal emissions would likely dip again next year if natural gas prices stabilize. Electric utilities have already announced plans to retire at least 28% of their remaining coal plants by 2035, the agency said. And power companies installed new wind turbines and solar panels at a record pace over the past two years.

Little progress has been made in the U.S. in reducing emissions from two major sectors: industry and buildings. Emissions from industries such as cement and steel rose 3.6% in 2021 after declining 6.2% in 2020. These factories account for about 20% of U.S. emissions and are dependent on a technological breakthrough to significantly cut back.

Homes and buildings are significant emitters by burning fossil fuels such as natural gas in furnaces, hot water heaters, stoves, ovens and clothes dryers. Emissions from buildings rose 1.9% in 2021 after declining 7.6% in 2020.

Huge GHG emissions were produced by last year's wildfires in California, Colorado and the Pacific Northwest, which burned millions of acres of forests and grasslands, sending the CO2 that had been stored in vegetation into the atmosphere.

Using satellite data, the European Union's Copernicus Atmosphere Monitoring Service estimated in December that last year's North American wildfires emitted 83 million tons of CO2. While the forests that burned may grow back, absorbing CO2 as they do, that process will take years. And scientists have warned that wildfires will become larger and more frequent as the planet warms.

I am focused here primarily on human GHG emissions and mostly U.S. Other countries like China, Brazil and India contribute greatly as well. Nor am I addressing other significant sources of GHG emissions such as "naturally" occurring from the ocean and melting permafrost in dangerous positive feedback loops described in earlier blogs. Alarming reports of the effects of global warming on the vital circulatory systems at the poles reveals dramatic increases is CO2 emissions from the ocean, as well as potential decrease in the absorption of CO2 by the ocean which has kept the planet from over-heating but may now be lessening. Similarly, in the previously frozen north, immense areas of previously frozen soil which had kept CO2 locked safely away for millenia is now thawing and releasing vast amounts of CO2.

I will note, again, that the crucially important forests of Brazil continue to be cut which both releases carbon and reduces the absorption of carbon and profoundly impacts global weather systems. The destruction of the Brazilian

Amazon in 2021 reached a 15-year high. President Bolsonaro skipped the meeting in Glasgow where most of the world's leaders gathered to address climate change. An official report by Brazil's National Institute of Space Research, showed that the world's largest rainforest had lost an astounding 5,100 square miles of forest between August 2020 and July 2021. Satellite data revealed that deforestation increased by about 22% from the previous year. It was also the first time that Brazil has reported four consecutive years of rising deforestation rates. Since Bolsonaro became president in 2019, the country has lost a forest area bigger than Belgium.

Similarly, deforestation continues in Columbia, due to lawlessness. Armed gangs are threatening and murdering community leaders and environmental activists trying to protect Colombia's forests from mining, lumber and oil companies. Colombia is now the world's deadliest place for environmentalists and others defending land rights. Global Witness documented at least 65 killings in 2020.

At the COP26 climate summit in Glasgow, President Iván Duque of Colombia posed as an environmental champion. He promised Colombia would be carbon neutral by 2050 and that, by next year, 30% of the country's land and waters would be protected areas.

In the Putumayo region, members of the Border Command, an illegal armed group dedicated to controlling drug production along the border with Ecuador, told residents that they have negotiated with Nueva Amerisur, owned by the multinational oil company GeoPark, to ensure that the company's work would not be impeded and warned the residents not to interfere. The criminal enterprise targeted environmental defender Jani Silva. Facing the threat of assassination for her work to protect the water sources and forest from oil exploration, she has been forced to continually move to escape assassination.

Such attacks and threats are rising as deforestation in the Colombian Amazon has surged, surpassing 250,000 acres in three of the last four years. Rainforest sheltering a spectacular biodiversity is being razed for cattle ranching and corporate farms, palm oil production, fossil fuel extraction, illegal gold mining and logging. Leaders of local communities, whose water is being poisoned and whose land has been devastated, have provided the last line of defense against this destruction by organizing and bringing attention to the problem through legal action and publicity campaigns.

Duque signed a regional environmental convention called the Escazú Agreement which obliges the government to protect environmental defenders. But he has not pushed Congress to ratify the pact, as cattle, mining and infrastructure industries have mounted a disinformation campaign against it.

Biden administration officials have recognized the importance of environmental defenders, and at the climate conference in Glasgow they unveiled a Plan to Conserve Global Forests. But the plan would not be nearly aggressive enough to fight the epidemic of violence facing forest defenders.

An effort to move from fossil fuels to renewable energy was made in mid-January by BP and Shell, which proposed to spend billions at a North Sea Auction to develop wind farms off Scotland.

In awarding the leases, the Scottish government is trying to persuade the oil companies, which have been laying off workers as investment in oil and gas plummets, to retain a substantial presence in Scotland. "For a number of key companies this will underline their commitment to the area," said Barney Crockett, the lord provost, or mayor, of Aberdeen, the oil hub.

Companies were bidding on the chance to develop offshore parcels covering 2,700 square miles. The auction will bring in nearly 700 million pounds, or about $955 million, in option fees to the Scottish government.

"We secured the blocks that we wanted," said Louise Kingham, head of country for Britain at BP, which gained the option to develop a large wind farm near Aberdeen with capacity comparable to a nuclear power station, in partnership with EnBW, a German utility.

Kingham said BP would invest £10 billion in the wind farm, including the acquisition of four service vessels and initiatives to modernize Leith, Edinburgh's port. It is expected to become a manufacturing center for offshore equipment. BP also plans for Aberdeen to transform from a center for undersea technology for the oil industry, to an operations and maintenance hub for the company's wind business.

Kingham said there was now "a real opportunity" for Scotland to become a center for renewable energy, including hydrogen, EV charging and other solutions to climate change.

The Scottish government insisted that winning bidders spend substantial sums with local businesses. Overall, the 17 offshore wind projects awarded are likely to bring in tens of billions of pounds in investment, bolstering the British and Scottish economies.

The Scottish projects are also likely to be test sites for floating wind turbines, which are anchored to the seabed rather than attached. Floating turbines can be placed in deep water, such as the area covered by the Scottish leases, as well as the California coast.

Presently, floating turbines are too costly for wide commercial deployment. Shell's two wind farms, which amount to about 20% of the capacity awarded, would need to be on floating structures, which are still in the experimental stage.

A key issue is where the power will go. Overall, the potential capacity that has been awarded is likely to exceed what the Scottish system can handle. Southbound cables will be needed to take power to major population and industrial centers in England. Eventually, the Scottish power may also be used to generate hydrogen, a clean-burning gas, and the electricity could be sent across the North Sea to Norway or Germany, executives say. Germany recently halted the Nord Stream 2 Baltic Sea gas pipeline project, which was intended to double the flow of Russian gas to Germany, after Russia formally recognised two breakaway regions in eastern Ukraine.

As humanity continues to make little if any progress in removing CO2 from the atmosphere, a technological breakthrough is desperately needed. Climeworks, a Swiss company, developed a device in Iceland that is doing just that, on a small scale.

The devise, called Orca, is the world's biggest commercial direct air capture (DAC). It resembles four massive air-conditioners, each the size of a shipping container sitting on top of another. It is powered by geothermal energy as it sucks air into steel catchment boxes where CO2 chemically bonds with a filtering substance. With the addition of heat, CO2 is released and mixed with water by the Icelandic company Carbfix to create a drinkable fizzy water which is then injected several hundred meters down into basalt bedrock. The CO2 mix reacts with basalt and turns to rock in two or three years. This is claimed to be a permanent solution, unlike the planting of forests, which can release carbon by rotting, being cut down or burning. Even the CO2 that other firms are planning to inject into empty oil and gas fields could eventually leak out.

Orca is billed as the world's first commercial DAC unit because the 4,000 metric tons of CO2 it can extract each year have been paid for by 8,000 people (and the band Coldplay) who have subscribed online to remove some carbon, and by firms including Stripe, Swiss Re, Audi and Microsoft.

The task is daunting as Orca's removal capacity handles three seconds of humanity's annual CO2 emissions, which is closer to 40 billion metric tons, but, once again, it's a start.

Christoph Gebald, Climeworks' co-founder, insists that the technology can grow into a trillion-dollar industry in the next three or four decades, a goal that was aided by the recent COP26 meeting in Glasgow where several nations, cities and businesses committed to net zero emissions by 2050: "Any approach that leads to net zero must include carbon removal as well as emission reduction," he said.

Dr. Gebald points to the release of the U.N.-led Intergovernmental Panel on Climate Change report in 2018 which established the need to reach net zero emissions by 2050 if global warming is to be limited to 1.5C. Crucially, it also produced the first scientific consensus that some emissions would be impossible to eradicate so reaching "net zero" would entail removing prior emissions.

Getting from 4,000 metric tons a year to five billion metric tons quickly enough to help limit climate change is challenging, but such a rapid scaling up has been done before. The world's first commercial wind farm opened in 1980 on Crotched Mountain in New Hampshire. It consisted of 20 turbines and produced 600,000 watts. Forty years later, in 2020, world wind capacity was 1.23 million times larger, at 740 gigawatts. At such a rate, Orca could remove five billion metric tons of CO2 by around 2060. "That is exactly what climate science asks us to do to achieve climate targets," Dr. Gebald said.

To succeed, Dr. Gebald says he must reduce costs, which currently are $600 to $800 a metric ton. Increased output could reduce costs to $200-$300 a metric ton by 2030, and $100 to $150 around 2035, he said. He is also likely to benefit from the kind of subsidies that helped EVs and solar panels deploy and flourish.

Dr. Ólafur Ragnar Grímsson, the former president of Iceland, says reducing GHG emissions is important, but "we also have to destroy some of the carbon that is already in the air. If we don't start doing that very, very quickly we are never going to succeed on climate change."

Currently only trees and oceans (and their vegetation) remove CO2 from the atmosphere at scale. It is essential that humanity protect and grow its existing forests, but we are failing. The 197 signatories of the 2015 Paris climate agreement committed to preserve forests and other ecosystems that store carbon. But forests continue to be cut and burned and fragmented into ever smaller patches. This failure challenges all of our other climate efforts because intact forests are essential to contain global warming.

In Glasgow at the recent COP26, delegates again pledged to end deforestation, committing $12 billion to the effort, with an additional $7 billion from the private sector. But the necessary steps are not being taken. Territorial rights of Indigenous peoples are not being recognized, protected forest areas are not being expanded and roads and industry are not being curtailed in forests.

In 2021, the loss of primary old-growth tropical forest rose by 12% over 2019. That loss added about twice as much CO2 to the atmosphere as the annual emissions by cars in the U.S.

The northern boreal forests protect soil that contains carbon equal to 190 times the global carbon emissions of last year, but this forest is being burned and cut which is accelerating the thawing of permafrost as the planet warms, releasing GHGs in a potentially catastrophic positive feedback loop.

Globally, intact forests absorbed around 28% of all CO2 emissions from 2007 to 2016, a huge reduction in the accumulation of the planet-warming gas in the atmosphere. In the tropics, intact forests store an average of twice the carbon held in forests bisected by roads or otherwise disturbed by development.

The nations richest in intact forest landscapes (defined as unbroken woodlands of slightly more than 190 square miles) are Canada, Russia, Brazil, the Democratic Republic of Congo, Peru and the U.S. Two of those countries, Brazil and the Democratic Republic of Congo, led the world in primary forest loss in 2020, and Peru ranked fifth on that list.

Globally, 10% of intact forest landscapes were fragmented or cleared in the first 16 years of this century, and half of the remainder are designated by governments for logging, mining and oil and gas extraction.

Protecting tropical forests can secure seven to 10 times as much carbon through 2050 as replanting forests. Saving the trees can also ease the crisis of species extinction. And protecting these forests is crucial to maintaining the homes and ways of life of thousands of forest cultures—people who speak as many as a quarter of Earth's languages.

Still, the majority of intact forests around the world lie outside Indigenous lands and require greater protection. The good news is that parks and reserves quadrupled in area, to 17% of Earth's land, between 1990 and 2020, an astounding success. As part of the world's Convention on Biological Diversity, most nations have agreed to increase protection to 30% of their land by 2030.

The first suit has been filed in New York pursuant to Green Amendment. The voters of the state agreed last November to amend New York's constitution guaranteeing the right to "Clean air and water, and a healthful environment." The suit was filed by Fresh Air for the East Side against Waste Management and the state DEC over a 300-acre landfill near Rochester. New York City waste is shipped there and New York City was named a defendant as well. Rochester attorney (and EELS Chair) Linda Shaw, of Knauf Shaw, represents Fresh Air and filed the case in State Supreme Court in Monroe County.

