ENERGY LAW JOURNAL

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The Chilean Case on Improving Power Transmission Within the Non-Conventional Renewable Energies Paradigm . . . . . *Sebastián Luengo Troncoso*

Energy Equity: A Framework for Evaluating Solar Programs Targeting Low-Income Communities . . . . . *Priya Patel*

TRANSCRIPTS

The Energy Law Journal & Energy Bar Association's September 22, 2022, Online Symposium: "Managing Energy Security Imperatives and Climate Aspirations In An Era of Global Conflict"

BOOK REVIEWS

The Coal Trap: A Broadside against West Virginia Energy Politics and Economics . . . . . *Reviewed by Kenneth A. Barry*

The Wolfberry Chronicle Charts the Rise of a Small Texas Oil Company from Slim Pickings to the Jackpot . . . . . *Reviewed by Kenneth A. Barry*

How the World Really Works: The Science Behind How We Got Here and Where We're Going. . . . . *Reviewed by Mosby G Perrow IV*

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PennEast Pipeline Co. v. New Jersey: Right of Private Corporation to Take State Land Upheld Under the Natural Gas Act. . . . . *Emory Fullington*

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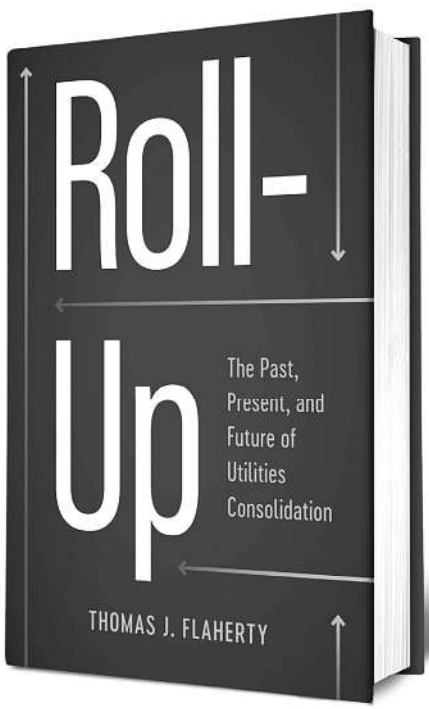

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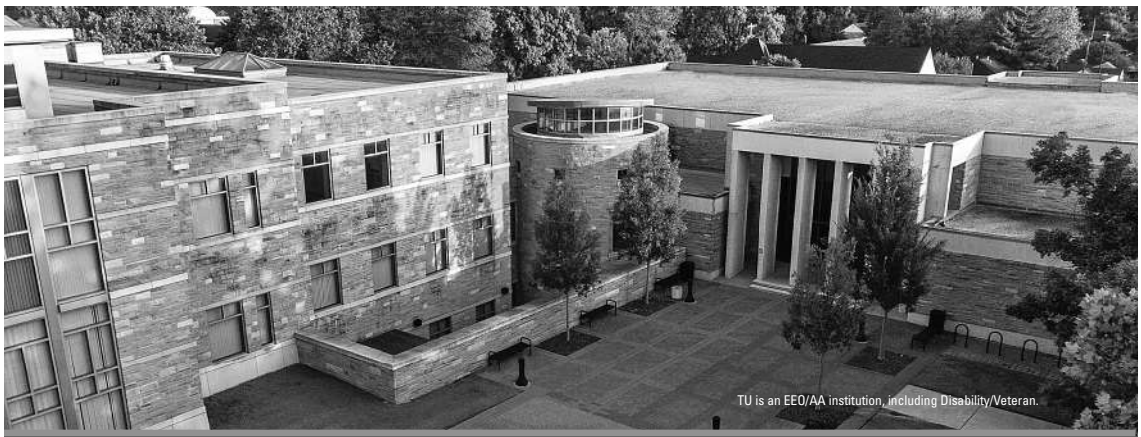

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The *Energy Law Journal* publishes legal, policy, and economic articles and other materials of lasting interest with significant research value on subjects dealing with the energy industries. The *Energy Law Journal* also welcomes articles and other materials on emerging issues and significant developments affecting the energy industries. Articles by members and non-members of the Energy Bar Association are welcomed. The *Journal* publishes articles and other materials of varying length that provide a full consideration of the issues and opposing viewpoints. The opinions expressed in the published materials are those of the writers and are not intended as expressions of the views of the Energy Bar Association. All submissions must contain a synopsis, table of contents, and a brief biographical statement about the author(s). Style and form of citations must be in conformity with the "Blue Book," as well as the *Energy Law Journal* Style Manual posted on the Energy Bar Association website. All submissions should be sent to Harvey L. Reiter, Editor-in-Chief, *Energy Law Journal*, by mail to Stinson LLP, 1775 Pennsylvania Ave., N.W., Suite 800, Washington, D.C. 20006 or electronically to harvey.reiter@stinson.com. By submitting materials for publication in the *Energy Law Journal*, authors agree that any such materials, including articles, notes, book reviews, and committee reports, published in the *Journal* are considered "works made for hire," and authors assign all rights in and to those written works to the Energy Bar Association. The Energy Bar Association hereby grants permission for reproduction and distribution of copies of written works herein for non-commercial use, provided that: (1) copies are distributed at or below cost; (2) the notice of copyright is included on each copy (); and (3) the *Energy Law Journal* and the author are clearly identified on each copy. The *Journal* is free to all members of the Energy Bar Association. Subscriptions for non-members are $35.00 per year for domestic subscriptions, $41.00 per year for Canadian subscriptions, and $60.00 per year for foreign subscriptions. Back issues are available by contacting the William S. Hein & Co. at (800) 828-7571.

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COMMITTEE REPORTS

Neither the reports of the Energy Bar Association Committees nor the annual review of the Canadian energy law developments are included in the print version of the Journal. Rather they are published online on the EBA's website at www.felj.org. Persons citing to the reports should use the following format: [Title of Report], 43 Energy L.J. [page number] Online (2022), [link to report]. Included in the full electronic version of the Energy Law Journal, Volume 43, No. 2, are the following reports:

Canadian Chapter Review

Electricity

Finance, Transactions and Investments

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And we gratefully acknowledge those EBA members and others who have so generously contributed in the past.

ENERGY LAW JOURNAL

The Energy Bar Association is an international, non-profit association. Founded in 1946 as the Federal Power Bar Association, the Association currently has approximately 2000 members. The Association's voluntary membership is comprised of government, corporate, and private attorneys, as well as energy professionals from across the globe, and includes law students interested in energy law. The mission of the Association is to promote the professional excellence and ethical integrity of its members in the practice, administration, and development of energy laws, regulations, and policies. In addition to publishing the *Energy Law Journal*, the Association organizes and sponsors a number of activities, including two national conferences a year, and numerous continuing legal education (CLE) programs each year. The Association also sponsors eight formal chapters in the United States and Canada and committees that monitor and report to the membership on developments of interest. Complete membership and subscription information can be obtained from the Association at 2000 M Street, NW, Suite 715, Washington, DC 20036, or by contacting us at (202) 223-5625 or by visiting EBA-Net.org.

Twice a year, the *Energy Law Journal* publishes legal, policy, and economic articles and other materials of lasting interest with significant research value on subjects dealing with the energy industries. The Journal also welcomes articles and other materials on emerging issues and significant developments affecting the energy industries. Articles by members and non-members of the Association are welcomed. The Journal publishes articles and other materials of varying length that provide a full consideration of the issues and opposing viewpoints. All submissions must contain a synopsis, table of contents, and brief biographical statement about the author(s). Style and form of citations must be in conformity with the "Bluebook," as well as the *Energy Law Journal* Style Manual posted on the Energy Bar Association website. All submissions should be sent to Harvey L. Reiter, Editor-in-Chief, *Energy Law Journal*, by mail to Stinson LLP, 1775 Pennsylvania Ave., N.W., Suite 800, Washington, D.C. 20006 or electronically to harvey.reiter@stinson.com. The opinions expressed in the published materials are those of the writers and are not intended as expressions of the views of the Energy Bar Association. Inquiries about advertising in the Journal should be addressed to Michele Smith at the Energy Bar Association at (202) 223-5625. The Journal is indexed in the INDEX TO LEGAL PERIODICALS, the CURRENT LAW INDEX, WESTLAW, and LEXIS SERVICES.

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DIVERSITY AND INCLUSION POLICY

The Energy Bar Association (EBA), the Charitable Foundation of the Energy Bar Association (CFEBA), and the Foundation of the Energy Law Journal (FELJ) are committed to the goals of fostering an inclusive and diverse membership and increasing diversity across all levels of the Associations. Attorneys, energy professionals and students with varied and diverse characteristics practicing in the energy field are welcome to join our ranks, regardless of race, creed, color, ethnicity, Native American, Alaska, or Hawaiian Native tribal membership or descendance, gender (including gender identity or expression), sexual orientation, family and marital status (including pregnancy), family responsibilities, religion, national origin, age, personal appearance, political affiliation, veterans status, disability, source of income (government, solo, corporate, firm practice), or place of residence or business (geographic diversity) and are encouraged to become active participants in the Associations' activities.

PRESIDENT'S MESSAGE

Climate change is motivating the U.S. energy industry to continue to reduce greenhouse gas emissions, while simultaneously ensuring the reliability, resilience, and security of the on-demand services that customers have come to expect. At the same time, these companies and load-serving entities must maintain financial stability and focus on customer equity and affordability.

States and local governments have long led the way by adopting laws and policies on climate change, renewable energy, and energy efficiency. Federal policy now will be instrumental in driving investments in energy infrastructure that will be required to accelerate the transition of the U.S. energy supply. Two recently passed laws, the November 2021, *Infrastructure Investment and Jobs Act* and the August 2022, *Inflation Reduction Act*, the most comprehensive climate-related legislation in U.S. history, are poised to hasten the transition to a cleaner energy future, if spent effectively.

The IRA alone rises to the challenge of climate change by encouraging, *inter alia*, the adoption of clean energy alternatives through positive reinforcement of climate-wise choices, e.g., tax credits, investment incentives, consumer rebates, and the allocation of billions of dollars for communities based on environmental justice-related criteria. As the United States takes bold steps to achieve its GHG reduction goals, the administration and many utilities have made clear that environmental justice and equity must be pillars of a customer-focused clean energy transition.

In this issue of the Energy Law Journal, there is an article by Priya Patel entitled "Energy Equity: A Framework for Evaluating Solar Programs Targeting Low-Income Communities." In it, she examines the concepts of "energy burden" and "energy equity" when implementing solar programs that have an impact on low-income communities. She offers an energy equity framework to analyze the effectiveness of certain solar programs. Improving equity requires intentionally designed policies and programs. I believe this energy equity framework Priya offers can be extrapolated to other customer programs as we transition to clean energy.

In "The Chilean Case on Improving Power Transmission Within the Non-Conventional Renewable Energies Paradigm," author Sebastián Luengo Troncoso provides readers lessons learned from Chile, as it improved its transmission system to accommodate increasing renewables. It is clear from this article that Chile has been taking climate change and the transition away from fossil fuels seriously. The key here was the support of the regulatory framework.

This edition wraps up with the symposium transcript entitled "Managing Energy Security Imperatives and Climate Aspirations in an Era of Global Conflict." The panel Gillian Giannetti, Patrick Nevins, and András Simonyi, moderated by Bob Gee, discussed how the Russian invasion of Ukraine has created uncertainty in global markets, including that of energy supply and affordability. The panelists had a healthy discussion about the dual energy and climate security concerns. I believe it will become increasingly clearer that addressing climate change as quickly as practicable, taking reliability into account, are more closely than ever linked to energy security.

I want to thank the Journal's leadership and its volunteers for putting together another quality edition for us – the faithful Journal readers. I also want to thank

the University of Tulsa College of Law, the faculty advisor and student editors there, for your continued dedication and hard work. You all are fantastic!

Sincerely,

/s/ Delia D. Patterson
Delia D. Patterson
President, Energy Bar Association

EDITOR IN CHIEF'S PAGE

Uneventful. That is not the word I'd use to describe the six months since the publication of the spring edition of the Journal. On the contrary, nearly every day brought its own major headline. So I thought I'd provide a recap organized by categories as part of my semiannual time capsule. And if I've been successful, this will all tie back – admittedly loosely – to the work of the Journal.

Big legislation

A major piece of legislation that will affect energy regulators and energy law practitioners became law since our last edition – the Inflation Reduction Act (IRA). Coupled with the Infrastructure Investment and Jobs Act passed last November, the two laws encompass sweeping provisions intended to spur the deployment of renewable energy technologies and infrastructure.

Clients of EBA members, EBA members, regulators and policymakers will have a lot to digest about how the IRA will work and how it will affect the energy sector. And it is not a wild guess to suggest that issues surrounding implementation of the IRA will become material for future articles in this Journal.

Climate Change

"Five 1,000-year rain events hit the U.S. in five weeks." That was the headline of an August 26, 2022 Washington Post article by DC area meteorologist Matthew Cappucci. The 16 inches of rain that fell on the Dallas area in mid-August, he wrote, "join[ed] the company of 1,000 year rain events that . . . struck Kentucky, St. Louis, eastern Illinois and Death Valley, California" in the prior three weeks. All of these extreme weather events occurred in areas that were "experiencing abnormally dry conditions or in severe drought beforehand."[1] In fact, 92 U.S. heat records had been recorded by *mid July* by the Natl Oceanic and Atmospheric Administration. Dallas had recorded more than 25 100+ degree days by mid-July, more than it typically gets in an entire summer.

These were not the only extreme weather events to hit North America. Hurricane Ian caused nationwide power outages in Cuba and hit the Florida Gulf Coast with 150 MPH winds causing massive flooding. In the aftermath of that hurricane a Florida Power and Light spokesperson rightly claimed pride in quickly restoring electricity to all those in its service territory able to receive service. But the qualifier, beyond any utility's ability to address, was that thousands in Fort Meyers and Sanibel Island are no longer able to receive electric service - their homes have been destroyed.

Only a few weeks earlier, Puerto Rico, still recovering from the massive hurricane that hit the island five years earlier, was ravaged by Hurricane, then storm Fiona, which then went on to cause half a million Canadians to lose power.

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1. Matthew Cappucci, *Five 1,000-year rain events hit the U.S. in five weeks. Why?*, WASH. POST (Aug. 23, 2022), https://www.washingtonpost.com/climate-environment/2022/08/23/flood-united-states-climate-explainer/. Higher temperatures, he wrote, lead to higher humidity and "precipitation extremes." *Id.*

A study published on Aug. 23rd in the Journal Plants People Planet, as recounted in a Washington Post article, found that with the "onslaught of invasive insects, a surge in deadly diseases and the all-encompassing peril of climate change as many as one in 6 trees native to the Lower 48 states are in danger of being wiped out," including "coastal redwoods, capacious American chestnuts, elegant black ash and gnarled whitebark pine."[2]

Reminders of climate change's impacts were not confined to our continent.

The worst, and most tragic of these were the monsoon rains that struck Pakistan in mid-June. At one point, nearly a third of the country's surface areas were under water. The heavy rains and flooding displaced seven million persons and adversely affected over thirty million Pakistanis.[3] Pakistan's Minister for Climate Change Sherry Rehman called the floods "unprecedented" and "the worst humanitarian disaster of this decade."[4] Not only were 7 million persons displaced, and more than a thousand killed, but the remaining swamplands have become breeding grounds for malaria, flooding has destroyed much of the country's cotton and rice crops and is likely to ruin chances for winter wheat crops as well.

Extreme and record heat spread across Europe this summer. Wildfires caused by the extreme heat spread across Spain, Italy, France, Slovenia and Greece. And the extreme heat waves led to over 1000 heat-related deaths in Portugal, while temperatures in the United Kingdom exceeded 40 degrees Celsius for the first time.[5]

Free speech, Vile Speech and Disinformation

In my spring E-i-C page I wrote about the Virginia Governor's executive order, issued on his first day in office, setting up a "tip line" where persons could anonymously report teachers who the informants claimed had made students feel uncomfortable by teaching "inherently divisive concepts" or where "their children are not being respected."[6] But this past summer Virginia's governor announced new "model policies" that, among other things, mandate that "teachers and other school personnel can refer to a transgender student by a different name or pronoun only if parents request the switch in writing." He then added that, in the name of protecting the "constitutionally protected free speech rights of teachers," despite the parents' written consent, teachers may nonetheless call students by their names assigned at birth.[7] Teachers fearful of prompting anonymous tips that they have made students feel uncomfortable will be understandably confused about the Virginia governor's solicitude for their free speech right to make transgender students uncomfortable.

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2. Sarah Kaplan, *As many as one in six U.S. tree species is threatened with extinction*, WASH. POST (Aug. 23, 2022), https://www.washingtonpost.com/climate-environment/2022/08/23/extinct-tree-species-sequoias/.

3. Michelle Velez & Teele Rebane, *Hundreds of children among 1,000 people killed by Pakistan monsoon rains and floods*, CNN (Aug. 28, 2022), https://www.cnn.com/2022/08/28/asia/pakistan-flooding-intl/index.html.

4. *Id.*

5. Kylie Maclellan & Dominique Vidalon, *France battles huge wildfires, Britain bakes in record heatwave*, REUTERS (July 19, 2022), https://www.reuters.com/world/europe/record-temperatures-scorch-europe-wildfires-rage-across-south-2022-07-19/.

6. Margaret Barthel, *Virginia Gov. Youngkin Sets Up Email 'Tip line' To Report Teachers, Schools*, DCIST (Jan. 27, 2022), https://dcist.com/story/22/01/27/virginia-gov-youngkin-sets-up-email-tip-line-to-report-teachers-schools/.

7. Hannah Natanson, *Virginia policy latest attempt to restrict rights of transgender students*, WASH. POST, https://www.washingtonpost.com/education/2022/09/16/trans-students-virginia-bathroom-sports/ (last updated Sept. 17, 2022).

Kanye West's Twitter account was suspended following his blatantly antisemitic tweets (and his lucrative endorsement contracts with several large companies were also terminated). But a Texas law "prohibits large online platforms from censoring users or limiting their posts based on the political views they express." Texas's recently reelected Attorney General, who had had successfully defended the law in the Fifth Circuit, was suddenly quiet about whether that law would bar privately-owned media companies from blocking hate speech like West's tweets on large media platforms.[8]

The absence of a Twitter account did not deter the former president from using his Truth Social media platform to threaten American Jews to "get their act together" before "it is too late" for failing to be appreciative enough for what he had done for Israel while President.[9] This threat came only weeks after he used a racist term in another Truth Social post to describe Elaine Chao, his former Secretary of Transportation, who had resigned following the January 6th attacks on the Capitol.[10] Whether the former President will be permitted to rejoin Twitter, as its new owner Elon Musk has previously promised, remains to be seen. But hours after Musk assumed ownership, Nazi memes and racial slurs began surging on the platform.[11] Days later, after Speaker Pelosi's husband was attacked by an intruder shouting "where's Nancy," Musk himself posted a link to baseless story about the attack by a conspiracy website. Musk removed the tweet only hours later, but not before it had garnered 28,000 retweets and 100,000 likes.[12] Facing skittish advertisers[13] apparently not comforted by his modest promise that Twitter would not become a "free for all hellscape,"[14] Musk met with several civil rights groups and announced that users previously banned from Twitter would remain off the site while he sets up a content moderation panel.[15] But his chief information security officer, chief privacy officer and Twitter's moderation and safety leader have all since resigned and Musk has openly discussed bankruptcy.[16]

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8. Will Oremus & Cristiano Lima, *Kanye's antisemitic tweet could be a preview of social media's future*, WASH. POST, https://www.washingtonpost.com/technology/2022/10/10/kanye-west-antisemitic-tweet-musk-texas/ (last updated Oct. 10, 2022).

9. Paul LeBlanc, *Trump complains American Jews don't appreciate his moves on Israel, drawing criticism*, CNN, https://www.cnn.com/2022/10/16/politics/trump-american-jews-israel (last updated Oct. 17, 2022).

10. Jordain Carney, *Elaine Chao, Donald Trump's Transportation secretary, told the Jan. 6 committee she resigned because of her "personal values*, POLITICO (Oct. 13, 2022), https://www.politico.com/minutes/congress/10-13-2022/leaderships-ask-for-help/.

11. Drew Harwell, Taylor Lorenz & Cat Zakrzewski, *Racist tweets quickly surface after Musk closes Twitter deal*, WASH. POST, https://www.washingtonpost.com/technology/2022/10/28/musk-twitter-racist-posts/ (last updated Oct. 28, 2022). *See also* Brian Bushard, *Twitter Removes Kanye's Tweet After He Drops N-Word—And Musk Claims Platform Rules Unchanged*, FORBES (Nov. 4, 2022), https://www.forbes.com/sites/brianbushard/2022/11/04/kanye-drops-n-word-on-twitter-as-musk-claims-platform-rules-unchanged/?sh=2f1ab78a2244 (noting finding by the Network Contagion Institute that there had been a 500 percent increase in the use of the n-word in the first twelve hours following Musk's acquisition).

12. Oliver Darcy & Donie O'Sullivan, *Elon Musk, Twitter's new owner, tweets conspiracy theory about attack on Paul Pelosi*, CNN, https://www.cnn.com/2022/10/30/business/musk-tweet-pelosi-conspiracy/index.html (last updated Oct. 31, 2022). The source for the story was a website that had claimed in 2016 that Hilary Clinton had died and had been replaced by a double. *Id.*

13. Katie Conger, Tiffany Hsu and Ryan Mac, *Elon Musk's Twitter Faces Exodus of Advertisers and Executives*, N.Y. TIMES (Nov. 1, 2022), https://www.nytimes.com/2022/11/01/technology/elon-musk-twitter-advertisers.html.

14. Bushard, *supra* note 11.

15. Rebecca Kern & Mark Scott, *Musk personally led call with civil rights groups to address hate speech on Twitter*, POLITICO (Nov. 2, 2022), https://www.politico.com/news/2022/11/02/musk-twitter-hate-speech-00064690.

16. AJ McDougall, *5 Top Twitter Execs Quit in Elon Musk's Most Chaotic Day Yet*, DAILY BEAST (Nov. 10, 2022), https://www.thedailybeast.com/top-twitter-execs-yoel-roth-lea-kissner-damien-kieran-robin-wheeler-resign-amid-elon-musk-takeover-chaos.

And Florida's recently reelected Governor, who had campaigned on reducing burdens on businesses, had a federal district court judge block enforcement against private businesses of the "Stop Woke Act" he had pushed.[17] In limiting how private businesses teach diversity and inclusion the workplace, district judge Walker ruled, Florida had turned "the First Amendment upside down." In Florida," he stated, the First Amendment apparently bars private actors from burdening speech, while the state may burden speech freely."[18]

For years, right wing conspiracy theorist Alex Jones had espoused the vile falsehood that the parents whose children were killed in the Sandy Hook massacre were "actors who faked the tragedy."[19] Juries in Texas and Connecticut, rejecting Jones's bogus First Amendment defense, awarded the families about a billion dollars in their defamation suits against the Infowars founder. And, citing Jones's "depravity," the judge presiding over the Connecticut case subsequently added $473 million in punitive damages to the total.[20]

Sports

Kat Gamache, the Journal's Executive Editor noted to me that I have used (abused?) my editorial independence to work sports into every one of my previous Editor-in-Chief pages. I intend to keep my record intact.

Before hitting his 61st homerun of 2022 to tie Roger Maris's 1961 American League record, and then breaking the record with his 62nd homerun, Aaron Judge broke a little-mentioned but even older American League home run record – the single season record for homeruns by a right- handed batter. The old record, shared by Jimmy Foxx and Detroit Tiger Hall of Famer Hank Greenberg (as a Detroit Tiger fan I had to mention that), was 58 homeruns and had stood for 84 years.

Forty-two year old Albert Pujols signed a one year contract last spring with the St. Louis Cardinals for what was supposed to be a farewell tour with his original team. But around mid-season he suddenly turned 25 and hit over twenty home runs, including his seven hundredth, becoming only the fourth player in baseball history to reach that milestone – improbably leading his team to the National League playoffs in the process.

Tennis greats Serena Williams and Roger Federer announced their retirements. WNBA star Britney Griner remains imprisoned in Russia. En route to their second World Series championship in four years, four Houston Astros pitchers combined to pitch only the second no-hitter in World Series history in a win over the Philadelphia Phillies. And showing signs of mortality, Aaron Rogers was intercepted three times in a loss to the lowly Detroit Lions, who went into the game with the worst record in the NFL.

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17. *Judge blocks Florida "woke" law, saying it violates the First Amendment*, CBS NEWS, ASSOCIATED PRESS, https://www.cbsnews.com/news/florida-woke-law-blocked-by-judge-over-first-amendment-issues/ (last updated Aug. 19, 2022).

18. Honeyfund.com, Inc. v Desantis, No. 4:22cv227-MW/MAF, 2022 WL 3486962 (N.D. Fla. Aug. 18, 2022).

19. Jack Queen & Jacqueline Thomsen, *Alex Jones must pay Sandy Hook families nearly $1 billion for hoax claims, jury says*, REUTERS (Oct. 12, 2022), https://www.reuters.com/legal/jury-begins-third-day-deliberations-alex-jones-sandy-hook-defamation-trial-2022-10-12/.

20. Andrea Salcedo, James Bikales and Joanna Slater, *Judge orders Alex Jones to pay $473 million more to Sandy Hook families*, WASH. POST (Nov. 10, 2022), https://www.washingtonpost.com/nation/2022/11/10/alex-jones-sandy-hook-infowars/.

Life's Absurdities

The Texas Republican Party Platform has been largely ignored by Texas's Governor, Attorney General and two U.S. Senators.[21] Among the things included in that platform this summer were both endorsement of a referendum that would allow Texas voters to declare their secession from the United States[22] and a change to the U.S. Constitution that would eliminate "anchor babies" by granting birth-right citizenship only to those "with at least one biological parent who is a US citizen."[23] It isn't clear from the platform whether proponents seek to change the U.S. Constitution before or *after* they have seceded from the United States. But it does appear that I would lose my citizenship under the platform. My parents were Holocaust survivors who came to America in the late 1940s as refugees. They still were not citizens when I was born in 1950. So I guess I'd be considered an "anchor baby."

Presidential Gaffes

"Let Me Start Off With Two Words, Made In America." Television's late night hosts had a field day with President Biden's gaffe in an early October speech to supporters at an event in Maryland. A few weeks earlier at a White House conference on hunger, nutrition and health, the President expressed his thanks to those in attendance, including Rep. Jackie Walorski, who had died in a car crash a month earlier. White House staffers in the press office, if polled, might well have been sympathetic to some limited form of censorship.

Foreign autocracies

Autocratic governments and would-be autocrats around the world have gained adherents for promising to protect their populations from the xenophobic threat that immigration would change their cultures. Viktor Orban won reelection in Hungary. Far right parties made parliamentary gains in Sweden. Giorgia Meloni was elected Prime Minister of Italy. In case that name is not familiar to you, she is a member of Italy's far-right Fratelli d' Italia party, a descendant of the Italian Social Movement party, formed by Mussolini supporters after World War II. Ferdinand Marcos, Jr. was elected president of the Philippines. He is, of course, the son of that country's former dictator, Ferdinand Marcos, who was expelled from the country. As a precursor to Brazil's presidential election, President Bolsinaro claiming election fraud before the election, threatened military action if he was not declared the winner. As we prepare to go online with the newest edition, Bolsinaro lost his run-off with his predecessor, Luiz Lula daSilva. While he did not concede, in a hopeful sign for democracy, Bolsinaro did announce that the transition to the new government would proceed on January 1. Meanwhile, left wing dictatorships in Venezuela, led by Nicolas Maduro, and in Nicaragua by Daniel Ortega, continue to repress their populations, forcing many to flee and claim asylum here and elsewhere.

But there are some signs of resistance to autocracy. Russia's call up of 300,000 men to fight in Ukraine has led to more than 100,000 Russian men of

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21. Christopher Hooks, *Yes, the 2022 Texas GOP Platform Is Extreme. But Little of It Is New.*, TEXASMONTHLY (June 20, 2022), https://www.texasmonthly.com/news-politics/texas-republican-convention-2022/.

22. REPORT OF THE PERMANENT 2022 PLATFORM & RESOLUTIONS COMMITTEE (2022), TEXASGOP, https://texasgop.org/wp-content/uploads/2022/06/6-Permanent-Platform-Committee-FINAL-REPORT-6-16-2022.pdf.

23. *Id.*

draft age fleeing the country. And in Iran's theocracy, thousands of women continue to engage in nationwide protests, burning their headscarves and hijabs after 22 year old Mahsa Amini died in police custody. She had been arrested by Iran's morality police because her hijab did not fully cover her hair. By the time of this writing several hundred women and nearly two dozen children had been killed by Iranian police during these protests.

Russia's War on Ukraine:

Criticism within Russia of Putin's unprovoked invasion of Ukraine – its so-called "special military operation" – continues to be dangerous. New outlets reported that several Gazprom and Lukoil executives who had voiced concerns about it died suspicious deaths within months of each other. The depths to which Russia has sunk in its immoral war continue to shock the conscience. Reminiscent of the Hamas terrorist group's use of hospitals to launch indiscriminate rocket attacks on Israeli civilians – turning doctors, nurses and patients into human shields, Russia occupied the Zaporizhzhia nuclear power plant as the launching site for its rocket attacks on Ukranian civilian populations. And in so doing, it has turned plant workers into both hostages and human shields.

Losing on the battlefield, embarrassed by the partial destruction of the bridge connecting the Russian mainland with Crimea and running low on its own munitions, Russia has turned to its fellow pariah nation, Iran, for "kamikaze" drones. These have been used both to terrorize Ukraine's civilian population centers and to damage that nation's vital infrastructure.

Primary Elections:

Liz Cheney, one of the most conservative members of Congress, lost her Wyoming primary. She lost, it is clear, not because of her lack of conservative bona fides, but because of her refusal to give fealty to a twice impeached former president and because of her participation in the January 6th committee that investigated his role in trying to overturn the 2020 presidential election. But Brad Raffensperger, the Georgia Secretary of State who refused the former President's demand that he "find" 11,000+ more votes, defeated his election denier primary opponent and subsequently won reelection.

Notable Retirements

After more than a half century at the National Institute of Health and nearly forty years as director of its National Institute of Allergy and Infectious Diseases, Anthony Fauci announced his retirement, effective at the end of this year. It is hard to comprehend his impact on global health. "Fauci's tenure as director of the infectious-diseases institute made him an adviser to seven presidents and put him on the front lines of every modern-day scourge, including AIDS, the 2001 anthrax scares, Ebola, Zika and the coronavirus pandemic."[24]

Deaths of Public Figures

Mikhail Gorbachev, the last leader of the former Soviet Union who oversaw its peaceful breakup, died in late August at the age of 91. The winner of the 1990 Nobel Peace Prize was admired in the West but not by most Russians, many of whom see the dissolution of the USSR as a great tragedy. Writing about his death,

24. Yasmeen Abutaleb, *Fauci plans to step down in December after half a century in government*, WASH. POST, https://www.washingtonpost.com/health/2022/08/22/fauci-retiring/ (last updated Aug. 22, 2022).

the famous dissident and *refusenik* – the first political prisoner released by Gorbachev and now a member of Israel's Knesset – had this to say about the significance of his passing:

> In nearly every dictatorship there are dissidents, and from time to time there are also Western leaders willing to risk ether political fates to promote human rights abroad. But Gorbachev was a product of the Soviet regime, a member of its ruling elite who believed in its ideology and enjoyed its privileges – yet decided to destroy it nevertheless. For that, the world can be grateful. Thank you, Mikhail Gorbachev.[25]

A few weeks later, **England's Queen Elizabeth** passed away at age 96, 70 years after taking the throne. Her life was marked by an unswerving dedication to her public duties. Indeed, only two days before her death she had engaged in her last official acts -- accepting the resignation of former British Prime Minister Boris Johnson and the appointment of Liz Truss as the new Prime Minister of Great Britain.

Only six weeks after England's longest-serving monarch passed away, Liz Truss resigned, becoming the shortest-serving Prime Minister in that country's history. With her demise as Prime Minister imminent, one British paper began a daily publication of a photo of a head of lettuce, posing the question: Which will have the longer shelf life, the head of lettuce or Truss's term in office? It turned out to be the former.[26]

Few will mourn the passing of al-Qaida leader **Ayman al-Zawahiri**, who was killed in a U.S. drone strike in Kabul, Afghanistan at the end of July. Al-Zawahri and his predecessor, Osama bin Laden, had planned the 9/11 attack on the World Trade Center towers that killed nearly three thousand Americans. Al Zawahri had served as bin Laden's deputy and later his successor after the former was killed by U.S. soldiers a decade earlier.[27]

Former President Trump still in the news:

"I don't f---ing care that they have weapons. They are not here to hurt *me*. Take the f---ing mags (magnetometers) away." These were the chilling words of the former President at the January 6 2021 "Stop the Steal" rally, as recounted by Cassidy Hutchinson, a senior aid to White House Chief of Staff Mark Meadows during her dramatic testimony before the House January 6th Committee.[28] The former president's words and actions or inaction were the focus of summer headlines surrounding his role in the mob attacks on the Capitol. But he continued to make other headlines almost daily.

Finally sitting for a long-delayed deposition in the New York Attorney General's civil investigation into the operations of the Trump Organization, the former president "took the Fifth" over four hundred times in a three hour deposition, following in the footsteps of his son, Donald Jr., who invoked the Fifth over five hundred times a few months earlier. And months later, the Organization's CFO,

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25. Natan Sharansky, *Gorbachev played a complicated but unique role in world history*, WASH. POST (Aug. 30, 2022), https://www.washingtonpost.com/opinions/2022/08/30/sharansky-gorbachev-death/.

26. Matthew Weaver, *Iceberg lettuce in blond wig outlasts Liz Truss*, GUARDIAN (Oct. 20, 2022), https://www.theguardian.com/politics/2022/oct/20/iceberg-lettuce-in-blonde-wig-outlasts-liz-truss.

27. Matthew Lee, Nomaan Merchant & Mike Balsamo, *CIA drone strike kills al-Qaida leader Ayman al-Zawahri in Afghanistan*, PBS, https://www.pbs.org/newshour/politics/cia-drone-strike-kills-al-qaida-leader-ayman-al-zawahri-in-afghanistan (last updated Aug. 1, 2022).

28. Jonathan Allen, *'They're not here to hurt me': Former aide says Trump knew Jan. 6 crowd was armed*, NBC NEWS (June 28, 2022), https://www.nbcnews.com/politics/congress/jan-6-panel-looks-trump-white-house-cassidy-hutchinson-testimony-rcna35550.

Alan Weiselberg, pleaded guilty to fifteen counts of tax fraud and evasion and agreed to cooperate in the criminal trial of the company.[29]

On Aug. 26th, at the direction of a federal district court magistrate, DOJ was directed to partially unseal the affidavit used to establish probable cause for its search and recovery of boxes of sensitive government documents from the former President's home/private club at Mar-a-Lago as part of its investigation into possible criminal violations of the Espionage Act.

Gun violence

My Editor in Chief page last May mentioned that there had been 10 mass shootings (defined as four or more shooting victims) in a ten day period and bemoaned that months later those shootings would not be remembered. Since then we've *averaged* more than one mass shooting a day. Indeed, days after publication there was a racially-motivated attack that killed ten black shoppers at a Buffalo area supermarket followed by an antisemitic attack in the heavily-Jewish Chicago suburb, Highland Park. And, giving the lie to the NRA's adage that "the only thing that stops a bad guy with a gun is a good guy with a gun,"[30] a month later 19 good guys -- armed police officers -- stood by for more than an hour while a person armed with an assault rifle gunned down nineteen children and two beloved teachers at an elementary school in Uvalde, Texas.

In some states individuals cannot purchase handguns until age 21, but face no similar restriction on the purchase of assault rifles. There were public pleas after Uvalde for making the age requirement the same. Unsurprisingly, Congress did not raise the age for purchasing assault weapons. South Dakota's senior Senator explained his opposition this way: "[I]n my state, they use them to shoot prairie dogs and, you know, other types of varmints."[31] Uvalde and Buffalo did, however, finally prompt the first, if exceedingly modest, federal gun control legislation in more than a quarter century. But that same week the Supreme Court discovered a new constitutional right - the right to carry loaded weapons outside the home.[32] Citing this new constitutional right, the Court struck down a more than century-old New York law limiting carriage of such weapons. And less than a week after the Court handed down its decision, four plaintiffs filed suit against the District of Columbia, maintaining that they had Second Amendment rights to carry loaded weapons on Metro. That is sure to be great news to Metro officials already suffering steep ridership losses because of concerns over safety and COVID. Knowing fellow passengers may be carrying concealed, loaded weapons will undoubtedly make riders feel safer.