Washington

President Biden in early December added to his plan to make the federal government carbon neutral, ordering federal agencies to buy EVs, to stop buying gasoline-powered vehicles by 2035, to power federal facilities with wind, solar and nuclear energy, and to use sustainable building materials.

In a series of executive orders, Biden directed the government to transform its 300,000 buildings, 600,000 cars and trucks, and use its annual purchases of $650 billion in goods and services to meet his goal of a federal government that stops adding CO2 into the atmosphere by 2050.

By 2030, Biden wants the federal government to purchase electricity produced only from sources that do not emit CO2 and other GHGs that are warming the planet. And by 2032, the Biden administration wants to see the emissions produced by buildings cut in half.

"The federal government in so many areas is one of, if not the largest, purchaser," said Joshua Freed, senior vice president for climate and energy at Third Way, a centrist Democratic research group, noting that the government spends about $5 billion annually buying concrete. Setting standards for more environmentally sustainable products as well as clean energy and zero-emissions vehicles, he said, would have a "huge influence" on the private sector.

Biden has pledged to cut U.S. emissions 50 to 52% below 2005 levels by 2030. As the Build Back Better bill is stalled, Democrats are looking for ways to advance pieces of it to devote hundreds of billions of dollars in tax incentives that analysts said could get the U.S. about halfway to that goal but the rest will require significant executive action.

Transportation is the largest single source of GHGs generated by the U.S. and so EPA announced plans to strengthen limits on automobile tailpipe emissions. The more stringent rule would be the most significant climate action taken to date by the Biden administration and highest level ever set for fuel economy. It would require passenger vehicles to travel an average of 55 mpg by 2026, from under 38 mpg today.

That would prevent the release of 3.1 billion tons of climate-warming CO2 through 2050, according to the EPA. It would save about 360 billion gallons of gasoline from being burned, leading to a 15% annual reduction in the nation's gasoline consumption by 2050. And motorists would save about $1,080 in fuel costs over the lifetime of more efficient vehicles, the agency estimated.

The tailpipe rule will take effect 60 days after it is published in the Federal Register and apply to model years 2023 to 2026. The new Biden rule "is basically just recapturing the emissions cuts that we lost during the Trump rollback," said Jeff Alson, a former EPA senior engineer and policy adviser who worked on the Obama auto emissions standards. "That's good, but it's not going to get us anywhere near the level we've got to get to reduce vehicle emissions enough to protect the planet."

A recent report by the International Energy Agency found that nations would have to end the sale of new gasoline-powered cars by 2035 to keep average global temperatures from increasing 1.5C compared with pre-industrial levels.

About $26 billion in tax incentives to speed up the adoption of EVs has been stuck in limbo on Capitol Hill, part of a larger $2.2 trillion Build Back Better Act that Manchin opposes. Among the bill's provisions are a tax credit of

$7,500 for purchasers of EVs, plus an additional incentive of $4,500 if the vehicles are assembled by union workers.

Biden has set a goal for EVs to make up 50% of all new car sales by 2030 in order to slash planet-heating emissions and slow climate change. But EVs are likely to total just 4% of American sales in 2021, a hint of the scale of the challenge.

Progress is being made. In November 2021, Congress passed a $1 trillion infrastructure bill that included $7.5 billion to build 500,000 electric charging stations in the U.S., plus another $7.5 billion to bolster supply chains needed to produce EVs.

EPA is also working on regulations for model year 2027 vehicles and beyond to advance sales of EVs. A draft may be published in 2022 to be completed before the end of Biden's term.

Increasing numbers of major automakers have publicly pledged to invest in EVs including GM which said it will only sell EVs by 2035. Ford announced $30 billion in investments in electrification and said that it intends to sell only EVs in leading markets like the U.S., China and Europe no later than 2035, and globally by 2040. Ford built an electric version of the F-150 pickup and dealers are taking orders.

GM issued a statement saying it "supports the goal of the final rule and its intention to significantly reduce emissions," but is still reviewing the details. Ford said, "we applaud EPA's efforts to strengthen greenhouse gas emissions standards and create a consistent national plan." And Stellantis, the company formed after the merger of Fiat Chrysler and Peugeot, said the new rule underscored the need for the government to support a transition to ZEVs.

Most Republicans oppose new tailpipe regulations. "Biden's inflation and energy crisis is hurting families and creating record-high costs," Cathy McMorris Rodgers, the ranking Republican on the House Energy and Commerce Committee, wrote on Twitter. "Instead of helping families, he's putting radical environmentalists first with strict regulations that dictate the cars we buy and drive."

Autoworkers have expressed concerns over the electric transition because the production of an EV requires about one-third less human labor than a vehicle powered by an internal combustion engine. Biden has sought to win them over with policies like the proposed tax credits that would reward buyers for purchasing union-made EVs.

Ray Curry, the president of the United Auto Workers, hailed the standards as "well thought out," adding, "history has demonstrated that strong standards based on input from stakeholders that include American workers at the table can be an opportunity for both job retention, job creation and environmental protections."

In late December, the Biden administration approved two major solar projects on federal land in the California desert. These projects, and a third for which approval is near, would generate about 1,000 megawatts, enough electricity to power about 132,000 homes, the Interior Department said. All three projects are in Riverside County, Calif.

Biden recognizes the environmental and political need to act and has used his executive authority to advance his goal of cutting U.S. GHG emissions roughly in half by 2030. But even that is under threat. In February the Supreme Court is scheduled to hear arguments in a case brought by coal companies and Republican-led states to limit the authority of the EPA to regulate GHG emissions.

"All bets are off with this Supreme Court," said John Podesta, a former top aide to President Obama, speaking at a recent panel discussion on climate change. "It's definitely a challenge."

The solar farms are known as the Arica and Victory Pass projects. They will be photovoltaic solar projects and will generate a total of up to 465 mws of electricity with up to 400 mws of battery storage. The combined projects would cost about $689 million to build.

The Bureau of Land Management also is expected to approve a separate 500 mw photovoltaic plan known as the Oberon solar project. It is located on 2,700 acres of public land and is expected to generate enough renewable energy to power nearly 142,000 homes.

The BLM also said it was soliciting interest for utility-scale solar energy development on nearly 90,000 acres of public land within what it called solar energy zones in Colorado, Nevada and New Mexico. Biden's goal includes eliminating emissions from fossil fuels in the electricity sector by 2035.

Facts on the Ground

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In early March, Australia's eastern coast endured record rainfall, some of the worst flooding in Australian history, which inundated parts of two of its largest cities, Lismore, in the state of New South Wales, and Sydney, killing 20 people. Residents had little time to evacuate so many became trapped in their attics and cut through their roofs where they became stranded as floodwaters quickly rose.

The flooding prompted the prime minister, Scott Morrison, to declare a national emergency for the first time in the nation's history. The prime minister authorized the expenditure of tens of millions of dollars in federal support for affected people, including disaster payments of 2,000 Australian dollars, or roughly $1,460, per adult and 800 Australian dollars, or $585, per child. More than 60,000 people were ordered to evacuate.

The extreme rain has produced the wettest start to any year on record in Sydney and the second wettest in Brisbane, the capital of Queensland. Parts of Sydney received over 34 inches of rain this year, an amount that the city usually doesn't reach until August.

More than 100,000 people have filed flood-related claims, according to the Insurance Council of Australia. The cost of the flooding may exceed 2 billion Australian dollars, or just under $1.5 billion, according to the ratings agency S&P.

Morrison has promoted coal use and downplayed climate change and was met by climate protesters in Lismore. Some carried signs: "He's a real nowhere man," or "This is what climate change looks like." Morrison acknowledged that "We are dealing with a different climate to the one we were dealing with before." "Australia is getting harder to live in because of these disasters."

In late February as well, Queensland and New South Wales endured what the authorities described as wild weather with "waves of water just coming down." At least nine people died in flash flooding from these rains which moved south and inundated the state's capital, Brisbane. About 18,000 homes across the state were damaged, more than 1,500 people were evacuated and about 53,000 homes lost power. Hundreds of schools are closed, residents were asked to conserve water after flooding knocked a water treatment plant offline.

New South Wales's premier, Dominic Perrottet, called the flooding "unprecedented." Annastacia Palaszczuk, the state premier of Queensland, described the latest calamity as a "rain bomb."

March was filled with lethal tornados in southern U.S. In late March two tornadoes hit Lacombe, north of New Orleans, and another hit both the Lower Ninth Ward in New Orleans and St. Bernard Parish, killing at least one person and sending more to a hospital. Rescuers from the National Guard, state police and others searched through the night looking for residents who may have been trapped.

"There are houses that are missing," said James Pohlmann, the sheriff of St. Bernard Parish. "One landed in the middle of the street." Rescuers worked in pitch darkness, amidst fallen tree branches, live power lines and the smell of gas from damaged gas lines. "We have a long road ahead of us with this recovery," Mr. McInnis of St. Bernard Parish said.

In mid-March, severe weather including tornados ripped through central Texas in and around Austin, the state capital, leaving behind a path of destruction including an overturned 18-wheeler truck and a mobile home blown onto the top of a building. More than 40,000 customers across northeastern Texas lost power according to PowerOutage.us, a website that aggregates data from utilities across the U.S.

Also in mid-March, four separate fires west of the Dallas-Fort Worth area, collectively called the Eastland Complex fire, killed a deputy with the Eastland County Sheriff's Office, burned over 45,000 acres including at least 50 homes and forced hundreds to evacuate. Gov. Greg Abbott signed a disaster declaration that would allow the state to better help 11 counties affected by the fire. The forest service said that it was responding to 10 wildfires across the state that had burned more than 52,000 acres.

Earlier in March, seven people were killed, including two children aged five and two, by tornadoes in Iowa with wind speeds exceeding 135 mph. Gov. Kim Reynolds issued a disaster proclamation for Madison County allowing state resources to be used for response and recovery efforts.

Alex Krull, a meteorologist with the National Weather Service in Des Moines, said powerful tornadoes are typical in the state in April and May, but are "somewhat uncommon" in March. Krull said the thunderstorm that produced

the tornado in Madison County traveled about 180 miles, and two other tornado-producing thunderstorms traveled about 120 miles. Roofs were torn from homes, neighbors were offering their barns to store salvaged belongings, and debris was strewn across streets in the eastern and southern parts of the city.

Rick Goehry Jr., who works for Tree Guardian U.S.A., a landscape company, said "I'm seeing total devastation." "Houses completely gone, lives uprooted. It's pretty sad."

Days before Vladimir Putin began his war against the citizens of Ukraine, in late February, the Intergovernmental Panel on Climate Change released a scientific report warning that the dangers of global warming are so imminent that adapting to them may soon be impossible. "Delay," the U.N. secretary general said, "means death."

The report, written by 270 researchers from 67 countries, is the most detailed analysis to date of the threats posed by global warming. It concludes that nations are not doing nearly enough to protect cities, farms and coastlines from the hazards that climate change has already unleashed, including droughts, wildfires and rising seas, nor from the much greater disasters ahead as the planet warms.

António Guterres, the U.N. secretary general, said the report is "an atlas of human suffering and a damning indictment of failed climate leadership," "With fact upon fact, this report reveals how people and the planet are getting clobbered by climate change."

The role that Russia's fossil fuel trade has played in promoting the invasion has placed climate change and its causes into the spotlight. "The world is paying Russia $700 million a day for oil and $400 million for natural gas," Oleg Ustenko, an economic adviser to the Ukrainian president, Volodymyr Zelensky, said. "You are paying all this money to a murderous leader who is still killing people in my country."

Russia is one of the largest producers of fossil fuels in the world. It is highly dependent on its energy trade, with fossil fuels accounting for almost half of its exports and 28% of its federal budget in 2020. Europe relied on Russia for about one-third of its oil and 40% of its natural gas. The U.S. gets none of its natural gas and only about 3% of the oil it consumes from Russia. But given the atrocities being committed in Ukraine, most of the countries that had done business with Russia are cutting off ties. How rapidly the world moves from fossil fuels and toward renewables will determine if we keep global warming below a 1.5C increase.

According to Svitlana Krakovska, Ukraine's leading climate scientist, who helped finalize the I.P.C.C. report from Kyiv as Russia invaded, the war on her home country is inextricably linked to climate change. "Burning oil, gas and coal is causing warming and impacts we need to adapt

to," she said. "And Russia sells these resources and uses the money to buy weapons. Other countries are dependent upon these fossil fuels; they don't make themselves free of them. This is a fossil fuel war. It's clear we cannot continue to live this way. It will destroy our civilization."

"It's not so simple to just say, 'OK, overnight, now we're going to suddenly switch and no longer going to be dependent on natural gas from Russia,' or fossil fuels in general," Pete Ogden, vice president for energy, climate and the environment at the U.N. Foundation, told Yahoo News. "Right now, you're seeing that vulnerability exposed and there not being easy, short-term fixes to that problem."

But it's evident that the collision of foreign-policy and climate interests has lent more political momentum to decarbonization. Germany earmarked 200 billion euros for investment in renewable energy production between now and 2026. "Many of the strategies to lower dependency on Russia are the same as the policy measures you want to take to lower emissions," Thijs Van de Graaf, a professor of international politics at Ghent University, told The Financial Times. "At the moments where we have these crises, the [energy] transition can be supercharged."

The European Union has vowed to slash Russian natural gas imports by two-thirds by next winter and to cut them out entirely by 2027. "That would be an extremely ambitious timetable in peacetime, but if the continent shifts to a war footing—as it must, with a savage conflict playing out on its eastern borders—then it should be achievable," The Boston Globe editorial board opined.

Key to the transition, the board wrote, is increasing American production of minerals and metals required for renewable energy technology. Russia is a key supplier of those materials, so the West needs to ensure it doesn't become just as reliant on Russia for clean energy production as it is now for fossil fuels.

Fossil fuels, not renewable energy, have been filling the void. As energy prices rise, some fossil fuel executives have used the crisis as a business opportunity. At CERAWeek, an annual energy conference that was held in Houston recently, climate change was supposed to feature heavily. Instead, Kate Aronoff reports for The New Republic, the focus shifted to increased domestic fossil fuel production.

"An industry that's spent the last two years and billions of dollars trying to convince the world that it can 'decarbonize hydrocarbons' is much too savvy to brag about all the money to be made off a humanitarian catastrophe," she writes. "Accordingly, the message fossil fuel execs pivoted to, as Russian troops crept further into Ukraine, is that they're patriots, standing ready to meet the world's energy needs and build American 'energy independence.'"

The war itself, just moving the Russian army into Ukraine, is energy intensive. According to the Watson Institute for International and Public Affairs at Brown University, the Pentagon's GHG emissions in 2017 exceeded those of entire industrialized countries, such as Sweden, Denmark and Portugal.

In the recent United Nations Environment Program (IPCC) report, climate scientists continue to warn that a warming planet will produce more extreme weather as well as a 'Global Wildfire Crisis.' Worsening heat and dryness could lead to a 57% rise in off-the-charts fires by the end of this century. The report was inspired by the deadly fires in recent years in the American West, much of Australia and even the Arctic. "The heating of the planet is turning landscapes into tinderboxes," said the report.

"There isn't the right attention to fire from governments," said Glynis Humphrey, a fire expert at the University of Cape Town and an author of the report. Forest management must be favored over firefighting, suggesting that developed countries have this formula exactly backward. Of every dollar spent in the U.S. on managing wildfires, almost 60 cents is for firefighting. Much less is spent on reducing fire risks in advance and helping communities recover in ways that could make them more resilient.

The report noted that fires in eastern Australia and the western U.S. and Canada, have become more intense over the last decade and are ravaging larger areas. Fires are also burning in places where it had not been common before, such as Russia, northern India and Tibet.

In general, climate change has produced record warmth and dryness that has contributed to severe burning, but precise attribution is complex and varies from place to place. Still, researchers have determined that last year's extreme heat in the Pacific Northwest would not have occurred without planetary warming caused by GHG emissions. Scientists have also found the fingerprints of climate change on brush fires in Australia and extreme heat and burning in Siberia.

The report considered the variables and still forecasts a significant increase in the global risk of record wildfires based on GHG already in the atmosphere. In a moderate scenario for global warming, the likelihood of catastrophic fires could increase by up to a third by 2050 and up to 52% by 2100. If emissions are not curbed and the planet heats up more, wildfire risks could rise to 57% by the end of the century.

Because the north is warming faster than the rest of the globe, most of the increase in burning likely will be in places including the Arctic, northern Russia and the U.S. said Douglas I. Kelley, who conducted the data analysis for the report. The huge Arctic fires of 2020 released more GHGs into the atmosphere that June than in any other month in 18 years of data collection.

And because higher amounts of CO2 in the air helps plants grow, it results in more vegetation to fuel fires. Thus, in temperate regions of the U.S. and Asia, Dr. Kelley said, wildfires could increase here too.

Basic facts about climate change are widely known. If humanity is to keep global warming from exceeding 1.5C then we must do everything we can to reduce GHG emissions. President Biden has embraced this and has set a national goal of cutting U.S. emissions nearly in half from 2005 levels by 2030 and to net-zero emissions by 2050. Thus, the decision by the Tennessee Valley Authority, the largest federal utility, to choose gas instead of committing to carbon free renewable energy, undermines this goal.

In mid-March, the TVA announced its plans to invest more than $3.5 billion in new gas-burning electric plants. The TVA provides electricity to nearly 10 million people across the Southeast and is replacing aging coal-powered plants. Critics say substituting gas for coal will lock in decades of additional CO2 emissions that contribute to global warming and could be avoided by generating electricity from solar, wind or another renewable source.

The U.S. Postal Service also made a decision inconsistent with Biden's goal. It is replacing 165,000 aging mail trucks with mostly gasoline-powered vehicles, despite the desire of the White House that it convert the fleet to all-electric vehicles.

Both the Postal Service and the TVA are independent organizations governed by a board of directors made up of presidential appointees. The boards of both entities are dominated by Trump appointees who share his view on climate denial and support the fossil fuel industry.

Catherine Butler, a spokeswoman for the TVA, said that it found that solar or other zero-emissions sources would be less dependable and more expensive than gas. "We have an obligation to serve, and ensure the lights come on," she said. "So, when renewables aren't available, natural gas will be available to ensure that reliable, resilient service is available to power our communities."

The TVA gets nearly half its power from zero-emissions sources: 11% from hydroelectric dams, 39% from nuclear plants, 39% from wind and 3% from solar. It gets 19% of its power from coal.

Environmentalists accuse the TVA of slow walking a transition to solar and renewable power at a time when scientists say it is imperative that countries must rapidly cut pollution from fossil fuels or face catastrophic impacts from climate change.

"It also sends a terrible message," said Leah C. Stokes, a political scientist and expert in environmental policy at the University of California, Santa Barbara. "The president has very bold goals to decarbonize the power sector by 2035, and here we have a big federal authority really thumbing their nose at that goal." "We can't build any new fossil fuel infrastructure and limit warming to 1.5 degrees," Stokes said. The planet has already warmed an average of 1.1C since the late 1880s.

Biden has nominated four new members to TVA's nine-member board of directors who are awaiting confirmation hearings. Vedant Patel, a White House spokesman, said that he expects Biden's appointees to be confirmed this spring.

The TVA is planning to build two gas-fired plants to replace retiring coal plants at Kingston, Tenn., where an infamous coal ash spill occurred in 2008, as well as a coal plant in Cumberland, Tenn. It also will replace aging gas-fired "peaker" plants with new combustion turbines in Kentucky, Alabama and Tennessee.

The Supreme Court heard arguments in a case that could restrict or even eliminate EPA's authority to control the pollution that is warming the planet. "They could handcuff the federal government's ability to affordably reduce greenhouse gases from power plants," said Michael Oppenheimer, a professor of geosciences and international affairs at Princeton University.

But the outcome could reach beyond air pollution and restrict the ability of federal agencies across the board. "If the court were to require the EPA to have very specific, narrow direction to address greenhouse gases, as a practical matter it could be devastating for other agencies' abilities to enact rules that safeguard the public health and welfare of the nation," said Richard Lazarus, a professor of environmental law at Harvard. "It would restrict the enactment of regulations under any host of federal statutes—OSHA, the Clean Water Act, hazardous waste regulation. In theory it even could limit the Fed's authority to set interest rates."

At issue is the Obama Clean Power Plan intended to govern emissions from power plants but stayed by the Supreme Court. Trump's plan was then vacated by a federal appeals court after finding that his administration had "misconceived the law." The Supreme Court is now taking the highly unusual step in taking a case concerning a future regulation.

"Trying to figure out the contours of E.P.A.'s authority to regulate greenhouse gases when there's no regulation being defended is just kind of a weird thing for the court to consider," said Jonathan Adler, a law professor at Case Western Reserve University. "I was surprised when they took the case."

The plaintiffs in the case, *West Virginia v. Environmental Protection Agency*, want the high court to block the kind of sweeping changes to the electricity sector that defined the Obama Clean Power Plan. Republican attorneys general in 18 states and some of the nation's largest coal companies argue that the 1970 Clean Air Act limits the EPA's authority to effect changes only at individual power plants, not across the entire power sector.

Conservatives have long argued that the executive branch routinely oversteps the authority granted by the Constitution in regulating all kinds of economic activity.

"This is really about a fundamental question of who decides the major issues of the day," said Patrick Morrisey, the attorney general of West Virginia. "Should it be unelected bureaucrats, or should it be the people's representatives in Congress? That's what this case is all about. It's very straightforward."

Defendants maintain that Congress delegated authority to the executive branch to broadly regulate air pollution under the Clean Air Act. The Legislature makes the law; the executive implements it through regulation, they say. "Just because the opponents are particularly shrill in their objection doesn't change the fact that this regulation is no different than hundreds of regulations that the agencies have produced since the New Deal—just as Congress intended them to do," said Richard Revesz, who teaches environmental law at New York University and filed a brief in support of the administration.

Notably, many of the nation's largest electric utilities, which would be subject to environmental regulation, have filed legal briefs in support of the government. They are joined by 192 members of Congress, the U.S. Conference of Mayors, climate and public health advocates and tech giants like Apple, Google and Netflix.

Washington

Given the difficulty Biden is having getting his party and federal agencies to follow his lead, he needs assistance from motivated states. In early March his administration restored California's legal authority to set auto pollution and mileage rules that are tighter than federal standards. Trump had stripped the state of such authority.

California's economic and environmental impacts are as powerful as its influence on like-minded states such that this policy change could significantly affect the type of cars Americans will drive in the coming decade, the amount of gasoline the nation consumes and the amount of tailpipe emissions that help drive climate change. Seventeen other states and the District of Columbia have adopted the California rules. Twelve other states are following California's mandate to sell only zero-emissions vehicles after 2035. EVs currently make up just 4% of new car sales in the U.S. despite the large demand (there are none to be had in dealerships).

Many of the world's largest automakers, which for years opposed federal rules to cut tailpipe pollution, have now publicly embraced a future built on EVs. "Automakers are committed to working cooperatively and constructively with California and other states to ensure vehicles are efficient, clean, and affordable for all," said a statement from John Bozzella, president of the Alliance for Automotive Innovation, which lobbies on behalf of more than a dozen automakers, including Ford, General Motors, Stellantis, Toyota and Volvo. "Collaboration between governments at all levels will be essential to achieving our shared goals for a cleaner transportation future that benefits all communities and enhances U.S. economic competitiveness."

During the Trump administration, five auto companies—Ford, Honda, BMW, Volkswagen and Volvo—signed a deal with California in which they voluntarily committed to continue to follow a tighter emissions standard in the state, even though Trump and had eliminated California's authority to enforce it and opposed such a deal.

The regulation of vehicles is central to reducing emissions as transportation is the largest single source of GHGs generated by the U.S., representing 29% of the nation's total emissions. Electricity generation is the second largest source.

A recent report by the International Energy Agency found that nations would have to end the sale of new gasoline-powered cars by 2035 to keep average global temperatures from increasing 1.5C compared with levels during the Industrial Revolution. That's the threshold beyond which scientists say Earth faces irreversible damage.

Under the 1970 Clean Air Act, Congress gave California authority to set tailpipe standards tougher than the federal limits in order to address its problem with smog. In 2009, President Obama set federal auto emissions standards based on the California rule, requiring passenger vehicles to reach an average of 51 mpg by 2025, up from roughly 38 mpg at the time. That incentivized the auto industry to aggressively increase EV production by 2025, until Trump revoked them in 2020.