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29. Josh Gerstein, Erin Durkin & Kyle Cheney, *Trump, company and family members sued by New York AG over alleged fraud scheme*, POLITICO (Sept. 21, 2022), https://www.politico.com/news/2022/09/21/trump-company-and-family-members-sued-by-ny-ag-over-alleged-fraud-scheme-00058011.

30. *NRA: 'Only Thing That Stops A Bad Guy With A Gun Is A Good Guy With A Gun'*, NPR (Dec. 21, 2012), https://www.npr.org/2012/12/21/167824766/nra-only-thing-that-stops-a-bad-guy-with-a-gun-is-a-good-guy-with-a-gun.

31. Tom Lawrence, *Prairie dogs and politics: Thune provides absurd reason for people to own mass-murder weapon in wake of Uvalde tragedy*, SOUTH DAKOTA STANDARD (June 10, 2022), https://www.sdstandardnow.com/home/prairie-dogs-and-politics-thune-provides-absurd-reason-for-people-to-own-mass-murder-weapon-in-wake-of-uvalde-tragedy.

32. Law clerks for Justice Scalia, who wrote the majority decision in the *Heller* Supreme Court case, and Justice Stevens, who wrote the lead dissent, maintain that while the two justices disagreed whether the Second Amendment protected "an individual right to keep a usable handgun at home," they agreed that "Heller merely established the constitutional baseline that the government may not disarm citizens *in their homes*." Kate Shaw & John Bash, *We Clerked for Justices Scalia and Stevens. America Is Getting Heller Wrong*, N.Y. TIMES (May 31, 2022), https://www.nytimes.com/2022/05/31/opinion/supreme-court-heller-guns.html.

Supreme Court

The last week of the Supreme Court's 2021-22 term was a dramatic one. The *New York State Rifle and Pistol Ass'n v. Bruen* case I mentioned earlier, struck down a century-old New York law restricting the carriage of loaded weapons outside the home.

That same week the Court further narrowed its Establishment Clause jurisprudence in *Kennedy v. Bremerton*, upholding the right of a football coach to conduct a "private prayer" *at the fifty-yard line* joined by more than a hundred players and fans. In ruling for the coach, the Court dismissed the school system's concerns that his actions would be perceived as endorsement by the school of Christian prayers. Muslim cornerbacks, Hindu wide receivers and Jewish punters pray that you won't lose your starting positions!

The *Dobbs* decision, varying little from the draft version leaked a few months earlier, struck down the nearly fifty-year old *Roe v. Wade* decision, ending women's constitutional right to abortion. The reverberations from that decision are still being felt.

Not long after the decision an Ohio trigger law forced a 10 year old pregnant rape victim to travel to neighboring Indiana for an abortion. Indiana's Attorney General Rokita announced that he was opening an investigation, claiming that the doctor (Caitlin Bernard) who had performed the abortion had "a long history" of non-compliance with Indiana's reporting laws. This, it was widely reported, was despite any evidence of non-compliance by the doctor. Subsequent physical threats to the doctor prompted the FBI to investigate and the doctor has since indicated she was considering a defamation suit against the state Attorney General.[33]

In August, Kansas voters rejected a referendum that would have overturned Kansas Supreme Court precedent upholding women's abortion rights. In November, voters in Michigan, California and Vermont voted in favor of referenda to add abortion rights to those states' constitutions. Kentucky voters rejected a referendum that would have added new abortion restrictions. In contrast, South Carolina's senior senator had introduced a bill in September that would have outlawed abortions after 15 weeks in all fifty states.

Of most interest to FERC practitioners, the Supreme Court struck down the Obama-era Clean Power Plan in *West Virginia v. EPA*, under an expanded "major questions doctrine." Under this doctrine, agency rules posing major questions, i.e., questions of "deep economic and political significance," will be held to exceed the agency's authority absent a clear expression from Congress that the agency has been granted the power it claims. In the interests of full disclosure, this editor has previously opined (1) that nearly all of FERC's and the FPC's major initiatives over the last sixty years would likely have failed the doctrine's test and (2) that this new test could risk regulatory instability.[34]

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33. Sarah McCammon & Becky Sullivan, *Indiana doctor says she has been harassed for giving an abortion to a 10-year-old*, NPR (July 26, 2022), https://www.npr.org/2022/07/26/1113577718/indiana-doctor-abortion-ohio-10-year-old.

34. *See, e.g.*, Harvey L. Reiter, *Would Ferc's Landmark Decisions Have Survived Review Under The Supreme Court's Expanding "Major Questions Doctrine" And Could The Doctrine Stifle New Regulatory Initiatives?*, EBA BRIEF, Spring 2022, at 1, https://www.eba-net.org/assets/1/6/EBA_Brief_-_Volume_3_Issue_1_Final1.pdf; Harvey L. Reiter, *Expanding 'Major Questions Doctrine' Risks Regulatory Stability*, BLOOMBERG LAW (Jul. 12, 2022), https://news.bloomberglaw.com/environment-and-energy/expanding-major-questions-doctrine-risks-regulatory-stability.

Covid

Despite President Biden's offhand, erroneous – maybe wishful - remark that the COVID pandemic was over, more than 8,000 persons are still dying from COVID each month.[35] And uptake for the newest covalent booster continues to be slow, worrying health officials.[36] Deaths from the disease, moreover, are not spread evenly across the country. The highest death rates are in areas with the lowest vaccination rates.[37]

Political Stunts

Florida's governor chartered a plane to fly Venezuelan immigrants fleeing leftist dictator Nicolas Maduro from Texas, not Florida, to Martha's Vineyard island *after* the tourist season on the pretext that it would offer them more economic opportunities. "States like Massachusetts, New York and California," his spokesperson explained, "will better facilitate the care of these individuals who they have invited into our country by incentivizing illegal immigration through their designation as 'sanctuary states' and support for the Biden administration's open border policies."[38] Ironically, many immigrants have since begun arriving in Florida to help in the rebuilding process in the aftermath of Hurricane Ian.[39]

The Mid-Term Elections

As we go to print, control of Congress remains undecided. The "red wave" predicted by some pundits did not materialize.[40] Control of the House of Representatives may be changing hands, but if so, only by a small margin. By contrast,control of the Senate will not change; it is possible, depending on the outcome of a December runoff election in Georgia, that Democrats will actually have gained a seat. And in a comforting sign for American democracy, several of the election deniers who lost their elections conceded defeat, a few even graciously offering their best wishes to their opponents.[41] Perhaps this will also provide some comfort to our Canadian neighbors. In 1991 Canadians were almost equally divided whether our democratic system or theirs worked better. But after the January 6th insurrection, only five percent of Canadians "preferred the American system."[42]

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35. *COVID Data Tracker*, CDC, https://covid.cdc.gov/covid-data-tracker/#datatracker-home.

36. Cecelia Smith-Schoenwalder, *Slow Updated Booster Shot Uptake Deepens Worry Over Future U.S. COVID-19 Surge*, U.S. NEWS (Oct. 14, 2022), https://www.usnews.com/news/articles/2022-10-14/slow-updated-booster-shot-uptake-deepens-worry-over-future-u-s-covid-19-surge.

37. Lydia Denworth, *People in Republican Counties Have Higher Death Rates Than Those in Democratic Counties*, SCIENTIFIC AMERICAN (July 18, 2022), https://www.scientificamerican.com/article/people-in-republican-counties-have-higher-death-rates-than-those-in-democratic-counties/.

38. Matthew Impelli, *DeSantis Warned by Fox's Rivera He Will 'Feel the Wrath' of Latino Voters*, NEWSWEEK (Oct. 5, 2022), https://www.msn.com/en-us/news/politics/desantis-warned-by-fox-s-rivera-he-will-feel-the-wrath-of-latino-voters/ar-AA12DYV4?ocid=msedgntp&cvid=dea82c15b2f542e9822195d7ed07cb74.

39. David C. Adams, *After Hurricane Ian, immigrants help with rebuilding. But will they get fair work conditions*?, UNIVISION NEWS (Oct. 11, 2022), https://www.univision.com/univision-news/united-states/who-will-protect-migrant-workers-who-help-rebuild-floridas-west-coast-after-hurricane-ian.

40. Interestingly, there was a small blue wave in my home state of Michigan, where Democratic candidates for Governor, Secretary of State and Attorney General all won reelection, one Congressional seat changed hands and Democrats took majorities in both houses of the Michigan legislature for the first time in forty years.

41. Emma Brown & Amy Gardner, *Key election deniers concede defeat after disputing Trump's 2020 loss*, WASH. POST (Nov. 9, 2022), https://www.washingtonpost.com/politics/2022/11/09/election-deniers-midterms-democracy/.

42. Damien Cave, *The World's Democracies Ask: Why Can't America Fix Itself?*, N.Y. TIMES (Nov. 8, 2022), https://www.nytimes.com/2022/11/08/world/us-international-democracy.html.

So how do all of these events relate to the work of the Journal? They don't, not directly anyway. But all of us are affected by the world around us, including the clients we represent and the agencies that develop energy policies and the legislators who shape energy law. Our recent symposium reflects on the fragile nature of democracies and the strain put on European democracies by a Russian dictator and his control over fossil fuels they rely upon – too heavily – to run their economies. How do we balance the need to supply these countries with the fossil fuels they need while advancing the goal of reducing the planet's carbon emissions to mitigate the impacts of climate change? These were the big issues discussed during that symposium. It has been transcribed and included in the current edition of the Journal. The Journal is proud to include its important content in this edition.

Once again, I want to thank the peer review editors, the EBA staff and the students at Tulsa, including, in particular student editor in chief, Sotheby Shedeck, for all their hard work in producing the latest edition of the Journal. And let me also express my gratitude to the FELJ board for their unwavering support of this publication. Oh – I almost forgot – Go Redwings!

Harvey L Reiter
November, 2022

IN MEMORIAM: DAVID WARD

David Bohan Ward passed away peacefully with his loving wife by his side on April 13, 2022 – his 88th birthday. For nearly forty years, he worked in the energy area, first with the Federal Power Commission and then in private practice. Born in 1934 in Worcester, MA, he graduated in 1958 from Holy Cross College and in 1961 from Georgetown Law School. He proudly and honorably served two years in the Army. During law school, Dave worked as a Capitol Police Officer.

David was involved in certificating natural gas pipelines, working through issues associated with the energy crisis in the 1970s as well as the energy industry's transition to natural gas and electric competition. He also represented hydroelectric and independent energy developers, filing the first QF certification in Docket No. QF80-1 after enactment of PURPA.

He was an avid supporter of and volunteer with the Energy Bar Association and Foundation of the Energy Law Journal where he served in various roles. In 1989-1990, he served as the president of the Federal Energy Bar Association. His daughter, Elizabeth Whittle, followed in his footsteps as an energy lawyer, working with him at Flood & Ward from 1990-1992 before moving to Nixon Peabody. She learned so much from him and carried his lessons to her practice and legal career. She loved participating in proceedings with and opposite him over the years. He was generous with his time and was a true gentleman.

David had many passions throughout his life, including golf, sailing and spending time in Maine at Celeste's family camp. He loved the Boston Red Sox. And, most of all, he loved his family.

He is survived by his wife of 59 years, Celeste, his two daughters, Elizabeth Whittle (Jim) and Lulu Gonella (Geoff) and four grandsons, Daniel Whittle, Geoff Gonella, Jr., Christopher Whittle and Andrew Gonella. The Charitable Foundation of the Energy Bar Association (www.eba-net.org/CFEBA) was David's designated charity.

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THE CHILEAN CASE ON IMPROVING POWER TRANSMISSION WITHIN THE NON-CONVENTIONAL RENEWABLE ENERGIES PARADIGM

By Sebastián Luengo Troncoso[*]

Abstract: Although global discussions about climate change and transitioning to clean energy have focused on the development of non-conventional renewable energy ("NCRE") like solar and wind generation, this new energy paradigm also presents challenges to states' power transmission systems. This article first proposes a theoretical framework for analyzing the regulatory effectiveness of transmission sector regulations in light of challenges posed by growing NCRE generation. Next, it analyzes key regulations of the Chilean electricity sector as a case study—arguably one of the most successful cases of NCRE development in the Americas—and assesses the effectiveness of those regulations on facilitating NCRE development and solving contemporary transmission challenges in Chile. From this analysis, the article distills lessons, including the importance of developing a strong transmission system with the support of a regulatory framework that promotes NCRE development through long-term national energy policies and other forward-looking regulations.

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I. INTRODUCTION

Climate change and the need to drastically reduce carbon emissions together present one of the most serious challenges to the electricity sector.[1] One widely accepted approach to climate change mitigation is to reduce fossil fuel generation use, and in recent years, the global share of renewable electricity generation has grown at an exponential rate.[2] For example, between 2011 and 2021, global solar capacity increased by 27.9%[3] and global wind capacity increased by 14.1%.[4] Given this growth, the electric generation sector is cited globally by scholars as an example of decarbonization success,[5] "and sometimes as the only energy sector for which the future path seems clear."[6]

Yet despite many countries' environmental awareness of the need for decarbonization and the explosive growth of renewable energy internationally, fossil fuel demand is also expected to grow significantly.[7] Global coal use, for example, is projected to increase more than all renewables combined in 2021 and 2022 and to cause "a rise in emissions of almost 5%, or 1500 Mt [metric megatons]"[8] and reverse "80% of the drop in 2020 [emissions], with emissions ending up just 1.2%

1. Valérie Masson-Delmotte et al., SUMMARY FOR POLICY MAKERS: GLOBAL WARMING OF 1.5°C. AN IPCC SPECIAL REPORT ON THE IMPACTS OF GLOBAL WARMING OF 1.5°C ABOVE PRE-INDUSTRIAL LEVELS AND RELATED GLOBAL GREENHOUSE GAS EMISSION PATHWAYS, IN THE CONTEXT OF STRENGTHENING THE GLOBAL RESPONSE TO THE THREAT OF CLIMATE CHANGE, SUSTAINABLE DEVELOPMENT, AND EFFORTS TO ERADICATE POVERTY (2018), https://www.ipcc.ch/site/assets/uploads/sites/2/2022/06/SPM_version_report_LR.pdf.

2. BRITISH PETROLEUM, STATISTICAL REVIEW OF WORLD ENERGY 44 (2022). Among the most remarkable growth rates of renewable energy generation in 2021 are Argentina (32.8%), Chile (30.3%), Saudi Arabia (301.7%), Israel (30.3%), and Vietnam (135.5%), among others. *Id.*

3. *Id.* at 46.

4. *Id.* at 47.

5. Hugh Rudnick & Constantin Velásquez, *Transmission Investment and Renewable Integration*, *in* 79 TRANSMISSION NETWORK INVESTMENT IN LIBERALIZED POWER MARKETS 417, 417-18 (Mohammad Resa Hesamzadeh et al. eds. 2020).

6. *Id.* at 418; *Cf.* Clemens Gerbaulet et al., *European Electricity Sector Decarbonization under Different Levels of Foresight*, RENEWABLE ENERGY, Oct. 2019, at 973, 981 (providing recent research on the challenges of full decarbonization in the electricity power sector).

7. INT'L ENERGY AGENCY, GLOBAL ENERGY REVIEW 2021: ASSESSING THE EFFECTS OF ECONOMIC RECOVERIES ON GLOBAL ENERGY DEMAND AND CO2 EMISSIONS IN 2021 2-3 (2021), https://iea.blob.core.windows.net/assets/d0031107-401d-4a2f-a48b-9eed19457335/GlobalEnergyReview2021.pdf.

8. *Id.* at 2.

(or 400 Mt) below 2019 emissions levels."[9] Therefore, the challenge, both worldwide and in Chile, is to develop regulatory approaches to sustain the growth of renewable energy and to secure a fast-paced transition toward a clean energy matrix in all economic sectors.[10]

Many regulatory approaches supporting this new non-conventional renewable energy ("NCRE") paradigm[11] focus on electric power generation, often leaving aside the transmission and distribution sectors.[12] It has been argued that new energy challenges must be addressed comprehensively, with regulatory schemes that include all parts of the electricity system, particularly transmission.[13] To achieve decarbonization in the power sector for any country, the whole grid must be modernized, including "uptake, transmission, distribution, off-take, [and] metering,"[14] while taking into account the unique political and geographical considerations of that country.[15] For example, the importance of the power transmission sector to NCRE transition has been the subject of many recent discussions in Europe.[16]

Existing literature evaluates the Chilean NCRE phenomenon from perspectives that do not fully grasp Chile's regulatory approach to transmission.[17] This

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9. *Id. Cf.* Horacio Andres Aguirre-Villegas & Craig H. Benson, *Expectations for Coal Demand in Response to Evolving Carbon Policy and Climate Change Awareness,* ENERGIES, May 19, 2022, at 1, 18 (noting that some scholars foresee that "[c]oal's predominance in the energy matrix has reached a peak, and a decline in coal demand is expected after 2024 and will continue in the future. The decline of coal's share will accelerate as China focuses on carbon neutrality goals, the U.S. re-engages in the Paris Agreement and implements new climate legislation, the E.U. progresses towards its emission reduction targets, and India moves to a lower-carbon future. Coal demand should diminish greatly by 2060, when China meets its carbon neutrality goal").

10. David García Howell, POLICY BRIEF ON TRADE AND ENVIRONMENT NO. 13: ARE WE ADVANCING IN THE TRANSITION OF THE ENERGY MATRIX IN LATIN AMERICA? ANALYSIS AND CONSIDERATIONS 3, 13 (2021), www.kas.de/energie-klima-lateinamerika ("The term 'energy matrix' can be defined as the combination of diverse primary energy sources used to satisfy the energy needs in a geographic region.").

11. For the purposes of the analysis presented in this article, NCRE refers to renewable energy generators whose primary energy source is solar radiation, wind power, hydraulic energy, biomass, geothermal energy, and energy generated from the sea, as defined in the Chilean legislation. *See* Law No. 20257, Introduce Modificaciones a la Ley General de Servicios Eléctricos Respecto a la Generación de Energía Eléctrica con Fuentes de Energías Renovables no Convencionales, Marzo 20, 2008, DIARIO OFICIAL [D.O.] (Chile).

12. *See* Thomas Sattich, *Electricity Grids: No Decarbonization without Infrastructure*, *in* DECARBONIZATION IN THE EUROPEAN UNION 70 (Claire Dupont & Sebastian Oberthür eds., 2015) ("discuss[ing] the role of electricity transmission infrastructure for the integration of renewables into the European power system in the context of the EU's decarbonization goals," and the relatively low attention that this issue has been given compared to other renewable energy transition issues).

13. *Id.*

14. *Id.* at 75.

15. *Id.*

16. Eckehard Tröster et al., EUROPEAN GRID STUDY 2030/2050 (2011); Till Kolster et al., *The Contribution of Distributed Flexibility Potentials to Corrective Transmission System Operation for Strongly Renewable Energy Systems*, 279 APPLIED ENERGY 115870 (2020); Rolando A Rodriguez et al., *Transmission Needs across a Fully Renewable European Power System*, 63 RENEWABLE ENERGY J. 467 (2014); Philipp Staudt et al., PREDICTING TRANSMISSION LINE CONGESTION IN ENERGY SYSTEMS WITH A HIGH SHARE OF RENEWABLES (2019).

17. Juan Carlos Osorio-Aravena et al., *The Impact of Renewable Energy and Sector Coupling on the Pathway toward a Sustainable Energy System in Chile*, 151 RENEWABLE AND SUSTAINABLE ENERGY REVS. 111557 (2021).

article fills that gap by assessing the effectiveness of Chilean regulations on promoting and integrating NCRE through transmission development, identifying the most successful regulatory approaches in the Chilean transmission sector that enabled the development of NCRE, and distilling lessons to be considered in other countries' regulatory frameworks.

First, the article frames the transmission discussion by analyzing the challenges of the NCRE energy transition and proposing a framework for reviewing the regulatory effectiveness of transmission regulations. Next, in section III, the article presents Chile as a case study, including its energy matrix and the unique regulatory framework of its NCRE-friendly electricity market. Section III also evaluates the regulatory effectiveness of Chile's transmission regulations, its level of NCRE integration, and its current energy challenges. Finally, in section IV, the article offers some lessons distilled from the Chilean case study to inform the development of a general legal framework that can promote a transmission sector compatible with the NCRE paradigm and the requirements of our global energy transition.

II. A FRAMEWORK FOR ANALYZING REGULATORY EFFECTIVENESS: CONTEMPORARY CHALLENGES OF ELECTRICITY TRANSMISSION

Transmission systems play a significant role in integrating NCRE development but face numerous challenges to their expansion, from planning complexities or pricing disputes, to outdated regulatory frameworks.[18] This section offers a framework for analyzing the effectiveness of transmission regulations by presenting the challenges encountered by transmission systems around the world to promote NCRE growth and integration and categorizing them for later use in the article.

A. Transmission Planning Challenges

One of the most pressing challenges of expanding electric power transmission is the need for holistic investment planning and coordination.[19] As Professors Hesamzadeh of the KTH Royal Institute of Technology and Vogelsang of Boston University explain, currently, the "operation and investment decisions of the transmission and distribution network have been placed under the control of regulators

18. Rudnick & Velásquez, *supra* note 5, at 418.

19. Notice of Proposed Rulemaking, Building for the Future Through Electric Regional Transmission Planning and Cost Allocation and Generator Interconnection, 87 Fed. Reg. 26,504 (2022) [hereinafter Notice of Proposed Rulemaking]. See also Barbara Tyran, A Transmission Boom is Needed to Realize the Inflation Reduction Act's Benefits, and It Will Pay for Itself, UtilityDive (Oct. 6, 2022), https://www.utilitydive.com/news/transmission-boom-clean-energy-benefits-inflation-reduction-act/633156/. *See* Modernizing the Electric Grid: State Role and Policy Options, NAT'L CONF. OF STATE LEGISLATURES, https://www.ncsl.org/research/energy/modernizing-the-electric-grid-state-role-and-policy-options.aspx.

and system operators,"[20] which could be public or private actors.[21] The involvement of these actors, among other factors, adds complexity to the goal of efficient generation and transmission investment coordination,[22] or — in other words — the "determination of the optimal capacity, sequence and timing of transmission network investments,"[23] resulting in what is often described as "the transmission planning problem."[24]

Another transmission planning challenge is the intermittency of NCRE sources, which has altered the needs of many countries' grids.[25] In response, transmission expansion planning must adapt by anticipating the changing availability of NCRE along with other factors, including the increasing deployment of energy storage and the continued growth in electricity demand.[26] For example, in New Zealand, the increasing development of dispersed solar and wind generation is challenging the country's "long-accepted institutional structure for electricity production and delivery"[27] by promoting generation decentralization as well as the inclusion of economically feasible storage solutions.[28] Although New Zealand's transmission network is considered to be presenting "signs of stress,"[29] and to be "close to the limit of [its] existing capabilities,"[30] the country is responding by changing its regulations, for instance, to allow the development of "[b]attery storage of energy directly with the grid."[31]

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20. M.R. Hesamzadeh et al., *An Introduction to Transmission Network Investment in the New Market Regime*, *in* 79 TRANSMISSION NETWORK INVESTMENT IN LIBERALIZED POWER MARKETS 1, 1 (Mohammad Resa Hesamzadeh et al. eds. 2020).

21. REGUL. ASSISTANCE PROJECT, ELECTRICITY REGULATION IN THE US: A GUIDE 9, 10 (2011), https://www.raponline.org/wp-content/uploads/2016/05/rap-lazar-electricityregulationintheus-guide-2011-03.pdf.

22. *Id.*; *see also* Carlos Matamala et al., *The Value of Network Investment Coordination to Reduce Environmental Externalities When Integrating Renewables: Case on the Chilean Transmission Network*, ENERGY POL'Y, 2019, at 251, 253 (2019) (discussing how "the benefits associated with coordination of network investments among new entrants (and also incumbent market participants) in terms of the saving in both investment costs and socio-environmental costs related to new network expansions needed to connect coming renewable generators").

23. Hesamzadeh et al., *supra* note 19, at 1.

24. *Id.*

25. *Id.* at 2.

26. Qingyu Xu & Benjamin F. Hobbs, *Transmission Planning and Co-Optimization with Market-Based Generation and Storage Investment*, *in* 79 TRANSMISSION NETWORK INVESTMENT IN LIBERALIZED POWER MARKETS 201, 201-2 (Mohammad Resa Hesamzadeh et al. eds. 2020).

27. Lewis Evans, *Practical Experiences with Transmission Investment in the New Zealand Electricity Market*, *in* 79 TRANSMISSION NETWORK INVESTMENT IN LIBERALIZED POWER MARKETS 523, 554 (Mohammad Resa Hesamzadeh et al. eds. 2020).

28. *Id.*

29. Zhiguo Zhang et al., *Overview of the Development and Application of Wind Energy in New Zealand*, ENERGY AND BUILT ENV'T, 2022, at 1, 10.

30. *Id.*

31. Evans, *supra* note 25, at 554.

Many countries have considered new transmission planning adaptations in response to NCRE intermittency challenges.[32] One transmission adaptation proposal is to optimize the use of national grids by developing dynamic and efficient use of existing transmission capacity limits.[33] For example, NCRE such as solar and wind farms have greater flexibility than traditional power plants and can adjust their size and output due to their modular constructability.[34] In other words, these type of plants have the ability to scale up or down within a broader geographical range because they are composed of many smaller units, meaning that they can be vastly dispersed across a country's territory where needed.[35]

However, widely distributed generation presents its own challenges and requires improved coordination among generation, transmission, and distribution systems.[36] Because NCRE plants must be located where the primary resource (i.e., wind, sun) is technically feasible to collect, transmission infrastructure must effectively respond to new generation demands scattered throughout a country's territory.[37] NCRE investors and transmission planners must consider these new variables and plan further ahead, which adds additional complexity compared to the planning processes of traditional fossil fuel power plants.[38] If done thoughtfully, however, transmission expansion and NCRE growth can be mutually beneficial.[39] For example, Professor Wolak from Stanford has illustrated in an Alberta, Canada case study that "[t]he expected economic benefits associated with Alberta's transmission expansion policy were also found to be significantly larger with a larger share of intermittent wind generation in the system."[40]

In light of these challenges, some countries have recognized the need for holistic transmission planning reform.[41] A recent case of proposed regulatory reform of regional transmission planning in the United States is the Federal Energy Regulatory Commission's (FERC) proposed rule to address planning for long-term transmission investment to address NCRE generation challenges.[42] Among other changes, the proposal specifically envisions more extensive long-term regional transmission planning and improved coordination and transparency for regional

32. Thomas-Olivier Léautier, *Regulated Expansion of the Power Transmission Grid*, *in* 79 TRANSMISSION NETWORK INVESTMENT IN LIBERALIZED POWER MARKETS 69 (Mohammad Resa Hesamzadeh et al. eds. 2020).

33. *Id.* at 72-73.

34. Rudnick & Velásquez, *supra* note 5, at 418. *See* Peter Mark Jansson & Richard A. Michelfelder, *Integrating Renewables into the US Grid: Is It Sustainable?*, 21 ELEC. J. 9, 13 (2008).

35. Rudnick & Velásquez, *supra* note 5, at 418.

36. *Id.*

37. *Id.*

38. *Id.* at 418-19.

39. Frank A. Wolak, *Transmission Planning and Operation in the Wholesale Market Regime*, *in* 79 TRANSMISSION NETWORK INVESTMENT IN LIBERALIZED POWER MARKETS 101, 122 (Mohammad Resa Hesamzadeh et al. eds. 2020). *See generally* Frank A. Wolak, *Measuring the Competitiveness Benefits of a Transmission Investment Policy: The Case of the Alberta Electricity Market*, ENERGY POL'Y, 2015, at 426.

40. *Transmission Planning and Operation in the Wholesale Market Regime*, *supra* note 36, at 122.

41. Notice of Proposed Rulemaking, *supra* note 19.

42. *Id.* at 26,506; *see* Eric L. Christensen, *FERC Proposes Reforms to Transmission Planning and Cost Allocation; Will Interconnection Reform Be Next?*, THE NAT'L L. REV. (May 4, 2022), https://www.natlawreview.com/article/ferc-proposes-reforms-to-transmission-planning-and-cost-allocation-will.

and local transmission planning to address needs driven by the increases of renewable energy in the resource mix and corresponding changes in demand.[43]

In summary, countries must enhance their transmission planning and grid operations to face challenges posed by the new global energy transition toward NCRE. As illustrated by the Chilean case below, this includes novel regulatory approaches that promote effective development of transmission infrastructure and investments in the whole transmission grid, including areas with NCRE potential.[44]

B. The Need for Increased Flexibility

To respond to the variable character of NCRE,[45] countries' power sectors need to develop more flexibility in operation, planning, and regulation.[46] For example, the massive growth of NCRE in electric power systems demands new ways of developing expansion-planning models.[47] These models are generally created by the specific entity in charge of "deciding which equipment should be selected, where it should be installed, and . . . the best time to install it,"[48] in the power generation, transmission and distribution sectors.[49] For example, when considering reliability in its expansion-planning models, regulators or other entities may need to conduct studies to predict power availability during peak load periods, which becomes more difficult with the increase in NCRE deployment.[50]

In the United States, policymakers have taken different steps to address this load prediction issue.[51] One example is the response to the duck curve phenomenon in California and elsewhere, particularly in states that have increasing deployment and operation of solar power plants.[52] This phenomenon demands innovative

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43. Notice of Proposed Rulemaking, *supra* note 19, at 26,506.

44. Rudnick & Velásquez, *supra* note 5, at 418.

45. R.P. O'Neill, *Transmission Planning, Investment, and Cost Allocation in US ISO Markets*, *in* 79 TRANSMISSION NETWORK INVESTMENT IN LIBERALIZED POWER MARKETS 171, 178 (Mohammad Resa Hesamzadeh et al. eds. 2020).

46. *Id. at* 178-79; s*ee* Marco Nicolosi, *Wind Power Integration and Power System Flexibility–An Empirical Analysis of Extreme Events in Germany under the New Negative Price Regime*, ENERGY POL'Y, 2010, at 7257; *see also* Hannele Holttinen et al., *The Flexibility Workout: Managing Variable Resources and Assessing the Need for Power System Modification*, IEEE POWER AND ENERGY MAG., 2013, at 53.

47. O'Neill, *supra* note 42, at 174.

48. M. Majidi & R. Baldick, *Definition and Theory of Transmission Network Planning*, *in* 79 TRANSMISSION NETWORK INVESTMENT IN LIBERALIZED POWER MARKETS 17, 19 (Mohammad Resa Hesamzadeh et al. eds. 2020).

49. Qixin Chen et al., *Power Generation Expansion Planning Model towards Low-Carbon Economy and Its Application in China*, 25 IEEE TRANSACTIONS ON POWER SYSTEMS 1117, 1117–19 (2010); *see* Alireza Soroudi & Mehdi Ehsan, *A Distribution Network Expansion Planning Model Considering Distributed Generation Options and Techo-Economical Issues*, 35 ENERGY 3364, 3364 (2010).

50. Chen et al., *supra* note 46, at 1117-19.

51. *See* Richard Schmalensee, Competitive Energy Storage and the Duck Curve, ENERGY J., 2022, at 1.

52. *Id.* The "duck curve" refers to the phenomena that "increased penetration of behind-the-meter solar photovoltaic (PV) generation . . . would depress net demand in the middle of the day and increase ramping requirements in the late afternoon." *Id.*

solutions to increase the entire grid's flexibility, including the development of energy storage rules for participation in wholesale markets,[53] which could mitigate power variations and increase grid flexibility.[54] Thus, increased NCRE power generation capacity must be paired with new regulatory approaches to incentivize solutions that ensure grid stability.[55]

If planned for and constructed at the scale needed, increased transmission capacity could serve as a "primary source of flexibility for the power system,"[56] and enable "sharing of the most economic and flexible resources across the power system, key for a secure operation under varying flow patterns."[57] This ability to rely on resources across the system could lead to avoidance of serious curtailments, because additional transmission capacity would be available at critical periods.[58]

C. Challenges in Increasing Transmission Infrastructure Capacity and Extension

In the coming years, the vast majority of transmission expansion projects in many countries will be focused on increasing the transmission grid's capacity to respond to NCRE needs.[59] Because renewable energy generation must be located where the primary energy resource resides, they must be placed in geographic areas which are frequently far from the load centers.[60] Consequently, well-planned transmission line expansion that can serve as common infrastructure for multiple renewable generation projects is economically beneficial for both load centers and NCRE generation hubs.[61] These transmission grid extensions address variability

53. John Kosowatz, *Energy Storage Smooths the Duck Curve*, 140 MECHAL. ENG'G 30, 35 (2018); *see* Paul Dunholm et al., OVERGENERATION FROM SOLAR ENERGY IN CALIFORNIA: A FIELD GUIDE TO THE DUCK CHART 27 (2015); *see also* Alexander J. Headley & David A. Copp, *Energy Storage Sizing for Grid Compatibility of Intermittent Renewable Resources: A California Case Study*, ENERGY J., 2020, at 117310.

54. Said O. Amrouche et al., *Overview of Energy Storage in Renewable Energy Systems*, 41 INT'L J. OF HYDROGEN ENERGY 20914, 20914 (2016).

55. Notice of Intent, Building a Better Grid Initiative to Upgrade and Expand the Nation's Electric Transmission Grid to Support Resiliance, Reliability, and Decarbonization, 87 Fed. Reg. 2769 (2022).

56. Rudnick & Velásquez, *supra* note 5, at 418; *see also* Sattich, *supra* note 12, at 72 (explaining how "the larger, more flexible and diverse a power pool is, the better a network can be stabilized").

57. Rudnick & Velásquez, *supra* note 5, at 418.

58. Kolster et al., *supra* note 16, at 313. *See* Sattich, *supra* note 12, at 72 (explaining how electricity grids must be optimized with interregional power lines providing system operators with the flexibility needed to keep the network stable despite local load changes); *cf.* F.F. Wu et al., *Transmission Investment and Expansion Planning in a Restructured Electricity Market*, 31 ENERGY 954, 961 (2006). However, the difficulty is striking an appropriate balance, because an overbuilding of transmission capacity could also be expensive and economically inefficient. *Id.*

59. Léautier, *supra* note 32, at 75.

60. Rudnick & Velásquez, *supra* note 5, at 418. "Load centers" refer to a particular geographical area where a relevant amount of power is consumed. *Id.*

61. *Id.*

by absorbing additional NCRE generation and meeting changing load requirements.[62] This type of "proactive transmission planning"[63] optimizes major investments "to connect remote areas with high renewable generation potential with load demands."[64]

For example, Brazil has promoted a proactive transmission planning approach.[65] Under the guidance of governmental authorities, private developers of NCRE are in charge of developing plans to interconnect their projects with existing networks.[66] When NCRE developers want to build generation projects, they have to present a technical plan to government authorities that includes the connection demands of their projects and how they intend to cover the associated costs.[67] Placing the responsibility on private developers has ensured that they plan ahead for the interconnection of NCRE in remote areas, and those additional resources allow distribution companies to "ease their capacity burden."[68]

Another useful example is Texas's regulatory approach to promote renewables through improved transmission infrastructure within its state borders.[69] The Competitive Renewable Energy Zone (CREZ) legislation enacted in Texas was a success in facilitating the "access to low-cost wind energy."[70] The 2005 legislative amendments to the Texas Utilities Code imposed a mandate to the Public Utility Commission of Texas to define "competitive renewable energy zones in areas with strong renewable-energy resources and 'develop a plan to construct transmission capacity necessary to deliver to electric customers, in a manner that is most beneficial and cost-effective.'"[71] This policy resulted in "an increase of 11,553 MW of capacity at a cost of over $6.5 billion" over six years.[72] Federal and state governments in the United States continue to consider multiple approaches to increase

62. Tom Brown et al., *Optimising the European Transmission System for 77% Renewable Electricity by 2030*, IET RENEWABLE POWER GENERATION, 2015, at 1, 2; *see* Rodriguez et al., *supra* note 16, at 476 (in the European case, transmission network should be multiple times stronger in capacity to support a fully renewable energies power matrix).

63. Alexandre Moreira et al., *Reliable Renewable Generation and Transmission Expansion Planning: Co-Optimizing System's Resources for Meeting Renewable Targets*, 32 IEEE TRANSACTIONS ON POWER SYSS. 3246, 3247 (2016).

64. *Id.*

65. Marcelino Madrigal & Steven Stoft, TRANSMISSION EXPANSION FOR RENEWABLE ENERGY SCALE-UP: EMERGING LESSONS AND RECOMMENDATIONS xv (2012) available for download at https://openknowledge.worldbank.org/handle/10986/9375.

66. *Id.* at 26.

67. *Id.*

68. *Id.*

69. Madeline Claire Gould, Everything's Bigger in Texas: Evaluating the Success and Outlook of the Competitive Renewable Energy Zone (CREZ) Legislation in Texas v (Aug. 2018) (M.A. thesis, University of Texas at Austin) (on file with Texas ScholarWorks, University of Texas Libraries).