Late last year, Biden enacted a federal standard that effectively reinstated and strengthened the Obama-era auto pollution rule. It requires new vehicles to average 55 mpg by 2026. That is designed to prevent the release of 3.1 billion tons of climate-warming CO2 through 2050, according to the EPA. It would also save about 360 billion gallons of gasoline from being burned, leading to a 15% annual reduction in the nation's gasoline consumption by 2050.

Biden has set a goal that, by 2030, half of all new vehicles sold in the country be electric. The EPA is writing a new tailpipe emissions rule to achieve that goal, and it is likely to be influenced by the forthcoming California rule.

Fossil fuel companies and Republican states are expected to continue to resist the new rules intended to cut oil use and promote EVs, with coordinated lawsuits against each of Biden's policies. "States that don't feel that they should be forced into the worldview of the state of California would be the primary litigants," said Thomas Pyle, the president of the Institute for Energy Research, which promotes the use of fossil fuels.

Recently, the Republican attorneys general of 15 states filed a suit against the Biden administration's reinstatement of the Obama-era auto pollution rule, arguing that it exceeded the Constitutional authority granted to the federal government.

"At a time when American gas prices are skyrocketing at the pump, and the Russia-Ukraine conflict shows again the absolute need for energy independence, Biden chooses to go to war against fossil fuels," said Attorney General Ken Paxton of Texas, who led the suit against the new rules. "These severe new rules proposed by the E.P.A. are not only unnecessary, but they will create a deliberate disadvantage to Texas and all states who are involved in the production of oil and gas. I will not allow this federal overreach to wreak havoc on our economy or the livelihoods of hard-working Texans."

In early March, EPA proposed strict new limits on pollution from buses, delivery vans, tractor-trailers and other heavy trucks—the first time in more than 20 years that tailpipe standards might be tightened for the biggest vehicular polluters. The draft rule would require heavy-duty trucks to reduce emissions of nitrogen dioxide by 90% by 2031 and would apply to model year 2027. Nitrogen dioxide is linked to lung cancer, heart disease and premature death. EPA also announced plans to slightly tighten truck emissions of CO2 which would apply to model year 2024 trucks. The proposed rule is expected to be finalized by the end of 2022.

Vice President Kamala Harris announced the proposal, along with a suite of other federal clean transportation actions, including the expenditure of $5.5 billion to help states purchase low or zero-emission transit buses, and $17 million to replace diesel school buses with electric versions in underserved communities.

"Seventy-two million people are estimated to live near truck freight routes in America, and they are more likely to be people of color and those with lower incomes," the EPA administrator, Michael S. Regan, said. "These overburdened communities are directly exposed to pollution that causes respiratory and cardiovascular problems, among other serious and costly health effects. These new standards will drastically cut dangerous pollution by harnessing recent advancements in vehicle technologies from across the trucking industry as it advances toward a zero-emissions transportation future."

The new limits could prevent up to 2,100 premature deaths, 6,700 hospital admissions and emergency department visits, 18,000 cases of asthma in children, 78,000 lost days of work and 1.1 million lost days of school by the year 2045, according to EPA. The agency estimates that the economic benefits of the rule could be up to $250 billion and said those benefits "would exceed its costs by billions of dollars."

Truckers and manufacturers oppose the rule as too stringent and costly, and that compliance could send higher prices rippling through the economy.

"This new standard simply may not be technologically feasible," said Jed Mandel, president of the Truck and Engine Manufacturers Association, an industry group. "We're worried about the cost. There is a potential of adverse impacts on the economy and jobs. Nobody wants to see union jobs laid off. Regular lunch-pail, blue collar workers."

While the new truck regulations will cut pollution that harms human health, they won't do much to reduce GHG emissions, climate experts said. The proposed regulations will require some trucks, 17 of the 33 categories of heavy-duty trucks, to lower their CO2 emissions. That's designed to bolster sales of all-electric trucks in the U.S., from fewer than 1,000 in 2020 to about 1.5% of total truck sales, or roughly 10,000 trucks, in 2027.

But in order to put the U.S. on a path toward a transition to all-electric trucks, the forthcoming truck rules would have to be far more stringent, experts said. "It's great to see that the rule is driving 90 percent reduction in air pollution in heavy-duty vehicles and at the same time opening the door to reducing greenhouse gas pollution," said Drew Kodjak, executive director of the International Council on Clean Transportation, a research organization. "But we've got this thing called climate change and we've really got to start driving electrification in the heavy-duty truck sector. My big concern is that the proposal as it is written will not do that."

In his State of the Union address in early March, Biden barely mentioned his climate goals despite promises to make climate a central issue of his presidency. The war in Ukraine and partisan politics are slowing efforts to address climate change both in the U.S. and in Europe as scientists renew their warnings of increasing dangers.

Oil and gas prices rose steeply in March as did oil and gas industry profits. Rising prices and the desire to curtail purchases of Russian oil and gas led to calls for increased drilling in the U.S. which is already one of the world's biggest producers of oil and gas.

This exemplifies the dilemma of the developed world. We insist on the short-term satisfaction of our unsustainable demands for energy while putting off the essential changes that might sustain the world as we know it. As noted above, an exhaustive report from the United Nations has renewed calls on world leaders to focus on reducing GHG emissions that are threatening the future of humanity. Otherwise, they warn, we face a harrowing future where the pace of climate change, and the displacement of millions of people, outpaces humanity's ability to adapt.

Energy experts said that Biden is missing an opportunity to use the war in Ukraine as impetus for change and swiftly sever our economic reliance on fossil fuels. "The president did not articulate the long-term opportunity for the U.S. to lead the world in breaking free of the geopolitical nightmare that is oil dependency," said Paul Bledsoe of the Progressive Policy Institute, a Washington-based think tank.

John Kerry, Biden's special envoy for climate change, said Putin has "weaponized" fossil fuels, particularly gas. "It's related, and people need to see it that way. Energy is a huge part of the geopolitics of what the options are," Kerry said. "Energy is a key weapon within this fight, and if there were far less dependency on gas there would be a different set of plays."

The U.S. has increased exports of LNG to Europe to counter the decline in Russian piped gas. By the end of this year, the U.S. likely will have the world's largest LNG export capacity.

United States Republicans have supported the oil and gas industry and pointed to the Russian invasion of Ukraine to underscore the need to increase drilling for more oil and gas in the U.S. to provide Europe with an alternative. Senator Kevin Cramer (R-ND) called Biden's opening of the strategic reserve "a thimble in the ocean."

Before the Russian invasion, in late February, Biden had directed the Interior Department to pause new federal oil and gas leases and permits. The move was a response to a recent federal ruling that blocked the way the Biden administration was calculating the real cost of climate change, a figure that guides a range of government decisions, from pollution regulation to whether to permit new oil, gas or coal extraction on public lands and in federal waters.

Under President Obama, the government estimated that the damage from wildfires, floods and rising sea levels was $51 for every ton of CO2 generated by burning fossil fuels. Trump lowered that number to $7 or less per ton. Biden revived the $51 level and is updating it further.

Known as the "social cost of carbon," the metric is designed to fully consider the economic threats from GHG emissions. Economists and climate scientists say it is needed because climate-fueled heat waves, extreme weather, wildfires and flooding already cost the U.S. billions of dollars annually but those costs are often not considered by policymakers. Factoring in those costs could justify rejecting projects promoting fossil fuel.

But 10 Republican-led states sued the government and on February 11, Judge James D. Cain Jr. of the U.S. District Court for the Western District of Louisiana found that the Biden administration's calculations "artificially increase the cost estimates" of oil and gas drilling. Judge Cain, a Trump appointee, said using the social cost of carbon in decision-making would harm his native Louisiana and other energy-producing states. He issued an injunction preventing the administration from considering the metric. The Justice Department said it intends to appeal.

As a result, the federal government has stopped work on new oil and gas leases, as well as permits to drill on federal lands and waters. "Work surrounding public-facing rules, grants, leases, permits and other projects has been delayed or stopped altogether so that agencies can assess whether and how they can proceed," the Department of Justice wrote in a legal filing asking the court to stay the injunction against using a climate metric.

States and bodies with significant interests in oil and gas drilling on federal land expressed their frustration. The Petroleum Association of Wyoming accused the Biden administration of "a dereliction of duty" by delaying a sale that could be worth millions of dollars in revenue to the state. Senator Cynthia Lummis (R-WY) called the delays "a conscious decision to continue to attack Wyoming and our domestic energy industry in favor of progressive, unrealistic climate policies." She asserted that Biden "has prioritized the agenda of radical environmentalists in his administration over the needs of people in Wyoming and the rest of the country."

Fossil fuel extraction on public land and in federal waters accounts for 25% of the GHGs generated by the U.S. Environmentalists said they were pleased by the pause in new leases and permits but worried that Judge Cain's ruling would ultimately weaken the administration's ability to issue aggressive climate policies.

"It's a mixed bag," said Brett Hartl, director of government affairs for the nonprofit Center for Biological Diversity. "They will have to issue the leases at some point, and they won't be able to use the social cost of carbon."

The Louisiana attorney general, Jeff Landry, who has called the social cost of carbon "voodoo economics," argued that Biden exceeded his authority by applying the social cost of carbon to decision-making. He was joined by the attorneys general of Alabama, Florida, Georgia, Kentucky, Mississippi, South Dakota, Texas, West Virginia and Wyoming.

Judge Cain sided with the Republican attorneys general, arguing that using a social cost of carbon is unconstitutional because Congress never passed legislation authorizing it.

In fact, Congress has passed virtually no legislation addressing how an administration should conduct economic analyses, something administrations have been doing for decades. Legal experts mocked Judge Cain for citing a non-existent "separation of powers clause" in the Constitution.

The Competitive Enterprise Institute, an organization opposed to addressing climate change, has urged EPA to revoke the new vehicle tailpipe emissions regulations as they utilized the social cost of carbon analysis.

The ruling is having ripple effects. "Pending rulemakings in separate agencies throughout the government—none of which were actually challenged here—will now be delayed," the Justice Department wrote.

Recent Decisions and Legislation in Environmental Law

New Jersey v. Wheeler, 475 F. Supp. 3d 308 (S.D.N.Y. 2020)

Facts

The plaintiffs, the States of New Jersey, Connecticut, Delaware, New York, and Massachusetts, brought suit against the Environmental Protection Agency (EPA) for continuing to evade its statutory obligations under the Clean Air Act, 42 U.S.C. §§ 7401-7671q (CAA). The current action arises out of *New York v. Pruitt*.[1] In *New York*, the District Court of the Southern District of New York found that the EPA had missed the mandatory August 12, 2017, deadline to promulgate Federal Implementation Plans (FIPs) to address non-compliant states' obligations under the CAA. The court ordered the EPA to discharge its duties under the CAA by promulgating FIPs by December 6, 2018.[2] Instead of complying with the court order and disseminating the FIPs, the EPA sought to discharge its nondiscretionary duty within the CAA by issuing the "Close-Out Rule" on December 21, 2018.[3] The standards written within the Close-Out Rule found it was not feasible to implement cost-effective emissions control before 2023 and that the EPA no longer had an obligation to issue FIPs.[4] The current action is challenging the Close-Out Rule on the grounds that (1) the plaintiffs are failing to meet their own attainment deadlines under the CAA at least in part due to pollutants traveling downwind from noncompliant states; (2) the plaintiffs are facing additional regulatory burdens because the EPA will not issue FIPs to noncompliant states; and (3) the plaintiff's citizens bear the associated costs of upwind states' air pollution.[5]

Procedural History

The plaintiffs filed a complaint against the EPA for failing to comply with the Clean Air Act.[6] The EPA filed an answer and moved to dismiss for lack of subject matter jurisdiction.[7] Both parties cross-moved for summary judgment.[8]

Issue

Whether the plaintiffs have standing to bring the action; whether the court has subject matter jurisdiction, and if so; whether the EPA failed to perform its non-discretionary statutory duties under the CAA to promulgate FIPs by issuing the Close Out Rule instead?[9]

Rationale

Pursuant to Article III standing, the court determined that "(1) the plaintiff[s] suffered an actual or imminent injury in fact; (2) there is a causal connection between the injury and the defendant's actions; and (3) that it is likely that a favorable decision will redress the injury."[10] The plaintiffs' standing is substantiated by the material facts that (1) the plaintiffs are failing to meet their own attainment deadlines under the CAA at least in part due to pollutants traveling downwind from noncompliant states; (2) the plaintiffs are facing additional regulatory burdens because the EPA will not issue FIPs to noncompliant states; and (3) the plaintiffs' citizens bear the associated costs of upwind states' air pollution.[11]