70. *Id.* at 43. *See* R. Ryan Staine, *CREZ II, Coming Soon to a Windy Texas Plain Near You: Encouraging the Texas Renewable Energy Industry through Transmission Investment*, 93 TEX. L. REV. 521, 524, 532 (2014).

71. Staine, *supra* note 70, at 529-28 (quoting Tex. Util. Code Ann. § 39.904(g) (West 2007)).

72. *Id.* at 524. *See* PUB. UTIL. COMM'N OF TEX., COMPETITIVE RENEWABLE ENERGY ZONE PROGRAM OVERSIGHT: CREZ PROGRESS REPORT NO. 14 10 (2014).

transmission expansion, including planning and permitting reforms, partnerships and coordination, and cost allocation initiatives.[73]

In summary, NCRE challenges demand countries to innovate, create new regulatory frameworks, and supply the transmission sector with effective tools to adapt to significant generation mix changes. The following sections analyze the Chilean case, assess the aptitude and efficacy of its energy sector regulations, and distills recommendations and lessons for transmission frameworks elsewhere in the world.

III. THE CHILEAN CASE

This section begins with brief comments on the Latin American perspective on NCRE and delves into the case study of the Chilean electric power transmission sector and regulations, including its existing legal framework and whether its regulations have effectively addressed NCRE challenges. Next, this section identifies continuing challenges to fully ensuring a successful energy transition in the Chilean transmission sector.

A. Why is the Chilean Case Relevant?

Latin America is experiencing a faster increase in carbon dioxide emissions per capita than "the rest of the world."[74] The need to promote and facilitate the construction and operation of NCRE generation is essential to the region, and Latin American countries are responding to the challenge.[75] According to the United Nations Economic Commission for Latin America and the Caribbean, by 2018, Latin America was "a world leader in RE [renewable energy], since it reached almost 28% of total energy consumption, while the world average remained at 18%."[76] Since 2010, the largest increase in NCRE share of the energy matrix within the region has been in "Brazil, Mexico, Chile, and Uruguay."[77]

Chile is a relevant case study because it exemplifies a developing country which has experienced a dramatic change to its power generation matrix in the last decade, despite continuing challenges to NCRE development.[78] The country has moved from a highly polluting and concentrated energy industry, where four companies accounted for 90% of the electricity generation, to being one of the leading

73. Liza Reed et al., HOW ARE WE GOING TO BUILD ALL THAT CLEAN ENERGY INFRASTRUCTURE? CONSIDERING PRIVATE ENTERPRISE, PUBLIC INITIATIVE, AND HYBRID APPROACHES TO THE CHALLENGE OF ELECTRICITY TRANSMISSION 1, 5–6, NISKANEN CENTER (2021), https://www.niskanencenter.org/wp-content/uploads/2021/08/CleanEnergyInfrastructure_Report_08.19.21.pdf.

74. Christian Washburn & María Pablo-Romero, *Measures to Promote Renewable Energies for Electricity Generation in Latin American Countries*, 128 ENERGY POL'Y 212, 212 (2019).

75. *Id.*

76. *Id.* at 213.

77. *Id.* at 221.

78. Clemente Pérez Errázuriz, Normas y Políticas Públicas Destinadas Al Crecimiento de Las Energías Renovables En Chile, REVISTA DE DERECHO AMBIENTAL, 2020, at 9-11.

NCRE generation countries, with multiple companies undertaking NCRE projects.[79] "Chile has been recognized as a world leader among emerging markets for enabling and using sustainable energy."[80]

According to scholars from the LUT University of Finland, Chile has several characteristics that make it a useful case study for studying NCRE regulations.[81] According to the Chilean national inventory on GHG emissions, by 2018, the energy sector represented 77% of the country's total GHG emissions,[82] and "Chile [was] one of the first countries to . . . announce its commitment to reach carbon neutrality by 2050."[83] The amount of renewable power powering the grid "has exceeded by 3.8 times the mandatory target set by the government."[84] However, there is still a long way to go—despite having among the "best solar and wind . . . resources" worldwide,[85] the country has only used "less than 1% of [its renewable energy] potential for electricity generation."[86]

Chile has adopted multiple regulatory approaches to promote NCRE, such as "net metering, certificate system, and grid access, as well as some fiscal incentives for rural areas in electricity production."[87] Among the most relevant regulations for this case study analysis is the establishment of a renewable energy target through an increasing mandatory quota under Law 20.257/2008, which is the first

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79. *Id.* at 9, 10.

80. Osorio-Aravena et al., *supra* note 17, at 2.

81. *See id.* at 2–3 (explaining some of the relevant criteria in detail).

82. MINISTRY OF ENVIRONMENT OF CHILE, INFORME DEL INVENTARIO NACIONAL DE CHILE 2020: INVENTARIO NACIONAL DE GASES DE EFECTO INVERNADERO Y OTROS CONTAMINANTES CLIMÁTICOS 1990-2018 15–17 (2021), https://unfccc.int/sites/default/files/resource/7305681_Chile-BUR4-1-2020_IIN_CL.pdf.

83. Palma Behnke R., et al., CHILEAN NDC MITIGATION PROPOSAL: METHODOLOGICAL APPROACH AND SUPPORTING AMBITION 13, MITIGATION AND ENERGY WORKING GRP. (2019), https://mma.gob.cl/wp-content/uploads/2020/03/Mitigation_NDC_White_Paper.pdf.

84. Osorio-Aravena et al., *supra* note 17, at 2.

85. *Id.* at 3.

86. *Id.* at 2, 13, 77 (reasserting that an energy system based on a 100% of renewable energies is technically and economically feasible in the Chilean case by 2050). According to these authors, Chile has a great potential, and it has been "found that a fully sustainable energy system for Chile could be achieved by 2050 mainly based on three vital elements (from a technological point of view) and three key enablers (from a cost-optimal point of view)." *Id.* at 13. Specifically, the three elements refer to: "high levels of renewable-based electrification across all sectors;" flexibility, through a "combination of electricity exchanges through the grids and the coupling of the sectors;" and "sustainable fuels production." *Id.* Moreover, "the three key enablers . . . to [maintain] a fully sustainable energy system are: solar PV technology, zonal interconnection and full sectoral integration." *Id*. *See* Yeliz Simsek et al., *Review and Assessment of Energy Policy Developments in Chile,* ENERGY POL'Y, 2019, at 87, 88; Rodrigo A. Escobar et al., *Estimating the Potential for Solar Energy Utilization in Chile by Satellite-Derived Data and Ground Station Measurements*, SOLAR ENERGY, 2015, at, 139.

87. Simsek et al., *supra* note 86, at 97; *see* Pérez Errázuriz, *supra* note 78, at 28; *see also* IRENA, RENEWABLE ENERGY IN LATIN AMERICA 2015: AN OVERVIEW OF POLICIES 16 (2015), available for download at https://www.irena.org/publications/2015/Jun/Renewable-Energy-in-Latin-America-2015-An-Overview-of-Policies ("Certificate systems are based on the principle of fixing a quota (absolute or relative) of electricity from renewable energy sources that subject parties (e.g. generators, distributors, consumers) must meet. This is achieved by creating a tradable renewable energy certificate system, where renewable energy producers are awarded certificates according to their production. Producers can then sell those certificates to subject parties who redeem them to meet their quota requirements. The specific design elements are particular to each jurisdiction, including items such as eligible technologies, compliance periods, bankability, etc.").

Latin American statute to establish a quota system and requires electricity generation companies to comply with a 10% annual renewable energy production quota.[88] This law deployed multiple regulatory tools to diversify the Chilean energy matrix and promote NCRE by allowing for different ways to fulfill that quota, including buying certificates from another company with an excess amount of NCRE generation.[89] This quota percentage was later increased to a requirement of 20% NCRE generation by 2025,[90] through one and two percent annual increases,[91] serving as an important "supportive system for clean energies."[92] Compliance by the regulated sector was a success because the quotas were met by every major company.[93] Yet some scholars have argued that the quotas were too low to be a real incentive to the development of renewable energy in the country and could have been set higher.[94]

Chile has also established electric market rules that promote NCRE.[95] For example, the country eliminated minimum power selling amounts in energy markets under Law No. 19,940/2014, which opened energy markets to small NCRE and promoted their economic feasibility.[96] The law allowed these smaller generators to sell energy "with a surplus power of less than 20 MW"[97] and exempted them—totally or partially—from paying the power transmission service toll through the main transmission lines of the network under certain generation limits.[98] Chile also established a new power bidding system under Law No. 20,018/2005, which required electric power distribution companies to secure their electric power supply through a more competitive bidding process, including long-term supply contracts with a maximum 15-year duration.[99] These reforms pro-

88. Sophie Von Hatzfeldt, *Renewable Energy in Chile: Barriers and the Role of Public Policy*, COLUM. J. OF INT'L AFF. (2013); Tania Varas et al., *Evaluation of Incentive Mechanism for Distributed Generation in Northern Chile*, 14 IEEE LATIN AMERICA TRANSACTIONS 2719, 2719 (2016); Cristián Flores-Fernández, *The Chilean Energy "Transition": Between Successful Policy and the Assimilation of a Post-Political Energy Condition*, INNOVATION: THE EUR. J. OF SOC. SCI. RES., 2020, at 173, 179.

89. Pérez Errázuriz, *supra* note 78, at 15.

90. Varas et al., *supra* note 88, at 2719.

91. *See* Law No. 20968, Propicia la ampliación de la matriz energética, mediante fuentes renovables no convencionales, Octubre 22, 2013, Diario Oficial [D.O.] (Chile).

92. Miguel Saldivia & Matías Guiloff, *3 Key Policies behind the Development of Solar Energy in Chile*, *in* GREEN BANKING 665, 666 (Jörg Böttcher ed., 2020).

93. Pérez Errázuriz, *supra* note 78, at 17.

94. *Id.*; *see* MINISTRY OF ENERGY, *MINISTRO JOBET ANUNCIA NUEVA META: "LAS ERNC REPRESENTARÁN EL 40% DE LA MATRIZ AL 2030,"* (2021), https://energia.gob.cl/noticias/nacional/ministro-jobet-anuncia-nueva-meta-las-ernc-representaran-el-40-de-la-matriz-al-2030 (explaining that in June 2021, the previous Minister of Energy announced it would present a bill to the Congress to increase the quota to 40% which to this date has not been done).

95. *The Legal Framework for Renewable Energy in Chile*, LEXOLOGY (2019), https://www.lexology.com/library/detail.aspx?g=88f2a68e-4da7-421d-8986-41016e2f6274.

96. Enrique Benítez et al., *Chile – A Clean Energy Powerhouse* (Jan. 14, 2019), https://www.globalenergyblog.com/chile-a-clean-energy-powerhouse/.

97. Von Hatzfeldt, *supra* note 88.

98. *Id.*

99. Miriam Grunstein et al., *Energy and Natural Resources*, 41 INT'L LAW. 491, 504 (2007).

moted NCRE investments by giving generators the chance to sign long-term contracts with more stable prices.[100] This power bidding system law was later amended by Law No. 20,805/2015, which, among other changes, extended the duration of the supply contracts up to 20 years, facilitated financing of NCRE projects, and permitted energy generators to offer NCRE energy during smaller chunks of time, instead of compromising to supply 24 hours of the day, so that solar projects, for example, did not have to supply during the night as well.[101] The amendments were a success and resulted in substantial energy price reductions, increased competition, and diversification of NCRE generation.[102] The two power auctions following the enactment of these amendments resulted in a 40% decrease in energy prices, with an increasing number of energy offers in the following years.[103]

One of the most remarkable characteristics of the Chilean approach toward NCRE is that the country has been able to successfully promote NCRE largely without using fiscal incentives, subsidies, or feed-in tariffs ("FITs").[104] Rather, the Chilean government developed a holistic regulatory approach to promote the transition to NCRE, as further discussed below.[105]

As a result of the government's actions, the NCRE generation percentile in Chile's electrical matrix grew from 5% in 2014 to over 20% by 2020.[106] This positioned Chile as the second most attractive country for energy transition investment in the world in 2021.[107] Even though the country's GHG emissions are expected to peak in 2027,[108] because of Chile's high dependency on external energy sources like natural gas or coal,[109] its power generation companies are on the path

100. Benítez et al., *supra* note 96.

101. Pérez Errázuriz, *supra* note 78, at 19.

102. Saldivia & Guiloff, *supra* note 92, at 656. *See* Hugh Rudnick & Andrés Romero, *Hacia Un Modelo En Competencia: Licitaciones de Suministro Eléctrico*, *in* REVOLUCIÓN ENERGÉTICA EN CHILE 413, 425 (Máximo Pacheco ed., Universidad Diego Portales First ed. 2018).

103. CHILEAN MINISTRY OF ENERGY, NUEVA LEY CHILENA DE LICITACIÓN DE SUMINISTRO ELÉCTRICO PARA CLIENTES REGULADOS: UN CASO DE ÉXITO 80 (2017), https://www.cne.cl/wp-content/uploads/2017/08/Libro-Licitaciones-de-Suministro-El%C3%A9ctrico.pdf.

104. Simsek et al., *supra* note 86, at 97; Pérez Errázuriz, *supra* note 78, at 11; Osorio-Aravena et al., *supra* note 17, at 2; IRENA, RENEWABLE ENERGY POLICY BRIEF: CHILE 3 (2015), https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2015/IRENA_RE_Latin_America_Policies/IRENA_RE_Latin_America_Policies_2015_Country_Chile.pdf?la=en&hash=304E17839F669D9E62CD40C68391A31364F97892#:~:text=Chile%20has%20a%20target%20to,10%25%20renewable%20electricity%20by%202024.

105. Pérez Errázuriz, supra note 78, at 11.

106. *Id.* at 29; Raúl O'Ryan et al., Renewable Energy Expansion in the Chilean Power Market: A Dynamic General Equilibrium Modeling Approach to Determine CO2 Emission Baselines, 247 J. CLEANER PROD. 119645, 1 (2020); ASOCIACIÓN DE GENERADORAS DE CHILE, REPORTE ANUAL 2020 44 (2021), available for download at http://generadoras.cl/documentos/reportes-anuales/reporte-anual-2020.

107. *Results*, CLIMATESCOPE BY BLOOMBERGNEF (2022), https://global-climatescope.org/results/.

108. MINISTRY OF ENVIRONMENT OF CHILE, *supra* note 82, at 12-13; Osorio-Aravena et al., *supra* note 17, at 2-3.

109. Pérez Errázuriz, *supra* note 78, at 13–14; Flores-Fernández, *supra* note 88*,* at 33. *See* Osorio-Aravena et al., *supra* note 17, at 10 fig. 9; Simsek et al., *supra* note 86, at 90 fig. 3. In fact, in December 2020, the 99.3% of the Chilean electric system had "an installed generation capacity of 26,310 MW, of which 49% corresponds

toward decarbonization, including through committing to early decommissioning and no more new coal plants.[110]

However, challenges remain in Chile's path toward decarbonization. The Chilean energy system structure has been subject to a range of critiques, including allegations of excessive centralization and privatization.[111] There are also socio-political hurdles to overcome.[112] According to Professors Carrasco and Rosner from the University of Chicago, Chilean society remains divided and inconsistent on energy and environmental policy matters, and because of this political problem, the country has not been able to fully satisfy its energy needs from its own vast renewable natural resources.[113] As discussed in the next section, this article dissents from these critiques and presents clear evidence—such as a successful long-term energy policy—proving that both the Chilean government and civil society have reached a virtuous cycle toward the development of NCRE.

Setting aside these hurdles, energy projects in Chile still face multiple institutional and regulatory barriers, which lie beyond the scope of this article.[114] The most pressing hurdles include, for example, long processing times for administrative permits including an environmental impact statement (EIA), difficulties in securing rights to land or water resources (e.g., securing land easement agreements if the land to be occupied is owned by the Chilean state, and local opposition to project development).[115] Indeed, local opposition to a project could delay its EIA and even prevent its approval,[116] although the opposition has typically focused on fossil fuel projects.[117]

B. The Chilean Electricity Transmission Sector

This section analyzes the Chilean transmission sector regulatory framework by identifying the most influential statutes and regulations and then evaluating

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to thermoelectric power plants, 25.9% to hydroelectric power plants, 9.6% to wind power plants, 13.6% to solar photovoltaic power plants, and 1.9% to biomass, geothermal and cogeneration power plants." ASOCIACIÓN DE GENERADORAS DE CHILE, *supra* note 106, at 43.

110. Pérez Errázuriz, *supra* note 78, at 13–14.

111. Flores-Fernández, *supra* note 88, at 173; O'Ryan et al., *supra* note 106, at 2; Osorio-Aravena et al., *supra* note 17, at 3.

112. Flores-Fernández, *supra* note 88, at 174.

113. Camila Carrasco & Robert Rosner, *The Chilean Electricity Sector Confronts Climate Change*, BULL. OF THE ATOMIC SCIENTISTS, 2017, at 395, 395.

114. Shahriyar Nasirov et al., *Assessment of Barriers and Opportunities for Renewable Energy Development in Chile*, ENERGY SOURCES, PART B: ECONS., PLANNING, AND POL'Y, 2016, at 150, 154.

115. Shahriyar Nasirov et al., *Investors' Perspectives on Barriers to the Deployment of Renewable Energy Sources in Chile*, 8 ENERGIES 3794, 3805-7 (2015).

116. Sebastián Huneeus et al., *Delayed and Approved: A Quantitative Study of Conflicts and the Environmental Impact Assessments of Energy Projects in Chile 2012–2017*, SUSTAINABILITY, 2021, at 1, 11.

117. Javiera Barandiarán & Sebastián Rubiano-Galvis, *An Empirical Study of EIA Litigation Involving Energy Facilities in Chile and Colombia*, ENV'L IMPACT ASSESSMENT REV., 2019, at 2-3, 8 (2019). One of the most renowned NCRE cases that has suffered strong local opposition is the wind farm 'Parque eólico Chiloé', which would be installed in the south of Chile, and has faced constant opposition for over a decade. *See* Jaime Garrido et al., *Les Respostes Socials a La Instal· Lació de Parcs Eòlics: El Cas Del Conflicte Mar Brava a La Illa Gran de Chiloé (Xile)*, 15 PAPERS 547 (2015).

their effectiveness in integrating NCRE. From there, the next section presents lessons and recommendations from this Chilean case study for transmission regulatory frameworks addressing NCRE growth and integration throughout other parts of the world.

The analysis begins with a few words of caution. This article aims to evaluate the impact of Chilean laws and regulations on its generation mix, but as the Chilean energy lawyer Pérez Errázuriz explains,[118] when measuring a regulatory measure's success on promoting NCRE, it is difficult to isolate the aggregate effect of one measure over another measure or factor, especially in light of cost decreases accelerated by technological innovation.[119] Additionally, this section only identifies the relevant regulations on the Chilean transmission sector from recent decades rather than historically, and limits discussion to those regulations that have played an important role in securing the transition to NCRE.[120]

C. Regulatory Framework

According to Professors Rudnick and Velásquez from the Pontifical Catholic University of Chile,[121] the modern regulatory transmission framework in Chile is characterized by several factors: the inclusion of scenario planning processes, by combining "predictive, explorative, and normative" scenarios;[122] development of spare capacity to ensure a robust transmission expansion;[123] flexibility in the transmission sector;[124] simplification of the "transmission cost allocation" methods;[125] the development of new "spatial transmission planning and siting" instruments, with a prominent state role;[126] and "open access to the transmission system" for renewable generation.[127] The success of the framework itself is due in large part to the Ministry of Energy's support of NCRE, the development of Chile's long-term energy policy, and a new transmission law designed to adapt the transmission

118. Pérez Errázuriz, *supra* note 78, at 30.

119. *Id.*

120. Enzo Enrique Sauma Santis, *Políticas de Fomento a Las Energías Renovables No Convencionales (ERNC) En Chile* (2012); Carlos Rodríguez Delgado, *Las Energías Renovables No Convencionales (ERNC) En Chile*23–28 (June 2018) (B.S. final degree project, Universidad de Sevilla); Javiera Soledad Turra Cid, *Energías Renovables No Convencionales: Mecanismos de Incentivo Para Su Inserción En El Mercado Eléctrico* (October 2019) (L.L.M. thesis, Universidad del Desarrollo Facultad de Derecho); Cristóbal Ricardo Muñoz Barañao, *Un Modelo de Expansión de La Red de Transmisión Eléctrica Compatible Con El Crecimiento de Las Energías Renovables No Convencionales En Chile* (July 2011) (M.S. thesis, Pontificia Universidad Católica de Chile); Daniel Alfonso Celis Rioseco, *Conexión de Energías Renovables No Convencionales Al Sistema Eléctrico* (2011) (Diploma in Engineering report, Pontificia Universidad Católica de Chile).

121. Rudnick & Velásquez, *supra* note 5, at 426–42.

122. *Id.* at 426.

123. *Id.* at 428.

124. *Id.* at 428–29.

125. Rudnick & Velásquez, *supra* note 5, at 431-32.

126. *Id.* at 433.

127. *Id.* at 442.

sector to Chile's changing energy matrix.[128] This section briefly discusses each of these three key regulatory pieces and identifies their main characteristics.

1. The Ministry of Energy

The creation of the Ministry of Energy (Ministry) has provided more autonomy to the electric sector within the government, by establishing a specialized authority for the development of innovative and long-term energy policies.[129] The Ministry, created by Law No. 20,402/2009,[130] has the legal mandate to prepare and coordinate plans, policies, and standards for the proper operation and development of the electric sector.[131] From its creation, the Ministry has played a critical role in championing the development of NCRE, and "long-term energy planning in Chile [has] gained momentum and accelerated after [its] establishment."[132]

A recent example of how the Ministry influenced NCRE development is the presentation of its "Just Transition Strategy" in December 2021.[133] This strategy, resulting from extensive participative processes, proposes multiple criteria for the retirement of coal power plants in the country, with the goal of promoting NCRE.[134] Specifically, this strategy delineates a comprehensive approach for the energy transition from fossil fuels to renewable energy, in the electricity, mining, industrial, and transportation sectors, and even in housing.[135]

2. The Ministry's Long-Term Energy Policy

The Ministry's Long Term Energy Policy, developed in three steps, played a decisive role in the integration of NCRE into Chile's generation mix.[136] The first step, called "Energy Agenda: A Country Challenge, Progress for All" (Energy Agenda),[137] recognized that the expansion of the transmission sector is key to the efficient and economic development of NCRE potential in the country.[138] Specifically, the Energy Agenda formally announced the interconnection of the two largest electric subsystems or grids of the country, established an inclusive participation process to decide the regulatory changes to the transmission system, and took

128. Alejandro Vergara Blanco, Regulación Del Procedimiento Concesional Eléctrico. Diagnóstico de Problemas, Actas de Derecho de Energía 401, 401 (2012), Thomas Reuters Legal Publishing. *See also* Law No. 20.402, Crea el Ministerio de Energía, Estableciendo Modificaciones al DL N° 2224, de 1978 y a Otros Cuerpos Legales, Diciembre 3, 2009, DIARIO OFICIAL [D.O.] (Chile).

129. *Id.*

130. Law No. 20.402, *supra* note 129.

131. *See* Law No. 2.224, Crea el Ministerio de Energía y la Comision Nacional De Energía, Mayo 25, 1978, DIARIO OFICIAL [D.O.] (Chile). Modified by Law No. 20.402.

132. Simsek et al., *supra* note 86, at 91.

133. CHILEAN MINISTRY OF ENERGY, ESTRATEGIA DE TRANSICIÓN JUSTA EN EL SECTOR ENERGÍA (2021), https://energia.gob.cl/sites/default/files/documentos/estrategia_transicion_justa_2021.pdf.

134. *Id.* at 7.

135. *Id.*

136. Flores-Fernández, *supra* note 88.

137. CHILEAN MINISTRY OF ENERGY, AGENDA DE ENERGÍA: UN DESAFÍO PAÍS, PROGRESO PARA TODOS (2013), https://energia.gob.cl/sites/default/files/documentos/agenda_de_energia_version_completa_esp.pdf [hereinafter AGENDA DE ENERGÍA].

138. *Id.* at 46.

first steps toward regulatory reforms to adapt the operation of electricity grids for the efficient and safe incorporation of NCRE.[139] The Energy Agenda was the result of extensive dialogue between the Ministry and multiple social, political, parliamentary, municipal, business, NGO, and academic actors, including coordination with universities and other academic entities.[140] After the Energy Agenda was published, the most relevant regulatory reform announced was the development of a bill to pass a new transmission law within one year.[141]

The second step, called "Roadmap 2050: Toward a Sustainable and Inclusive Energy for Chile" (Roadmap),[142] recognized a historical lack of governmental involvement in the long-term strategic planning of energy transmission infrastructure.[143] To address this deficiency, the Roadmap established a 2025 commitment to adapt transmission regulations to eliminate competition barriers in generation, among other guidelines.[144] The Roadmap also emphasized the necessity of improving energy efficiency throughout the whole system to avoid the excessive expansion of transmission infrastructure and its socioenvironmental impacts.[145]

Third, the Ministry presented the "Chilean Energy Policy 2050" (2050 Policy)[146] with the main goal of advancing the country toward sustainable energy, in all its dimensions, based on attributes of reliability, social inclusion, competitiveness, and environmental sustainability.[147] Regarding the transmission sector, the 2050 Policy acknowledges the necessity of a long-term energy plan to guide the adequate and timely development of electricity transmission infrastructure.[148] The 2050 Policy also emphasizes the need to periodically review transmission grid design to respond to the new power system and demand reconfiguration needs driven by NCRE growth.[149] Therefore, besides explicitly addressing the role of NCRE in combatting climate change, the 2050 Policy also recognizes the transmission sector's role in decarbonization and promotes a proactive planning approach to transmission development to support NCRE growth and integration.[150]

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139. *Id.* at 61–62.

140. *Id.* at 7.

141. AGENDA DE ENERGÍA, *supra* note 137, at 61.

142. CHILEAN MINISTRY OF ENERGY, HOJA DE RUTA 2050: HACIA UNA ENERGÍA SUSTENTABLE E INCLUSIVA PARA CHILE (2015), https://www.energia.gob.cl/sites/default/files/hoja_de_ruta_cc_e2050.pdf [hereinafter HOJA DE RUTA 2050].

143. *Id.* at 46.

144. *Id.* at 58.

145. *Id.* at 59.

146. CHILEAN MINISTRY OF ENERGY, ENERGÍA 2050: POLÍTICA ENERGÉTICA DE CHILE (2015), https://www.energia.gob.cl/sites/default/files/energia_2050_-_politica_energetica_de_chile.pdf [hereinafter ENERGÍA 2050].

147. *Id.* at 39. *See* Flores-Fernández, *supra* note 88, at 180.

148. ENERGÍA 2050, *supra* note 146, at 65, 104.

149. *Id.* at 97.

150. *Id.* at 71–81.

3. New Electricity Transmission System

As a result of the work in planning and developing the 2050 Policy, and from the participative processes of the Energy Agenda, the Chilean Congress enacted Law No. 20,936/2016 (Electricity Transmission System Law).[151] This new law was designed to adapt the transmission sector to the growth of renewable energy and address other local transmission regulatory problems, such as the intricate process of routing new transmission projects over private land.[152] Notably, it established a new nation-wide transmission system by directing the interconnection of the two largest Chilean electricity systems or grids, as previously envisioned in the Energy Agenda.[153] In doing so, the law led to the establishment of electrical connections between fourteen of the sixteen regions in the country, and has been lauded as "another advantage for attaining a fully sustainable energy system."[154] For example, joining these two grids facilitated the flow of NCRE-generated electricity from the Atacama Desert to the center of the country, which has the highest energy demand.[155]

The new Electricity Transmission System Law also established a new Independent Coordinator of the National Electricity System (*Coordinador Independiente del Sistema Eléctrico Nacional* or Coordinator) in charge of the new National Electric System[156] and of planning new transmission infrastructure.[157] This Coordinator "was conceived as a technical and independent organism [from the Ministry of Energy]."[158] Among its many duties, it is tasked with coordinating

151. Law No. 20936, Establece un Nuevo Sistema de Transmisión Eléctrica y Crea un Organismo Coordinador Independiente del Sistema Eléctrico Nacional, Julio 20, 2016, DIARIO OFICIAL [D.O.] (Chile).

152. Rudnick & Velásquez, *supra* note 5, at 422. *See generally* Rafael Ferreira et al., *The Expansion of Transmission: The Challenges Faced in South America*, 14 IEEE POWER AND ENERGY MAG., 2016, at 54, 60–61.

153. Flores-Fernández, *supra* note 88. The Chilean energy system used to have four independent subsystems or electricity grids, divided according to its geographical location. *Id.* Nonetheless, as planned in the 2014 Energy Agenda, and mandated by Law No. 20,936/2016, by November 2017 the two biggest subsystems or grids were connected, creating the National Electric System (*"Sistema Eléctrico Nacional"* or *"SEN"* for its acronym in Spanish), and representing 99.3% of the national installed capacity. *Id.* These systems were the Northern Interconnected System ("Sistema Interconectado del Norte Grande" or "SING" for its acronym in Spanish) and the Central Interconnected System ("Sistema Interconectado Central" or "SIC" for its acronym in Spanish). *Id.* This interconnection directly addressed the problem of transmission lines expansion to connect renewable energy hubs with energy demand. *Id. See also* Rudnick & Velásquez, *supra* note 5, at 418; Von Hatzfeldt, *supra* note 88, at 205; Javier García Monge & Pamela Delgado Moreno, ANÁLISIS DE BARRERAS PARA EL DESARROLLO DE ENERGÍAS RENOVABLES NO CONVENCIONALES 14, PROGRAME CHILE SUSTANABLE PROPUESTA CUIDADANA PARA EL CAMBIO (2011), https://www.chilesustentable.net/wp-content/uploads/2011/03/Analisis-de-Barreras-para-el-desarrollo-de-ERNC_nov2011.pdf (discussing the challenge to connect renewable energy hubs with demand through the expansion of transmission lines).

154. Osorio-Aravena et al., *supra* note 17, at 31.

155. *Id.*; *see* Flores-Fernández, *supra* note 88, at 183.

156. Law No. 20936, *supra* note 151, at Art. 1, No. 38, Art. 212. *See generally* Flores-Fernández, *supra* note 88, at 182–83.

157. Juan Francisco Mackenna, *Law 20,936: New Power Transmission Systems and New Independent Coordinating Body*, CAREY (Aug 9, 2016), https://www.carey.cl/en/law-establishes-new-power-transmission-systems-and-creates-an-independent-coordinating-body-for-the-national-power-system-law-no-20-936/.

158. Flores-Fernández, *supra* note 88, at 183.

the electricity market—including the economic transactions between the regulated actors,[159] authorizing connection to the transmission systems by third parties,[160] and overseeing the security of the electric system, such as the observance of technical safety requirements.[161] The Coordinator even participates in transmission expansion planning by preparing a proposal at the beginning of each year with transmission segments to be considered in further expansion projects, which are then analyzed by the National Energy Commission along with private actors that bid to develop those segments, and finally approved by the Ministry of Energy.[162]

Additionally, the Electricity Transmission System Law directs the Ministry of Energy to "prepare long-term energy scenarios"[163] and develop "a long-term energy plan" every five years "for different energy scenarios that include expansion of generation and energy demand, in a horizon of at least thirty years."[164] According to the Law, this energy planning process should include a wide range of considerations for possible development scenarios, such as the energy supply and demand projection scenarios, particularly for electricity, the identification of generation development poles,[165] the development of distributed generation, the role of international energy exchanges, and the interaction with environmental policies that have an impact and energy efficiency objectives.[166]

Other key transmission-related elements of this Law include, for example, heightened requirements to justify transmission expansion beyond the already existing reliability and least-cost production factors, such as competitiveness and resiliency benefits, the incorporation of scenario analyses and consideration of spare transmission capacity benefits in long-term transmission planning, and proactive transmission expansion for renewable energy hubs.[167] All of these transmission planning obligations imposed on Chilean governmental agencies "aim[] to select the set of projects that meet future transport needs at the minimum system costs for the planning horizon."[168]

D. How Chilean Regulations Addressed Contemporary Challenges of Electricity Transmission

As previously discussed, transmission development around the world faces multiple challenges, including planning problems, the grid's need for more flexibility, and the electric sector's need for both better investment coordination and

159. Law No. 20936, *supra* note 151, at Art. 1, No. 3, Art. 72-3.

160. *Id.* at Art. 1, No. 3, Art. 72-5.

161. *Id.* at Art. 1, No. 3, Art. 72-6.

162. *Id.* at Art. 1, No. 4, Art. 91.

163. Flores-Fernández, *supra* note 88, at 183.

164. Simsek et al., *supra* note 86, at 87–88. *See* Law No. 20936, *supra* note 151, at No. 3 Art. 83.

165. These development poles, or hubs, are defined in Chilean law as a location with resources for renewable energy power generation, where the use of a unique power transmission system is in the public interest because it is economically efficient for power supply. *See* Law No. 20936, *supra* note 151, at No. 4 Art. 85.

166. *See* Law No. 20936, *supra* note 151, at No. 3 Art. 83.

167. *See* Ferreira et al., *supra* note 152, at 61; Rudnick & Velásquez, *supra* note 5, at 421–22.

168. Fernando Fuentes & Pablo Serra, *Chilean Electric Transmission Regulation: From a Merchant Approach to Central Planning*, ENERGIES, 2022, at 1, 7.

vast increases in transmission capacity and infrastructure.[169] This section evaluates the effectiveness of the Chilean regulatory framework and its ability to address these challenges,[170] and sets the foundation for recommendations proposed in the following section. The discussion begins with identifying specific Chilean regulatory provisions that addressed the contemporary transmission problems identified in the first part of this article and continues with analyses of how those transmission regulations have been implemented.

1. Addressing Transmission Planning Problems

An important power transmission sector goal is "achieving efficient investment"[171] through generation and transmission investment coordination, or seeking the "optimal capacity, sequence and timing of transmission network investments."[172] As discussed below, the way that Chile's transmission investment planning and coordination has unfolded is the product of its particular characteristics, i.e., the Chilean power system promotes a free and competitive market, and the amount of State intervention in the development of the electric market power is limited.[173]

The modern Chilean electric regulatory framework was established by the 1982 "Decree with Force of Law" ("*Decreto con Fuerza de Ley*" or "DFL") No. 4, also known as the "General Law of Electrical Services" ("*Ley General de Servicios Eléctricos*" or "LGSE").[174] This law established two key principles to achieve efficient investment in the electric sector: "(i) the safe and cost-efficient operation of the electricity system, and (ii) the existence of a competitive market in the field of generation-transmission and a price market in the field of distribution."[175] Additionally, the LGSE distinguished between three energy segments: generation, transmission, and distribution, [176] which, as a result, promoted the establishment of separate regulations, and even the privatization and division of State-controlled companies.[177] Indeed, in the early 1970s, two state companies (Endesa and Chilectra) owned 90% of generation, 100% of over 500 Kva transmission, and 80% of distribution.[178] During the 1980s these two companies were divided into multiple companies to operate within one of the specific segments, and by the 1990s the majority of the energy sector was under private control.[179] In

169. *See* Section II.

170. Carrasco & Rosner, *supra* note 113; Osorio-Aravena et al., *supra* note 17*,* at 77; Simsek et al., *supra* note 86.

171. Hesamzadeh et al., *supra* note 19, at 1.

172. *Id.*

173. Flores-Fernández, *supra* note 88, at 179.

174. *Id.*

175. *Id.*

176. Ronald D Fischer & Pablo Serra, EFECTOS DE LA PRIVATIZACIÓN DE SERVICIOS PÚBLICOS EN CHILE: CASOS SANITARIO, ELECTRICIDAD Y TELECOMUNICACIONES 46 (2004).

177. *Id.* at 43.

178. *Id.* at 42.