In the court's jurisdictional analysis, subject matter jurisdiction was found in the citizen-suit provision of the Clean Air Act.[12] It was determined that the plaintiffs' complaint falls within the non-discretionary duty cases involving express deadlines within the CAA.[13] The court then established the authority to compel an "agency action unreasonably delayed" through 42 U.S.C. § 7605(a).[14] Since the CAA stipulated express deadlines for nondiscretionary EPA duties and the plaintiffs' claim alleges a failure to perform these duties, the court found proper subject matter jurisdiction in this case.[15]

The court expressly rejected the EPA's argument that the "Close-Out Rule" discharges the EPA's nondiscretionary duty to promulgate FIPs on two grounds.[16] The court cited the prior decision of the D.C. Circuit Court of Appeals, which vacated the Close-Out Rule and enforced the nondiscretionary statutory duties established by the CAA.[17] The court also asserted that Congress deliberately created a judicial review scheme within the CAA to enforce the obligations mandated and that an agency's ability to promulgate regulations to negate this scheme would be inconsistent with this framework.[18]

The court declared that *Environmental Defense Fund, Inc. v. Gorsuch* was not sufficiently similar to the present claim, since the parties in *Environmental Defense Fund, Inc* did not dispute the EPA's power to discharge the nondiscretionary duty in question via regulation.[19] In the present case, the plaintiffs are challenging the timing by which the EPA must take certain nondiscretionary actions and the plaintiffs seek to compel the EPA to fulfill its statutory duty to promulgate FIPs.[20] The citizen suit provision within the CAA only asks whether the EPA failed to perform is nondiscretionary statutory duty by the required dead-

line.[21] In this case, the EPA does not dispute the material fact that the EPA has not fulfilled its nondiscretionary duty to promulgate FIPs under the CAA deadline.[22]

Conclusion

The citizen suit provision within the clean air act only asks whether the EPA failed to perform is nondiscretionary statutory duty by the CAA deadline.[23] In this case, the EPA does not dispute the material fact that the EPA has not fulfilled its nondiscretionary duty to promulgate FIPs under the CAA.[24] The court granted the plaintiffs motion for summary judgment and directed the EPA to expeditiously resolve its statutory duty to create FIPs per the CAA.[25]

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Endnotes

1. *New York v. Pruitt*, No. 18-CV-406 (JGK), 2018 WL 2976018, at *2 (S.D.N.Y. June 12, 2018).
2. *Id.* at *3.
3. *New Jersey v. Wheeler*, 475 F. Supp. 3d 308, 317 (S.D.N.Y. 2020).
4. *Id.*
5. *Id.* at 320.
6. *Id.* at 308.
7. *Id*.
8. *Id.*
9. *Id.* at 319–20.
10. *Id.* at 320 (internal citations omitted).
11. *Id.* at 320.
12. *Id.* at 326 (internal citations omitted).
13. *Id.* at 326 (internal citations omitted).
14. *Id.* at 321 (internal citations omitted).
15. *Id.* at 321.
16. *Id.* at 322.
17. *Id.* at 323.
18. *Id.* at 323–24.
19. *Id.* at 324 (citing *Envtl. Def. Fund, Inc. v. Gorsuch*, 230 U.S. App. D.C. 8, 713 F.2d 802 (1983)).
20. *New Jersey v. Wheeler*, 475 F. Supp. 3d 308, 325 (S.D.N.Y. 2020).
21. *Id.* at 326.
22. *Id.* at 324.
23. *Id.* at 326.
24. *Id.* at 324.
25. *Id.* at 333–34.

South Grande View Development Company, Inc. v. City of Alabaster, 1 F.4th 1299 (2021)

Facts

In 1993, real estate company South Grande View Development (SVG) bought over 547 acres of land within the City of Alabaster, Alabama ("city").[1] After its master plan for construction was approved by the city, SVG began building a variety of housing units on the property, in accordance with the current city zoning regulations.[2] SVG completed most of its planned construction on the property by 2008, leaving only "Sector 16"—a 142-acre parcel—to be developed. SVG planned to build "garden homes" throughout Sector 16, which was primarily zoned for larger, multifamily units.[3] In 2011, the city rezoned Sector 16 so that the entirety of the parcel was restricted to single-family housing.[4]

Procedural History

SGV brought a § 1983 action against the city, claiming that the rezoning of the SVG's property was a regulatory taking without just compensation, in violation of the Fifth Amendment of the U.S. Constitution.[5] The city filed several pre-trial motions seeking to dismiss SVG's claim as not ripe for adjudication, and to exclude evidence presented by SVG that the city's rezoning decision was arbitrary.[6] The trial court ruled in favor of SVG on both counts.[7] A jury ultimately found in favor of SVG and entered a verdict awarding the developer $3.5 million.[8] The city appealed, and the case was brought before The Eleventh Circuit of the U.S. Court of Appeals for review.[9]

Issues

Two main issues were raised in the city's appeal. The first issue was whether SVG's claim was ripe for review by the court.[10] This ripeness issue centered on the question of whether a final decision had been made by the city on how the zoning ordinance would apply to the developer's property.[11] The second issue was whether, by admitting evidence of the city's motivation for passing the zoning ordinance, the trial court improperly allowed the developer to bring an "arbitrary and capricious challenge" in a regulatory takings claim.[12]

Rationale

The Eleventh Circuit first looked at the issue of ripeness. It applied the standard set by The United States Supreme Court that a just compensation claim for regulatory takings is not ripe for review until "a final decision has been reached regarding the application of the regulation at issue."[13] The court held in this case that the enactment of the zoning ordinance itself constituted the final decision required to meet this standard.[14] The court rejected the

city's argument that SVG was required to apply for a zoning variance to reach a final decision by city on the matter.[15] The court argued that the facts in this case were substantially different from the two cases used as precedent by the city, where a final decision on a zoning variance application was determined necessary to meet ripeness.[16] In these cases, no final decision had been made as to how a broad regulation or zoning ordinance would be applied to a specific piece of property.[17] In contrast, the court argued that there was "no ambiguity as to how a general plan would be applied to a specific project" in SVG's case.[18]

The Eleventh Circuit then turned to the admissibility of SVG's evidence regarding the city's motivations for enacting the zoning change.[19] The city argued that by allowing this evidence, the trial court permitted SVG to challenge the ordinance under an "arbitrary and capricious" standard, which was improper for a takings claim.[20] The Eleventh Circuit held that evidence of the city's reasoning for enacting the zoning change was relevant background information for a jury to consider in takings claims, but disagreed with the trial court's ruling that inquiries into the state interest in enacting legislation may be relevant to determining "the character of the governmental action" under the *Penn Central* test.[21] The court cautioned that inquiring into the legitimacy of state interests was not the purpose of this element of a takings analysis, which considers only the "severity of the government's interference with property rights."[22] While the court conceded that some of the evidence offered by SVG "went beyond what was relevant," it ultimately determined that any errors in admissibility of SVG's evidence were harmless.[23]

Conclusion

The Eleventh Circuit of the U.S. Court of Appeals affirmed the lower court's ruling.

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Endnotes

1. *South Grande View Development Company, Inc. v. City of Alabaster*, 1 F.4th 1299, 1302 (2021).
2. *Id.*
3. *Id.*
4. *Id.*
5. *Id.*
6. *Id.* at 1302-3
7. *Id.* at 1302-3
8. *Id.* at 1301-2
9. *Id.* At 1301-2.
10. *Id.*
11. *Id.* at 1307.
12. *Id.* at 1308.
13. *Id.* at 1307.
14. *Id.* at 1307.
15. *Id.* at 1306.
16. *Id.* at 1306.
17. *Id.* at 1307.
18. *Id.* at 1307.
19. *Id.* at 1308.
20. *Id.* at 1308.
21. *Id.* at 1310.
22. *Id.* at 1311.
23. *Id.* at 1309.

Coalition for Cobbs Hill by Pasecki v. City of Rochester, 194 A.D.3d 1428, 149 N.Y.3d 400 (4th Dep't 2021)

Facts

Petitioners, tenants of an affordable senior housing community and tenants association ("coalition"), commenced this Article 78 proceeding against the following: the City of Rochester ("city"); Plymouth Gardens Inc., and Rochester Management, Inc. ("corporate respondents"); City of Rochester Planning Commission (CPC) and the Rochester Manager of Zoning ("city respondents"). This appeal involves the redevelopment of the affordable senior housing community, Cobbs Hill Village, which is located on property owned by respondent-defendant Plymouth Gardens, Inc. ("Plymouth").[1]

In 1957, the city sold the Cobbs Hill Village property to Plymouth's predecessor in interest. The deed conveying the property contained several restrictive covenants, specifically, that provided that ownership of the property would revert back to the city once the mortgage had been paid in full. Another restrictive covenant required any plans or specifications for construction on the property would be subject to CPC approval.[2] That same year, Cobbs Hill Village was constructed with 60 apartment units.[3]

In 2016, corporate respondents announced their intent to redevelop Cobbs Hill Village, which included demolishing the existing complex and constructing new apartment buildings in its place, with over 100 apartment units ("project").[4] The city's corporation counsel recommended the CPC use the special approval standard pursuant to the Rochester Zoning Code § 120-192 (Code).[5] At this time, the mayor of Rochester was granted the authority to enter an agreement that would extend city's reversionary interest in the property as a means to finance the project.[6]

However, there were two overlapping standing agreements at the time with respect to the process under the State Environmental Quality Review Act (SEQRA). In one agreement with the City Council, the mayor would act

as lead agency for projects involving both entities. In the other agreement between the mayor and the zoning manager, the zoning manager would act as lead agency for actions involving both entities. As a result of the overlapping agreements, the zoning manager had acted as lead agency over the project.[7]

Corporate respondents submitted the first part of the Environmental Assessment Form (EAF), indicating that the project was consistent with community plans, and would have a small impact on the environmental area. Further, the zoning manager issued preliminary site plan findings where he noted the project was a Type I action under SEQRA, and issued a negative declaration, concluding that the project would not result in any significant adverse effects on the environment.[8] The project had also been submitted to the Monroe County Department of Planning and Development ("planning department") pursuant to General Municipal Law § 239-m.[9] During a public hearing, the CPC requested further information on the project, and corporate respondents revised the application to address their concerns. Under the special approval standard, the CPC conditionally approved the project so long as the concerns were addressed, and the zoning manager submitted a revised negative declaration.[10]

Procedural History

Petitioners commenced this Article 78 proceeding, seeking declaratory judgment in a complaint asserting four causes of action. First, petitioners sought to annul the zoning manager's negative declarations based on SEQRA violations. Second, they sought to annul the CPC's determination conditionally approving the project, arguing that the Code's special permit standard requirements were not satisfied. Third, petitioners sought to annul the CPC's determination based on allegations that the project violated terms of the 1957 deed. Finally, petitioners sought to annul the CPC's determination, alleging that the project violated General Municipal Law § 239-m when the revised application was not resubmitted to the planning department.[11] The trial court dismissed the petitioners' complaint in its entirety, and the petitioners appealed the decision.[12]

Issue

Whether the Supreme Court, Monroe County, properly dismissed petitioners' complaint in its entirety, pursuant to General Municipal Law § 239-m, the Code § 120-192, and CPLR Article 78.