179. *Id.* at 43-45.

fact, the LGSE largely left the development of electric projects to the private sector, "with the State playing a role of supervision, referential planning of investments, and analysis and calculation of prices and tariffs."[180]

Additionally, to facilitate modern transmission planning, the new Chilean regulatory framework on transmission and NCRE—which includes the Ministry's three step policy development and the subsequently enacted Electricity Transmission System Law, discussed above—promotes the adoption and formulation of broad and long-term power planning throughout the generation and transmission sector.[181]

Despite having these regulatory structures in place, challenges remain.[182] The demand for enhancing transmission and generation investment coordination persists, especially in linking NCRE hubs to demand centers, which are typically distant from each other in this particularly long country.[183] As some scholars have argued, challenges are not merely geographical, and "economic risks and strategic considerations curb the development of . . . coordinated transmission solutions,"[184] because there are many "difficulties associated to planning, coordination and allocation of the costs and risks of proactive transmission investments."[185]

To aid in overcoming these problems, professors from the University of Chile and Pontifical Catholic University of Chile developed a new study that evaluated the benefits that come from investment coordination on the transmission network.[186] Specifically, they focused on "the land use externalities of the necessary network infrastructure that serves to integrate coming renewable generation"[187] from a socio-environmental perspective.[188] Their results showed that by coordinating new transmission infrastructure, the costs on network investments and land use externalities are reduced by around 21%, compared with a non-coordinated scenario.[189] Specifically, the costs they evaluated included "the network investment monetary cost and the socio-environmental (land use externality) cost associated with new lines (in addition to the cost of operating the power system, i.e. economic dispatch of generation . . .)."[190] The study concluded by calling on network regulators to develop more suitable methods to "recognize land use externalities from various network plans and determine the set of new expansions,"[191] and to create "appropriate mechanisms for coordination of the needed network

180. Flores-Fernández, *supra* note 88, at 179.
181. *Id.*
182. *Id.*
183. Rudnick & Velásquez, *supra* note 5, at 419.
184. *Id.* at 444.
185. *Id.*
186. Matamala et al., *supra* note 22, at 251.
187. *Id.* at 252.
188. *Id.* at 259.
189. *Id.*
190. Matamala et al., *supra* note 22, at 256.
191. *Id.* at 259.

expansions,"[192] including "institutional arrangements,"[193] and "cost-reflective network charges that encourage coordination."[194]

2. Signs of Increased Flexibility

As discussed above, due to the enormous growth of highly variable electric power from NCRE sources, traditional expansion-planning models must be flexible by addressing resilience and reliability.[195] Chilean regulations have adopted different approaches to enhance flexibility within the transmission sector in the face of disruptions from NCRE variability.[196] For example, the three stages of the Long-Term Energy Policy, and the Electricity Transmission System Law, which enacted most of the Policy's vision, promoted the interconnection of the two largest electric subsystems of the country to increase resilience and reliability.[197] Additionally, both the Long-Term Policy and the Electricity Transmission System Law recognized the necessity of greater flexibility by establishing a gradual adaptation of the electricity grid for the efficient incorporation of NCRE, with a proactive planning approach that promotes periodic reviews of the transmission grid design.[198]

Resilience concerns are grave given climate change scenarios that could disrupt wind patterns used by turbines[199] or water availability for hydro-generation.[200] Chile is also prone to earthquakes and other natural disasters, which is a foreseeable factor endangering power supply, so the country's energy policies should be ready to address "quick changes and unexpected disasters."[201] The new Electricity Transmission System Law considers these factors by adding resilience to the benefits that would justify transmission expansion plans.[202]

3. Increasing Capacity and Extension of Transmission Infrastructure

As discussed above in section II.C., to appropriately respond to NCRE generation needs, transmission infrastructure must also expand and increase in capacity. That expansion allows renewable energy hubs to connect with load centers and increases the resilience and flexibility of the grid at the same time.[203] To facilitate that expansion, regulators and the private sector must optimize major investments through a proactive transmission planning approach.[204]

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192. *Id.* at 256.

193. *Id.*

194. Matamala et al., *supra* note 22, at 256.

195. *See* Section II.

196. Matamala et al., *supra* note 22, at 252.

197. Fuentes & Serra, *supra* note 168, at 10.

198. *See* Law No. 20936, *supra* note 151, at No. 3 Art. 83.

199. Simsek et al., *supra* note 86, at 100.

200. Esteban Gil et al., *Addressing the Effects of Climate Change on Modeling Future Hydroelectric Energy Production in Chile*, ENERGIES, 2021, at 1, 19.

201. Simsek et al., *supra* note 86, at 100.

202. Law No. 20936, *supra* note 151, at No. 4 Art. 87 letter a.

203. *See* Section II.C.; Fuentes & Serra, *supra* note 168, at 10.

204. *See* Section II.A.

Chile's Long-Term Energy Policy successfully sets a proactive planning vision.[205] For example, it acknowledges the advantages of the type of adequate and timely development of electricity transmission infrastructure borne from proactive planning.[206] This policy also promotes the inclusion of holistic social and local considerations into the decision-making processes of transmission expansion, through the development of land-use planning.[207] Furthermore, as previously discussed, the 2050 Policy and the new Electricity Transmission System Law together delegated long-term planning duties to multiple agencies, which all clearly recognize the need to expand and adapt transmission infrastructure for NCRE.[208] Moreover, the new Chilean Electricity Transmission System Law incorporated the need to expand and increase the capacity of transmission infrastructure, by incorporating scenario analysis and consideration of spare capacity benefits in long-term transmission planning.[209] Indeed, this law explicitly discusses proactive transmission expansion for renewable energy hubs.[210]

As scholars have thoughtfully observed, transmission expansion and integration of NCRE should also consider "local energy markets and microgrids to provide an alternative for centralized energy production and long-distance energy transmission."[211] Addressing distributed generation and demand-side resources will increase resilience throughout the grid.[212] For example, in 2013, Chile passed Law No. 20,571/2013, which allowed the creation of a net billing scheme for residential power generation,[213] which mandates payment for energy injected from NCRE into the electricity system by customers whose installed capacity is less than 100 kW.[214] Although a full exploration of Chile's distributed generation efforts lies outside the scope of this article, the net billing scheme, enacted to "promote self-consumption and distributed generation, in addition to efficient and environmentally friendly generation," was an integral step to modernizing Chile's grid more broadly.[215]

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205. MINISTRY OF CHILE, LONG TERM ENERGY PLANNING IN CHILE (2018), https://www.irena.org/-/media/Files/IRENA/Agency/Webinars/LTES_IEA-and-Chile/20181128_LTES-CEM-PELP.pdf?la=en&hash=45FC6D46E617F4AB8527E50BC580449189BE77F1.

206. ENERGÍA 2050, *supra* note 146, at 65, 104.

207. *Id.*

208. Flores-Fernández, *supra* note 88, at 183; Simsek et al., *supra* note 86, at 87–88.

209. Law No. 20936, *supra* note 151, at No. 4 Art. 87. *See* Rudnick & Velásquez, *supra* note 5, at 422.

210. Law No. 20936, *supra* note 151, at No. 4 Art. 85. *See* Section II.C.3.

211. Simsek et al., *supra* note 86, at 99.

212. *See* Section III.D.2.

213. David Watts et al., *Potential Residential PV Development in Chile: The Effect of Net Metering and Net Billing Schemes for Grid-Connected PV Systems*, RENEWABLE AND SUSTAINABLE ENERGY REV., 2015, at 1037, 1050. Although there is an ongoing discussion on whether to develop new regulations that allow "time integration periods used in Net Billing schemes to accelerate the residential PV market and incentivize investment in distributed residential PV." *Id.*

214. Varas et al., *Evaluation of a net billing incentive mechanism for distributed generation in Northern Chile*, Symposium on Energy, Efficiency and Sustainability, 2015, at 2.

215. *Id.* at 3.

4. Assessing Chilean Regulatory Effectiveness from its Contemporary Implementation Challenges

Despite the regulatory efforts to promote the growth and flexibility of the transmission network, Chile still needs to develop and build new transmission systems to harness and transport the NCRE produced in remote areas to the largest load centers of the country.[216] Scholars from Universidad Autral de Chile, University of Jaén, and LUT University have estimated that Chile must increase "at least 1.5 times" the existing transmission capacity from the north to the capital, to ensure a sustainable transition through renewable energy.[217] In fact, given the current "plan to decommission all coal-fired power plants by 2040," there will be an increasing demand for more NCRE, especially for solar projects in the north and wind farms in the south of Chile.[218] The country is also planning for "the electrification of cities through electromobility, new heating and air conditioning systems in residences, commerce and industry, as well as the replacement of fossil fuels with green hydrogen,"[219] all of which will also increase NCRE demand.[220]

According to official Chilean governmental data, as of May 2022, there are 263 NCRE power plants in construction, for a total of 4,860 MW.[221] In the twelve months before May 2022, a total of 11,432 MW of power generation projects obtained their environmental permits, which are one the last major permits before beginning construction.[222] These figures show a clear trend of increasing amounts of NCRE generation in Chile's energy mix, which will, in turn, demand more transmission infrastructure.[223]

Despite the policies and regulations set in place by the Ministry of Energy and the Chilean Congress, there is a consensus within the Chilean energy market sector that NCRE generation is growing at a much faster pace than the transmission lines that would be needed to transmit the produced energy.[224] Indeed, although the interconnection of the country's main transmission networks has been successful, "the NCRE spillover trend [or the loss of energy generated due to the inability to transmit it to load] has increased in the last years . . . although with fluctuations explained by the entry into service of lines connecting the locations

216. Osorio-Aravena et al., *supra* note 17, at 17.

217. *Id.* at 14.

218. Rudnick & Velásquez, *supra* note 5, at 419.

219. Jorge Molina Alomar, *Transmisión Eléctrica: Clave Para Aprovechar El Auge de La Generación Limpia, Requiere de Urgente Inversión En Infraestructura Para Evitar La Pérdida de Energía*, PAÍS CIRCULAR (2021), https://www.paiscircular.cl/industria/transmision-electrica-clave-para-aprovechar-el-auge-de-la-generacion-limpia-requiere-de-urgente-inversion-en-infraestructura-para-evitar-la-perdida-de-energia/.

220. MINISTRY OF ENERGY OF CHILE, CARBONO NEUTRALIDAD EN EL SECTOR ENERGÍA: PROYECCIÓN DE CONSUMO ENERGÉTICO NACIONAL 2020 36, 53 (2020), https://energia.gob.cl/sites/default/files/pagina-basica/informe_resumen_cn_2019_v07.pdf.

221. COMISIÓN NACIONAL DE ENERGÍA DE CHILE, REPORTE MENSUAL: SECTOR ENERGÉTICO JUNIO 2022, VOL. NO. 88, 5 (2022).

222. *Id.* at 21.

223. *Id.*

224. Molina Alomar, *supra* note 219; Fuentes & Serra, *supra* note 168, at 9–12.

of NCRE plants to large demand centers."[225] In this sense, the "continued rapid expansion of NCRE absorbed the new [transmission] capacity, recording January 2022 as the highest monthly energy loss on record,"[226] because of bottlenecks and congestion, and the following months with similar loss percentages.[227] As a result, the transmission sector companies are under pressure, and on September 2020, it founded its own trade association to push and lobby for improvements in the coordination required between the key stakeholders to plan and execute transmission projects quickly enough to keep up the pace of NCRE generation increase.[228]

The steps taken by Chilean lawmakers and regulators have supported faster development of new transmission lines. Specifically, there are two major projects in recent years that have benefited from these actions.[229] One project is the upgrade of Cardones-Polpaico, the largest line in the central-north regions of Chile with 468 miles line of 500 kV to increase its resilience and transmission capacity by 85% in five years, as proposed by its controller ISA Interchile.[230] This project was submitted to the National Energy Commission for consideration the first semester of 2021, just one year after the beginning of operations for the initial Cardones-Polpaico transmission line, given the increasing demand from NCRE.[231] It has been argued by its controller that this expansion —if approved— could be built faster than the original project, considering the existing transmission line and the improvements on transmission regulation.[232]

The second project is the construction of the Kimal-Lo Aguirre transmission line, which would run parallel to the Kapatur-Cardones line —already interconnected with the Cardones-Polpaico line.[233] This project was included in the 2017 expansion plans of the Chilean authorities, its adjudication process was completed four years later on December 2021, and it is estimated to enter into operation in ten years.[234] Despite the new regulations, the adjudication process still took four

225. Fuentes & Serra, *supra* note 168, at 10. *See* Molina Alomar, *supra* note 219.

226. Fuentes & Serra, *supra* note 168, at 10. *See* VALGESTA NUEVA ENERGÍA, BOLETÍN INFORMATIVO: AÑO 12 NO. 5, 4 (2022) available for download at https://valgesta.com/inicio/en/noticias/.

227. *See* VALGESTA NUEVA ENERGÍA, *supra* note 226, at 4.

228. *See* Molina Alomar, *supra* note 219; ELECTRICIDAD, NUEVO GREMIO EN EL SECTOR ELÉCTRICO: ASOCIACIÓN DE TRANSMISORES DE CHILE (2020), https://www.revistaei.cl/2020/09/23/nuevo-gremio-en-el-sector-electrico-asociacion-de-transmisores-de-chile/; Jorge Alomar Molina, *Acelerar Los Proyectos de Transmisión Eléctrica, El Principal Desafío Del Nuevo Gobierno Para Impulsar La Transición Energética*, PAÍS CIRCULAR (2022), https://www.paiscircular.cl/agenda-2030/acelerar-los-proyectos-de-transmision-electrica-el-principal-desafio-del-nuevo-gobierno-para-impulsar-la-transicion-energetica/ ("We all have to 'step up the pace.' For the development of the transmission works that decarbonization requires, both good planning and execution with the highest standards are required. In both aspects, the contribution of all authorities, both technical and political, central and local, working hand in hand with the companies, is key.").

229. *See* Molina Alomar, *supra* note 219.

230. *Id.*; VALGESTA NUEVA ENERGÍA, BOLETÍN INFORMATIVO: AÑO 11 NO. 12, 2 (2021), available for download at https://valgesta.com/inicio/en/noticias/.

231. EL DIARIO FINANCIERO, INTERCHILE LANZA PROYECTO PARA AUMENTAR CAPACIDAD DE CARDONES-POLPAICO CON INVERSIÓN DE CASI US $ 1.700 MILLONES (2020), https://acera.cl/interchile-lanza-proyecto-para-aumentar-capacidad-de-cardones-polpaico-con-inversion-de-casi-us-1-700-millones/.

232. *Id.*

233. Matamala et al., *supra* note 22, at 251-52.

234. Fuentes & Serra, *supra* note 168, at 10.

years to be completed, even when transmission development progress in Chile within the next five to ten years is critical for securing the grid's necessary capacity and resilience, and its ability to avoid NCRE spillovers.[235]

According to Professors Fuentes and Serra from the Economy Schools of Diego Portales University and University of Chile, these NCRE curtailments have three potential explanations.[236] First, the new transmission projects are late, "and their implementation was too sparing to avoid RE [renewable energy] curtailments."[237] Second, the "sociocultural variables that have delayed transmission investments," have not been appropriately taken into consideration.[238] Third, the curtailments can simply be attributed to a "lack of capacity in the country to build all the new transmission projects required by the rapid expansion of NCRE."[239]

Their analysis concentrates on the execution timing of transmission expansion projects, and concludes that "[i]mplementation difficulties that systematically delay the start-up of planned works explain" the curtailment of NCRE due to congestion.[240] In particular, "[t]he increasing empowerment of civil society in the decision-making processes of new investments is relevant in explaining delays, especially in approving environmental permits."[241] Accordingly, the authors call for more "realistic timelines"[242] estimates in the planning, bidding, permitting, and execution of transmission projects, and for reducing these timelines by fast-tracking their implementation, especially within stages outside of the sole jurisdiction of energy authorities, such as environmental impact assessment procedures.[243]

In summary, during recent decades, Chile has developed a strong regulatory framework to address some of the most pressing contemporary issues on power transmission and NCRE integration.[244] The country has developed regulatory and policy instruments, assessed above in this article and by other scholars, in three broad analytical categories — transmission planning problems, increased flexibility, and increased capacity and extension of transmission infrastructure.[245] The effectiveness of these regulatory and policy reforms is now being reflected in the changing energy matrix, regulatory compliance, and other statistics discussed above showing how NCRE has thrived in Chile.[246]

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235. *See* ENERGÍA ESTRATÉGICA, CARLOS FINAT: «PROBABLEMENTE ESTEMOS ATRASADOS 5 O 10 AÑOS EN LAS LÍNEAS DE TRANSMISIÓN QUE SE NECESITAN HOY DÍA» (2020), https://www.energiaestrategica.com/finat-advierte-atrasos-en-obras-electricas-que-condicionaran-el-crecimiento-de-las-renovables-en-chile/ ("We are probably 5 to 10 years behind in the lines that are needed today.").

236. Fuentes & Serra, *supra* note 168, at 10.

237. *Id.*

238. *Id.*

239. *Id.*

240. Fuentes & Serra, *supra* note 168, at 13.

241. *Id.*

242. *Id.*

243. *Id.*

244. Fuentes & Serra, *supra* note 168, at 3.

245. *Id.* at 10; *see* Molina Alomar, *supra* note 219.

246. *See* Section III.A.

However, the work is not yet done. The effectiveness of these regulations will be tested by the current transmission network scenario and its expected future trajectory, which reveals an ever-increasing gap between the NCRE generation and the transmission capacity of the country. Indeed, NCRE spillover effects have reached historic numbers in 2022.[247] Therefore, the current regulatory framework will need further improvements to enhance its effectiveness and keep up the pace of NCRE generation, such as addressing the challenges that Fuentes and Serra raised regarding environmental permits and land-use agreements, among others, which lie outside the exclusive domain of energy regulation.[248]

IV. TWO REGULATORY LESSONS

Countries need to develop regulatory approaches that ensure a fast-paced and robust development of NCRE to avoid the catastrophic scenarios posed by climate change.[249] Section II of this article proposed three broad analytical categories to assess the regulatory effectiveness of transmission regulations on integrating NCRE, and Section III focused on Chile's transmission regulations as a case study. Subsequently, the article assessed the regulatory effectiveness of these regulations and their challenges and solutions, including timely implementation of new infrastructure, increase of transmission capacity, grid resilience, and enhanced transmission and generation coordination. Despite the multiple implementation constraints that the Chilean regulatory framework continues to face, this section distills two main lessons from the Chilean case for other countries attempting to develop a regulatory framework for successful NCRE transmission integration.

These lessons are flexible and should be adapted on a case-by-case basis because the ability for these lessons to be extrapolated into another regulatory framework depends on the specific characteristics of the country. For example, each country's unique natural resources and existing environmental conditions could influence the development of specific NCRE. Moreover, the preexisting regulatory and administrative framework could be decisive: for example, in the United States, state policies may be in tension with federal policies regarding planning, permitting, construction, and cost allocation of transmission infrastructure.[250]

A. The First Brick in the Wall: A Comprehensive Long-Term Energy Policy

The first lesson is that the most important regulatory action to promote the development of NCRE is the establishment of a Long-Term National Energy Policy. In Chile, this energy policy was divided into about three stages: an energy roadmap, an energy agenda, and the 2050 energy policy.[251] Each of these policy

247. *See* Fuentes & Serra, *supra* note 168, at 10; *see also* Molina Alomar, *supra* note 219.

248. *See* Fuentes & Serra, *supra* note 168.

249. *Strengthening and Implementing the Global Response*, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, https://www.ipcc.ch/sr15/chapter/chapter-4/.

250. Reed et al., *supra* note 73, at 2–3; Johannes Saurer & Jonas Monast, *Renewable Energy Federalism in Germany, and the United States*, 10 TRANSNAT'L ENV'TAL L., 293, 297 (2021).

251. Flores-Fernández, *supra* note 88.

stages should be supported by an inclusive and participative process.[252] In Chile, the policy development process incorporated perspectives from every relevant stakeholder in the energy sector, including academics, technicians, companies, and communities.[253]

The Chilean 2050 Policy, established in 2012, is a useful illustration of the importance of a national energy policy because it served many roles at different regulatory stages.[254] First, it served to define national goals, such as the will to favor NCRE over fossil-fueled powered generation and the decision to engage in proactive transmission planning to address NCRE issues.[255] This policy also served as a roadmap to guide the legislative agenda promoted by the Chilean government to tackle the main NCRE transmission issues described in prior sections.[256] This legislative process then resulted in the development of the new Electricity Transmission System Law, which set forth standards for regional grid interconnection, long-term planning obligations, and substantive transmission planning transformations, including the proactive transmission expansion of renewable energy hubs and amendments to the definition of new transmission projects' routes,[257] all to ensure a flexible, resilient, and reliable system.[258]

Indeed, long-term energy policies like the 2050 Policy can have a profound impact on the promotion and growth of NCRE and related transmission infrastructure, particularly when promoted by a high-level agency mandated specifically to address energy issues, like the Chilean Ministry of Energy.[259] Data from the Association of Chilean Energy Generators (*Asociación de Generadoras de Chile)* shows that NCRE generation capacity in the Chilean electrical matrix increased from 5% in 2014 to over 20% by 2020,[260] positioning Chile as the second most attractive country for energy transition investment in the world in 2021.[261] Chile's Long-Term Energy Policy also served as a roadmap for private actors in the power generation sector because it incentivized commitments to early decommission of new coal plants.[262]

In summary, national long-term energy policies can be the first brick in the wall in establishing transformative and progressive regulatory reform to achieve NCRE integration and to build the transmission needed to deploy NCRE. From a regulatory effectiveness lens, a national long-term policy serves as a comprehensive first step to tackle a wide variety of power transmission issues, including most

252. Fuentes & Serra, *supra* note 168, at 8.

253. *See id.* ("This participatory planning reduces the risks of inefficient expansions by improving electricity generation and consumption forecasts with stakeholders' inputs.").

254. Flores-Fernández, *supra* note 88;. ENERGÍA 2050, *supra* note 146, at 130–37.

255. ENERGÍA 2050, *supra* note 146, at 130–37.

256. HOJA DE RUTA 2050, *supra* note 142.

257. *See* Section III.C.3.

258. Fuentes & Serra, *supra* note 168, at 10.

259. Flores-Fernández, *supra* note 88.

260. Pérez Errázuriz, *supra* note 78, at 29; O'Ryan et al., *supra* note 106, at 1; ASOCIACIÓN DE GENERADORAS DE CHILE, *supra* note 106, at 44.

261. CLIMATESCOPE BY BLOOMBERNEF, *supra* note 107. *See* Section III.A.

262. Pérez Errázuriz, *supra* note 78, at 35.

of the transmission planning problems described in prior sections, like the need for increased grid flexibility and capacity.[263]

Stepping back, however, success with a long-term energy policy and the enactment of innovative laws require political continuity in the policy agenda of successive governments.[264] In Chile, despite their different political factions, the country's multiple Presidential Administrations have maintained a similar policy approach towards NCRE, which has allowed the adoption and implementation of national long-term policies to thrive.[265] Indeed, the Chilean "regulations and public policies promoted have been successful, [because] they show a constant and exponential increase in the participation of these type of sources in the electricity matrix (especially solar and wind) in the short and medium term."[266] However, there is a worldwide need to elucidate how our societies can "accept and use the technological changes," and which and how extensive are the key contemporary barriers "to government policy regarding the energy transition in Chile."[267] Only with that understanding could a more comprehensive and effective approach be shaped for further advances.

B. Toward a New Electricity Transmission System Statute

The second lesson from the Chilean case is the importance of enacting a transmission system-specific statute, or reforming an existing statute to address transmission system concerns more comprehensively.[268] The Chilean case study shows that the adoption of a transmission-specific statute allows governments to enhance grid modernization by incorporating multiple regulatory tools into the transmission sector.[269] For example, the recent Chilean Electricity Transmission System Law facilitated the interconnection of the two largest regional grids in the country, provided for a scenario-based long-term planning approach to transmission grid expansions, and allowed for the consideration of NCRE integration in transmission planning decision-making processes.[270]

To be fully comprehensive, any electricity transmission system statute should explicitly include provisions to resolve the interconnection issues that NCRE face within conventional transmission systems. Some scholars have argued that, in Chile, "there are no clear policies to promote the connection of these projects."[271] On the contrary, the new Electricity Transmission System Law establishes a new transmission legal category called "development poles transmission system" ("*sistemas de transmisión para polos de desarrollo*"), comprised of transmission

263. *See* Section IV.A.
264. Flores-Fernández, *supra* note 88.
265. *Id.* at 178-80.
266. *Id.* at 173-74.
267. Osorio-Aravena et al., *supra* note 17, at 17.
268. *See* Section IV.A. and Section IV.B.
269. *See* Law No. 20936, *supra* note 151.
270. *Id.* at Art. 1, No. 3, Art. 72-6. *See also* Flores-Fernández, *supra* note 88.
271. Saldivia & Guiloff, *supra* note 92, at 666.

lines and electrical sub-stations specially created for these development poles.[272] These development poles, or hubs, are defined in Chilean law as a location with resources for renewable energy power generation, where the use of a unique power transmission system is in the public interest because it is economically efficient for the region's power supply.[273] The Ministry of Energy must identify these development poles within its long-term energy plans and prepare a technical report that includes a strategic environmental impact assessment of the plans that include those development poles.[274] Consequently, the Electricity Transmission System Law established a specific legal entity that mandates the planning of new transmission lines to hubs where NCRE plants would be located.[275]

In summary, the direct promotion of NCRE connectivity to the grid through a comprehensive regulatory approach and a long-term energy policy could be decisive in supporting the exponential growth of NCRE in a country's energy matrix. Such a long-term approach would enhance regulatory effectiveness by establishing the framework to begin solving transmission planning problems, including investment coordination difficulties and how to sufficiently increase transmission infrastructure capacity to address complications arising from increasing NCRE deployment. The development of transmission-specific statutes will also support the need for grid flexibility, because the intermittency and variability of NCRE can be managed more easily with a robust and expansive transmission grid that connects multiple NCRE hubs together with a country's main grid system.

Finally, as previously discussed, the enactment of a statute is not the end, but just the beginning of the path towards effective NCRE transmission systems. Careful attention to the quality of the statute's implementation, such as the timely planning and construction of new transmission infrastructure developed from these reforms, will be essential to determine its effectiveness. In fact, as previously analyzed, it could be possible that major implementation constraints arise from legal and regulatory areas outside of energy regulation, including environmental permitting.[276] Other factors may also impact the effectiveness of a statute, including the multiple interpretations that the actors carrying out the statute might have of the statute's meaning and purpose,[277] or the impacts of court interpretations of the statute under judicial review.[278]

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272. Law No. 20936, *supra* note 151, at No. 4 Art. 75.

273. *Id*. at No. 4 Art. 85.

274. *Id.*

275. *Id.*

276. *See* Section IV.

277. *See generally* Jerry L Mashaw, *Norms, Practices, and the Paradox of Deference: A Preliminary Inquiry into Agency Statutory Interpretation*, 57 ADMIN. L. REV. 501 (2005); Abbe R Gluck & Lisa Schultz Bressman, *Statutory Interpretation from the Inside-An Empirical Study of Congressional Drafting, Delegation, and the Canons: Part I*, 65 STAN. L. REV. 901 (2013); Christopher J. Walker, *Inside Agency Statutory Interpretation*, 67 STAN. L. REV. 999 (2015); Aaron Saiger, *Agencies' Obligation to Interpret the Statute*, 69 VAND. L. REV. 1231 (2016).

278. *See generally* T.R.S. Allan, *Judicial Deference and Judicial Review: Legal Doctrine and Legal Theory*, 127 L. Q. REV. 96 (2011); Wendy Wagner, *Revisiting the Impact of Judicial Review on Agency Rulemakings: An Empirical Investigation*, 53 WM. & MARY L. REV. 1717 (2011).

V. CONCLUSION

This article assessed the regulatory effectiveness of the Chilean electricity transmission sector in the development and integration of NCRE. The article proposed and considered three analytical categories in analyzing transmission challenges: transmission planning problems, the need for increased flexibility, and the need for increased transmission infrastructure capacity and growth. Through these lenses, the article identified key Chilean regulations and policies that influenced the transition toward a more sustainable energy matrix, including a 2050 Long-Term Energy Policy, a new Electricity Transmission System Law, and the resulting interconnection of major regional grids in Chile.[279] Then, through an assessment of the Chilean regulatory framework, the article identified the main continuing challenges of the transmission sector, including how to timely build new infrastructure or upgrade existing infrastructure.

Finally, the article distilled two regulatory lessons. The first lesson is the importance of a long-term energy policy for supporting a transmission sector that integrates NCRE, which should include an inclusive and participatory process that identifies the main priorities, principles, and directives for the electric power sector. This long-term policy can serve as a roadmap to define and legitimize specific regulatory actions to ensure a successful transmission transition and adaptation of NCRE generation. The second lesson is the importance of enacting or reforming a comprehensive electricity transmission system statute. Despite the implementation challenges that emerge after statutory enactment, such a statute would be critical to establishing regional grid interconnections, considering NCRE in the long-term planning, or taking other needed steps to modernize the transmission sector.

In summary, as illustrated by the Chilean case study, the transmission sector has been and will continue to be a protagonist in the renewable energy transition. Countries that fail to recognize the urgency and importance of modernizing their transmission grids and governing regulations could compromise their timely transition to NCRE.

279. Law No. 20936, *supra* note 151, at Art. 1, No. 3, Art. 72-6.

ENERGY EQUITY: A FRAMEWORK FOR EVALUATING SOLAR PROGRAMS TARGETING LOW-INCOME COMMUNITIES

Priya Patel[*]

Abstract: This article will examine the concepts of energy burden and energy equity to outline a framework for evaluating the recent deployment of solar programs targeting low-income communities. Energy burden is defined as the percentage of income spent on energy costs. Low-income households spend a disproportionate share of their income on house energy costs. The recent shift in addressing energy equity and energy burden shows great promise for promoting energy affordability in urban areas, but engaging all households to participate in solar programs and incentives, especially low-income households, is a significant challenge. There is no straightforward definition for energy equity, but it has different components: procedural equity, distributive equity, and structural equity. Assessing these programs' effectiveness through an energy equity lens can help identify additional characteristics that might influence a program's success. This article adopts an "energy equity" framework to analyze the solar programs implemented in Washington, D.C., New Orleans, and Los Angeles that target low-income communities. Specifically, the article examines those three programs to discover if each: (1) incorporates community participation and outreach as a part of the program; (2) recognizes and engages all low-income households; (3) removes or avoids barriers to entry; (4) collects, tracks, and reports data on solar program participation and engagement; and (5) effectively reduces energy burden for low-income households.

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I. INTRODUCTION

Energy powers life's necessities, including storing and cooking food, heating and cooling homes, and in some cases, powering crucial medical devices.[1] Households that struggle to meet their energy needs are considered "energy insecure."[2] Such households tend to "engage in risky behaviors to meet their energy needs" and pay their utility bills.[3] Some use "high-interest payday loans."[4] Others rely on dangerous energy or heat sources or "forego[] . . . food and medical care."[5] "Energy-insecure households are more likely to remain in poverty" and will disproportionately experience "adverse mental and physical health" issues.[6]

Household energy costs do not track household income nor do they always correlate with a household's square footage.[7] However, some key energy cost-drivers can negatively correlate with income.[8] For example, lower income homes frequently do not have efficient weatherization of the building envelope that is characteristic of more expensive homes.[9] Also, lower income homes may have appliances that are less energy efficient – and may support the needs of more residents per square foot.[10] Those that study this issue define "energy burden" as "the share of a household's income that is spent on energy utilities."[11] Every household in the United States has an energy burden.[12] However, low-income households

1. Trevor Memmott et al., *Sociodemographic Disparities in Energy Insecurity Among Low-Income Households Before and During the COVID-19 Pandemic*, NATURE ENERGY, Feb. 2021, at 186.

2. *Id.*

3. *Id.*

4. *Id.*

5. Memmott et al., *supra* note 1, at 186.

6. *Id.*

7. *Id.*

8. *Id.*

9. Marilyn A. Brown et al., *High Energy Burden and Low-Income Energy Affordability: Conclusions from a Literature Review*, PROGRESS IN ENERGY, Oct. 2020, at 1, 16.

10. *Id.* at 5-6 (citing Ariel Drehobl & Lauren Ross, *Lifting the High Energy Burden in America's Largest Cities: How Energy Efficiency Can Improve Low-Income and Underserved Communities*, AM. COUNCIL FOR AN ENERGY-EFFICIENT ECON. (Apr. 20, 2016), https://www.aceee.org/research-report/u1602).

11. *Id.* at 3-4.

12. *Id.* at 4.

spend a disproportionate share of their income on home energy costs.[13] "Annual electricity bills exceeding six percent of total household income are widely considered to be financially unsustainable."[14] This can require households to forego meeting some of their energy needs (such as adequate heating or cooling) or reduce their ability to afford other necessities.[15] Renewable energy, particularly wind and solar, is playing an increasing role in U.S. energy policy targeting low-income communities impacted by energy burden.[16]

An excessive energy burden is present in low-income households in both rural and urban regions of the United States.[17] However, the character of that burden differs significantly between rural and urban populations.[18] Rural households generally experience higher energy burdens than urban households.[19] In some states, like Georgia, rural energy burdens are higher "at every income level compared to their urban counterparts."[20] Although urban areas have higher utility rates than their rural counterparts, rural households have greater energy burdens because the housing tends to "lie[] in older, less-efficient housing, lack[ing] . . . access to energy efficiency, . . . in deeply rooted housing disparities."[21] Rural areas have more single-family rental housing, while urban areas have more multifamily housing, or apartment buildings.[22] Rural areas also face unique challenges related to "a lack of economic diversification, geographic isolation, and barriers to accessing public and private resources, creating particularly challenging relationships with the energy sector."[23] Despite the disproportionate energy burdens experienced by both urban and rural communities, this article seeks to examine what policies are effective in addressing energy burden. Such policies are more likely to be seen in urban

13. Brown et al., *supra* note 9, at 5.

14. Michelle Moore, *Bridging the Rural-Urban Energy-Efficiency Divide*, GREENBIZ (Mar. 28, 2022), https://www.greenbiz.com/article/bridging-rural-urban-energy-efficiency-divide.

15. Brown et al., *supra* note 9, at 7.

16. *Id.* at 25.

17. Moore, *supra* note 14.

18. *Id.*

19. *Id.*

20. *Id.* (citing Elvis Moleka, *A Call to Action: Analyzing Rural Energy Burdens in Georgia*, GROUNDSWELL, INC. (2022), https://groundswell-web-assets.s3.amazonaws.com/lift-solar/Energy+Impoverishment+and+Climate+Change+(1).pdf) ("With a statewide [low-to-moderate-income] energy burden of 19.4 percent . . . 14 of [Georgia's] 159 counties have average [low-to-moderate-income] energy burdens exceeding 30 percent.").

21. Moore, *supra* note 14 ("Disproportionate rural energy burdens aren't limited to low-income [rural] households. In fact, rural Georgians at every income level experienced higher energy burdens than their urban counterparts. Why? Rural residents don't have higher utility rates than people who live in cities. The explanation lies in older, less-efficient housing, lack of access to energy efficiency, and in deeply rooted housing disparities.").

22. *Id.*

23. Ann M. Eisenberg & Elizabeth Kronk Warner, *The Precipice of Justice: Equity, Energy, and the Environment in Indian Country and Rural Communities*, 42 ENERGY L.J. 282, 284 (2021) (citing Ann M. Eisenberg, *Distributive Justice and Rural America*, 61 B.C. L. REV. 189, 224 (2020)) (examining the frameworks of energy justice, environmental justice, climate justice, and just transitions as they pertained to Indian country and coal-reliant rural communities while acknowledging the overlaps and distinctions between the two communities).

settings and are only starting to be addressed in rural communities and cooperatives.[24] This article restricts its analysis to three major metropolitan areas that have implemented significant renewable energy policies targeting low-income communities: Washington D.C. (DC), New Orleans, and Los Angeles. This article will track the elements of energy equity outlined, *infra*.

These cities were selected for a variety of reasons. The low-income programs in these cities are comparable and target the urban population. Each city is located in a different geographic location of the United States: the East Coast, the West Coast, and the South. Geographic diversity of the programs can help provide a comprehensive examination of low-income households across the United States despite the small sample size. The selection of these cities also allowed a view of the efficacy of such programs when applied to customers of a variety of utility ownership structures.[25] It is important to note that the scope of this article is limited to these three cities based on the availability of data and geographic diversity. Similar and notable programs in other cities were not included to maintain the geographic diversity of this article's scope.

- Washington, D.C. receives distribution service from the Potomac Electric Power Company (commonly referred to as "Pepco"), an investor-owned subsidiary of Exelon.[26] Although Pepco serves areas outside of Washington, D.C.[27] Its activities within the DC footprint are regulated by the District of Columbia Public Service Commission and it must comply with laws established by Washington, D.C.'s local government.[28] Residents of Washington, D.C. may elect to receive their electricity supply from a competitive supplier.[29]

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24. *See* Moore, *supra* note 14 (pointing out the example of LIHEAP and other "national energy-efficiency programs [being] either insufficient or [not reaching] into rural communities").

25. *Investor-owned Utilities Served 72% of U.S. Electricity Customers in 2017*, U.S. ENERGY INFO. ADMIN. (Aug. 15, 2019), https://www.eia.gov/todayinenergy/detail.php?id=40913. The U.S. Energy Information Administration "classifies utilities into three ownership [structures]: investor-owned utilities, publicly run or managed utilities, and cooperatives." *Id.* "Investor-owned utilities . . . are large electric distributors . . . owned by shareholders," while publicly owned utilities are government entities or "utilities . . . vot[ed] into existence" outside of the local government. *Id.* "Cooperatives . . . are not-for-profit member-owned utilities." *Id.* "According to the U.S. Energy Information Administration . . . [a]lthough there are fewer investor-owned utilities than the other two types of utilities, they tend to be very large. Investor-owned utilities serve three out of every four utility customers nationwide." *Id.*

26. *Potomac Electric Power Company (Pepco)*, ENERGY STAR, https://www.energystar.gov/about/content/potomac_electric_power_company_pepco_1.

27. *Id.*

28. *Energy Supply Options*, PEPCO, https://www.pepco.com/MyAccount/MyService/Pages/DC/EnergySupplyOptions.aspx.

29. *See* D.C. Code § 34-1502(b)(1) ("Customer choice must be available for all consumers, regardless of customer class, no later than 2 years after the initial implementation date."). *See also* D.C. Code § 34-1501(14) (defining "[c]ustomer choice" as "the right of electricity suppliers and consumers to use and interconnect with the electric distribution system on a nondiscriminatory basis in order to distribute electricity from any electric supplier to any customer. Under this right, consumers shall the opportunity to purchase electricity supply from their choice of licensed electricity suppliers.").

- Entergy New Orleans, another subsidiary of an investor-owned utility (Entergy), supplies energy to New Orleans and is regulated by the New Orleans City Council, not the Louisiana Public Service Commission.[30] Entergy New Orleans is a vertically-integrated utility and provides residents with both electricity and distribution services.[31]
- The Los Angeles Department of Water and Power (LADWP) is "the largest municipal water and power utility in the [United States]," supplying a majority of electricity to the City of Los Angeles.[32] Like Entergy New Orleans, LADWP is also vertically integrated, and provides both electricity and distribution services to residential customers.[33]

Section II of this article will provide additional clarity on the concepts of energy burden and energy equity. Section III will briefly catalog and contextualize the Washington, D.C., New Orleans, and Los Angeles programs. Section IV will analyze these policies based on the framework established in Section II.

II. ENERGY BURDEN AND ENERGY EQUITY

Before analyzing the energy programs and policies, it is necessary to examine the terms "energy burden" and "energy equity" conceptually and outline a framework of energy equity that will be used to analyze the solar programs targeting urban low-income households.

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30. *See* NEW ORLEANS, LA., CODE OF ORDINANCES, § 3-130(1)(2022) ("The Council of the City of New Orleans have all powers of supervision, regulation, and control consistent with the maximum permissible exercise of the City's home rule authority and the Constitution of the State of Louisiana and shall be subject to all constitutional restrictions over any . . . electric, gas, heat, power . . . and other public utility providing service within the City of New Orleans . . . .").

31. Michael Isaac Stein, '*No Place to Go But Up': Entergy Critics Urge a New Look at Abandoned Plan to Sell Transmission Grid, Break Up Vertical Monopoly*, THE LENS (Oct. 5, 2021), https://thelensnola.org/2021/10/05/no-place-to-go-but-up-entergy-critics-urge-a-new-look-at-abandoned-plan-to-sell-transmission-grid-break-up-vertical-monopoly.

32. *Who we Are*, L.A. DEP'T OF WATER AND POWER, https://www.ladwp.com/ladwp/faces/ladwp/aboutus/a-whoweare?_adf.ctrl-state=1c6q6pmp8h_96&_afrLoop=317741138301984&_afrWindowMode=0&_afrWindo...&_afrWindowId=null#%40%3F_afrWindowId%3Dnull%26_afrLoop%3D317741138301984%26_afrWindo...%3D%26_afrWindowMode%3D0%26_adf.ctrl-state%3Dwbl5mtbt3_4. Other cities within Los Angeles County, such as Claremont, Malibu, and Compton, are served by Southern California Edison, a subsidiary of investor-owned utility Edison International. S. CAL. EDISON, SOUTHERN CALIFORNIA EDISON'S SERVICE AREA, https://download.newsroom.edison.com/create_memory_file/?f_id=5cc32d492cfac24d21aecf4c&content_verified=True (last updated Apr. 25, 2019).

33. *Power Today*, L.A. DEP'T OF WATER AND POWER, https://www.ladwp.com/ladwp/faces/ladwp/aboutus/a-power/a-p-pastandpresent/a-p-pp-powertoday?_adf.ctrl-state=uas5puvtp_17&_afrLoop=204664016102798.

A. Energy Burden

The U.S. Department of Energy (DOE) defines energy burden as "the percentage of gross household income spent on energy costs."[34] However, there is no standardized measure or specific percentage that determines whether a household's energy burden is disproportionate or not.[35] DOE estimates "the national average energy burden for low-income households is 8.6%."[36] It also estimates the energy burden for non-low-income households to be just 3%.[37] As noted, *infra*, some researchers believe energy burden is unsustainable for a household when energy bills are more than 6% of the household's annual gross income.[38] That number is based on estimates that a household can only afford to spend up to 30% of the household income on shelter costs, of which 20% would be used for energy bills.[39] Other researchers argue that the energy burden affordability threshold is 11% of a household's gross annual income, based on the estimate that around 50%

34. *Low-Income Community Energy Solutions*, U.S. DEP'T OF ENERGY, https://www.energy.gov/eere/slsc/low-income-community-energy-solutions.

35. Drehobl & Ross, *supra* note 10, at 10.

36. U.S. DEP'T OF HOUSING AND URBAN DEV., METHODOLOGY FOR DETERMINING SECTION 8 INCOME LIMITS (2016), https://www.huduser.gov/portal/datasets/il//il18/IncomeLimitsMethodology-FY18.pdf.

37. *Low-Income Community Energy Solutions*, *supra* note 34 ("[T]he national average energy burden for low-income households is 8.6%, three times higher than for non-low income households which is estimated at 3%. . . . Of all U.S. households, 44%, or about 50 million, are defined as low-income [according to the U.S. department of Housing and Urban Development, Office of Policy Development and Research].").

38. *Home Energy Affordability Gap*, FISHER SHEEHAN & COLTON, http://www.homeenergyaffordabilitygap.com/index.html.

39. AM. COUNCIL FOR AN ENERGY-EFFICIENT ECON., UNDERSTANDING ENERGY AFFORDABILITY 1 n.2, https://www.aceee.org/sites/default/files/energy-affordability.pdf (citing FISHER SHEEHAN & COLTON, *supra* note 38).

of household income can be used for shelter costs, of which 22% are expected to be used for energy costs.[40]

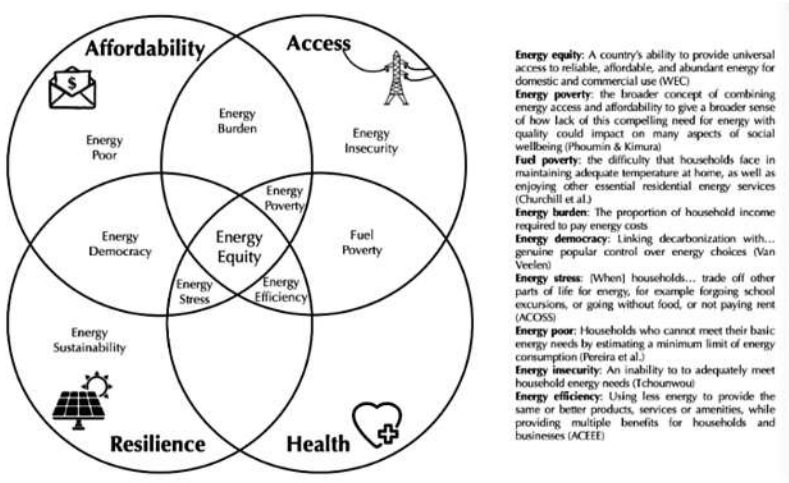

Figure 1. Dimensions of Energy Issues and Metrics.[41]

Although there is no consensus as to the precise percentage of energy burden that is unsustainable, a number of studies have shown that low-income households in the United States, including a disproportionate share of minority households, have higher energy burdens than the average household in their relative cities.[42] Unfortunately, a higher energy burden is correlated with secondary impacts, e.g.

40. APPLIED PUBLIC POL'Y RESEARCH INST. FOR STUDY AND EVALUATION & FISHER, SHEEHAN, AND COLTON, RATEPAYER-FUNDED LOW-INCOME ENERGY PROGRAMS: PERFORMANCE AND POSSIBILITIES iv (2007), http://www.appriseinc.org/reports/NLIEC%20Multi-Sponsor%20Study.pdf.

41. Lucy Hummer, Sustainable G.W. Fellow. There are a myriad of different dimensions relating to energy issues that overlap with one another. *Id.* For example, energy burden can be confused for "energy insecurity," which involves the instability in making utility bill payments that leaves a household vulnerable to losing energy services. *Id.* Other concepts, like "energy poverty" and "energy access," are separate constructs that operate in different contexts, which are not the primary focus of this article since the focus is on energy burden. *Id.* The charts above provide clarification to distinguish energy burden from the various dimensions of energy issues and metrics. *Id.*

42. Drehobl & Ross, *supra* note 10, at 3–4 ("[T]he overwhelming majority of single-family and multifamily low-income households (those with income at or below 80% of area median income), minority households, low-income households residing in multifamily buildings, and renting households experienced higher energy burdens than the average household in the same city. For example, the median U.S. energy burden across all cities [was] 3.5%. The median low-income household's energy burden was more than twice as high at 7.2%, and three times greater than higher income households (2.3%). Overall, low-income households experienced the highest energy burden (7.2%), followed by African-American households (5.4%), low-income households living in multifamily buildings (5.0%), Latino households (4.1%), and renting households (4.0%)."). *See* U.S. DEP'T OF ENERGY, LOW-INCOME HOUSEHOLD ENERGY BURDEN VARIES AMONG STATES – EFFICIENCY CAN HELP IN ALL OF THEM (2018), https://www.energy.gov/sites/prod/files/2019/01/f58/WIP-Energy-Burden_final.pdf [hereinafter LOW-INCOME HOUSEHOLD ENERGY BURDEN].

a greater risk for "respiratory diseases and increased stress," which is then amplified by economic hardship and cyclical poverty.[43]

However, relying on net income alone as a predictor of energy burden may not be reliable. Energy burden can vary by region, even for individuals in the same socio-economic group, because energy-related costs depend on a variety of factors including the weather patterns at different geographic locations, the type and efficiency of the available housing, energy costs, and behavioral factors.[44] For example, the American Council for an Energy-Efficient Economy reports that in Los Angeles, "the median energy burden is [about] 2.2%, [but] the median low-income energy burden is 6%."[45] On the other hand, in Washington D.C., the "median energy burden is 2%, [while] the median low-income energy burden is [around] 7.5%."[46]

As noted above, high energy burdens on low-income families have several causes related to "location and geography, housing characteristics, socio-economic situation, [and] energy prices and policies."[47] Policy makers in the utility space that want to address disproportionate local energy burden should consider how utility rates impact low-income households, the availability and effectiveness of subsidy programs targeting low-income households, and the behavioral components of energy consumption in the targeted low-income community, such as lack of knowledge and lifestyle.[48]

This article assesses these programs based on whether they reduced participants' energy burden as a percentage of the total cost of housing. In addition, this article evaluates the programs' mechanisms (if any) for addressing the secondary impacts that a reduction in energy costs can have.

B. Energy Equity

There is no straightforward definition for energy equity.[49] "Equity" has different components: procedural equity, distributive equity, and structural equity.[50] Procedural equity involves inclusively engaging stakeholders and representatives

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43. Drehobl & Ross, *supra* note 10, at 3.

44. *Low-Income Community Energy Solutions*, *supra* note 34. *See also* LOW-INCOME HOUSEHOLD ENERGY BURDEN, *supra* note 42.

45. AM. COUNCIL FOR AN ENERGY-EFFICIENT ECON., ENERGY BURDENS IN LOS ANGELES (2020), https://www.aceee.org/sites/default/files/pdfs/aceee-01_energy_burden_-_los_angeles.pdf. The American Council for an Energy-Efficient Economy finds "a high energy burden is considered to be above 6%" "of income spent on home energy bills," "while a severe energy burden [is] above 10%." *Id.* "[About] 17% of Los Angeles households . . . have a high energy burden" and about "9% of . . . households . . . have a severe energy burden." *Id.*

46. AM. COUNCIL FOR AN ENERGY-EFFICIENT ECON., ENERGY BURDENS IN WASHINGTON, DC (2020), https://www.aceee.org/sites/default/files/pdfs/aceee-01_energy_burden_-_washington_dc.pdf. About "14% of Washington, D.C. households . . . have a high energy burden" and about "7% of . . . households have a severe energy burden." *Id.*

47. Brown et al., *supra* note 9, at 5–6.

48. *Id*.

49. *Energy Equity*, AM. COUNCIL FOR AN ENERGY-EFFICIENT ECON., https://www.aceee.org/topic/energy-equity.

50. *Id.*

in decision-making and implementation of programs and policies.[51] Distributive equity involves a just distribution of benefits and services across all levels of a community based on need.[52] Structural equity, also frequently referred to as recognition equity, refers to recognizing and understanding the social inequities that plague marginalized communities as opposed to more privileged communities.[53] Framing energy equity using these components will provide a comprehensive understanding of the solutions needed to combat energy burden.

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51. *See* Angela Park, *Equity in Sustainability: An Equity Scan of Local Government Sustainability Programs*, URB. SUSTAINABILITY DIRS. NETWORK i:4 (2014), https://www.usdn.org/uploads/cms/documents/usdn_equity_scan_sept_2014_final.pdf (defining procedural equity as "inclusive, accessible, authentic engagement and representation in the process to develop or implement programs or policies"); Dr. Darren McCauley et. al., *Advancing Energy Justice: The Triumvirate of Tenets*, 32 INTL. ENERGY L. REV. 107 (2013) (defining procedural justice as the ability of people to be involved in decision-making about energy system infrastructures and technologies and the fairness of those decision-making processes). *See also* Brown et al., *supra* note 9 (defining procedural equity as "the idea of fairness and transparency of the processes the allocate resources and resolve disputes. . . . Inclusive and authentic engagement in the process to develop, implement, and adjudicate programs or policies is key to procedural equity."). The absence of procedural equity is seen in a number of remediation programs aimed for overburdened communities, such as the U.S. Superfund program, due to "bias in prioritization and program delivery." Simone J. Domingue & Christopher T. Emrich, *Social Vulnerability and Procedural Equity: Exploring the Distribution of Disaster Aid Across Counties in the United States*, AM. REV. OF PUB. ADMIN., 2019, at 897 (citing Martin Burda & Matthew Harding, *Environmental Justice: Evidence from Superfund Cleanup Durations*, J. OF ECON. BEHAV. & ORG., 2014, at 380). Without Spanish language assistance, Latino communities face procedural barriers to government programs, as documented by environmental justice studies. *Id.* (citing David Schlosberg, DEFINING ENVIRONMENTAL JUSTICE: THEORIES, MOVEMENTS, AND NATURE (Oxford Academic ed., 2007)).

52. *See* Park, *supra* note 51, at i:1 (defining distributional equity as access to "programs and policies [that] result in fair distributions of benefits and burdens across all segments of a community, prioritizing those with highest need"); *see also* McCauley et al., *supra* note 51, at 2 (defining distributional justice as the issues relating to the distribution of the benefits and burdens of energy deployment, including economic issues and issues relating to "the siting of energy infrastructure"); Brown et al., *supra* note 9, at 2 (defining distributive equity as "fairness in the allocation of rights or resources, arguing that one's place of birth, social status, and family influences are matters of luck that should not unduly influence the benefits we receive in life"). Shortcomings of distributive equity can be seen in transportation polices impacting low-income individuals, women, and ethnic minority access to public transport infrastructure and services. Rafael Henrique Moraes Pereira, Distributive Justice and Transportation Equity: Inequality in Accessibility in Rio de Janeiro (2018) (Ph.D. thesis, University of Oxford), http://redpgv.coppe.ufrj.br/index.php/pt-BR/producao-da-rede/dissertacoes-e-teses/2018/1148-rafael-pereira-distributive-justice-and-transportation-equity-inequality-in-accessibility-in-rio-de-janeiro/file (applying a framework of distributive justice to assess transport policies and plans in Rio de Janeiro).

53. *See* Park, *supra* note 51, at 3 (defining structural equity as "decisions [that] are made with a recognition of the historical, cultural, and institutional dynamics and structures that have routinely advantaged or privileged groups in society and resulted in chronic, cumulative disadvantage for subordinated groups"); *see also* McCauley et al., *supra* note 51 (defining recognition justice as the issues relating to the understanding of the basis or social inequalities and the reconciliation of inequalities suffered by marginalized and deprived communities in relation to energy systems). An example of structural inequity can be seen with racial disparities in neighborhoods. "A 2010 study found that non-White families with incomes above $75,000 are more likely to live in poor communities than White families with incomes below $40,000. Poor neighborhoods are less safe, and the schools are of a lower quality than those in affluent areas." Kimberly Amadeo, *What is Structural Inequality? How Structural Inequality Stifles the American Dream*, THE BALANCE (Mar. 26, 2022), https://www.thebalance.com/structural-inequality-facts-types-causes-solution-4174727 (citing John R. Logan, *Diversity and Inequality: Recent Shocks and Continuing Trends*, *in* DIVERSITY AND DISPARITIES: AMERICA ENTERS A NEW CENTURY (2014)).

Because society is undergoing an energy transition, the question of energy equity is now more applicable than ever. Renewable energy technologies are becoming more affordable to implement.[54] Utilities have introduced net metering for "rooftop solar panels and home battery storage programs" that promote customer renewable generation into the power mix.[55] Utilities credit ratepayers with rooftop solar for the electricity they provide to the grid and ratepayers are billed for their "net" energy consumption.[56] Federal programs are also providing tax incentives for energy efficiency programs.[57] State and local governments have implemented renewable portfolio standards and carbon reduction targets to incentivize utilities to improve efficiency, purchase and develop renewable energy, and invest in energy storage.[58] State programs also allow consumers and ratepayers to purchase "clean" or "green" energy.[59]

54. James Ellsmoor, *Renewable Energy is Now The Cheapest Option – Even Without Subsidies*, FORBES (June 15, 2019, 2:39 P.M.), https://www.forbes.com/sites/jamesellsmoor/2019/06/15/renewable-energy-is-now-the-cheapest-option-even-without-subsidies.

55. Brown et al., *supra* note 9 at 7.

56. *Net Metering*, SOLAR ENERGY INDUS. ASS'N, https://www.seia.org/initiatives/net-metering. *See Guide to Net Metering and Net Billing*, OESOLAR (Aug. 1, 2016), https://osceolaenergy.com/guide-net-metering-net-billing (explaining that net metering, which credits excess electricity generated to the ratepayer's account, should be distinguished from net billing which "allows solar customers to generate electricity for personal use, and sell any excess energy to the utility company at wholesale or 'avoided cost' prices, while purchasing power at the retail rate").

57. Brown et al., *supra* note 9, at 7.

58. *State Renewable Portfolio Standards and Goals*, NAT'L CONF. OF STATE LEGISLATURES (Aug. 13, 2021), https://www.ncsl.org/research/energy/renewable-portfolio-standards.aspx.

59. *See* Christopher McMichael, ENERGY JUSTICE AND THE ENERGY TRANSITION, NAT'L CONF. OF STATE LEGISLATURES 1 (2022), https://www.ncsl.org/Portals/1/Documents/energy/EnergyJusticeReport_2021_37639.pdf (discussing various state initiatives to promote energy justice and the energy transition). "States including Illinois, Oregon, North Carolina, Washington, New York and Virginia have enacted broad clean energy or emissions reduction legislation in the past few years." *Id.* at 4. *See What is Green Energy?*, NATIONALGRID, https://www.nationalgrid.com/stories/energy-explained/what-is-green-energy (stating that "green energy" is energy that comes from nature, for example solar energy).

Utilities are the single largest distributor of low-income energy programs and about 80% of the funding utilities receive to address energy burden challenges for low-income households is used on bill payment assistance, as depicted in the chart below.[60]

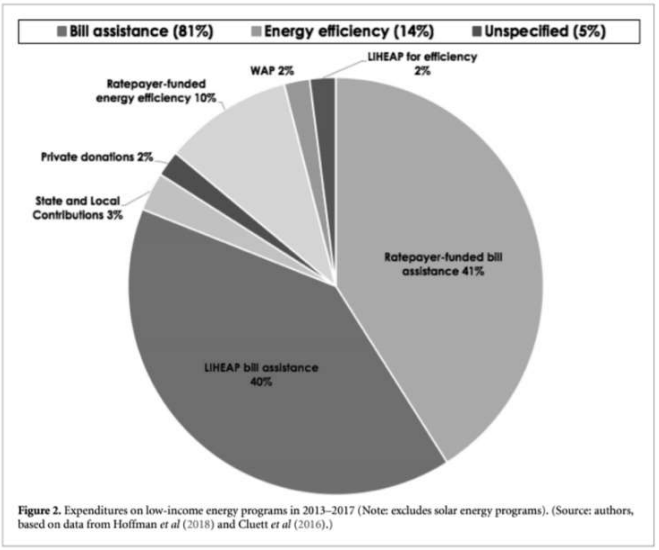

Figure 2. Expenditures on Low-Income Energy Programs in 2013-2017.[61]

Policy makers have been experimenting with solar programs targeting low-income households.[62] These experiments show great promise for promoting energy affordability in urban areas.[63] However, efforts to recruit low-income households in solar programs and incentives is a significant challenge.[64] Assessing such programs' effectiveness through an energy equity lens might help identify additional characteristics that might further a program's success.

C. Assessment Framework for Reducing Energy Burden and Increasing Energy Equity

Based on the components of energy equity (procedural, distributive, and structural), an energy equity framework that is useful for assessing programs aimed at reducing energy burden specifically requires looking at the following:

60. Brown et al., *supra* note 9, at 10.
61. *Id.*
62. *Id.* at 24.
63. *Id.* at 24-26.
64. Brown et al., *supra* note 9, at 25-26.

- Incorporating community participation and awareness surrounding the causes of energy burden and how the solar program reduces that burden [Procedural Equity][65];
- Recognizing and engaging *all* low-income households such as those residing in single-family homes, apartment buildings,[66] government-subsidized housing, and manufactured/mobile homes [Structural Equity][67];
- Removing or avoiding barriers to entry by, e.g., subsidizing up-front costs for equal access and participation [Distributive Equity][68];
- Including mechanisms for collecting, tracking, and reporting data for solar program participation and outreach, especially for low-income households with high energy burdens[69]; and
- Effectively reducing energy burden for low-income households.[70]

If a project is going to reduce energy burden across all low-income households, it should reckon with all of these factors. The next section will catalog the community solar and other solar programs and policies enacted and implemented by the local governments of Washington, D.C., New Orleans, and Los Angeles. The following section will then analyze and assess these programs through an energy equity lens by applying the factors listed above.

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65. *Id.* at 2, 29. "Because of their limited means, low-income households are also least able to participate in many types of initiatives aimed at reducing energy costs, because they often require up-front costs to participate." *Id.* at 10-11.

66. McCauley et al., supra note 51. "More than two-thirds of the multifamily rental market consists of households that have an annual household income of less than $50,000 (NMHC 2015)." Drehobl & Ross, *supra* note 10, at 6. *See* Brown et al., *supra* note 9, at 1, 20 (explaining that "[m]ultifamily buildings are home to nearly 25% of the U.S. Population and more than half of low-income households . . . . For a variety of reasons including high land values, cities and urban areas have a disproportionate number of multifamily buildings.").

67. Brown et al., *supra* note 9, at 21 ("Although 70% of manufactured/mobile homes are situated in rural areas, they are still important for urban utilities to consider since they have higher than average energy burdens despite relatively less energy consumption.").

68. *Id.* at 10-11 ("Because of their limited means, low-income households are also least able to participate in many types of initiatives aimed at reducing energy costs, because they often require up-front costs to participate.").

69. Drehbol & Ross, *supra* note 10, at 7 ("Demographic information can inform program design and marketing and outreach strategies. Examples of demographic data that should be incorporated into program evaluation include income level, renter versus owner, multifamily versus single family, and race and ethnicity."). *See* Brown et al., *supra* note 9, at 23 ("[Most behavior economics] analyses do not focus specifically on low-income households. As a result, there is deep uncertainty about likely responses to information feedback, incentives, and an array of other policy interventions and program offerings. . . . [T]he incongruence between households' values and intrinsic and extrinsic factors can limit their ability to invest in energy saving activities. This gap is especially relevant for low-income households, which generally have lower energy literacy than other income groups.").

70. Brown et al., *supra* note 9, at 28-29.

III. SURVEY OF URBAN LOW-INCOME SOLAR PROGRAMS ACROSS THE U.S.

Washington D.C., New Orleans, and Los Angeles have enacted renewable energy policies targeting low-income households.[71]

Washington D.C.'s Solar for All Program aims to reduce the electricity bills of 100,000 low-income households through solar power generation and panel installations.[72] New Orleans recently approved regulations creating a community solar program while also enacting a Solar For All program that connects low-income households to local solar developers.[73] Los Angeles has implemented several energy programs targeting low-income households, most notably the Solar Rooftop program and the Shared Solar program.[74]

Evaluating these programs through an energy equity lens requires an in-depth catalog of each city's programs and energy policies. The following will detail the program components, focusing on how low-income households are targeted, how these programs aim to reduce energy burden, and the application process for low-income household participation.

A. Washington D.C.

In 2018, Washington D.C. pledged to operate on 100% renewable energy by 2032, an ambitious mandate rivaling other major state targets.[75] However, reducing energy burden and promoting energy equity was on the agenda even prior to its pledge.[76] On July 25, 2016, DC's mayor, Muriel Bowser signed into law, the "Renewable Portfolio Standard Expansion Amendment Act of 2016."[77] The Act established the "Solar for All" program, which was designed to reduce the cost of electricity bills for low-income DC residents via taxpayer subsidies.[78] The DC Department of Energy & Environment is required to fund the program.[79] The cited

71. *Id.* at 25. *See* Allison Cormier & Benaiah Harvey, *Solar for All NOLA*, CITY OF NEW ORLEANS (July 9, 2020), https://www.nola.gov/neighborhood-engagement/news/?tagname=gnoha&groupid=21.

72. Brown et al., *supra* note 9, at 25.

73. Cormier & Harvey, *supra* note 71.

74. Brown et al., *supra* note 9, at 25.

75. Warren Leon, *Table of 100% Clean Energy States*, CLEAN ENERGY STATES ALL., https://www.cesa.org/projects/100-clean-energy-collaborative/guide/table-of-100-clean-energy-states/. New York pledged to be on "100% carbon-free electricity by 2040" and Washington state pledged to operate on 100% clean energy by 2045. *Id.* California has pledged to operate on "100% carbon-free electricity by 2045," while Hawaii has pledged to have "100% renewable energy by 2045 through" implementation of its renewable portfolio standards. *Id.*

76. Wayne Barber, *Transmission Constraints, Renewables Affect Clean Power Plan, PJM says*, TRANSMISSIONHUB (Sept. 1, 2016), https://www.transmissionhub.com/articles/2016/09/transmission-constraints-renewables-affect-clean-power-plan-pjm-says.html.

77. *Id.*

78. *Solar Initiatives*, DEP'T OF ENERGY AND ENV'T, https://doee.dc.gov/service/solar-initiatives.

79. *Clean Energy DC*, DEP'T OF ENERGY AND ENV'T, https://doee.dc.gov/cleanenergydc.

motivation underlying the legislation and establishment of the Solar for All program was equity.[80] Ward 3 Councilmember Mary M. Cheh defines equity as equal access to solar for all folks in the district no matter what their income is.[81]

DC's Solar for All program aims to reach 100,000 residents of low-income households, including renters and residents in apartment buildings, and reduce their electricity bills by 50% by December 31, 2032.[82] The DC local government implements the Solar for All program primarily through its Department on Energy & Environment (DOEE), which in turn utilizes the expertise of the District of Columbia Sustainable Energy Utility (DCSEU).[83] DCSEU, on behalf of the DOEE, works directly with the designated solar vendor partners to design and install the solar panels for eligible households.[84] The DOEE expects the Solar for All program to install approximately 240 to 300 megawatts of solar power in DC.[85]

In the early stages of the program in mid-2017, the Department of Energy & Environment "awarded $13.2 million in 'Solar for All DC Innovation & Expansion Grants' to 10 applicants'[86] that responded to the request for applications."[87] The Council of the District of Columbia and the Department of Energy & Environment looked to solar developers and innovators through these grants to come up with a program that provides the benefits of solar power to low-income households while reducing their energy burden.[88]

Out of the $13.2 million in grants, about $8 million was designated to install "4 to 8 megawatts of new solar capacity on multifamily homes, commercial buildings, and non-residential surface spaces."[89] The other $5 million was designated "to install 2.5 to 5 megawatts of solar capacity on low-income single-family

80. Dep't of Energy and Env't, *DC Solar Stories EP1 Solar for All*, YOUTUBE (Nov. 12, 2019), https://www.youtube.com/watch?v=yjKYgpQk7y4.

81. *Id.*

82. *DOEE Announces Intent to Award 10 "Solar for All" Grants Totaling $13.2 Million to Deploy 7MW of Solar*, DEP'T OF ENERGY AND ENV'T (July 21, 2017), https://doee.dc.gov/release/doee-announces-intent-award-10-solar-all-grants-totaling-132-million-deploy-7mw-solar.

83. *DC Sustainable Energy Utility (DCSEU)*, DEP'T OF ENERGY AND ENV'T, https://doee.dc.gov/service/dc-sustainable-energy-utility-dcseu. The Clean and Affordable Energy Act of 2008 required the DOEE "to contract with a private entity to conduct sustainable energy programs," which led to the creation of the District of Columbia Sustainable Energy Utility (DCSEU). *Id.*

84. *Solar for All*, DC SUSTAINABLE ENERGY UTIL., www.dcseu.com/solar-for-all.

85. GOV'T OF THE DISTRICT OF COLUMBIA DEP'T OF ENERGY AND ENV'T, SOLAR FOR ALL IMPLEMENTATION PLAN 14 (2017), https://doee.dc.gov/sites/default/files/dc/sites/ddoe/service_content/attachments/DOEE-%20Report-%20Solar%20for%20All%20Implementation-%20Final%20for%20Transmittal.pdf.

86. *DOEE Announces Intent to Award 10 "Solar for All" Grants Totaling $13.2 Million to Deploy 7MW of Solar*, *supra* note 82. Awards were to be granted to: Solar United Neighbors, formerly known as "Community Power Network; [as well as] Groundswell, Inc.; GRID Alternatives Mid-Atlantic; New Partners Community Solar Corp.; Urban Energy Advisors; PEER Consultants, P.C.; Neighborhood Solar Equity, LLC; Open Market ESCO LLC; Ethos Strategic Consulting, LLC; and Community Preservation and Development Corporation." *Id.*

87. *Id.*

88. *DC Solar Stories EP1 Solar for All*, *supra* note 80.

89. *DOEE Announces $13 Million in Funding for Solar for All DC Innovation and Expansion*, DEP'T OF ENERGY AND ENV'T (Feb. 16, 2017), https://doee.dc.gov/release/doee-announces-13-million-funding-solar-all-dc-innovation-and-expansion.

homes, small businesses, and owner-occupied nonprofits."[90] For example, one of the awarded applicants, Solar United Neighbors, used their grant money to provide free solar through solar co-ops "to more than 200 low- and moderate-income DC residents living in single-family homes."[91]

The partners for the DC Solar for All project are the following listed vendors:

- Community Preservation and Development Corporation,
- Groundswell Community Power,
- GRID Alternatives Mid-Atlantic,
- Neighborhood Solar Equity,
- New Partners Community Solar Corp.,
- OpenMarket ESCO,
- PEER Consultants, P.C.,
- Urban Ingenuity,
- Enflection Energy Consulting,
- SaveSolar, and
- New Columbia Solar.[92]

These vendors are building trust with low-income household communities by educating them about the DC Solar for All program and how it is an option to reduce their energy costs while also building relationships and forming trust with these residents.[93]

DC's Solar for All program defines eligible households with incomes "below 80% of the area median income (AMI) threshold."[94] The chart below shows the 2020 income threshold eligibilities for households of various sizes:

Persons in household	1	2	3	4	5	6	7	8	9	10
Income threshold	$70,600	$80,650	$90,750	$100,800	$110,900	$121,000	$131,050	$141,150	$151,200	$161,300

Household income amounts listed in the eligibility table are effective as of 04/01/20, but may change.

Please visit the US Dept of Housing and Urban Development website for the most up-to-date numbers.

Figure 3. 2022 Area Median Income (AMI) Thresholds.[95]

90. *Id*.

91. *Solar for All in D.C.*, SOLAR UNITED NEIGHBORS, www.solarunitedneighbors.org/campaigns/solar-for-all-in-d-c/.

92. *Solar for All*, DEP'T OF ENERGY AND ENV'T, https://doee.dc.gov/solarforall. Most, but not all of the vendor partners for DC Solar for All, received grants from the Solar for All program. *DOEE Announces Intent to Award 10 "Solar for All" Grants Totaling $13.2 Million to Deploy 7MW of Solar*, *supra* note 82.

93. Dep't of Energy and Env't, *DC Solar Stories EP2 Solar for All*, YOUTUBE (Nov. 12, 2019), https://www.youtube.com/watch?v=q0zmzfupoPk.

94. *Solar for All*, *supra* note 92.

95. *Id.*

The Potomac Electric Power Company (Pepco), an investor-owned utility operating in the District of Columbia and a subsidiary of major energy provider Exelon, is not listed as a partner to DC's Solar for All.[96] Pepco does not participate with the program's implementation or development.[97] Rather, Pepco's role in the project is limited to facilitating the electrical connections to its system, where applicable, and administering the solar credit to the program's participants.[98] Credits generated by solar installations, both those that serve a single customer-location and community solar projects, are applied to the customer bills by PEPCO where applicable.[99] Community solar projects differ from traditional rooftop solar, where each beneficiary hosts a solar system on their rooftop.[100] In community solar projects, the solar panels are "installed in a common location and operate as a single project" to benefit multiple households.[101]

DC has a "definitional distinction" between individual net metering programs and "community net metering."[102] Individual net metering involves a single customer at a single location, where both the solar generation and consumption occur.[103] There, the customer receives credit for the solar it generates in excess of its usage.[104] The community net metering model, as illustrated in the diagram[105] below, is more complex. It allows for multiple beneficiaries of a single solar project.[106] The community net metering model has 4 primary actors: (1) subscribers

96. *Id.*

97. *Id.*

98. *Solar for All, supra* note 92.

99. *Community Solar FAQs,* PEPCO, HTTPS://WWW.PEPCO.COM/SMARTENERGY/MYGREENPOWERCONNECTION/PAGES/DC/COMMUNITYSOLARFAQS.ASPX. Customers who receive their power from an alternative power supplier under the District of Columbia's retail choice program may also receive payments from their alternative power supplier for offsets to their power supply costs. *See Frequently Asked Questions*, DC POWER CONNECT, https://dcpowerconnect.com/faqs/.

100. *Community Solar Basics*, DEP'T OF ENERGY, https://www.energy.gov/eere/solar/community-solar-basics.

101. Donna Attanasio et al., *Catalyzing Community Solar: A Handbook for* Municipalities 2, GEO. WASH. (2017) ("A community solar project functions very much like a rooftop solar project, except that rather than each beneficiary hosting a solar system on [their] own roof, the panels are installed in a common location and operate as a single project. While project locations vary considerably, ranging from a shared rooftop of a multi-family building unit, to a structure over a parking area, to a ground-mounted installation on otherwise vacant land in the utility's service territory, in most cases the power generated is not behind the meter of the benefitting ratepayer.").

102. *Net Metering*, SOLAR UNITED NEIGHBORS, https://www.solarunitedneighbors.org/learn-the-issues/net-metering/#othertypes.

103. *What is Net Metering and How Does it Work?*, ENERGYSAGE, https://www.energysage.com/solar/solar-101/net-metering/ (last updated Aug. 29, 2022).

104. *Net Metering, supra* note 102.

105. *Community Energy*, PEPCO, https://www.pepco.com/MyAccount/MyService/Pages/DC/CommunityEnergy.aspx.