Rationale

First, the Appellate Division held that this action is an Article 78 proceeding because the relief petitioners sought was available under Article 78 without the necessity of a declaration, since petitioners seek review of an administrative proceeding.[13] Under the first cause of action, petitioners contended that the overlapping agreements which established the zoning manager as lead agency were deficient. With respect to the project, the lead agency is the "involved agency principally responsible for undertaking, funding, or approving a project,"[14] while an involved agency has "jurisdiction by law to fund, approve, or directly undertake an action."[15] Here, the mayor's office was an involved agency with discretionary authority to approve the ordinance needed to obtain financing for the project, but did not identify itself as an involved agency. However, the court ruled that the mayor's office could have acted as lead agency based on the standing agreement with the City Council and its role in approving the financing for the project. Further, there was no dispute whether the zoning manager was an involved agency under the standing agreements, and the Appellate Division concluded that the zoning manager properly acted as lead agency under both standing agreements.[16]

With respect to the first cause of action, petitioners alleged that the zoning manager failed to comply with SEQRA requirements in issuing a negative declaration. The court held that based on the record, the zoning manager took the requisite hard look and provided a reasoned elaboration of the basis for her determination. She had properly considered mitigation measures to offset any traffic increase,[17] and properly relied on a soil study that concluded no indication of any metals or lead contamination on the premises.[18] With respect to the lead contamination, the court reasoned that this issue was never raised at any point during the administrative approval or SEQRA processes but was first raised in petitioners' reply papers submitted in the underlying proceeding.[19] Given these facts, the court did not consider the points raised by petitioners in the reply papers in determining whether the zoning manager took a hard look at lead contamination, but further reasoned that just because the zoning manager did not specifically evaluate "every possible permutation of how traffic may be affected by the project,"[20] does not mean a hard look was not taken. SEQRA analysis requires a rule of reason, and the court believed specifically evaluating every possible permutation would effectively abandon this rule of reason. With respect to the first action, the court held that the zoning manager "complied with the requirements of SEQRA in issuing the negative declaration" and an environmental impact statement was not required for this project, even with the Type I designation.[21]

The Appellate Division further held that the negative declaration was not conditioned on any changes of the project. As initially proposed, the application plainly indicated that the project might result in one of more significant environmental impacts. However, the court reasoned that it was equally as plain that neither the EAF nor the amended EAF contained any mitigation measures that the zoning manager required as a condition of issuing a negative declaration. Rather, the record disclosed the mitigation measures were adopted after the issuance of a negative declaration. Nothing in the record had indicated that the negative declaration was conditioned on any changes made to the project.[22]

In terms of the second cause of action, the court held that the CPC's use of the special permit standard was not arbitrary or capricious. The 1957 deed merely required that the CPC review and approve any plans or specifications for the project.[23] Pursuant to the Code § 120-192, the CPC came to its decision after conducting multiple hearings, reviewing comments and recommendations, and initially reserved decision based on concerns about the project.[24]

With respect to the third cause of action, the court held petitioners lacked standing as third-party beneficiaries under the 1957 deed. A binding agreement existed between the city and Plymouth's predecessors in interest, and petitioners failed to establish that the Cobb Hill Village tenants and surrounding neighbors were intended third-party beneficiaries to the agreement.[25]

With respect to the fourth and final cause of action, petitioners argued that General Municipal Code § 239-m was violated because the project was not resubmitted to the planning department after changes were made to the plans. The statute requires an agency to refer to approval of site plans "relating to real property located within 500 feet of 'the boundary of any existing or proposed county or state park' to a county 'planning agency' for a recommendation on the proposed action."[26] Here, the agency was not required under the statute to provide multiple referrals to the planning agency unless the revisions are "so substantially different from the original proposal [that] the county . . . should have the opportunity to review and make recommendations on the new and revised plans."[27] The court held that these revisions made to the project were not so substantially different that a second referral was necessary, and the trial court properly dismissed this action.[28]

Conclusion

The Appellate Division found that the Supreme Court, Monroe County properly dismissed all causes of action in petitioners' complaint. The trial court's decision was unanimously affirmed on all counts.[29] Under SEQRA, the zoning manager properly acted authority as lead agency and complied with SEQRA in issuing a negative declaration, which was not conditioned on any changes to the project. The use of the special permit standard was not arbitrary or capricious, and the petitioners lacked standing as third-party beneficiaries under the 1957 deed.

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Endnotes

1. *Coal. for Cobbs Hill by Pasecki v. City of Rochester,* 194 A.D.3d 1428, 149 N.Y.3d 400, 403 (4th Dep't 2021).
2. *Id.*
3. *Id.* at 404.
4. *Id.*
5. *Id.*
6. *Id.*
7. *Id.*
8. *Id.*
9. *Id.*
10. *Id.*
11. *Id.* at 405.
12. *Id.*
13. *Id.*
14. *Id.*
15. *Id.*
16. *Id.* at 406.
17. *Id.*
18. *Id.* at 407.
19. *Id.*
20. *Id.* at 406.
21. *Id.* at 407.
22. *Id.*
23. *Id.*
24. *Id.* at 408.
25. *Id.*
26. *Id.* at 409.
27. *Id.*
28. *Id.*
29. *Id.* at 403.

Evans v. City of Saratoga Springs, 2022 N.Y. Slip Op 01079, 2022 WL 479403 (3d Dep't 2022)

Facts

In 2015, the City of Saratoga Springs City Council ("council") adopted an update to the city of Saratoga Springs' ("city") comprehensive plan which revised the future use land map by identifying categories of land use akin to those found in an official zoning map.[1] The revisions in turn became proposed amendments to the city's official zoning map, one of which converted a parcel of land ("parcel 1") owned by Saratoga Hospital from an "Urban Residential-1" (UR-1) district to an "Office/Medical Business-2" (OMB-2) district.[2] UR-1 districts are mainly for single-family homes but allow other uses with a special use permit and site plan approval, whereas OMB-2 districts require site plan approval and are "primarily used for business and medical offices, medical clinics, parking facilities and other ancillary uses."[3]

Upon referrals from the council seeking "advisory opinions" on the revisions to the zoning map, the Saratoga County Planning Board gave unanimous approval, and the city's Planning Board unanimously affirmed compli-

ance with the comprehensive plan.[4] However, the city's Planning Board recommended that Parcel 1 be designated a district with "fewer permitted uses" than OMB-2.[5] The council subsequently performed an analysis pursuant to the State Environmental Quality Review Act (SEQRA) which resulted in a negative declaration, as the proposed amendments would "not have a significant adverse impact on the environment."[6] The council then approved the zoning map amendments, designating parcel 1 as an OMB-2 district.[7]

The petitioners, residents of Saratoga Springs, then commenced this action against the city and the council alleging several causes of action, three of which were addressed on appeal.[8] First, petitioners alleged SEQRA violations during the review of the zoning map amendment pertaining to parcel 1.[9] Second, petitioners alleged that the zoning map amendment related to parcel 1 conflicted with the comprehensive zoning plan and local zoning ordinances.[10] Finally, petitioners alleged that the council was biased in the amendment process, highlighting campaign contributions made to council members by representatives of Saratoga Hospital.[11]

Procedural History

Petitioners filed a combined proceeding pursuant to CPLR Article 78 and action for declaratory judgment in the Supreme Court in Saratoga County.[12] Respondents moved for summary judgment, submitting an answer denying petitioners' assertions and raising multiple affirmative defenses, to which petitioners replied with a cross motion for summary judgment.[13] The Supreme Court granted respondents' motion for summary judgment, denied the petitioners' cross motion for summary judgment, and dismissed the complaint.[14]

Issue

1. Whether the council complied with the requirements of SEQRA regarding review of the zoning map amendment pertaining to Parcel 1.
2. Whether the zoning map amendment pertaining to Parcel 1 conflicts with the comprehensive zoning plan and local zoning ordinances.
3. Whether there was bias in the amendment process due to council members receiving campaign contributions from representatives of Saratoga Hospital.

Rationale

To comply with SEQRA requirements, the lead agency must have "identified the pertinent areas of environmental concern, took a hard look at them and advanced a reasoned elaboration of the grounds for its determination."[15] "'Segmentation' of actions involving SEQRA is 'the division of the environmental review [. . .] such that various activities or stages are addressed . . . as though they were independent.'"[16] When the rezoning of an area amounts to the "first step" in the eventual development of that area, the agency is "obligated to consider the impacts to be expected from such future development at the time of rezoning, even absent a specific site plan for the project proposal."[17] As evidence of their allegation that the council violated SEQRA by failing "to take the requisite hard look and improperly segment[ing] the SEQRA review," petitioners provided FAQ pages from the Saratoga Hospital's 2015 development proposal, the negative declaration issued by the council pursuant to its SEQRA review, and a 2019 letter from Saratoga Hospital.[18] The provided FAQ pages outlined the hospital's plans to develop a three-story office building and 300 parking spaces on parcel 1.[19] The negative declaration included the council's refusal "to speculate and meaningfully evaluate potential environmental impacts of [a] hypothetical [h]ospital expansion," along with a stipulation that any proposed plans from the hospital would be subject to a later SEQRA review.[20] The 2019 letter from Saratoga Hospital informed its "neighbors" that it intended to pursue the plans outlined in its 2015 development proposal were the relevant zoning changes approved.[21] Upon review of the full environmental assessment form (EAF) provided by the respondents, the court found the sections of the EAF regarding "proposed and potential development" were incomplete.[22] The court accordingly found the council failed to comply with SEQRA requirements regarding review of the amendment to rezone parcel 1 as it "did not consider the potential development by Saratoga Hospital."[23]

"A municipality is free to alter its zoning regulations, but must do so in a manner that comports with its comprehensive plan."[24] A petitioner asserting a zoning determination to be improper "bears a heavy burden of demonstration, beyond a reasonable doubt, that the determination was arbitrary and unreasonable or otherwise unlawful."[25] Upon review of the comprehensive zoning plan provided by the respondents, the court found the future land use categories relevant to Parcel 1 were "core residential neighborhood" and "institutional."[26] The court then found the OMB-2 designation aligned with the "institutional" category as it "is meant to include areas 'that provide services such as [. . .] health.'"[27] Therefore, the court held the redistricting of parcel one from UR-1 to OMB-2 comported with the comprehensive zoning plan and in turn with the local zoning ordinances, and that the petitioners had not met their burden to prove the rezoning was arbitrary, unreasonable, or unlawful.[28]

Finally, while court conceded that council members' receipt of campaign contributions from representatives of Saratoga Hospital "may create an appearance of impropriety," it did "not find that it gave rise 'to an instance where a substantial conflict [is] inevitable.'"[29] The court further noted that the contributions violated neither the city's code of ethics nor the general municipal law, and the petitioners did not contend otherwise.[30]

Conclusion

The court affirmed in part and reversed in part. It reversed the part of the Supreme Court's judgment dismissing the cause of action concerning SEQRA violations as to parcel 1 and partially granted petitioners' cross motion for summary judgment to annul the council's SEQRA determination as to parcel 1, remitting the matter to the council for a full environmental review of the proposed development.[31] The court affirmed otherwise, finding the petitioners neither met their burden to prove the amendment as to parcel 1 conflicted with the comprehensive zoning plan or local zoning ordinances, nor established that the amendment process was tainted by any conflict of interest.[32]

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Endnotes

1. *Evans v. City of Saratoga Springs*, 2022 N.Y. Slip Op 01079, 2022 WL 479403, 1 (3d Dep't 2022).
2. *Id*.
3. *Id*.
4. *Id*.
5. *Id*.
6. *Id*.
7. *Id*.
8. *Id*. at 2.
9. *Id*.
10. *Id*.
11. *Id*. at 4.
12. *Id*. at 1.
13. *Id*.
14. *Id*.
15. *Id*. at 2 (quoting *Matter of Town of Waterford v. New York State Dept. of Envtl. Conservation*, 187 A.D.3d 1437, 1442, 134 N.Y.S.3d 545 (2020) (citations omitted); citing *Matter of Hart v. Town of Guilderland*, 196 A.D.3d 900, 903-04, 151 N.Y.S.3d 700 (2021)).
16. *Id*. (quoting 6 NYCRR § 617.2 (ah)(citations omitted)).
17. *Id*. at 3 (quoting *Matter of Defreestville Area Neighborhoods Ass'n. v. Town Bd. of Town of N. Greenbush*, 299 A.D.2d 631, 633-35, 750 N.Y.S.2d 164 (2002)).
18. *Id*.
19. *Id*.
20. *Id*.
21. *Id*.
22. *Id*. at 3.
23. *Id*.
24. *Id*. (quoting *Matter of Wir Assoc., LLC v. Town of Mamakating*, 157 A.D.3d 1040, 1042-43, 69 N.Y.S.3d 130 (2018) (citations omitted); citing *Matter of Troy Sand & Gravel Co. v. Town of Sand Lake*, 185 A.D.3d 1306, 1309, 128 N.Y.S.3d 677 (2020), *lv. denied* 36 N.Y.3d 913, 2021 WL 1807023 (2021)) .
25. *Id*. (quoting *Matter of Birchwood Neighborhood Ass'n. v. Plan. Bd. of the Town of Colonie*, 112 A.D.3d 1184, 1185, 977 N.Y.S.2d 454 (2013) (internal quotation marks and citations omitted); citing *Matter of Troy Sand & Gravel Co. v. Town of Sand Lake*, 185 A.D.3d at 1309, 128 N.Y.S.3d 677).
26. *Id*. at 4.
27. *Id*.
28. *Id*.
29. *Id*. (quoting *Matter of Town of Mamakating v. Village of Bloomingburg*, 174 A.D.3d 1175, 1179, 105 N.Y.S.3d 611 (2019)).
30. *Id*.
31. *Id*. at 3.
32. *Id*. at 4.