106. *Id.*

or Pepco customers; (2) subscriber organizations; (3) "community renewable energy facility[ies]"; and (4) Pepco.[107] Customers can participate in subscriber organizations for shares of electricity generated at community renewable energy facilities.[108] This allows those customers to earn credit on their electricity bill from Pepco.[109] The Community Renewable Energy Facility can be located anywhere in Pepco's DC service territory, as can the subscribers.[110] Below, as earlier referenced, is a diagram depicting Pepco's community net metering structure:

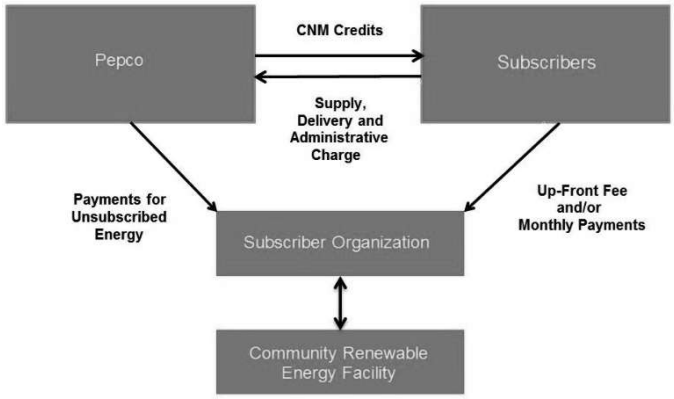

Figure 4. "Community Net Metering in a Nutshell."[111]

The DCSEU works with solar developers to install these community renewable energy facilities throughout the city as a part of the Solar for All program, and subscribers participate based on the community net metering model as a part of the Solar for All program.[112] These facilities then produce the credits which Pepco applies to the eligible low-income residents' bills.[113] Those credits have on average allowed customers to reduce their electricity bills by up to 50%.[114] In

107. PEPCO, NET ENERGY METERING AND INTERCONNECTIONS, COMMUNITY SOLAR IN THE DISTRICT OF COLUMBIA 6-7 (2016), https://www.pepco.com/SiteCollectionDocuments/Pepco%20DC%20Cref%20Training.pdf.

108. *Id.* at 6.

109. *Id.* at 7.

110. *Id.* at 6.

111. *Community Energy, supra* note 105.

112. *DC Sustainable Energy Utility (DCSEU)*, *supra* note 83. *See What is the DC "Solar for All" Program?,* HONEYDEW ENERGY ADVISORS (Apr. 5, 2019), https://honeydewadvisors.com/what-is-the-dc-solar-for-all-program/; *DC Sustainable Energy Utility (DCSEU) Request for Proposals for Solar For All Program*, HOUS. ASS'N OF NONPROFIT DEVS. (Dec. 9, 2019), https://www.handhousing.org/dc-sustainable-energy-utility-dcseu-request-for-proposals-for-solar-for-all-program/.

113. *Community Energy, supra* note 105.

114. DC SUSTAINABLE ENERGY UTIL., *supra* note 84.

2019, approximately 2,000 eligible households received credit on their Pepco electricity bill as a result of the Solar for All program.[115]

Given the rapid expansion of the solar industry in DC, the Solar for All program also required a larger workforce.[116] Commendably, some solar developers also trains individuals of the targeted communities as a pathway to join the solar workforce.[117] This training program, known as Solar Works DC, is part of DC's Solar for All initiative and is implemented by DC Solar for All's partner/vendor, GRID Alternatives Mid-Atlantic.[118]

The DOEE was tasked with reducing the energy burden of 100,000 households in the city.[119] But during both its inception and innovation phase, DC Solar for All faced challenges in reducing the energy burden for all of DC's low-income households, because many residents lived in apartment buildings or in subsidized housing.[120] Single-family residences can access the program by having solar panels directly installed on their homes.[121] A problem unique to some renters is the presence of a single meter monitoring energy consumption for the residence.[122] In such cases, the landlord might not choose to pass the solar credits onto the tenants.[123] Another concern for eligible low-income participants that reside in subsidized housing is the impact the reduction of their energy costs has on their rent costs.[124] According to the Department of Housing and Urban Development, if their energy costs are lower, the rent subsidy low-income households receive is reduced because the assistance they receive is determined based on the ratio of the total cost of rent and utilities to their income.[125]

Given the city's low-income population, DC's Solar for All program could not achieve its mandate of benefitting 100,000 households unless these difficult-to-reach households were included.[126] Therefore, DOEE and the Solar for All partners and vendors needed to develop creative solutions to distribute the savings from solar panel installation in other ways, such as community benefits in the form of "enhanced daycare services," "rebate checks," "financial literacy trainings," or

115. Dep't of Energy and Env't, *DC Solar Stories EP8 Solar Future*, YOUTUBE (Nov. 12, 2019), https://www.youtube.com/watch?v=eWroxIqdZ6s&t=303s.

116. Dep't of Energy and Env't, *DC Solar Stories EP4 Building Workforce*, YOUTUBE (Nov. 12, 2019), https://www.youtube.com/watch?v=etujDhQjqa4&t=15s.

117. *Id.*

118. *Solar Works DC*, GRID ALTERNATIVES, https://gridalternatives.org/regions/midatlantic/solar-works-dc.

119. *DC Solar Stories EP1 Solar for All*, *supra* note 80.

120. Dep't of Energy and Env't, *DC Solar Stories EP6 Sharing the Wealth*, YOUTUBE (Nov. 12, 2019), https://www.youtube.com/watch?v=uQUzetnRwvo.

121. *Id.*

122. *Id.*

123. *Id.*

124. *DC Solar Stories EP6 Sharing the Wealth*, *supra* note 120.

125. *Id. See Housing Choice Vouchers Fact Sheet*, DEP'T OF HOUSING & URB. DEV., https://www.hud.gov/program_offices/public_indian_housing/programs/hcv/about/fact_sheet (explaining the amount of subsidy available under the Section 8 housing program).

126. Dep't of Energy and Env't, *DC Solar Stories EP7 Innovation and Collaboration*, YOUTUBE (Nov. 12, 2019), https://www.youtube.com/watch?v=JljA9cr-I4E&t=217s.

enhanced security.[127] For residents that pay their own electric bill but lack a rooftop or other suitable location, community renewable energy facilities installed on apartment buildings directly channeled the benefits of energy savings to eligible tenants.[128] However, the solar panels installed as a part of this community solar program did not necessarily have to be installed on the residences of the eligible/participating low-income households – a number of the panels were also installed in Northeast and Northwest DC, including on office buildings, to generate energy for households in Southeast and Southwest DC.[129]

Another issue DOEE and Solar for All's partners/vendors faced was physical space and locations for the solar panel installations.[130] DC's Solar for All program expected to install up to "240-300 megawatts of solar power" but is limited in real estate and space.[131] However, the locational flexibility of siting community solar projects helps address this problem. Given the number of commercial buildings in the city, rooftop installations are less challenging.[132] Large scale ground solar installations often are opposed by residential communities with available space, but the availability of commercial rooftops aid in siting solar installations.[133]

One significant issue DOEE faced in developing the Solar for All program was the "split-incentive problem" which arises when financing for the solar project comes from different sources and some of those sources are cash-flow contingent.[134] In these cases, the solar developer does not benefit from lower costs of the project, the lenders do.[135] This problem provides less incentives for solar developers to participate in the Solar for All program. Accordingly, DOEE created the Solar for All grant to assure solar developers get a cash payment at closing to increase their overall returns.[136]

B. New Orleans

Louisiana, ranking 35th in the country for "state solar installations" has seen very little renewable energy deployment.[137] Only 0.12 percent of Louisiana's electricity is generated by solar, and the state does not employ a "Renewable Portfolio

127. *Id.*

128. *Id.*

129. Dep't of Energy and Env't, *DC Solar Stories EP3 Power to the People*, YOUTUBE (Nov. 12, 2019), https://www.youtube.com/watch?v=809ouuMbl9Y&t=130s.

130. SOLAR FOR ALL IMPLEMENTATION PLAN, *supra* note 85.

131. *Id*. at 11-12.

132. *DC Solar Stories EP8 Solar Future*, *supra* note 115.

133. *Id.*

134. Dep't of Energy and Env't, *DC Solar Stories EP5 Solving the Split Incentive Problem*, YOUTUBE (Nov. 12, 2019), https://www.youtube.com/watch?v=v03ugmAChno&t=183s.

135. *Id.*

136. *Id*.

137. Seth Mullendore et al., *Resilient Southeast – Exploring Opportunities for Solar + Storage in New Orleans, LA*, CLEAN ENERGY GROUP 10 (Apr. 2019), https://www.cleanegroup.org/wp-content/uploads/Resilient-Southeast-New-Orleans.pdf.

Standard" or "any voluntary renewable energy or energy storage targets or mandates."[138] Louisiana is among the most prolific state producers and consumers of natural gas.[139] Louisiana's carbon-free power comes from two nuclear plants operated by Entergy, constituting about "16% of the state's electricity."[140]

Despite Louisiana's minimal renewable energy policies, the City of New Orleans has followed a different trajectory. On April 15, 2020, the New Orleans City Council, the local government for the city, voted to adopt a Renewable and Clean Portfolio Standard, "mandating net-zero carbon emissions by 2040, and a zero-carbon energy portfolio by 2050."[141]

New Orleans' energy landscape is unique in that Entergy New Orleans, the utility for the City of New Orleans and a subsidiary of the investor-owned Entergy, is regulated by the New Orleans City Council.[142] The Louisiana Public Service Commission oversees the rest of Louisiana.[143] The New Orleans City Council 2020 decision requires Entergy New Orleans to show progress towards the 100% carbon-free 2050 target every year or face potential fines.[144] Entergy New Orleans has outlined a plan to provide 70% of its generation from "clean energy" sources by 2030.[145]

New Orleans also has a net metering policy for both residential and commercial customers.[146] Entergy New Orleans must provide retail rate crediting to customers' bills to account for exported solar energy to the local grid and customers receive the credit on their account for the following month.[147] If the customer chooses to terminate the service, Entergy New Orleans reimburses the customer for any excess credits accrued.[148] However, "individual net-metered systems are limited to 300 kilowatts for commercial and agricultural customers and 25 kilowatts for residential customers."[149]

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138. *Id.*

139. *The Louisiana Oil and Gas Industry Growth: Natural Gas*, STI GRP. (June 27, 2013), https://setxind.com/downstream/louisiana-oil-gas-growth-natural-gas/.

140. Michael Burns & Mark Sullivan, *Entergy Nuclear Plants Contribute to Louisiana's Bright Future,* ENTERGY CORP. (Jan. 7, 2019), https://www.entergynewsroom.com/news/entergy-nuclear-plants-contribute-louisiana-s-bright-future/#:~:text=Entergy%20owns%20and%20operates%20power,9%2C000%20megawatts%20of%20nuclear%20power.

141. Catherine Weidert, *New Orleans Approves Net-Zero Carbon Standard by 2040*, AUDUBON LOUISIANA (Apr. 15, 2020), https://la.audubon.org/press-release/new-orleans-approves-net-zero-carbon-standard-2040.

142. Mullendore et al., *supra* note 137, at 11.

143. *Utilities Division*, LA. PUB. SER. COMM'N, https://www.lpsc.louisiana.gov/Utilities.

144. Jessica Williams, *Green by 2050: New Orleans City Council Orders Entergy to Cut Emissions*, NOLA.COM (May 20, 2021), https://www.nola.com/news/business/article_5297cdc4-b982-11eb-903e-b3ae5b66d433.html.

145. *Vision 2030*, ENTERGY, https://www.entergy-neworleans.com/cleanenergy/.

146. *Net Metering and Distributed Generation (New Orleans)*, ENTERGY, https://www.entergy-neworleans.com/net_metering/.

147. *Id.*

148. *Id.*

149. Mullendore et al., *supra* note 137, at 11.

1. New Orleans City Council Community Solar

Although none of their plans are to the scale of DC's Solar for All, it is possible that the New Orleans City Council developed a similar community solar program.[150] In 2018, the New Orleans City Council voted to create a community solar program that would provide access to "solar for all residents, including renters and low-income residents."[151]

During the public comment phase of the rulemaking process for the new community solar regulations, "the Alliance for Affordable Energy, 350 New Orleans, the Sierra Club, solar developers, and other community advocates" pushed the New Orleans City Council "to do more for low-income" households with the community solar program.[152] These community advocates also pushed for greater community engagement in the rulemaking process, as well as "a different measure to calculate bill credits" to ensure community solar participants receive the same benefits as residential solar owners.[153] The community advocates envisioned reduced energy burden and lower utility bills through their recommendations for the community solar program.[154]

On March 28, 2019, the New Orleans City Council adopted final rules for the community solar program.[155] The rules opened the community solar program to renters, low-income homeowners, and homeowners with rooftops that are unsuitable for solar installation.[156] On January 28, 2021, the New Orleans City Council,[157] approved Entergy New Orleans' implementation plan. The plan provided a subscription program where customers receive bill credits if they subscribe to a large community solar development.[158] Implementation began in summer of 2021.[159]

150. Michael Bates, *New Orleans Implementing Solar for All Program*, SOLAR INDUS. (Jan. 27, 2020), https://solarindustrymag.com/new-orleans-program-offers-accessible-clean-energy. *See* Brown, *supra* note 9.

151. Mullendore et al., *supra* note 137, at 11.

152. Nikki Luke & Nik Heynen, *Community Solar as Energy Reparations: Abolishing Petro-Racial Capitalism in New Orleans*, AM. Q., Sept. 2020, at 603, 616.

153. *Id*.

154. *Id*.

155. Resolution and Order Establishing Rules for Community Solar Projects, R-19-111 (Mar. 19, 2019), https://www.all4energy.org/uploads/1/0/5/6/105637723/2019_03_28_ud-18-03_cno_r-19-111_res_and_order_establishing_rules_for_comm_solar_projetcs.pdf.

156. *Id*.

157. Resolution and Order Approving Rules for Community Solar Projects, R-21-38 (Jan. 28, 2021), https://www.all4energy.org/uploads/1/0/5/6/105637723/2021_01_28_ud-18-03_curo_r-21-38_approved_rules_for_comm_solar_projects.pdf.

158. *Id.*

159. *Id.*

Entergy New Orleans and other local solar providers are permitted to do installs.[160] Customers can "either purchase or lease the panels based on the developers' price.[161] Each community solar project must have "a minimum of three participants."[162] Applications are submitted to Entergy New Orleans and upon approval are designated as qualifying for one of two categories: (1) open; and (2) low-income.[163] The Community Solar Program Rules define a "Low-Income Customer" as:

> a Customer whose gross annual household income is at or below 50 percent of Area Median Income for the year of subscription [OR] who is certified as eligible for any federal, state, or local assistance program that limits participation to households whose income is at or below 50 percent of Area Median Income.[164]

On December 8, 2021, the Alliance or Affordable Energy filed a motion with the City Council of New Orleans to redefine the definition of "Low-Income Customers" to include:

> [a] Customer whose gross annual household income is at or below 60 percent of Area Median Income for the year of subscription or who is certified as eligible for any federal, state, or local assistance program that limits participation to households whose income is at or below 60 percent of Area Median Income.[165]

The open category of solar facilities can be "of any size of up to 2 megawatts."[166] The low-income category of solar facilities can also be "any size of up to 2 megawatts," but at least 30% of the facility's output must be provided to low-income customers.[167] Entergy New Orleans must designate no more than half of

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160. *See* R-19-111, *supra* note 155, at Appendix A, 4 ("A Subscriber Organization that has registered with the Council through CURO, that wishes to construct and operate a CSG Facility as part of the Community Solar Program shall submit an application to the Utility in accordance with the CSG Facility project application procedure established by the Utility as part of these Rules."). "Subscriber Organization" is defined as "a person or legal entity that owns and operates a CSG Facility, or operates a CSG Facility that is built and owned by a third party under contract with such Subscriber Organization . . . ." *Id.* at Appendix A, 3.

161. Jessica Williams, *City Council Approves First Steps Toward 'Community Solar' Power Program* 4, NOLA.COM (Jun. 21, 2018, 5:15 PM), https://www.nola.com/news/article_04df5db1-f15f-5c41-a073-f0c65af300f8.html.

162. *Id.*

163. Resolution and Order Establishing Rules for Community Solar Projects, R-18-538, Appendix A, 6 (Dec. 20, 2018), https://www.all4energy.org/uploads/1/0/5/6/105637723/2018_12_20_ud-18-03_cno_r-18-538_resolution_establishing_rules_for_community_solar_projects.pdf. *See* R-19-111, *supra* note 155, at 6.

164. R-19-111, *supra* note 155, at 5-7. Initially the Proposed Rules put out by the Council suggested defining "Low Income Customer" as "a Customer whose gross annual household income is at or below 175% of the federal poverty level for the year of subscription or who is certified as eligible or any federal, state, or local assistance program that limits participation to households whose income is at or below 175% of the federal poverty limit." *Id.* at 5. However, advocacy groups during the comment period pushed for a definition that would replace "175% of the federal poverty level" with "below 50% of Area Median Income" because it is the same methodology used by the Housing Authority of New Orleans, Louisiana Housing Corporation, and Louisiana Department of Health. In addition, this definition would expand the number of customers or Subscribers that could qualify as a "Low Income Customer." *Id.* at 5-7.

165. Resolution and Order Establishing a Comment Period to Amend the Community Solar Rules, R-21-472 (Dec. 16, 2021), https://www.all4energy.org/uploads/1/0/5/6/105637723/2021_12_16_ud-18-03_curo_r-21-472_establishing_cmnt_period_comm_solar.pdf.

166. R-18-538, *supra* note 163, at Appendix A, 6.

167. *Id*. at Appendix A, 7-8.

the community solar program to the open category and reserve at least half of the solar facilities for the low-income category.[168] Owners or operators of apartments and, or multifamily residences that qualify as low-income, may apply to the New Orleans City Council to qualify as subscriber as long as they "demonstrate . . . that the subscription credits will be credited to the tenants."[169]

The final rules also provide "low-income customers will receive full retail credit for each kilowatt-hour generated by their portion of a project," while other subscribers "will receive credit based on" the utility's avoided energy and capacity costs. [170] If there is an excess of credits on a customer's bill, those credits can roll over to the next month without any expiration.[171] The chart below depicts the program's subscriber credit rate thus far through Entergy New Orleans for both low-income households and non-low-income households.

ENTERGY NEW ORLEANS, LLC
COMMUNITY SOLAR GENERATING FACILITIES - SUBSCRIBER CREDIT RATE

	$ PER KWH	
	LOW INCOME	NON-LOW INCOME
June 2021	$ 0.09457	$ 0.05174
July 2021	$ 0.10575	$ 0.05174
August 2021	$ 0.11248	$ 0.05174
September 2021	$ 0.10602	$ 0.05174
October 2021	$ 0.10871	$ 0.05174
November 2021	$ 0.10902	$ 0.05174
December 2021	$ 0.10784	$ 0.05174
January 2022	$ 0.10365	$ 0.05174
February 2022	$ 0.09814	$ 0.05174

Figure 5. Entergy New Orleans, LLC, Community Subsriber Credit Rate.[172]

168. Jenny Heeter et al., DESIGN AND IMPLEMENTATION OF COMMUNITY SOLAR PROGRAMS FOR LOW- AND MODERATE-INCOME CUSTOMERS, NAT'L RENEWABLE ENERGY LAB'Y 21 (2018), https://www.nrel.gov/docs/fy19osti/71652.pdf. This is sometimes referred to as a "LMI carve-out" in that a fraction of a project's capacity generation is reserved for low-income to medium-income households. *Id.* at 5. Of the three programs examined, New Orleans is the only program implementing a carve-out program (as opposed to a "participation incentives" which apply to D.C. and Los Angeles). Some advantages to this design are that it "ensure[s] a minimum level of [low-income households] participat[e]" in the community solar program, higher income household participation helps lower costs for low-income households, greater participant eligibility, and reduced risk of default. *Id.* However, some disadvantages are increased costs in the event of low-income household turnover, artificial limits, and additional costs imposed on higher-income households as a result of low-income household participation. *Id.*

169. R-18-538, *supra* note 163, at Appendix A, 14-15 ("The operator of a low-income multi-family dwelling unit may apply to the Council to qualify as a Low-Income Subscriber for the purposes of the Community Solar Program. The operator should demonstrate to the Council that the Subscription Credits will be credited to the tenants of low-income multi-family dwelling. A Subscriber Organization shall certify to the Utility in writing that the Subscriber Organization has verified the eligibility of all Low-Income Subscribers needed to qualify for the program prior to receiving permission to operate from the Utility. The Council will provide guidelines for acceptable methods for Subscriber Organizations to verify Low-Income Customer status of Subscribers within 90 days from the effective date of these Rules.").

170. Mullendore et al., *supra* note 137, at 11.

171. *Id*. at 10-11.

172. ENTERGY NEW ORLEANS, COMMUNITY SOLAR GENERATING FACILITIES-SUBSCRIBER CREDIT RATE, https://cdn.entergy-neworleans.com/userfiles/community-solar/ENO_Community_Solar_Rate_History.pdf.

Entergy New Orleans is prohibited from "establish[ing] a separate surcharge fee or rate" for any community solar costs, and any cost recovery related to the community solar program will be determined by the New Orleans City Council based on its review of the community solar tariffs.[173]

2. Solar for All NOLA

In 2020, while the City of New Orleans was finalizing the mechanisms for the community solar program, New Orleans Mayor LaToya Cantrell announced the city would implement a "Solar for All NOLA" year-long program aimed at providing financial and reliability – incentives for all qualifying households through rooftop solar.[174]

"Solar for All NOLA [is] led by the Greater New Orleans Housing Alliance ('GNOHA')"[175] in coordination with PosiGen Solar[176] and Solar Alternatives, two local businesses focused on expanding solar infrastructure throughout New Orleans.[177] As a part of the Solar for All program, "PosiGen Solar and Solar Alternatives . . . provide free solar evaluations to all homeowners and small business owners interested in seeing if clean energy can save them money on their utility bills."[178] For those households that can accommodate solar installations, PosiGen Solar offers accessible financing solutions[179] that are not limited to the traditional financing.[180] Interested participants have the option to lease or purchase a solar system.[181]

In 2020, Solar for All NOLA engaged "450 New Orleans homeowners and businesses" in rooftop solar and energy efficiency, provided an "average savings of $532.00 per customer" for that year, and created "1,300 solar jobs in the metro New Orleans area."[182] Solar for All NOLA has been renewed for 2021 and is being funded by Mayor Cantrell's Forward Together New Orleans fund.[183]

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173. R-18-538, *supra* note 163, at Appendix B, 12.

174. Bates, *supra* note 150.

175. *Id.* GNOHA is "a nonprofit that advocates for affordable housing [and] affordable energy bills . . . for . . . vulnerable working families and retirees." *Id.*

176. *Id.* PosiGen's mission statement focuses on low-income solar installations. *POSIGEN, https://www.posigen.com/about/*.

177. Bates, *supra* note 150.

178. Cormier & Harvey, *supra* note 71.

179. *Solar for All NOLA*, CITY OF NEW ORLEANS, https://www.solarforallnola.com/ ("Solar for All NOLA offers 100% of solar feasible homeowners and business owners an easy solution with either a no money down, no credit requirement solar lease with energy efficiency upgrades, or traditional financing for eligible homeowners and small businesses who wish to acquire a solar energy system.").

180. Bates, *supra* note 150.

181. *Solar for All NOLA*, *supra* note 179.

182. *Mayor Cantrell Celebrates Relaunch of Solar for All NOLA Program Reducing Energy Costs for Residents and Businesses*, CITY OF NEW ORLEANS (Mar. 5, 2021), https://nola.gov/mayor/news/march-2021/mayor-cantrell-celebrates-relaunch-of-solar-for-all-nola-program-reducing-energy-costs-for-residents/.

183. *Id.*

C. Los Angeles

"The Los Angeles Department of Water and Power (LADWP) is the largest municipal utility in the [United States]."[184] LADWP's Board of Commissioners, which establishes utility policy, is composed of 5 members who are appointed by the Mayor of Los Angeles and confirmed by the Los Angeles City Council.[185] LADWP's Board of Commissioners vote on power matters such as "utility rates [and] renewable energy projects."[186] LADWP has set a goal of having 55% of its power generated by renewable sources by 2025.[187] The City of Los Angeles has committed to reducing carbon emissions[188] and has instituted renewable energy programs through LADWP, specifically with LADWP's "Go Green" initiatives.[189] As a part of this "Go Green" initiative, LADWP offers a number of solar programs such as feed-in-tariffs (FITs),[190] virtual net metering, and two solar installation

184. MEISTER CONSULTANTS GRP., FRAMEWORK FOR AN EQUITABLE ENERGY SUPPLY TRANSFORMATION 9 (2018), https://cadmusgroup.com/wp-content/uploads/2018/08/MCG_Framework-for-an-Equitable-Energy-Supply-Transformation.pdf.

185. *Facts & Figures*, L.A. DEP'T OF WATER AND POWER, https://www.ladwp.com/ladwp/faces/ladwp/aboutus/a-power/a-p-factandfigures. *See* MEISTER CONSULTANTS GRP., *supra* note 184, at 9.

186. *See* MEISTER CONSULTANTS GRP., *supra* note 184, at 9.

187. Emily Guerin, *LA Program Would Let Renters Plug into the Benefits, Good Karma of Solar*, ELEMENTAL (Oct. 22, 2018), https://elementalreports.com/kpcc/2018/10/22/la-program-would-let-renters-plug-into-the-benefits-good-karma-of-solar/.

188. *Sustainability*, OFF. OF MAYOR ERIC GARCETTI OF LOS ANGELES, https://www.lamayor.org/sustainability.

189. *Go Green*, L.A. DEP'T OF WATER AND POWER, https://www.ladwp.com/ladwp/faces/ladwp/partners/p-gogreen?_afrLoop=570791575261222&_afrWindowMode=0&_afrWindowId=null#%40%3F_afrWindowId%3Dnull%26_afrLoop%3D570791575261222%26_afrWindowMode%3D0%26_adf.ctrl-state%3D5ji069ybw_76.

190. *Feed-in Tariff (FiT) Program*, L.A. DEP'T OF WATER AND POWER, https://www.ladwp.com/ladwp/faces/ladwp/partners/p-gogreen/p-gg-localrenewableenergyprogram?_adf.ctrl-state=xuumn6is3_4&_afrLoop=506889630438187. FITs are designed to "guarantee[] . . . a set price" for customers with eligible renewable electricity generators, such as rooftop solar, "from the utility for the power they generate and provide to the grid." *See Feed-in Tariff: A policy Tool Encouraging Deployment of Renewable Electricity Technologies,* U.S. ENERGY INFO. ADMIN. (May 13, 2013), https://www.eia.gov/todayinenergy/detail.php?id=11471#:~:text=A%20FIT%20is%20a%20performance,credits%20or%20other%20investment%20subsidies. In addition, "a FIT is a performance-based incentive rather than an investment-based incentive, and in that respect is more similar to production tax credits and the renewable energy credits of an RPS market than to investment tax credits of other investment subsidies. In the United States, FITs are typically used in combination with one or more of these other incentives. FITs are most similar to the federal Qualifying Facility (QF) incentives available in the United States since the late 1970s, although the QF contracts were limited to paying avoided cost rates based on the utility's cost-of-generation rather than the above-utility-cost rates typical of a FIT. FIT programs are also similar to net metering programs but differ significantly in one key aspect: the power generated by a utility customer's system is compensated at the rate set by the FIT rather than the retail electricity rate. This generation is treated independently from the customer's own electricity use, which is billed at the utility's regular retail rates. In a net metering program, a utility customer is effectively paid the retail rate for any generation that is fed back into the grid." *Id.*

programs, Solar Rooftops and Shared Solar.[191] Programs from the Go Green Initiative[192] that focus specifically on low-income communities are discussed below.

1. Equity Metrics Data Initiative

Around 2013, LADWP examined its data on energy incentive program participation and realized that its preexisting solar initiatives were benefiting wealthier neighborhoods more than its lower-income communities.[193] That meant its solar energy program was not reaching those lower-income neighborhoods, which limited the programs' effectiveness.[194] Promotion of existing solar programs was insufficient because they included barriers for low-income participation related to the high-cost of installation and living in apartments rather than single-family homes.[195] To fully understand the impact of the existing solar programs on all customers, the LADWP Board of Commissioners "adopted the Equity Metrics Data Initiative Resolution (EMD)."[196] The EMD is required to "track, measure, and report on how LADWP programs are serving every customer in its service area," including low-income households and communities.[197] LADWP releases the collected data publicly on its website and engages with local communities and advocacy groups to analyze the data for ways to improve the programs.[198]

Although EMD does not produce data specific to the following LADWP solar programs, it does a tracking mechanism of energy rate impacts on low-income households.[199] By using the EMD data in this way to improve existing programs, LADWP has subsequently implemented several solar programs geared towards low-income households in Los Angeles.[200]

2. Solar Rooftop Program

In 2017, as a response to remedy cited skewed solar participation, LADWP implemented the Solar Rooftop Program, which provides single-family residences rooftop solar systems free of charge.[201] Through this program, single-family households lease their rooftops to LADWP for solar production.[202] LADWP does

191. *Solar Incentive Program,* L.A. DEP'T OF WATER AND POWER, HTTPS://WWW.LADWP.COM/LADWP/FACES/LADWP/PARTNERS/P-GOGREEN/P-GG-INSTALLSOLAR?_ADF.CTRL-STATE=SM9MCM6Y6_29&_AFRLOOP=572131546901560.

192. *See infra,* Section III.C.1.

193. Kate O'Brien, *Behavior Change Case Study: LA Department of Water & Power – The Shared Solar Program*, MEETING OF THE MINDS (June 4, 2019), https://meetingoftheminds.org/behavior-change-case-study-la-department-of-water-power-the-shared-solar-program-30480.

194. *Id.*

195. *Id.*

196. *Id.*

197. O'Brien, *supra* note 193.

198. *Id.*

199. *Id.*

200. *Id.*

201. MEISTER CONSULTANTS GRP., *supra* note 184, at 9.

202. *Id.*

not charge the resident customers solar panel installation fees.[203] Maintenance and operation of the panels are the responsibility of LADWP and not the customer participant since the utility retains ownership over the solar panels.[204] The energy generated from these panels (which is around 2-4 kW) does *not* offset the customer's bills through net metering and is instead delivered directly to the grid.[205] Customer bills are not reduced because of this program.[206] Instead, customers receive a prepayment of $360.00 for the first year's lease payment.[207] Depending on the type of solar system installed and its size, "LADWP will either issue a fixed monthly lease payment between $20 and $50 per month, or between $240 and $600 per year," resulting in financial benefits between $4,800 to $12,000 over 20 years.[208] Each rooftop is leased for a 20-year term from the date the solar panel is installed, but "homeowners can terminate the agreement with a 60-day written notice."[209]

The program uses the utility's class rate structure for identifying low-income households and communities.[210] So, those households that are specifically classified as Schedule "R1-D-Low-Income" under LADWP's rate structure would qualify for this program.[211] However, priority is given to those communities that have low solar participation, which is determined based on the household's zip code.[212] No credit checks or up-front costs are required, but customers' "utility accounts must be 'in good standing' to participate."[213] Systems can be removed twice at no charge to the household as long as the first time is "for rooftop repairs" and the second time is "at the end of the program term."[214] Single-family homes must meet the following eligibility requirements for the program:

- The home must be "owner occupied."[215]

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203. *LADWP Low-Income Program – Is it Really Worth It?*, SOLAR EARTH CHOICE, INC. (Aug. 12, 2019), https://www.solarearthchoice.com/2019/08/12/ladwp-low-income-program-is-it-really-worth-it/.

204. MEISTER CONSULTANTS GRP., *supra* note 184, at 9.

205. *Id*.

206. *Id.*

207. SOLAR EARTH CHOICE, INC., *supra* note 203.

208. *Solar Rooftops*, L.A. DEP'T OF WATER AND POWER, https://www.ladwp.com/ladwp/faces/ladwp/residential/r-gogreen/r-gg-ressolar/r-gg-rs-solarrooftops?_adf.ctrl-state=c72jqqmwb_118&_afrLoop=334002142504691. *See* SOLAR EARTH CHOICE, *supra* note 203 (stating that "[a]fter the first year is completed, the [customers] receive a $30.00 credit on their monthly utility bill" or $360.00 prepayment for each subsequent year as payment for the utility leasing their rooftops).

209. L.A. DEP'T OF WATER AND POWER, SOLAR ROOFTOPS PROGRAM GUIDELINES: COMMUNITY SOLAR 9 (2016), http://clkrep.lacity.org/onlinedocs/2016/16-1284_misc_1_11-16-2016.pdf [hereinafter SOLAR ROOFTOPS PROGRAM GUIDELINES].

210. *Id.* at 3.

211. *Id.* Although the target is low-income households, LADWP also considers applicants for the program from "R1-A-Standard," "R1-B-Time-of-Use," and "R1-E-Lifeline" rate classes. *Id.*

212. MEISTER CONSULTANTS GRP., *supra* note 184, at 10.

213. *Id.* at 9.

214. SOLAR ROOFTOPS PROGRAM GUIDELINES, *supra* note 209, at 2.

215. *Id.*

- The single-family home must "meet all of the LADWP and Los Angeles Department of Building and Safety expedited PV installation criteria."[216]
- The home must be "a single story."[217]
- The home must "have [a] suitable rooftop[] with composite shingle roofing" to allow safe installation.[218]

The Solar Rooftop program aims to include around 300-400 low-income residential households as "customers" of the program.[219] In addition, although it is not officially identified as an "equity" component, LADWP also provides jobs and training for LADWP's workforce through this program.[220]

The Solar Rooftops program focuses on expanding renewable energy programs into low-income communities with little exposure to solar savings due to the high cost of installation rather than reducing the energy burden for low-income communities without access to renewable energy.[221] As of September 2020, "LADWP ha[s] performed over 400" single-home rooftop inspections for the suitability of panels for the Solar Rooftop Program.[222] However, since April 5, 2021, the Solar Rooftop program stopped accepting applications due to a back-log in processing applications received during the pandemic.[223] The suspension is deemed temporary, but LADWP has since not provided any updates to the program.[224]

3. Shared Solar Program

More recently in 2018, LADWP launched the Shared Solar Program which targets multifamily and renters who do not own rooftops.[225] Customers do not need to install solar panels on the rooftops of their buildings to participate.[226] LADWP and city-owned structures provide locations for the Solar installations to supply power to the program's participants.[227] Solar power for this project "also

216. *Id.*

217. *Id.*

218. SOLAR ROOFTOPS PROGRAM GUIDELINES, *supra* note 209, at 1.

219. *Id.* at 2.

220. MEISTER CONSULTANTS GRP., *supra* note 184, at 9-10.

221. *Id.* at 10.

222. *LADWP Community Solar Program Honored for Innovative Community Service*, L.A. DEP'T OF WATER AND POWER (Sept. 23, 2020), https://www.ladwpnews.com/ladwp-community-solar-program-honored-for-innovative-community-service/.

223. *Solar Rooftops: Temporary Suspension*, L.A. DEP'T OF WATER AND POWER, https://www.ladwp.com/ladwp/faces/wcnav_externalId/r-gg-rs-solarrooftops?_adf.ctrl-state=uwdqf4m19_29&_afrLoop=906610503513541 (last updated Mar. 2022).

224. *Id.*

225. Guerin, *supra* note 187.

226. *Id.*

227. *LADWP Will Launch New Community Solar Power Program for Renters*, PHOTON.INFO (Sept. 27, 2018), https://www.photon.info/en/news/ladwp-will-launch-new-community-solar-power-program-renters.

come[s] from a large-scale 90 MW solar project . . . in the Mojave Desert," which is more economical to build and operate compared to single rooftops.[228]

The Shared Solar Program allows customers to purchase "blocks of solar power" from these locations that are remote from their dwellings.[229] They may purchase "up to 100 kWh per month at a 10-year fixed rate."[230] Customers that subscribe to the program have a portion of their energy costs "fixed," which allows the customer to have bill certainty.[231] The solar rate for this program will be "[$0.1/kWh] *more expensive* than the" standard LADWP residential rates at the outset of the program.[232] The benefits of this structure are the consistency and predictability of utility bills.[233] Customers can cancel at any time, and, as is common for community solar projects, customers can transfer their subscriptions to the program to other eligible locations.[234] Like the Solar Rooftop program, Shared Solar is available to those renters that LADWP classifies as "R1-D-Low-Income."[235]

LADWP aims to provide 10 MW of solar power through this program.[236] Shared Solar targets approximately 13,000 customers to participate in the program.[237] Below is an infographic from LADWP on the structure of the Shared Solar Program.

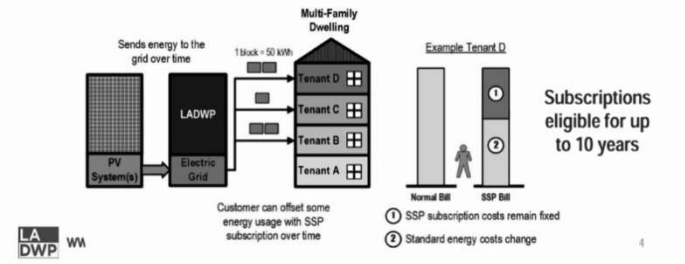

Figure 6. "Shared Solar Program Overview Decision."[238]

228. *Id.*

229. *LADWP Approves New Community Solar Power Program for Renters*, L.A. DEP'T OF WATER AND POWER (Sept. 26, 2018), https://www.ladwpnews.com/ladwp-approves-new-community-solar-power-program-for-renters/.

230. PHOTON.INFO, *supra* note 227.

231. L.A. DEP'T OF WATER AND POWER, SHARED SOLAR PROGRAM: ENERGY, CLIMATE CHANGE, AND ENVIRONMENTAL JUSTICE COMMITTEE 4 (2019), http://clkrep.lacity.org/onlinedocs/2018/18-0928_misc_03-19-2019.pdf.

232. Guerin, *supra* note 187.

233. SOLAR ROOFTOPS PROGRAM GUIDELINES, *supra* note 209.

234. L.A. DEP'T OF WATER AND POWER, LADWP SHARED SOLAR GUIDELINES 12 (2019), available for download at https://www.ladwp.com/ladwp/faces/ladwp/residential/r-gogreen/r-gg-ressolar?_adf.ctrl-state=rtyabwcx0_75&_afrLoop=587974238828151.

235. SOLAR ROOFTOPS PROGRAM GUIDELINES, *supra* note 209, at 3 (explaining that LADWP also considers applicants for the program from "R1-A-Standard," "R1-B-Time-of-Use," and "R1-E-Lifeline" rate classes).

236. PHOTON.INFO, *supra* note 227.

237. LADWP SHARED SOLAR GUIDELINES, *supra* note 234, at 6.

238. *Id.* at 10.

The motivations behind this program were energy equity.[239] The program allows families and residents access to utility bill predictability even though they are renters and not homeowners.[240] In 2018, approximately 63% of residents rented their housing while 37% of households were owner-occupied.[241] LADWP engaged with two local community based organizations in developing and shaping this program in order to incorporate community concerns and reduce skepticism within the communities.[242] LADWP mentioned attempts of seeking additional federal and local funding for discounted solar rates for low-income households, but no updates or progress have been reported.[243]

IV. COMPARATIVE ANALYSIS THROUGH ENERGY EQUITY LENS

Although all three cities have implemented solar programs targeting low-income communities, these programs have different elements and end-results which touch on different aspects of energy equity. A careful evaluation of these programs not only reveals their effectiveness in reducing energy burden, but also their effectiveness in promoting equity for low-income households. To recapitulate the framework established in section II, this section will examine the following energy equity components in these low-income solar programs:

- Incorporating community participation and awareness surrounding the causes of energy burden into the low-income solar program can make the program more efficient [Procedural Equity][244];
- Recognizing and engaging *all* low-income households such as those residing in single-family homes, apartment buildings, government-subsidized housing, and manufactured/mobile homes [Structural Equity][245];
- Removing or avoiding barriers to entry such as up-front costs for equal access and participation [Distributive Equity][246];
- Having some mechanisms for collecting, tracking, and reporting data for solar program participation and engagement, especially from low-income households experiencing high energy burdens.[247] Among other things, the data should be suitable for revealing any issues and incongruities that can be addressed through "in-person engagement and education campaigns" as well as ways in which the program can be improved[248]; and
- Effectively reducing energy burden of low-income households.

239. O'Brien, *supra* note 193.

240. *Id.*

241. Guerin, *supra* note 187.

242. O'Brien, *supra* note 193 (names of the local "community based organizations" were not listed or mentioned).

243. *Id*.

244. Park, *supra* note 51, at 3.

245. O'Brien, *supra* note 193; Park, *supra* note 51, at 3

246. O'Brien, *supra* note 193; Park, *supra* note 51, at 3.

247. Brown et al., *supra* note 9, at 23-24.

248. *Id.* at 23.

These components may reveal the strengths and weakness of the identified low-income solar programs, but more importantly, they will reconcile the goals of these programs with the goals of energy equity to provide a more focused perspective on energy equity in low-income solar programs aiming to address energy burden.

A. Community Participation – Procedural Equity

Community participation plays a significant role in both the effectiveness and accessibility of the solar program. If the targeted low-income communities are unable to communicate their desires and concerns in the planning and implementation of a program directly affecting them, then the program fails in achieving procedural equity.[249] Lack of community engagement can impede a program's success, most obviously because the program's targets are either unaware of the program or do not understand its benefits, but also because understanding the complexities of the impacted population is likely to improve outreach efforts.[250] All three programs ultimately relied on advocacy organizations and third-party vendors to engage community participation, but the approaches of third-party partners were different across the programs.[251]

DC's Solar for All program, led by DC's DOEE, worked directly with local community advocacy groups and solar developers both during the planning stages and implementation phases of the program.[252] However, it was the solar developers/community advocacy groups that formed relationships with the targeted communities to inform them about the DC Solar for All program as an option to reduce their energy burdens.[253] Similarly, LADWP worked with local community organizations to develop and structure the Shared Solar Program to reduce skepticism and incorporate community concerns of solar benefits for low-income residents in apartment buildings.[254] The New Orleans' City Council's Community Solar program is still in its early stages, so information on effective community engagement during its implementation phases is scarce.[255] However, it is worth noting that community advocacy organizations played a significant role in shaping the program during its rule and comment period while engaging stakeholders.[256]

The community solar programs in D.C. and Los Angeles tried to increase employment opportunities for community members through the solar industry workforce.[257] These workforce programs, although not directly impacting energy burden, to the extent they were successful in providing additional employment

249. Park, *supra* note 51, at 4.

250. *Id.*

251. *Solar for All in D.C.*, *supra* note 91; Luke & Heynen, *supra* note 152, at 616; O'Brien, *supra* note 193.

252. *Solar for All in D.C.*, *supra* note 91.

253. *DC Solar Stories EP2 Solar for All*, *supra* note 93.

254. O'Brien, *supra* note 193.

255. Luke & Heynen, *supra* note 152, at 618.

256. *Id.* at 616.

257. MEISTER CONSULTANTS GRP., *supra* note 184, at 9; *DC Solar Stories EP4 Building Workforce*, *supra* note 116.

opportunities to impacted communities, provided them with a greater role in the energy transition.[258] Although there is always room for improvement, all three programs had varying degrees of awareness surrounding the importance of community engagement.[259]

Community solar programs in their early stages seeking to encourage community engagement and awareness should replicate the outreach tactics used by the community solar programs in Washington D.C., Los Angeles, and New Orleans. All three programs engaged local advocacy groups in shaping the community solar programs in its early phases since the local advocacy groups better understood the needs and constraints of low-income communities.[260] Nonprofit and community advocacy groups can also act as intermediaries between policymakers and communities to ensure concerns and awareness are communicated effectively.[261] Policymakers and/or utilities looking to develop community solar programs for disadvantaged communities but have not yet fostered a relationship with these communities can consider hosting workshops or forums of open dialogue for community members and community advocacy organizations.[262]

B. Engaging all low-income households – Structural Equity

A shortcoming of some solar programs is that they benefit particular groups (such as single-family homeowners) but do not account for the barriers to participation faced by other low-income groups, e.g. renters. Local governments and utilities must recognize that the way many current programs are structured prevents low-income households from accessing the benefits of the solar power programs.

All the identified solar programs have addressed (to varying degrees) the gap in the access to the benefits of the solar programs between homeowners and renters.[263] DC's Solar for All program was focused on tenants of apartment buildings accessing solar benefits because the low-income population of Washington D.C. largely consists of renters, not homeowners. DC's Solar for All program identified and accounted for the concerns related to apartment buildings and devised a solution that benefits renters and tenants of apartment buildings.[264] This

258. MEISTER CONSULTANTS GRP., *supra* note 184, at 9.

259. *Solar for All in D.C.*, *supra* note 91; Luke & Heynen, *supra* note 152, at 616; O'Brien, *supra* note 193.

260. *Solar for All in D.C.*, *supra* note 91; Luke & Heynen, *supra* note 152, at 616; O'Brien, *supra* note 193.

261. Heeter et al., *supra* note 168, at 33.

262. *See* Nidhi Thakar & Jake Wise, *Making More Room at the Table: A Utility Perspective on Energy Equity*, *in* 12 ADVANCING EQUITY IN UTILITY REGULATION 51 (Lisa Schwartz ed., 2021) (discussing in the context of distribution system planning how Portland General Electric "deferred to [community-based organizations] to facilitate a series of community workshops where [Portland General Electric] would join in community dialogue and lay the groundwork for future outreach without dominating the agenda. The scope of work included recruitment and convening, development of nontechnical and multilingual educational materials, and qualitative and quantitative research" from which Portland General Electric developed a Community Engagement Plan).

263. PHOTON.INFO, *supra* note 227; *Solar for All in D.C.*, *supra* note 91; *DC Solar Stories EP6 Sharing the Wealth*, *supra* note 120. *See* NOLA, WHITE PAPER OF THE COUNCIL'S UTILITY ADVISORS REGARDING COMMUNITY SOLAR AND OTHER SHARED DISTRIBUTED ENERGY RESOURCES 9-10 (2018), https://council.nola.gov/council/media/Assets/Committees/Utility/White-Paper-on-community-solar(107122241_5).pdf.

264. Heeter et al., *supra* note 168, at 12; *Solar for All in D.C.*, *supra* note 91.

DC program's recognition of renters played a significant role in the development of the overall program.[265] LADWP took a different approach by first implementing a single-family home program and then moving forward with implementing a program targeting renters.[266] Although the latter solar program came sometime later than the single-family solar program, LADWP still recognized the disparity between single-family homes and apartment buildings.[267]

New Orleans' programs, on the other hand, have not fully addressed this disparity. NOLA's Solar for All program was directed at single-family households.[268] It did not include any options to connect solar developers with occupants of apartment buildings. The New Orleans Community Solar rules allow renters to qualify for subscription credits that would then benefit tenants.[269] Yet, there is still no other provision or benefit directed specifically at residents of apartment buildings who could seek solar benefits outside the landlord or building owner applying for the program.[270] Even when a landlord's permission is not a barrier, if eligible participants live in government housing where they pay 30% of their income towards rent and utilities, this can complicate how the tenants benefit from share solar savings/credits.[271] That is why DC's Solar for All program diverted some savings to community benefits or rebates for similarly situated low-income consumers.[272] The New Orleans' Community Solar program should consider the DC program experiences and address these issues.

It is not clear from public information whether LADWP's Shared Solar program is designed to address this barrier. If not, they too may want to consider the solutions suggested by DC's program.

Although the solar programs in all three cities recognized the struggles renters, these solar programs have not recognized other social inequities that impact low-income communities, such as racial disparities.

Structural equity requires a recognition of issues relating to *social inequalities* affecting marginalized groups, which include both low-income and racial inequalities.[273] Although the focus of this article is on energy equity for low-income communities, it is valuable to recognize the intersection of race with energy equity for low-income communities.[274] For example, in New Orleans,

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265. Heeter et al., *supra* note 168, at 27.

266. O'Brien, *supra* note 193.

267. *Id*.

268. *Solar for All NOLA*, *supra* note 179.

269. Luke & Heynen, *supra* note 152, at 615.

270. *Id.* Heeter et al., *supra* note 168, at 8.

271. Heeter et al., *supra* note 168, at 8.

272. DC SUSTAINABLE ENERGY UTIL, *supra* note 84.

273. Park, *supra* note 51, at 3 (defining structural equity).

274. Chandra Farley, *Advancing* Just Energy *in the South: The Potential for Equitable Utility Regulation through Public Participation, in* 12 ADVANCING EQUITY IN UTILITY REGULATION 1 (Lisa Schwartz ed., 2021) ("Nearly every equity indicator . . . including those related to our energy and utility systems, can be linked to systemic racism and practices that institutionalize it. We can look to racist federal policy such as redlining, where the Federal Housing Administration, established in 1934, furthered segregation by refusing to insure mortgages in and near African-American neighborhoods. . . . Redlining buttressed the segregated structure of American

> Black households are six times more likely to live in poverty relative to white households, Black workers are three times more likely than white workers to be unemployed, Black households pay more than 8 percent of household income on average in energy bills relative to a citywide average closer to 5 percent.

These disparities ultimately stem from New Orleans' history of housing and employment policy impacting Black communities.[275] The New Orleans Community Solar rules do not address or recognize this disparity despite the intersection with participants who would qualify as "low-income" under the program.[276] DC's Solar for All program[277] and LADWP[278] also do not use any particular language beyond "low-income," which ultimately leads to failure in recognition of other socioeconomic inequities related to solar benefits. Although no official language is used by these programs,[279] understanding and recognizing certain racial disparities in the targeted communities can broaden the impact and effectiveness of these solar programs.

In determining whether or not racial disparities are reduced by focusing solely on poverty and low-income groups, these programs should collect data to assess whether the programs that are designed for low-income communities are promoting structural equity for *all* groups or whether a racial disparity and inequity continues to persist if not addressed. Using that information, policymakers and utilities should ensure participation by communities with high concentrations of communities of color and other underrepresented communities. Meaningful promotion and awareness of the benefits of the community solar program directed at underrepresented communities, given the intersectionality as "low-income households," is one way to campaign for structural equity.[280] Engaging community advocacy groups with either a focus on racial justice or strong ties to underrepresented communities can also increase participation and promote structural equity.

C. Removing Barriers to Entry – Distributive Equity

Traditional programs promoting cleaner energy generation typically benefit higher-income households that can afford (i) additional up-front costs, such as solar panel installation fees, or (ii) higher electricity bills.[281] To include participants from all economic classes in the energy transition equitably, low-income solar programs must be designed to accommodate the financial limitations of low-in-

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cities. . . . The United States' long, shameful history of discriminatory housing policies and racial segregation is part of the reason why Black families are more likely to live in older, energy-inefficient homes that saddle them with higher energy burdens than white families at almost every position in the income distribution.").

275. Luke & Heynen, *supra* note 152, at 616–17.

276. *Id*. at 616.

277. *Solar Initiatives*, *supra* note 78.

278. *Solar Rooftops*, *supra* note 208.

279. *Solar Initiatives*, *supra* note 78. *Solar Rooftops*, *supra* note 208.

280. *See* Park, *supra* note 51, at i:4.

281. Heeter et al., *supra* note 168, at 5 (This class disparity is not intentional because implementing community solar projects with a majority of low-income participants end up being costlier due to "higher customer acquisition costs, . . . eligibility verification, and increased project financing costs").

come households while reducing their energy burdens. Specifically, these programs must address and/or remove the barriers to entry and participation that prevent such households from enjoying solar benefits.

All three of the surveyed cities implemented these programs while conscious that additional costs and burdens cannot be imposed on low-income household participants.[282] LADWP recognized their existing solar programs' nature and design excluded low-income households, which ultimately led to the creation of the Solar Rooftop and Shared Solar programs.[283] LADWP designed these programs to meet some of the barriers faced by low-income households by not charging installation, maintenance, or operation fees to the participants and by giving both renters and homeowners the power to participate without significant barriers to access.[284] While Los Angeles created two separate low-income solar programs for single-family homes and renters to bridge the gap for renting families, D.C. incorporated other benefits for renters into their Solar for All program through community benefits such as rebate checks, daycare services, or financial literacy trainings.[285] The New Orleans City Council Community Solar program was originally intended to be a city-wide program for all residents with some provisions directed for low-income households.[286] Advocacy by local New Orleans nonprofit organizations pushed for allocation of solar benefits to low-income households leading to the expanded scope of the program's definition of "low-income" and setting aside solar generation capacity specifically for low-income participants.[287]

One other issue that these programs must consider is retention–households may sign up for the program as participants, but will they continue to participate for the entire duration of the program? Generally, low-income household retention, especially from renters, is a major issue for community solar programs, especially when acquiring and replacing customers leaves the solar program with additional costs.[288] None of the three programs mentioned how they address the issue of retention, especially in circumstances of distributive equity barriers, which could harm program management.[289] One option to consider when facing issues of retention is designating representatives to communities engaged with the program to survey and address concerns of participants with the program.[290] Gathering feedback regarding cost-based barriers and directly resolving participant issues could have some impact on participant satisfaction and ultimately retention of low-

282. *Id*. at 22.
283. Guerin, *supra* note 187.
284. *Id. See* SOLAR ROOFTOPS PROGRAM GUIDELINES, *supra* note 209.
285. *DC Solar Stories EP7 Innovation and Collaboration*, *supra* note 126.
286. *City Council Approves First Steps Toward 'Community Solar' Power Program*, *supra* note 161.
287. Luke & Heynen, *supra* note 152, at 616.
288. Heeter et al., *supra* note 168, at 11.
289. *Id*. at 11-12.
290. *Id.* at 11.

income households in the community solar programs.[291] Community solar participation and retention can be better managed when relationships are fostered and maintained with engaged communities.[292] Another option policymakers should determine is which stakeholder is responsible for participant retention because that entity would be responsible for the continuation of the program.[293] Heeter, et al. also outline several options to addressing participant turnover and retention, including prepaid subscriptions for a set period of time supported by external funding, shorter contracts, and incorporating large subscribers such as cities and places of worship to cover any shortages.[294]

D. Data Collection and Tracking

Understanding energy equity requires access to data for many reasons. Pre- and post-program implementation data are needed to assess the program's effectiveness. Data provides an understanding to the energy burden of a particular household in relation to its community. Data is a tool to understand what barriers low-income households face in accessing benefits from solar programs. Data also informs and engages a community on how they are affected by a particular solar program. Without access to data and measurements of success, it is difficult to determine whether a program is successful, where it (1) reduces energy burden for low-income households, and (2) addresses structural equity.

LADWP approached its solution to energy burden on low-income households through its data tracking mechanism, the Equity Metrics Data Initiative, which aims to enhance the services LADWP provides to its customers.[295] The EMD monitors LADWP's programs and utility rates based on their impacts on low-income households and communities and then releases this information publicly on its website.[296] Through this initiative, LADWP also engages local communities

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291. *See* Thakar & Wise, *supra* note 262, at 57 (discussing Portland General Electric's smart grid program for low-income households and how the program implements a "community organizer-like presence" in order to "attain and sustain participation and understand the customers taking service within each [geographic] area"). This approach was modeled after the 1980 Hood River Conservation Project conducted by the Bonneville Power Administration where "onsite personnel were credited with community outreach, resolution of contract quality-of-work issues, and identification of emerging issues." *Id.* at 58.

292. *See* Heeter et al., *supra* note 168, at 11 ("Solar developers typically specialize in up-front customer acquisition but are unaccustomed to ongoing subscription management. For this reason, effective subscription management may require a partnership with a utility or community organization with an ongoing relationship with potential subscribers.").

293. *Id.* at 9 (considering the disadvantages and advantages of acquisition and retention of low-income households in community solar programs by three entities: utilities, third-party community solar developers, and affordable housing facilities as subscribers).

294. Heeter et al., *supra* note 168, at 11–14.

295. O'Brien, *supra* note 193.

296. *Equity Metrics Data Initiative*, L.A. DEP'T OF WATER AND POWER, https://www.ladwp.com/ladwp/faces/wcnav_externalId/au-fr-corporateperformance-emdi?_adf.ctrl-state=gmru1ugso_4&data-source=ucm%23dDocName%3A2063_EN)))&_afrLoop=232956639110764&_afrWindowMode=0&_afrWindowId=null#%40%3F_afrWindowId%3Dnull%26_afrLoop%3D232956639110764%26data-source%3Ducm%2523dDocName%253A2063_EN%2529%2529%2529%26_afrWindowMode%3D0%26_adf.ctrl-state%3Da5nduksbe_41.

and civil society to analyze the data and find ways to improve their programs.[297] This initiative does not produce data specific to the Solar Rooftop program or the Shared Solar program, but it provides some tracking mechanism of energy impacts on low-income households, which New Orleans appears to lack.[298]

Tracking mechanisms and data reporting on the community solar programs would provide transparency, which in turn will promote improvements on the different components of energy equity. Data reporting on a geographic or zip code level can help pinpoint which demographics and communities are participating in the community solar programs and which ones are experiencing barriers to access or misinformation. Data collection would also aid community advocacy groups in targeting and aiding communities for community solar benefits. Data reporting can take the form of revealing general changes in customer rates over time as a part of participation in the program.

E. Reducing Energy Burden

In addition to all the aforementioned considerations, these programs can and often do *effectively* reduce energy burden for their program participants. The presence of a disproportionate energy burden can influence how or if a low-income household chooses to participate in the solar program and the overall energy transition.[299] If certain entry costs are not reduced, then there is little incentive for some low-income households to participate given their limited financial capacity.

DC and New Orleans tailor their community solar programs to provide direct credit or savings to their participating households either on their electricity bills or in some other rebate or community benefit (as is the case with DC's apartment buildings where direct passthrough of the financial benefits to the residents of the building is not otherwise feasible).[300] The National Renewable Energy Laboratory (NREL) has found the DC Solar for All program to be a particular success; it has reduced energy burden for the "lowest income households from 13.5% to 8.8%."[301] Los Angeles, on the other hand, focuses on "predictability" and "long-term savings" through its programs by providing a sense of fixed rates or fixed savings but does not necessarily guarantee a reduction in electricity bills.[302] Luckily, none of the major low-income solar programs (with the exception of Solar for

297. *Id.*

298. MEISTER CONSULTANTS GRP., *supra* note 184, at 9-10; *see DCSEU – Quarterly and Annual Reports*, DEP'T OF ENERGY AND ENV'T (June 24, 2022), https://doee.dc.gov/publication/dcseu-quarterly-and-annual-reports.

299. Jenny Heeter et al., *Affordable and Accessible Solar for All: Barriers, Solutions, and On-Site Adoption Potential*, NAT'L RENEWABLE ENERGY LAB'Y (2021), https://www.nrel.gov/docs/fy21osti/80532.pdf.

300. NET ENERGY METERING AND INTERCONNECTIONS, COMMUNITY SOLAR IN THE DISTRICT OF COLUMBIA, *supra* note 107; *see Net Metering and Distributed Generation (New Orleans)*, *supra* note 146.

301. Heeter et al., *supra* note 299. *See also* Herman K. Trabish, *Bringing equity to electricity service through home, power sector and regulatory innovation*, UTILITY DIVE (Oct. 27, 2022), https://www.utilitydive.com/news/bringing-equity-to-electricity-service-through-home-power-sector-and-regul/630253/.

302. SOLAR ROOFTOPS PROGRAM GUIDELINES, *supra* note 209, at 1.

All NOLA) involve upfront costs that would preclude participation given the financial constraints.[303]

Although LADWP's energy bill predictability can be appealing for long-term budgeting and planning, it ultimately does not directly impact the energy burden of a low-income household in the short-term to the same extent subscription credit and savings would.[304] Further, long-term savings are predicated on the assumption that utility rates will increase from their present level; such that in comparison, the solar rates locked-in today will look more attractive than the utility-provided alternative in the future.[305] LADWP appears to recognize this shortcoming and has stated its intentions to secure federal funding to provide rate credits to its customers, but it has not released any updates, progress, or information regarding federal funding.[306] Without any reduction or reimbursement on a participant's energy bill, a low-income household's near-term energy burden ultimately remains the same or possibly higher after entering the program than before.[307]

F. Other Considerations

Each of the identified programs are in different stages of implementation. Each are still measuring their impacts and achievements of savings through solar power. The New Orleans' Community Solar program has only begun its implementation while DC's Solar for All has been providing benefits to low-income households for a couple of years.

The most important question to consider is to what extent have these programs successfully promoted equity. Energy equity was the underlying motivation for these programs regardless of whether they used this term in their promotion and overarching discourse.[308]

Although to varying extents, all three of the cities' programs included some element of "procedural equity" by working with non-profit organizations and third-party solar vendors to enhance community engagement and participation.[309] Although each program engaged local advocacy groups and considered particular concerns associated with their local communities, there is room for improvement. These programs can engage local communities regularly by obtaining feedback and understanding concerns the communities have with the program. Regardless, all three programs shared the same goal: expanding solar capacity to benefit low-income households.[310]

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303. *See* Heeter et al., *supra* note 168, at 19.

304. Ben Zientara, *LADWP Solar Programs, Incentives, and Net Metering*, SOLAR REVIEWS (Sept. 19, 2022), https://www.solarreviews.com/blog/going-solar-with-los-angeles-department-of-water-and-power#programs.

305. *Id*.

306. *Id*.

307. *Id*.

308. Bridget Williams, *Solar for All Demonstrates the Importance of Equity in Clean Energy*, ENVT'L & ENERGY STUDY INST. (JUNE 8, 2020), https://www.eesi.org/articles/view/solar-for-all-demonstrates-the-importance-of-equity-in-clean-energy; SOLAR FOR ALL IMPLEMENTATION PLAN, *supra* note 85.

309. *Solar for All in D.C.*, *supra* note 91; Luke & Heynen, *supra* note 152, at 616; O'Brien, *supra* note 193.

310. *Solar for All in D.C.*, *supra* note 91; Luke & Heynen, *supra* note 152, at 603; O'Brien, *supra* note 193.

Looking at all three cities, DC's Solar for All program seems to have made the most progress in not only reducing energy burden but in promoting energy equity. Not only has there been an actual reduction in energy burden for some low-income households,[311] the program components utilized community groups to engage participants and identify significant equity issues – acting on procedural equity.[312] Participants see a reduction in their energy bill while expanding the city's solar generation capacity.[313] Importantly, it recognized the issue that not all participants can directly see the savings from solar on their energy bill, and therefore DC's Solar for All program made sure to redistribute these benefits for certain renters by enhancing community facilities and providing rebates – addressing both distributive and structural equity.[314] DC's Solar for All program could improve by working directly with community members in recognizing other disparities impacting energy burden (structural equity beyond a low-income lens) and implementing a robust data collection and reporting program as LADWP did.[315] However, the DC Solar For All's progress cannot be denied.

New Orleans' Community Solar program has the right mechanisms in place to be successful to the same extent that DC's Solar for All program is. Although the program is new and still in its early phases, New Orleans should consider the challenges that could arise in multifamily housing where rent is based on income or where there is only a single meter shared for the whole building. Encompassing these considerations would make the community solar program more equitable from a distributive and structural equity standpoint.

Los Angeles' programs embody many of the components of equity but require more attention and resources towards reducing energy burden. Without the incentive of reducing energy burden or savings in general, especially with its Shared Solar program, low-income household participation and retention will serve as a major barrier to the programs' continuation. However, LADWP's Equity Metrics Data Initiative[316] serves as an excellent example of what other cities and utilities can do to track and report data on equity participation of solar programs.

V. CONCLUSION

Energy equity has three different components: procedural equity, distributive equity, and structural equity.[317] The recent shift in addressing energy equity and energy burden shows great promise for promoting energy affordability in urban areas. Engaging all households to participate in solar programs and incentives, especially low-income households, is a significant challenge. A reduction in energy costs can have secondary impact on total cost of housing and utilities for low-

311. Heeter, et. al., *supra* note 299.
312. *Id.*
313. *Id.*
314. DC SUSTAINABLE ENERGY UTIL, *supra* note 84.
315. O'Brien, *supra* note 193.
316. *Id.*
317. *Energy Equity*, *supra* note 49.

income households and other intended recipients. Assessing these programs' effectiveness through an energy equity lens can help identify additional characteristics that might influence a program's success. The identified solar programs targeting low-income communities have elements and end-results that are different from one another, and thus touch on different aspects of energy equity. Continuing to evaluating these programs from an energy equity framework will reveal their effectiveness in reducing energy burden and promoting equity for low-income households. Washington D.C., New Orleans, and Los Angeles are accomplishing significant strides through their solar programs.[318] However, given the nascent state of low-income oriented solar programs with limited data, these programs can expand their reach to better promote energy equity and reduce energy burden for low-income communities.

318. *See supra*, Section III.

MANAGING ENERGY SECURITY IMPERATIVES AND CLIMATE ASPIRATIONS IN AN ERA OF GLOBAL CONFLICT

The following is a transcript of the Energy Law Journal/Energy Bar Association September 22, 2022 online symposium: "Managing Energy Security Imperatives and Climate Aspirations In An Era of Global Conflict." The Russian invasion of Ukraine has spawned turbulence in global markets, but none as dramatic as reshaping the map for energy supply accessibility and affordability. As European countries recalibrate their economies to lessen dependence on Russian-supplied hydrocarbons, the United States is poised to bolster Europe's energy security partially for the foreseeable future, and to support Ukraine's fight on behalf of democratic values. The panel of experts participating in the symposium examined how the emphasis on energy security squares with US domestic and international commitments to lessen dependence on fossil energy to meet climate challenges as the United States and other suppliers encourage increased sales of liquefied natural gas to aid Europe.

Moderator: Robert W. Gee[1]
Panelists: Gillian R. Giannetti[2],
J. Patrick Nevins[3], Former Ambassador Andras Simonyi[4]

PANEL DISCUSSION

MR. GEE: My name is Robert Gee and on behalf of the Foundation for the Energy Law Journal, I welcome you to this symposium entitled Managing Energy Security Imperatives and Climate Aspirations in an Era of Global Conflict.

As a long-time member of the Energy Bar Association, whose Foundation publishes this Journal, I'm honored to moderate today's symposium. I've been an attorney and energy professional for many years, but as pertinent here, I served as the Assistant Secretary for Policy and International Affairs during the Clinton Administration, during which time I chaired the Energy Department's Caspian Energy Desk.

Our objective was to influence the routing and construction of commercial hydrocarbon pipelines in Central Asia to blunt Russian economic domination of

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3. J. Patrick Nevins: Partner, Latham & Watkins, LLP, BA, International Relations & Global Studies & Economics, University of Virginia (1989); JD, Georgetown University Law Center, (1992).

4. Former Ambassador to NATO and to the U.S. Andras Simonyi: Nonresident Senior Fellow, Global Energy Center, Atlantic Council.

the newly independent states of the former Soviet Union; thus, I've had an acquaintanceship with the matters to be discussed today.

Today's symposium is sponsored by the Energy Law Journal. Its content will be recorded, transcribed, and published in the Journal's fall edition. For that reason, I advise members of our live audience with us today, as well of our online viewers, to be aware of that should you wish to participate in our Question & Answer session during today's discussion.

On February 24th of this year, the world was shaken by Russia's invasion of Ukraine, rupturing geopolitical relations in a manner that can justifiably be termed as tectonic. In immediate response, the United States, the European Union, and the UK escalated economic sanctions against Russia, layering them atop those already in place owing to Russia's prior annexation of Crimea.

These new sanctions upended long-term European plans to rely on substantial quantities of Russian natural gas via transit to the Nord Stream 1 and Ukrainian pipeline systems. Despite long-held notions of avoiding disruption of energy supplies during wartime, Russia retaliated by halting Nord Stream Gas supplies.

In the meantime, the EU girds for this winter, shoring up its stocks of natural gas storage from other suppliers, imposing mandates to reduce demand, 15 percent for natural gas in some instances, and seeing its industrial manufacturing capacity starting to falter, all while natural gas and electricity prices soared to astronomic highs.

In the words of noted energy economic historian, Dan Yergin, the Russo/Ukrainian Conflict opened a second battlefront and energy war in Europe. On March 25th, the United States and the European Commission announced the creation of a joint taskforce to reduce Europe's dependence on Russian fossil fuels and strengthen European energy security.

The taskforce's dual objectives are to, one, diversify liquefied natural gas supplies in alignment with climate objectives, and two, reduce demand for natural gas. The former goal means that the U.S. and its international partners will work to increase LNG volumes for the EU market of at least 15-billion-cubic meters in 2022 with expected increases going forward, a portion undoubtedly originating from the United States.

Concurrently, however, the announcement also calls for the countries to undertake efforts to reduce the greenhouse gas intensity of all new LNG infrastructure in associated pipelines, including using clean energy to power onsite operations, reducing methane leakage, and building clean and renewable hydrogen-ready infrastructure.

With this heightened emphasis on the EU's energy security, a host of questions with global and domestic U.S. consequences have followed. Can or should the United States supply the EU with escalating U.S. sourced LNG for the foreseeable future? Conversely, how will this initiative be squared with U.S. and other developed countries' pledges for greenhouse gas mitigation steps likely to be assessed at the COP 27 Summit in Egypt this November?

Finally, how can the Biden Administration meaningfully fulfill domestic climate change mitigation goals while serving in its new role in what is essentially now a co-guarantor of European energy security?

To address these and other salient questions, we've assembled a panel of energy and environmental experts to hear their perspectives. So, let me turn to introduce them now.

To my right, Ambassador Andras Simonyi, is a former Hungarian Ambassador to the United States and to NATO, who is now a U.S. citizen. He is a Senior Fellow at the Atlantic Council Global Energy Center and a visiting scholar at the George Washington University School of Engineering and Applied Science.

His focus areas are transatlantic security, in particular, energy security, Russia and Central Eastern European countries in the EU/US relationship. He is a transportation economist by training and has a Ph.D. in International Relations. And on a parenthetical note, Mr. Ambassador, I might also add that I did some research on your unofficial bio and I note that you are also an accomplished guitarist and play with U.S. Secretary of State Tony Blinken in the Rock and Blues Band Coalition of the Willing, but that is for a different discussion on another day.

To Ambassador Simonyi's right is Gillian Giannetti, who is a senior attorney with the Natural Resources Defense Council's Sustainable FERC Project. Her area of expertise is U.S. gas infrastructure, including pipelines and LNG export terminals.

Previously, Gillian worked at a large international law firm. She is regularly cited in trade and national press on gas issues and is an active member of the Energy Bar Association. Gillian earned her bachelor's degree from George Washington University and her law degree from the University of Virginia.

And finally, to my far right is Patrick Nevins. Patrick is a partner in the Washington, D.C. office of Latham and Watkins with over 30 years of experience advising leading energy companies in the development of major infrastructure projects, administrative litigation, and high-stakes regulatory matters with a primary focus on natural gas.

His experience with LNG extends many years to working on U.S. LNG import projects, as well as numerous LNG export projects over the past decade. Among his current clients are operating LNG export terminals, terminals under construction, LNG projects that have been permitted but are not yet under construction, as well as LNG projects currently subject to the regulatory approval process.

He appears with the customary disclaimer that he is not representing nor speaking for any of his clients here today.

So, let me begin by turning to Ambassador Simonyi, who is our European expert to get his perspective on the events that have transpired this year.

Mr. Ambassador, let me ask you, prior to the Russo/Ukrainian War, the EU relied on Russia for around 40 percent or so of its gas supplies. Germany relying around 50 percent for its gas supplies. How did Europe get to this place and did concerns of energy security ever play a role in its planning?

AMBASSADOR SIMONYI: Thanks so much. It's a thrill to be here. I was spending the whole morning with European leaders. As a matter of fact, the Danish Prime Minister is here to talk about energy, energy security, energy transition. Let me just say something. Last night I played a gig at Madam's Organ. I don't know if anyone had heard of Madam's Organ? One of the songs we played is "One Way Out" by the Allman Brothers. And I just want to say there's only one

way out for Europe: closer cooperation with the United States. There is at this moment no other alternative.

So, how did we get here? I think it's part naivete, part neglect, part ignorance. We've known all along that Germany, and in fact, through Germany, Europe is making itself way too dependent on Russian gas. And something I, because of my experience having lived much of my life in a country that was suppressed and dominated by the Russians, I knew that once the Russians got an opportunity to use energy as a weapon against the Europeans they would and this is what happened and nobody was listening, so I was PNG'ed (persona non grata) from one particular unnamed embassy in Washington, D.C. that did not want to talk to me because I spoke out very clearly against Nord Stream 2.

And I also think it's because Russian gas was cheap. The whole concept of developing this relationship with the Russians is driven by German industry. What is going to happen now? And I agree with you when the Russians attacked Ukraine, the world turned on its head and Europe was scrambling to figure out, okay, what do we do now?

I think they did the right thing. They – the Europeans turned – away from the Russians and in just a couple of months there will be a halt to Russian oil imports and they're going to as fast as possible turn away from Russian gas. The question is what is going to happen this year, right?

I think this year is going to be fine. I think Europe will survive the winter. The real question is what is going to happen next year. The problem is that the Europeans when they were offered a lot more U.S. LNG, they said we're not interested and we tried to tell them it's not a turn on/turn off situation, you know, that the gas will be there when you ask for it.

The U.S. gas and LNG industry has been going out of its way to figure out how to meet the demands for cleaner gas production in the United States, so methane capture, water recycling, the replenishment of the environment. You can tick all those boxes. So, the U.S. gas industry has done a lot to meet European demands for cleaner gas, but we have not -- the United States has not built the infrastructure necessary to be able to supply more U.S. LNG to Europe.

And that's a problem because now that the Europeans are begging us for more, we don't have more. We can't deliver more. We are at full capacity. More importantly, the Europeans have neglected their own infrastructure and so therefore we have a serious, infrastructure situation.

My mantra is: more energy security, not less green transition. I repeat: more energy security, not less green transition. The two have to go hand in hand. In the world that I deal in -- which is security writ large -- if there is no energy security, then you can forget about the rest. And if there's no security, you can forget about the stability of our democracy, so that is really what is at stake. Therefore, those who suggest that the two big issues, energy security and green transition, are mutually exclusive, I don't think so. I think we have to figure out how to balance the two.