Gabe Realty Corp. v. City of White Plains Urban Renewal, 195 A.D.3d 1020, 151 N.Y.S.3d 143 (2d Dep't 2021)

Facts

On December 5th, 2019, Respondent City of White Plains Urban Renewal Agency ("agency") adopted a resolution approving the condemnation of certain real property in a designated urban renewal area.[1] The agency identified urban blight as the cause for exercising the power of eminent domain and issued a negative declaration under the State Environmental Quality Review Act (SEQRA), indicating that the proposed condemnation and resulting plans would not have a significant adverse environmental impact. Petitioners owned some of the parcels in the area to be condemned and challenged the action.

Procedural History

Petitioners seek review of the agency's determination to acquire their properties by eminent domain.[2]

Issue

Was there a conceivable public purpose that justified the agency's decision to condemn the real properties within the urban renewal area?

Rationale

To justify the use of eminent domain a city must demonstrate findings regarding the public use, benefit or purpose of the project, and the general effect on the environment and nearby residents, in addition to other relevant factors.[3] This is required to show that the taking will serve a valid public use or purpose, which will provide "a public benefit, utility or advantage or otherwise contribute to the health, safety, general welfare or convenience, or prosperity of the community."[4] The agency relied upon its declaration of urban blight as the basis for condemnation. However, as the court noted, the urban blight determination was based on a 25-year-old urban renewal plan, which the court found to lack sufficient detail and documentation.[5]

Furthermore, the agency did not demonstrate the presence of substandard conditions that would justify blight as a cause for condemnation.

The agency also failed to identify a public purpose or benefit that would be served through the use of eminent domain, which is essential given that "a mere potential future public benefit is not sufficient to satisfy the requirement that property be taken only for public benefit."[6] The court leaned on reasoning from the federal Court of Appeals for the Seventh Circuit, stating that an intended public use must be identified at the time of taking, otherwise the public use requirement would be rendered meaningless.[7]

Additionally, the court found the agency's SEQRA Environmental Assessment Form to be incomprehensive. The agency did not provide a full account of the areas of environmental concern, and thereby did not satisfy the requirement to "take a hard look" at them.[8] The unsatisfactory SEQRA review provides the grounds to annul the resolution that approved the condemnation of plaintiff's property.[9]

Conclusion

The Appellate Division held that the agency did not adequately justify the use of eminent domain to condemn petitioner's property because there was not sufficient evidence to support the finding of community blight, nor was there a specific public use identified for the condemned area, and the agency failed to take a hard look at the environmental consequences from the action.[10]

This holding appears to diverge from the seminal cases of *Kelo v. City of New London* and *Berman v. Parker*.[11] In *Kelo*, the Supreme Court found that there was a valid cause for the use of eminent domain despite that the public use justification of economic development was relatively vague.[12] The Supreme Court determined that it is not within the responsibilities of the judicial branch to second guess the municipality in determining what lands need to be acquired, or whether the purported public use will be served. They further clarified that the term "public use" was interpreted to appeal to a broad notion of public purpose, such that public accessibility to the condemned area is not strictly required. In *Berman*, the Supreme Court upheld the use of eminent domain to acquire a department store that was located in a targeted blighted area but was not itself a blighted property.[13] The *Berman* Court upheld the action by deferring to the redevelopment plan, rather than evaluating the public use of any particular property on piecemeal basis. The present case may give rise to new considerations with respect to the justifiable use of eminent domain.

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Endnotes

1. *Gabe Realty Corp v. City of White Plains Urban Renewal,* 195 A.D 3d 1020, 1021, 151 N.Y.S.3d 143 (2d Dep't 2021).
2. *Id.*
3. *Id.*
4. *Id.*
5. *Id.* at 1022.
6. *Id.* at 1023.
7. *Id.*
8. *Id.*
9. *Id.*
10. *Id.* at 1022-23.
11. 545 U.S. 469 (2005); 348 U.S. 26 (1954).
12. *See Kelo v. City of New London,* 545 U.S. 469 (2005).
13. *See Berman v. Parker*, 348 U.S. 26 (1954).

Waterwatch of Oregon v. Water Resources Department, 501 P.3d 507 (Or. 2021)

Introduction and Legal Background

Oregon has, since 1909, been increasingly influenced by the Prior Appropriation Doctrine.[1] Under this doctrine property owners who are the first to put water to beneficial use obtain thereby water rights.[2] Since 1909 water right holders have had to put their rights to some form of "beneficial use" without halt for longer than five years.[3] Failure to do so would result in forfeitures of the rights and reappropriation by the state.[4] This incentivized water rights owners to divert water from natural streams causing ecological degradation.[5] Oregon thus came up with the concept of the "in-stream" right, a water right whereby holders could retain their water holdings even as they did not divert water.[6] Oregon, moreover, developed a leasing scheme so that water right holders could lease some or all of their water to others for conversion to in-stream water rights.[7]

Lastly, Oregon has had a history of hydroelectric power generation for which special hydroelectric water rights were issued.[8] Reexamination of the state's ailing hydro industry in the 1990s led to the development of laws targeting hydroelectric water rights and specifically the one at issue in this case whereby such rights would be subject to conversion to in-stream rights 5 years after "use . . . under a hydroelectric water right ceases."[9]

Facts

The Rock Creek Project, a hydroelectric dam, was completed in 1905.[10] Its certificate of hydroelectric water rights was obtained in 1923.[11] Throughout the 20th century ownership of the dam, and its rights, switched hands multiple times ending with the Oregon Trail Electric Cooperative (OTEC) in 1988.[12] In 1995 OTEC shut down operations at the hydroelectric plant.[13] Then between 2000 and 2020, OTEC on various occasions leased its water rights to vari-

ous parties for in-stream use (i.e., not diverting water but restricting its use to within the stream), never with more than five years in between leases, but also never restarting the hydroelectric plant.[14] The last entity to lease the rights was Warm Springs Hydro LLC ("Warm Springs").[15] The environmental group Waterwatch of Oregon eventually grew concerned that Warm Springs intended to use its lease to reactivate the hydroelectric plant and thus began by petitioning Oregon's Water Resources Department (WRD) to compel conversion process as stipulated by statute.[16] WRD didn't act on the petition and it was deemed denied.[17]

Procedural History

Waterwatch thus petitioned a trial court for review of WRD actions and to compel conversion.[18] Warm Springs intervened on behalf of WRD (the "respondents") and the parties filed cross motions of summary judgement.[19] The trial court held that any beneficial use by Warm Springs restarted the five-year clock and thus granted summary judgment to WRD.[20] When Waterwatch appealed the higher court affirmed, interpreting "use of water under a hydroelectric water right" to mean any beneficial use.[21] Waterwatch appealed to the Oregon Supreme Court.

Issue

Did the trial and appellate courts err in holding that "use" under a hydroelectric water right could qualify as any beneficial use?

Rationale

The Supreme Court began by considering the language of the conversion statute: "Five years after the use of water under a hydroelectric water right ceases . . . the hydroelectric project shall be converted to an in-stream water right."[22] The court drew attention to three considerations: what "use" means, what "under" a hydroelectric water right means and what "cease" means.[23]

The court pointed out that related statutes as well as the common law background show that Oregon jurisprudence has been concerned with specific uses in assigning water rights.[24] While it certainly was, and remains, possible for water rights to have multiple uses, for this to be the case would require language in the plural when describing water "rights".[25] The Oregon Legislature declined to use such language describing the water "right" associated with a hydro project.[26] Consequently the court was forced to conclude the water right contemplated by the Oregon Legislature was for the sole purpose of creating hydroelectric power and did not encompass other beneficial uses.[27]

Next the court considered the meaning of the term "under."[28] This is defined as "required by," or "in accordance with," "bound by," etc. Use under a hydroelectric water right thus means use in accordance with that right.[29] Respondents' argued that if the Legislature had desired only hydroelectric use the statute would have read "hydroelectric use under a hydroelectric water right."[30] The court found this need for legislative explicitness unpersuasive.[31] Respondents also attempted to argue that a similar statute was instructive; it specified that water rights not exercised under *any* beneficial use for a period of five years or more would be forfeited to the state.[32] The court rejected this argument because that statute was written as part of the state's prior appropriation doctrine and involved the broader topic of water use generally while the statute at issue here involved the more specific topic of hydroelectric power.[33]

Finally, the court considered the meaning of the term "cease."[34] The court ultimately sided with Warm Springs' definition of this word namely "to come to an end;" "break off or taper off to a stop;" "to give over or bring to an end an activity or action."[35] While all these definitions suggest a degree of permanence not merely a pause, the court noted that the statute's five-year deadline specifically offers a means of determining when a break was permanent: anytime a hydroelectric water right isn't exercised for hydroelectric use for longer than five years it was sufficiently permanent to have ceased.[36] Waterwatch's definition would have the hydroelectric water use cease five years after the plant's owners decided to end operations, a definition the court rejected.[37]

A second related statute at issue was that by which OTEC had leased its hydroelectric rights to Warm Springs in the first place.[38] The statute reads "'any person' may acquire by purchase, lease, or gift, all or part of an existing water right 'for conversion to an in-stream water right.'"[39] Furthermore "a person with an existing water right may lease that right to another for 'use as an in-stream water right for a specified period of time'" not to exceed five years.[40] Respondents propose firstly that these two clauses describe different scenarios and secondly that the present situation falls into the second category and therefore that while the water rights in question were used for in-stream purposes this qualifies as the beneficial use necessary to set the clock back.[41] The court rejected this argument, holding that the two clauses describe the same kind of transaction from the lessor and lessee perspectives.[42] Consequently if the water rights were leased at all, it was for the purpose of conversion to in-stream water rights.[43]

Conclusion

The court held that the hydroelectric use had ceased in 1995 and that in 2000 the hydroelectric water rights had thus become subject to conversion.[44] The periodic leases were not beneficial uses as contemplated by the statute.[45] The decisions of the trial and appellate courts were thus reversed, and the case remanded for further proceedings.[46]

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Endnotes

1. *Waterwatch of Oregon v. Water Resources Department*, 501 P.3d 507, 510 (Or. 2021).
2. *Id.*
3. *Id.*
4. *Id.*
5. *Id.*
6. *Id.* at 511.
7. *Id.*
8. *Id.* at 511-12.
9. *Id.* at 512.
10. *Id.* at 513.
11. *Id.*
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14. *Id.*
15. *Id.*
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19. *Id.* at 514.
20. *Id.*
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22. *Id.*
23. *Id.*
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25. *Id.*
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29. *Id.*
30. *Id.*
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33. *Id.*
34. *Id.* at 517.
35. *Id.*
36. *Id.* at 518.
37. *Id.*
38. *Id.*
39. *Id.* at 519.
40. *Id.*
41. *Id.*
42. *Id.*
43. *Id.*
44. *Id.* at 520.
45. *Id.*
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Hart v. Town of Guilderland, 196 A.D.3d 900, 151 N.Y.S.3d 700 (3d Dep't 2021)

Facts

The Town of Guilderland (the "town"), the Zoning Board of Appeals of the Town of Guilderland ("Zoning Board"), The Planning Board of the Town of Guilderland (the "Planning Board"), Rapp Road Development, LLC (RRD), Pyramid Management Group, LLC ("Pyramid"), and Crossgates Releaseco, LLC ("Releaseco") appealed a trial court judgement in favor of the petitioners, a group of Guilderland residents, and business and property owners (the "petitioners"). RRD, Pyramid, and Releaseco were involved in the creation of a neighborhood plan for an area that the town had reserved for mixed-use residential and commercial development.[1] More specifically, RRD applied to the town to construct a residential development on a tract of land owned by Releaseco. This development would contain two five-story and three two-story buildings, totaling 4,300 square feet of commercial space and 222 apartment units.[2] Pursuant to the State Environmental Quality Review Act (SEQRA), RRD submitted part 1 of its environmental assessment form (EAF) in November of 2018.[3] The Planning Board declared itself to be the lead agency to review RRD's application under SEQRA in July of 2019.[4] As RRD's proposed activities, when combined with development of other adjacent properties by Pyramid and Releaseco, may have negative effects on the environment, the Planning Board required an environmental impact statement (EIS).[5] Public scoping for a draft EIS was initiated, with a final scoping outline decided soon after in October of 2019.[6] In November of 2019, Releaseco applied for, and received, a special use permit for one of the development sites at issue.[7] Pyramid and Releaseco submitted a draft EIS in January of 2020, which was accepted by the Planning Board the next month.[8] After a May 2020 public hearing, which included receipt of 600 written comments, a final EIS was submitted in July of 2020.[9] The Planning Board issued a findings statement in August of 2020, which authorized the project.[10] It is noteworthy that in June of 2018, the town adopted Local Law No. 4, which created a Transit Oriented Development District incentivizing development that adequately protects nearby residential neighborhoods.[11]

In September of 2020, petitioners commenced an action under CPLR Article 78 seeking declaratory judgement to annul the Planning Board's adoption of the August 2020 findings as "arbitrary and capricious."[12] After an October 2020 Planning Board approval of the residential development, petitioners amended their complaint to also include court review of this approval.[13] The Supreme Court granted this amended petition, finding that the board procedurally and substantially violated SEQRA.[14] The Planning Board's acceptance of the EIS and plan approvals were

held to be arbitrary and capricious, and therefore null and void.[15] The respondents then appealed.[16]

Procedural History

The respondents are appealing the decision of the Supreme Court, Albany County, which granted an amended petition annulling the necessary authorizations by the Planning Board of the Town of Guilderland for a residential development plan.

Issue

Did the Supreme Court use the correct standards when annulling the authorizations of the Planning Board?

Rationale

The Appellate Division, Third Department addressed the findings of the trial court individually, analyzing each for legal accuracy in the standards applied.

The Third Department disagreed with the trial court's ruling that petitioners may challenge the Planning Board declaring itself as lead agency. The court determined that this finding was inaccurate, as a challenge to lead agency status may only be commenced by another involved agency, and no petitioner meets this standard.[17]

The Third Department also ruled that the Planning Board took the requisite "hard look" at the potential impacts of the proposed development to avian populations. This court argued that the trial court's finding that the Planning Board failed this requirement of SEQRA review was also inaccurate. To meet the requirement under the SEQRA of a "hard look," a lead agency must analyze the environmental impacts and any unavoidable adverse environmental effects of the project under review, identifying those areas of concern, taking a hard look at them, and providing reasoned elaboration of the basis for the determination.[18] While literal compliance is required and substantial compliance will not be enough, SEQRA is satisfied even if not every conceivable economic impact, mitigating measure, or alternative is identified and addressed.[19] Ultimately, it is not the court's place to intervene in agency decisions unless the findings are arbitrary, capricious, or unsupported by the evidence.[20] Under this standard, the Planning Board's involvement of the DEC to acquire information on potential avian species of special concern in the use area, combined with the board's use of an environmental consultant to perform long-term studies over three years to confirm no such species of special concern were present, satisfied the requirements of a "hard look."[21]

The Third Department also rejected the trial court's ruling that the Planning Board failed to examine visual impacts from the project on the neighboring historic district and did not perform a viewshed analysis. The court pointed out that in this case, the Planning Board had addressed the historic district in the draft EIS, noting a 200-foot wide perimeter buffer would provide a visual buffer with the historic district, and the closest house would be 975 feet away.[22] In light of community concerns over traffic, the final EIS prompted a historic preservation officer with Parks and Recreation and Historic Preservation to confirm the reasonableness of the Planning Board's findings.[23] Without reason to find this arbitrary, capricious, or unsupported by evidence, the trial court should not have intervened, and the Planning Board's finding should be treated as valid.[24]

The Third Department also rejected petitioner's argument that the Planning Board's project is incompatible with Local Law No. 4 and community character. The court argued first, that the granting of a special use permit serves as a legislative finding that the use is in harmony with the zoning plan and health of the community.[25] Additionally, even treating the grant of a special use permit as non-dispositive, the overall goals of the transit district can be in harmony with this construction.[26] The transit district permits a wide-range of uses, and includes a special permit process for certain commercial uses that may not otherwise be in compliance.[27] The impact of the construction must be viewed holistically, as a balance between uses and the impact of the project on zoning goals. More importantly, just because a proposed use may not be the most obvious use or the best fit, the role of the court is not to try to optimize use, but merely to ensure the justifications for the proposed use are not arbitrary, capricious, or unsupported by evidence.[28] Since those standards do not appear to be met, the use should be viewed as compatible.

Finally, the Third Department rejected the argument that the Planning Board failed to consider reduced scale alternatives to the 222 apartment units and did not consider a residential alternative to the Costco store. In order to comply with SEQRA and other applicable regulations, a lead agency must explore alternatives to the proposed action, including a no-action alternative.[29] The draft EIS must include a description and evaluation of the feasible reasonable alternatives, and the no action alternative should consider what changes the site is likely to undergo without the proposed action.[30] While the final EIS must discuss all reasonable alternatives to the proposed action, a lead agency is not required to engage in an exhaustive analysis of every conceivable alternative to the proposal.[31] The written findings must certify that the action will avoid or minimize adverse environmental impacts to the maximum extent practicable.[32] The Third Department concluded that is not the role of the courts to weigh the desirability of a given action or its alternatives, as the lead agency is given wide latitude in choosing between alternative measures.[33] The court further argued that these alternatives must align with the business objectives of the developer, and need not be considered when they would reduce a project to the point where it can no longer serve its intended function.[34] In this case, the proposed residential uses are the only permitted uses in that part of the transit district.[35] On the issues of building height and alternate building uses, the draft EIS lists alternative uses and reasons for the rejection of those alternative uses.[36] Just because another group may disagree with rejecting these alternatives, it does not make

the rejection inherently unreasonable.[37] As such, there is no evidence that the Planning Board failed to take a hard look on these issues, and the finding should stand.[38]

Conclusion

Since the findings used by the Supreme Court to support its holding in favor of the petitioners do not stand up to legal analysis, there is no evidence that the authorizations of the Planning Board are arbitrary and capricious.[39] Thus, the court reversed the decision of the trial court, and dismissed the petition.[40]

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Endnotes

1. *Hart v. Town of Guilderland*, 196 A.D.3d 900, 151 N.Y.S.3d 700 (3d Dep't 2021).
2. *Id.* at 901.
3. *Id.*
4. *Id.*
5. *Id.*
6. *Id.*
7. *Id.* at 902.
8. *Id.*
9. *Id.*
10. *Id.*
11. *Id.* at 900.
12. *Id.* at 902.
13. *Id.*
14. *Id.*
15. *Id.*
16. *Id.*
17. *Id.* at 902-03.
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30. *Id.*
31. *Id.* at 909-10.
32. *Id.* at 910.
33. *Id.*
34. *Id.* at 910-12.
35. *Id.* at 911.
36. *Id.* at 911-12.
37. *Id.* at 910.
38. *Id.* at 913.
39. *Id.* at 913-14.
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PSC, LLC v. City of Albany Industrial Development Agency, 200 A.D.3d 1282, 158 N.Y.S.3d 379 (3d Dep't 2021)

Facts

During August 1988, the predecessors of property owner, PSC LLC ("petitioner"), entered into a lease agreement for 10 of their properties "for parking and other lawful purposes."[1] The lease was later transferred to respondent, Liberty Square Development, LLC; a subsidiary of Capitalize Albany Corporation ("Capitalize Albany").[2] Capitalize Albany is a municipal corporation that works to economically develop the City of Albany. Capitalize Albany received a grant of over $10 million to obtain real estate across eight acres of land in Albany, in the area known as Liberty Square.[3] They planned to redevelop the area, which they described as "blighted and underutilized."[4] Capitalize Albany was able to purchase all of the property needed for the redevelopment project in Liberty Square, except for less than an acre of land owned by petitioner.[5]

Capitalize Albany submitted an application to respondent City of Albany Industrial Development Agency (the "agency") requesting that the agency acquire the properties using its power of eminent domain.[6] The agency held a public hearing via Zoom, where it heard public comments, including those of petitioner's counsel. In January of 2021, the agency approved the use of eminent domain to obtain the properties for the respondents. It issued a determination and findings resolution, and a negative declaration pursuant to the State Environmental Quality Review Act (SEQRA) in support of the decision.[7] Petitioner then commenced this proceeding to challenge the agency's determination.

Procedural History

Petitioner brought this claim before the Supreme Court, Appellate Division, Third Department of New York, challenging the condemnation action initiated by the agency to acquire petitioner's properties in Liberty Square for Capitalize Albany.

Issue

Whether the agency properly used its power of eminent domain to acquire the properties Capitalize Albany and its subsidiaries needed to redevelop the area.

Rationale

The petitioners first argued that there were several procedural errors that should necessitate the annulment of the determination by the court. They claimed that the agency: (1) relied on additional evidence, a short environmental assessment form (EAF), after closing the public hearing; (2) improperly closed the public hearing before issuing a SEQRA determination; and (3) that the hearing was conducted in violation of the Public Officers Law and Executive Order 202.1 because it took place on Zoom, and did not provide an adequate way for the public to view or listen to the meeting."[8] Petitioner challenged the determination, and thus had the burden of proving these violations.[9]

The Third Department ruled in favor of the agency on all counts. First, it noted that the EAF was submitted as part of the initial application to the agency, which was before the Zoom hearing.[10] Second, the court ruled that there is no statutory requirement that SEQRA determinations be made in advance of a public hearing.[11] The court determined it was proper for the SEQRA determination to be fully made once the final project was approved.[12] Lastly, the court argued that, due to the COVID-19 pandemic, the agency was permitted to hold a public hearing over Zoom, so long as these meetings were open to the public and were recorded and transcribed, as was done in this case.[13]

Next, petitioner asserted that the taking was excessive and unnecessary.[14] They claimed that there was no evidence that the properties were in a state of blight or disrepair, and argued that the taking of petitioner's remaining land was unnecessary to develop the remaining acres already owned by Liberty Square.[15] The court pointed out that the area had been assessed by Capitalize Albany in the "Concept Plan Report" ("report") submitted with its application to the agency, which showed that the area was, in fact, in a state of disrepair.[16] The report included a fourteen year review of the area using Google Earth, which showed that only 6% to 31% of the land area was actively utilized.[17] Regarding whether condemnation of the remaining area was necessary, the court noted evidence brought by respondent showing that there was economic potential for this area, but no "legitimate" proposals were received because of the difficulty in negotiating without "full site control."[18] Maps were also presented that showed how the properties in question were centrally located to City Albany's development plans.[19] The court concluded that the agency determination that redevelopment of the property would be economically beneficial to the area was a proper public use for its exercise of eminent domain.

Conclusion

The Third Department confirmed the agency determination, holding that it properly used its power of eminent domain to acquire the remaining .88 acre of petitioner's land for Capitalize Albany and Liberty Square.[20]

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Endnotes

1. *PSC, LLC v. City of Albany Industrial Development Agency*, 200 A.D.3d 1282, 158 N.Y.S.3d 379 (3d Dep't 2021).
2. *Id.*
3. *Id.*
4. *Id.*
5. *Id.* at 1282.
6. *Id.* at 1282.
7. *Id.* at 1282.
8. *Id.* at 1283.
9. *Id.*
10. *Id.* at 1283.
11. *Id.* at 1283.
12. *Id.* at 1283.
13. *Id.* at 1283-84.
14. *Id.* at 1284.
15. *Id.* at 1284.
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17. *Id.* at 1285.
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19. *Id.* at 1286.
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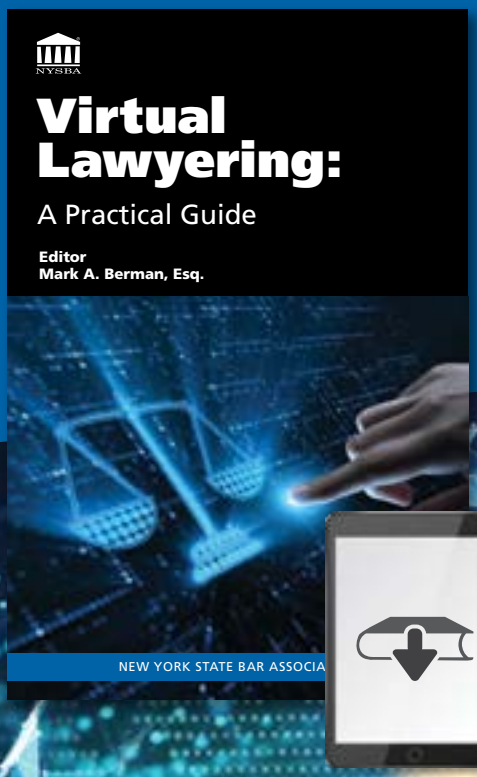

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