Finally, let me say this. Europe is doing a lot right with the green energy revolution, but the baseload has to be there and there is no other way you can provide the baseload than through enough gas to support the powerplants and enough nuclear plants. Otherwise, the baseload otherwise will simply not be there. This problem will be with us for a long, long time. Just a final thing, the Europeans

are now looking for gas all over the world. There are only two countries globally that can provide them with energy which does not come with strings attached. One is Norway and, the other, is us, the United States.

I'll stop here and I'm very much looking forward to a good conversation.

MR. GEE: So, the picture you sketch, Mr. Ambassador, is one of, let's just say, European naivete, elimination of optionality in their resource mix, failure to account for the localized geopolitical situation with Russia as their neighbor, over reliance on Russia as a supply source.

Let me just ask you this. It had been conventionally believed among people in the geopolitical world and the global political world of which you've been a part, that even during wartime there have been very rare instances where supplies of energy have been interdicted or disrupted, but Russia has now done that. Were you surprised when that occurred?

AMBASSADOR SIMONYI: No, I was totally not surprised because the nature of the Russian system has changed. Even under Brezhnev, even under communism, there was more collective leadership in Russia than there is now. Russia is now an authoritarian dictatorship led by, let's face it, a looney.

MR. GEE: By one person.

AMBASSADOR SIMONYI: By one person, Vladimir Putin. And so I was totally not surprised, knowing and having been a student of the Stalinist regime, this is basically the repetition, a carbon copy of the Stalinist system. I'm surprised at how surprised others were and I have to say this: I'm kind of angered by the fact that nobody in Europe and not even the United States really wanted to listen to the Central-Eastern Europeans who said the writing is on the wall, be careful, this is not going to end well.

MR. GEE: Understood. Let me shift a little bit of gears and I'm going to ask Gillian for her perspective because, obviously, there may be some differences of opinion, which we welcome.

And so, Gillian, you represent a very well-known environmental organization that is very heavily involved in issues dealing with U.S. infrastructure, particularly, on the natural gas side and have been very active before the FERC in advocating on behalf of your NGO's interests. Let me ask you. Based upon your understanding of the geopolitical situation and things that Ambassador Simonyi has mentioned, there appears now to be a large policy imperative for the U.S. to play a much bigger role in increasing its presence in Europe through supplies of LNG. Are there any downsides from the U.S. perspective of this approach that you'd like to highlight for us?

MS. GIANNETTI: Sure. Thank you very much, first of all, for inviting me to this forum, and Ambassador, for your thoughtful comments.

I want to start off before we go into the downsides and actually talk about the fact that there's a lot of agreement between the Ambassador and myself on some of the core challenges and the issues that we're dealing with.

First of all, I think it was incredibly foolhardy of Western Europe, and potentially willfully blind, to not see this coming. A continued dependence on a despotic regime that is impulsive and selfish -- something was going to happen. And when you think of the potential weapons that they have that they could use to pin Western Europe in a corner, natural gas is a clear weapon in its arsenal that it was going to use.

And so, I think that it is unfortunate that whether it was from convenience or lack of political will, lack of economic will, that our friends and partners in Western Europe did not come up with a robust Plan B years ago to make sure that they were ready for this moment.

And the other thing that I want to highlight that I agree with is that I think that the U.S. has a critical role to play in managing this difficult situation. Because when you look at the major gas players in the world, the Ambassador mentioned Norway and the U.S., there are some democracies that are a part of it, such as Australia and the U.S. and Norway, but there are many countries that are not and many countries where the geopolitics of the gas supply could be very unstable, such that engaging in a relationship with some of the other major players in the space, isn't necessarily long term a better decision than being beholden to Russia.

So, it's not an easy situation and I think that anyone who is oversimplifying it and saying, oh, we can just do what we need to do and not think about the hard decisions that have to be made, are being foolhardy themselves, just as the exact situation that got us into this mess.

So, from my perspective, my organization, the NRDC, has been heavily involved in U.S. domestic gas infrastructure, but we also play a unique role in that we are the site of the Sustainable FERC Project, which you mentioned during the introduction. And the Sustainable FERC Project is a coalition that represents not just NRDC, but a large swath of national, regional, and local grassroots organizations that represent a variety of interests.

And it is sometimes very difficult to come to agreement on things. So, I will say also that even though I'm here representing my role in the FERC Project, that there are significant differences of opinion amongst even the Green Community of what should be done in this moment. So, if you've got the talking points from NRDC, or from the Sierra Club or from the Environmental Defense Fund, or from a grassroots organization of 20 people in Calcasieu Parish, Louisiana, you're going to get very different answers.

So, despite the fact that I am here in that collective capacity, I do largely come at this from my own personal perspective. But my personal perspective here is that -- and the Ambassador talked about balance, about how we can't abandon the green transition. Timelines are timelines. The science is not politically created, but is a creature of fact, but at the same time we have a significant security issue that we can't ignore.

I agree with that balance. I think that on the U.S. side that we have to strike a similar balance between energy democracy and diplomacy, and making sure that we are supporting our partners overseas, and energy justice at home and making

sure that we are not going about it in a way that has unintended consequences of harming our local communities or U.S. energy consumers.

So, the two areas that I'll focus on in that is first the actual siting of infrastructure. So, I come at this form a personal lens. I grew up in Pennsylvania. I used to live and work in Louisiana. I've been to the places we're talking about and know them intimately. And just as the Green Community is not a monolith, neither is Western Pennsylvania or Cameron Parish, Louisiana.

They're wrestling with these same issues that we are today. And I'll highlight specifically a recent conversation that I had with a group of individuals who live in Western Louisiana feeling like they are in a bit of a rock and hard place, where if you are looking for economic opportunity in Western Louisiana, without a doubt the single biggest contributor to economic advancement and employment in that region is the oil and gas industry.

I used to be a high school teacher in Louisiana and these stereotypes of military recruiters coming into the classroom didn't happen, but the oil and gas industry did. And when you are 18 years old and you're offered an $80,000-a-year job, it's hard to say no to that and there're a lot of people who been able to rise themselves out of poverty working in the oil and gas industry in these regions. It doesn't come without a price, though.

If you look at global climate trends and in Louisiana, you know the number of storms that have continued to happen, sea level rise, erosion effects, flood insurance rates, asthma rates, cancer rates, they are not coincidental. We can connect the regions in which this infrastructure is located and the incidents of these various either scientific or public health harms and there's a recognition of that.

And so, there is a strong desire from many in the communities that are the backbone of our oil and gas industry to find a way to be able to continue to encourage economic and energy development, while at the same time making sure that communities are protected and that we are not sacrificing American communities to protect European communities. I don't think that that's something that anybody wants to do.

So, in particular, one of the areas that the Federal Energy Regulatory Commission can work on is making sure that the breadth and the depth of the Natural Gas Act, which is the federal law that guides review of these applications to build gas pipelines and LNG infrastructure, is given the life that Congress gave it.

So, what I mean by that is specifically, so for example, for a pipeline, interstate gas pipeline applications are supposed to be reviewed to determine whether they are in the public convenience and necessity. And if they're required for the public convenience and necessity, they have to be approved. But if they're not, they have to be denied. And the factors that go into the public convenience and necessity are supposed to be very robust, are supposed to look at public health and environmental justice and climate change and public health issues with endangered species and others.

Historically, however, there have been challenges in making sure that all of those aspects of the problem are being thoroughly considered and the FERC has lost in numerous cases over the years for failing to consider an important aspect of the problem.

When it comes to LNG infrastructure, the legal regime is a little bit different in that rather than a red light/green light, required by the public convenience and

necessity or not, there is a presumption of approval, but the projects have to be found -- essentially they shall be approved unless they're not inconsistent with the public interest. It's a bit of an awkward grammatical structure in the statute, but that still requires a look at the public interest factors that go into building this infrastructure and making sure that we're doing it in the most responsible way.

So, one of the challenges has been that if you ask a lot of people in these local communities, that hasn't been done, so making sure that there are better site visits and that the true impacts of this infrastructure are being considered and we are actually taking the public interest into account. That could be a very positive step to making sure that we are striking that balance between energy security and energy justice.

And some people have asked me, do you think that the European energy situation is a factor that the FERC and the DOE should be considering when reviewing this and my answer is absolutely because that does affect the domestic public interest. Generally, if you look at our filings, ours is a "yes and" type of approach -- we want the FERC and the DOE to look at everything and the pluses and minuses -- to have a robust perspective. And unfortunately, it is our view that that has not historically been the case.

If you look at approval rates, the FERC has only denied one LNG export application ever and it approved it four years later. So, in reality, it hasn't ever really denied any of them and these projects are not fungible. Some of them are being built in a much more environmentally responsible way than others.

Some are investing in much more effective carbon capture technology than others. Some are way better at being able to engage with communities and making sure that community impacts are being considered and thoroughly incorporated into the building of the project than others. And yet, the actual review of these projects in our experience has been fungible in that the details and the specifics of a particular project haven't really mattered as much.

So, that's something that I think that we can do now that isn't going to slow down the process, but could make it more efficient, because the one thing that we see time and time again is that when U.S. regulators fail to consider an important aspect of the problem, then these projects end up in court and they get dragged out longer and longer and longer.

And having an efficient system that allows projects that are able to capture that balance of protecting the public interest and adding energy security get built I think is something that we can all support, but we want to make sure that we have a robust domestic regime in place so that we're not becoming so afraid of the current geopolitical moment that we are rubber stamping projects without making sure that they are as clean and efficient and effective as they can be.

MR. GEE: Let me ask you. I do want to get to Patrick in just a moment, but let me just do a very quick follow up, Gillian.

Understanding that obviously the world has changed since early this year, and thank you so much for your perspective on how you see the geopolitical events factoring into the overall equation of whether to permit, site and permit, additional LNG export capacity.

The Biden Administration, and we actually tried to get somebody from the Biden Administration with us today. Unfortunately, through my own failings, I'll

admit, we were not able to do so. But there was an announcement made when they announced the creation of this taskforce in March that if there was going to be additional LNG export with additional LNG infrastructure, that it was going to be done in an environmentally responsible way to mitigate greenhouse gas emissions, also address methane leakage, and then, as I mentioned, try to incentive some type of build out of hydrogen-ready infrastructure as well.

What's your take on this position of the Administration? Are you in some fashion -- admittedly, FERC is an independent regulatory agency. You've got the whole plethora of issues that have to be addressed by them.

MS. GIANNETTI: Right.

MR. GEE: But what is your take on where the Administration's stance on this is relative to the events in Europe?

MS. GIANNETTI: Certainly. So, very briefly because I want to make sure that Pat has plenty of time to offer his interesting remarks --

In terms of ensuring that these projects are being reviewed and evaluated in an environmentally responsible way, there are a couple of things that the Administration could do right now that would make that better. So, for example, during the Trump Administration, LNG exports -- taking a step back, just to make sure that everyone here is working in the same space.

An LNG export project has the physical infrastructure, you know, the pipelines and the export terminals, but it also has the actual decision of whether the gas leaves the country and those decisions are made by different agencies.

So, FERC reviews the applications for the infrastructure and DOE reviews the application for the actual commodity.

MR. GEE: Export license.

MS. GIANNETTI: Exactly. Under the Trump Administration, there was a decision to make reviews of the commodity, so DOE's part of the equation, categorically excluded from the National Environmental Policy Act. What this means is that the environmental review of those decisions was cut at the knees and particularly when it comes to looking at the greenhouse gas effects of LNG export, the DOE side of the coin essentially fell to the wayside.

And what's interesting about that is that there was case law from a few years ago where the Sierra Club had challenged the Federal Energy Regulatory Commission for not looking at the so-called indirect or upstream or downstream environmental impacts of LNG infrastructure. And I should say there's agreement, including from the current FERC, that they are responsible for the direct emissions, so we're only talking about the indirect emissions, the upstream and downstream, which are the majority of the emissions that are associated with LNG infrastructure.

And in that case it was determined that FERC was not responsible for considering the upstream and downstream emissions because DOE had said, well,

that's our job. So, when you then overlay a case from before the Trump Administration where FERC isn't looking at them because it's DOE's job and then DOE has come forward and said, well, it's not our job, nobody is really looking at those emissions right now.

MR. GEE: That's what you call a regulatory gap in legal words.

MS. GIANNETTI: Right. Nobody is looking at them. Now, based on public statements, it is my understanding that Secretary Granholm and this Department of Energy agrees that that the categorical exclusion is unlawful and is a problem, but there has been no action onto it. So, that is one example. I'll leave it there for now of the kinds of things that could make sure that the declarations of ensuring that the environment is being considered are actually being executed in the regulatory review.

MR. GEE: Understood. Patrick, thank you so much for your patience. I know you've been champing at the bit.

MR. NEVINS: I was having to bite my tongue with a lot of things here.

MR. GEE: And what I'd like to do, I'm going to ask you, this is an overall question, but I want you to feel free to weigh in on what you've heard from Ambassador Simonyi and from Gillian.

But let me just ask you, your world changed on February 24th. How did it change and what do you see as the outlook for the industry at this point from your perspective? And if you would, as I said, feel free to comment on what you've heard, thus far, from our two previous panelists.

MR. NEVINS: Sure. I'll try not to do too much of that. I do disagree with a lot of what we just heard from Gillian, though.

MR. GEE: We're not shying away from disagreement. In fact, I think we need to frame the issues, so obviously, if there is some disagreement --

MR. NEVINS: Debating what FERC has to analyze for the public convenience and necessity for pipelines would take us down a whole other rabbit hole.

MR. GEE: Okay. Understood. Right.

MR. NEVINS: But to start with your question, I did agree with pretty much everything the Ambassador said. And frankly, I mean it's good to hear part of Gillian's perspective recognizing that there is an important role for increased LNG exports and that is not a uniform view in the environmentalist community. There are much more extreme groups out there who are adamantly fighting every LNG project. So, I would disagree with Gillian less than I would with, say, a Sierra Club representative, I think, but there are strong areas of disagreement.

But you're right, I mean the Russian invasion was a dramatic event for U.S. LNG exports. Now, gas prices were already getting higher before that.

MR. GEE: Right. And actually, we're going to get into that in a just a moment.

MR. NEVINS: And they were going up and even before sort of the rumblings of Russia, so it wasn't black and white; but the prices in Europe and Asia right now are astronomical. And the differences between U.S. gas prices and anywhere you can land LNG in the world are incredible opportunities, at least in the immediate term, for anyone who exports LNG from the U.S.

So, in the short term, that leads to maximizing all the LNG exports we can right now. We've got seven operating terminals. One came on in March of this year. Now, Freeport went off online, but certainly everyone is maximizing the throughput as much as you can. There are a lot of LNG companies that are making a lot of money right now. A lot of that is the customers who have contracted for the rights in these projects and to some extent it's the terminals and their affiliates in some cases, but there's clearly a large economic opportunity right now in the short term.

In the longer term, now there is obviously an increased demand for LNG and much more interest in signing long-term contracts. The Ambassador's point about a lot of Europeans have kind of said, no, we don't need that. We don't want long-term contracts. We can live on a spot market and we can live on Russia. That hasn't turned out to well.

So, for a few years there were very few long-term LNG offtake contracts being signed. Cheniere and Venture Global had a lot of success, but not many other projects did until recently. Now, in the last year, there are many more contracts being signed by many more projects.

Those contracts are necessary to build the infrastructure. You need long-term contracts to finance these projects. So, the upshot of that is we will see more projects that are possible to get built. There are three projects that are under construction. We can get into the details of how much LNG there is and what else can happen, but clearly, the number of projects that will be built is increasing as a result of recent events.

Frankly, it hasn't been so much Europeans signing most of these LNG export contracts, with some exceptions. Hearkening back to something the Ambassador said, PGNiG from Poland has been signing these contracts going back longer term, because they recognized the need to divorce themselves from Russia.Some of the other Europeans, not so much even now. Now, there are contracts with portfolio players who can supply Europe. I think you will see contracts with Europeans coming, but they need to be long-term contracts. So, there's an issue there on if that's going to happen and how is that going to happen.

The other important thing that changed, I think, is the policy implications. The geo-strategic importance of U.S. LNG has been recognized for a long time by some people, including by DOE. Every export authorization since at least 2014 has a piece where they talk about the geopolitical advantages of LNG exports for the U.S., for its allies, for its trading partners. That's always been out there.

MR. GEE: There's also been a preference for U.S. allies towards the public interest determination in the export license, anyway, that's a part of legal process. Rebuttable presumption that it's in the public interest with a free trade partner.

MR. NEVINS: For free trade partners it's essentially automatic, right? There's actually a rebuttable presumption even for non-free trade nations.

MR. GEE: Understood. Okay. Yes.

MR. NEVINS: But you're right. But actually, I mean my point is the geo-political importance has become more obvious and more incontestable. And I do think the policy dynamic has shifted much more in favor of LNG exports and we see that from some of the Administration's pronouncements and the part of the announcements of the taskforce you pointed out that essentially said that the U.S. will facilitate and expedite the regulatory process.

Now, whether or not that's actually happening we can talk about, but the commitment from the Administration to LNG has ratcheted up dramatically and I think that the public consciousness has shifted toward much more favorable support for the projects.

MR. GEE: Let me ask you this, and I don't mean to take you down a side path, but it is an important part of the conversation. We didn't talk about it during the prep call, but I did some extra reading. I don't know if I get extra credit for that, and I've been talking to people at the state level.

You know there's a huge issue of affordability now, energy affordability, natural gas affordability, power price affordability. One-sixth of every -- one of every six American families now is in arrears in paying the utility bill. That's a number I heard recently. There had been a notion, a number of years back during the Obama Administration, whether there's a linkage between the domestic spot price of natural gas and allowing exports to go overseas. I don't think that there's dispute today, unless you tell me there is, that there is a correlation between, at least for now, a correlation between domestic price of U.S. gas and the volumes they're exporting overseas. How do you address that issue from a near-term and long-term perspective, given the fact that affordability is something that crosscuts everything, right?

People who can't pay their utility bills, although they might care about the value of democracy in Ukraine, aren't really going to be focused on that.

MR. NEVINS: Yes, it's an important topic. The consistent opposition to LNG export projects for a decade has been, one, from environmentalists and two, from certain consumer groups -- municipalities, some of the industrials -- and that has been a debate whether LNG exports are going to raise domestic gas prices.

MR. GEE: Right.

MR. NEVINS: Now, you mentioned correlation, we can talk about correlation versus causation. I'm not sure I totally concede that point.

MR. GEE: Understood.

MR. NEVINS: LNG exports are not really up that much this year. Gas prices are.

MR. GEE: Right.

MR. NEVINS: There's a lot of increased gas power generation going on. So talking about what's driving U.S. gas prices up is complicated.

MR. GEE: There's a tightening of supply overall.

MR. NEVINS: And that's the most important point, right? I mean the U.S. has an amazing amount of natural gas reserves that can be produced over time. And over time, I think that there is ample U.S. gas supply for domestic needs and international needs without significantly increasing U.S. prices.

We can debate that. Not everyone's going to agree with that. Clearly, prices are high right now. They're much higher than they've been in years and that leads to hardship for people. And again, there are complicating details. Where it's worst is in New England because we can't build gas pipeline to New England, right? So, suspend the Jones Act and let us export gas from Louisiana to Boston.

MR. GEE: And they have to rely on LNG imports in order to meet their needs.

MR. NEVINS: So, it's really complicated. But you're right, it's an important part of the puzzle. And certainly, if you look at the data for the last year and you can look at data when Freeport went offline and what happened to prices --

MR. GEE: And there was a price spike temporarily.

MR. NEVINS: Certainly, the arguments that there's a tie between LNG exports and domestic gas prices, it's harder to dismiss those arguments. I do think it's a little bit simplistic to say you're exporting LNG; therefore, domestic gas prices are going up.

AMBASSADOR SIMONYI: May I add?

MR. GEE: Sure. Go ahead. Have a conversation amongst yourselves.

AMBASSADOR SIMONYI: May I add something to this? It'd be latching onto what Pat said.

So, first of all, what you just asked should be told to Europeans. There is an internal debate. Don't take this for granted. It's not just the United States is not

producing more. It's also because Americans are asking, well, why are we sending it overseas?

By the way, in a way one of your arguments that some Americans would care more about their own well-being and their own environment than about our allies -- I think it's not the right way to put the issue. The bottom line is there are domestic, internal, and social considerations that Europeans have to be told of.

On the other hand, I think it takes some leadership. It takes some leadership from Biden. It takes some leadership from Granholm to tell the American people that the price of not providing Europe with adequate amounts of LNG from the United States, which by the way, is sourced cleaner than the Russian gas they so much depended on, that is going to be more costly because we might have to go to war for Europe if there is a total disaster.

So, I think these are issues which have to be vectored into the conversation and I don't see it that much.

MR. NEVINS: And where U.S. gas prices have maybe doubled, they've gone up 10 times in Europe, right? That's a whole order of magnitude, the burden on the Europeans consumers.

MR. GEE: That's an interesting parallel you drew, Mr. Ambassador, about our military and defense needs versus how we meet our energy security imperatives and there's never really been a holistic perspective taken by our side, by our government in the budget process to determine how much more money do we need to spend on the military and defense in order to secure supply lanes overseas for everybody.

AMBASSADOR SIMONYI: I agree.

MR. GEE: Not just for us, to maintain security in venues where there are very precarious regions of the world, transit points that need to be maintained. I once had a conversation with Former Secretary of Defense, Robert McNamara, about that very subject and he actually took the view that we ought to be taking that into account as we determine what our military budget is.

AMBASSADOR SIMONYI: Let me say this and let's step out of this transatlantic sphere. Two weeks ago, my good friend and maybe your former colleague, Dan Poneman, former Deputy Secretary of Energy, received the Order of the Rising Sun Gold and Silver Star from the Japanese. And you know what the argumentation was? His input into helping out with Fukushima and building LNG relationships. That's a pretty, pretty strong message and it's not from the Europeans. It's from our Asian, most important Asian ally. And I think we need to think about this.

I mean Dan Poneman was serving under Moniz. By the way, Moniz said the same in his speech there and they were serving under Obama. I want to take as much party politics out of this debate as possible. I think there is way too much party politics in this right now, which --

MR. NEVINS: Including at FERC.

AMBASSADOR SIMONYI: Including at FERC. And the last thing we need in this is ideology to get in the way of a reasonable and realistic approach.

MS. GIANNETTI: So, one of the points that I wanted to comment on that I think is really important that you mentioned, Bob, is this question of domestic pricing. So, I agree with Pat that it's not as simple as you export more gas, domestic prices go up, right? Like that is a reductionist way to look at the problem.

It's not a one-to-one. However, and this was briefly mentioned, when you look at when Freeport went offline, in that little pop, domestic prices actually went down and you look at that and you have to concede that there is a relationship that we have to consider about making sure that we are not sending gas overseas at the sacrifice of making sure that gas is affordable at home for people who are dependent on it.

And part of the reason I mention that is that if you look at gas uses in the United States by domestic consumers certainly there are people who are in high income brackets that do use gas without a doubt, but increasingly you are actually seeing shifts in higher income brackets towards electrification, LEED homes, things of that nature. Where you see a lot of gas use is in apartments, people who are lower income, people who do not necessarily have the choice of being able to go and buy that fancy electric stove that they want to use instead.

So, they're already dealing with higher, different margins. Different margins. And that goes back to a point that the Ambassador picked up on that I said, is that I personally, speaking as me, think that national security and international security are interrelated and so making sure that we are putting forth an energy policy that has a world view is a public interest.

However, if you look at the federal laws that guide LNG export and review in this country, the words "public interest" are meant to mean the U.S. public interest and so I think that when we're evaluating whether a particular project or proposal or export commodity is in the public interest, we need to frame the international debate within the context of U.S. benefits and costs.

Because, "something is good for Europe" is not the legal regime -- it's "does it benefit America?" And I think in many cases it could, right, because of the points that the Ambassador made of making sure that our friends and allies are secure, right? But we need to make sure that we are looking at it from that perspective, so that's part of the point I was trying to make earlier, is that the legal regimes that guide review of these projects are expressly directed to look at what does the U.S. get out of building these projects.

MR. NEVINS: On this pricing point, that has clearly been part of the public interest analysis. It's been a central part of the public interest analysis that DOE has done for a decade. They have repeatedly studied the issue and rejected the arguments that LNG exports will increase domestic prices.

They've had three studies on that over three Administrations or two Administrations.

MS. GIANNETTI: That is true.

MR. NEVINS: And every time they issue a new export authorization, they update it with new data and they look at it and they have consistently rejected this pricing argument, right? Now, to say that when Freeport went off the market, if you take 1.8 Bcf of demand off on a day and there is no supply response, yeah, there's going to be a price difference. That's obvious. That's a very different question from saying if we double the amount of LNG exports volumes from the U.S. over the next five years, what happens to prices, which is a much more relevant question than what happens if a project goes off line and their demand suddenly disappears.

And the other point is: what's in the U.S. interest? Sure, it's the U.S. public interest at issue, but helping our allies and trading partners is in the U.S. interest.

AMBASSADOR SIMONYI: Can I say something? Here's my problem with the radicals in the environmental community. So, you cannot single out --

MR. GEE: Present company excepted.

AMBASSADOR SIMONYI: No, you're [Gillian] not one of them. No, I'm sorry. No, no, you're definitely not one of them.

MS. GIANNETTI: I don't think I should take a side on that.

AMBASSADOR SIMONYI: You can't single out gas and say that the American people are angry if the price goes up. Because what you are saying is they care more about the end of the month than they care about Europe.

When it comes to the climate issues, most Americans do care more about the end of the month than they care about the end of the world and that's an issue. So, let's just be very, very careful about it, it's just a tiny little bit altruistic to say that the American people are angry because the prices go up.

Here's something else. The United States is the leader of the Western world and the United States has huge responsibilities for its friends and allies and I understand the approach. Our primary responsibility, of course is the welfare and the health of the American people, but we cannot forget about the fact that we are the leader of the free world and that entails certain responsibilities and this is part of it.

MR. GEE: Well stated. And let me just also add that the phrase "We care more about the end of the month than the end of the world" was actually made by the Yellow Vest people in France when they were rioting in the streets over energy crisis.

AMBASSADOR SIMONYI: Yes, but it was in French. I never knew others read French, so that's why I dared to "invent" it.

MR. GEE: I do think that if you were to talk to those people at the state and local level, as much as they care about what's going on in Europe, and they

do care very deeply about democratic values being maintained in Europe and in Ukraine, the economic pressures that they're under right now sort of focuses their attention at this point because of affordability and the notion that somehow or another there's a correlation between gas exports and the domestic price of natural gas, even if it's not well founded, is probably going to persist, Patrick, and your clients are probably going to have spend a lot of time on it.

MR. NEVINS: It comes up in every case. Sure.

MR. GEE: Let me just ask you a corollary question though and this is really kind of off the charts. If you think this is beyond your capability as an attorney to address, that's fine. It's more of an economic question. Do you think ultimately long term there could be a convergence between U.S. domestic spot prices and global prices for natural gas?

Is Henry Hub a thing, will Henry Hub still be around in 20 years? I guess that's what I'm saying.

MR. NEVINS: So, at a minimum, I think this is probably implied in your question, but: You'd have to take into account the cost of liquefying, the cost of shipping, the cost of regasifying. But then whether you will have some convergence between a domestic price, plus all those variables, and an international price, I mean, we are clearly getting closer to that world. But natural gas has never been a global commodity. It's not oil. It's still not. There have always been two very distinct Pacific and Atlantic markets

That's collapsing to some extent and we see interesting things like, I read some trade press about the Chinese taking U.S. exports, taking them to Europe and then they're picking up cheap Russian gas. So, it's an interconnected market. I think it's moving towards a global market. Could it get there some day? Sure. I don't think it's near term.

MR. GEE: Understood.

MR. NEVINS: But it's heading in that direction.

MR. GEE: Gillian?

MS. GIANNETTI: So, yes, that's an important point. I was going to pivot back to the conversation of how we wrestle with the realities in the United States of the effects, the perceptions of effects, and then also our international security needs.

So, one of the things that I have noticed over the years is that there have been several efforts by the Federal Energy Regulatory Commission and by DOE to seek feedback on what it should be looking at and what it should be considering in deciding whether or not to approve new federal interstate gas infrastructure, whether it's pipelines, LNG exports facilities, and so forth.

And it has seemed, at least from the perception of most of the environmental community, the consumer community, landowners, consumer trade groups,

that the answer from the industry is, no, you shouldn't consider anything more than you're already considering. Opposition to continued evaluation of greenhouse gas effects, of looking at upstream and downstream, historical opposition to looking at environmental justice, though interestingly recently INGAA and the American Gas Association actually came out and said that they agree that environmental justice should be a part of it, so that was a shift.

Historic opposition to looking at a variety of factors that affect landowners and ensuring that their rights are being protected. And I think there would be less animosity in some of these dockets, because as Pat knows, they can get extremely heated, if there was a feeling that there actually was a joint desire to make sure that all relevant factors are being considered.

The perception, speaking from people who are directly affected by this, who live right by the infrastructure that's sited, is that their views do not matter, their interests do not matter, and that the industry is looking for the fastest process to make sure that they can build and make money and it doesn't matter what the effects may be.

Now, I am not saying whether or not that actually is the position of the industry. I actually think that there have been a lot of shifts in the gas industry over the last 15 years, recognizing that these are factors that need to be considered, right, especially as our collective perception of gas has shifted and the conversation has become more muddied.

But one thing, going back to your earlier question of what are some things that, for instance, the Biden Administration could do to bring life to that other part of the announcement, of making sure that environmental responsibility is a collective interest, is making sure that to the extent that there are environmental justice impacts, that they are being considered and that they are being mitigated to the vast extent possible.

To the extent that carbon capture technology is being used, that it is the best available and not window dressing that is used to try and be politically appealing, right? Like there are things that could be done from a collective approach that I think would, in the long run, lessen litigation and actually cause more projects to be built, and would also leave it such that there isn't this feeling of animosity by so many of the people who are living right by the infrastructure, who feel like they're holding the short end of the stick.

MR. GEE: Let me let Patrick answer that. Before I do that, program note. I want to ask our live audience here and those watching online if you have any questions. For those of you who are with us today, do you want to raise your hand to ask a question, please feel free to do so.

For those of you watching, if you could use the Chat Box to indicate what question you have, if you want to direct it to a particular speaker, please, please do that. Does the show of hand function work for the Zoom? Okay. You could try the show hand function. I'm not too sure. I can see the participants. Here are the attendees. If you want to try to use the show hand function to be heard verbally, we can try to arrange for you to ask your question. My only request for all of you is, please identify yourself and any affiliation, so we'll know to get that down for the record when we produce the transcript as opposed to unknown voice from

somewhere asking a question. I think it helps to know who the identity is of the questioner.

But Patrick, please go ahead and take the floor.

MR. NEVINS: Thanks. I think a couple things that once again I would disagree with pretty vehemently. Gillian mentioned a couple of times the opposition by the people who are in the community. I'm sure that that's true of some people. I also know that I have multiple clients who are investing billions of dollars in Louisiana and Louisiana state and local politicians seem to be really, really happy about it. So do a lot of people who are employed and are getting a lot of benefit from that. So, the fact that there is some opposition, let's not detract from the fact that there's a lot of support from the local community as well.

The FERC process takes two to three years. It's a very, very detailed process. FERC goes through a lot of factors. The idea that downstream greenhouse gas emissions or upstream greenhouse gas emissions should not be part of the analysis, that's a legal argument. It's an argument you're going to disagree with, but I could make it: that's not part of the Natural Gas Act public convenience and necessity. From a NEPA standpoint, it's not reasonably foreseeable. So, there are legal arguments about whether those emissions should be addressed or not, certainly at FERC.

On the other hand, DOE has very consistently addressed this greenhouse gas emissions argument. And again, they have studied it under different Administrations and they have concluded that LNG exports do not increase worldwide greenhouse gas emissions. This red herring about the Trump Administration policy statement of categorical exclusions has never been applied for any project. Every project is going through a NEPA review led by FERC with the DOE participating as a cooperating agency, so there's no categorical exclusion leading to projects being built.

And I would say that LNG exports are the best thing we can do to reduce greenhouse gas emissions. The fact is that there's a lot of coal being burned around the world. The U.S. is moving off of coal. The rest of the world is not. Particularly, in Asia: India and China are building massive amounts of coal plants. The best thing we can do to improve greenhouse gas emissions is to replace that with U.S. LNG.

Europe is moving back to coal. For Europe, it's a short-term thing. It's not for China, right? To me, the LNG export opportunity to reduce greenhouse gas emissions is tremendous. EQT put out a big piece on this – which I had nothing to do with, so I can tout it in good faith.It was great. It was released back in March, and explains the opportunity to replicate the success the U.S. had had from 2005 through now reducing greenhouse gas emissions by transitioning power generation from coal to natural gas. Repeating that transition internationally is a tremendous opportunity. So, I don't see this tension that LNG exports are supposedly bad from a greenhouse gases standpoint.

AMBASSADOR SIMONYI: The Europeans included gas in their famous taxonomy and the so-called delegated act with some very, very strict criteria, which I think in terms of intensifying the relationship. Exporting more gas to

Europe, means that the United States will be forced to apply those criteria, which I think is a good thing.

By the way, many companies have already discovered that. So, I just want to say there is a connection between beefing up our support for Europe in terms of more LNG and the environmental interests. Let's be very clear about this. I mean until now Europe has been viewed as the example we should be following and now the Europeans have included gas, short and medium term, as part of their energy mix.

MR. GEE: Mr. Ambassador, you raised another technology we barely touched on and I know that the focus today is really on LNG, but I want to ask our other panelists too. What role do you think small modular nuclear might play in the resource mix overseas and both here in the U.S., obviously, as well as in -- and Mr. Ambassador, you mentioned Europe is now placing high priority on resuming at least or extending the economic lives of its conventional nuclear fleet, but also I know they're also looking at small modular nuclear. Any thoughts about that potential as opposed to additional exports of LNG as a potential fuel resource in overseas markets? Good, bad, indifferent? Gillian, any thoughts?

MS. GIANNETTI: Sure. So, a couple points. First, let's put it out there, right? I've bene talking about how I think that the FERC and the DOE can do a better job in making sure that they are evaluating all the aspects of these projects. The approval rates of LNG projects, as I said earlier, is essentially 100 percent.

There was a project in Oregon that was rightly rejected in 2016 and then was approved in 2020. So, when we're talking about how long the FERC process takes, how intensive the FERC process takes, it has not stopped an LNG project that has the financial resources and development in play from getting approved.

The reason why we don't have some of these other LNG projects that have been approved, there's a huge, bunch of them that are sitting in the queue, is because there has not been financial investment in them to reach a final investment decision.

And so, when we're talking about making sure that we are considering these factors, I mean, the approval rate is 100 percent and, especially, when it comes to pipelines, the approval rate is like 99.5 percent, and that's supposed to be an on/off switch and I don't think that you can discredit the concerns that folks have about whether the robustness and richness of those statutes is actually being given life, when the question is not, if these projects will get approved, but when they'll get approved from a perspective of commercial advancement.

Now, turning to your questions about nuclear, I mean, full disclosure, I do not work on nuclear, so I am stepping way out of my box here. But I think that, in general, Europe needs to be creative about the variety of solutions that it can look at to make sure that it continues to maintain itself on a green energy transition.

Personally, I think that, in the long term, the more appetizing potential is to look at the possibility of green hydrogen and using hydrogen to be able to replace a lot of things that we are currently using on gas.

Now, it obviously wasn't recorded, but we had a discussion beforehand about whether or not that is practical. I think at this point there's still a lot of innovation and research that has to be done and I will say that I -- you know, Pat talked about

red herrings -- I think when you hear the gas industry say, oh, we'll just retrofit these pipelines that we've built and use them for hydrogen, that that is the biggest red herring of all, and fails to take into account the scientific differences between shipping gas and hydrogen.

But to the extent there was a possibility to make sure that infrastructure that is being built today is flexible to be able to adjust to the energy transitions that we need to make, I think that's a great thing.

MR. GEE: Patrick, let me allow you to answer my comment -- my question -- as well as any response to what Gillian and the Ambassador said.

MR. NEVINS: Thanks. Nuclear is not my area and I will not step outside of my box.

MR. GEE: Understood.

MR. NEVINS: So, I have nothing to offer on that front. On the last point, hydrogen, sure, interesting opportunity years down the road, right? Not going to help Europe in the near term, but certainly building infrastructure to the extent possible that it could be retrofitted for that process or modified for that process, great idea. A lot of Europeans are talking about that, but I'm not really a hydrogen guy either, though more so than nuclear, so I'll stop on that.

On the FERC front, Gillian and I could continue this debate all day. The fact that the statute says it should be authorized if not inconsistent with the public interest could be why the projects are getting approved -- because it's not inconsistent with the public interest, right? DOE has found that it's in the public interest to export LNG.

Now, there are literally hundreds of conditions in these Orders, so it's not like there's some sort of rubber stamp that the projects can do whatever they want. We can contrast it with crude oil exports where there's no gate process at all for exporting crude or petroleum products. And the fact that LNG projects are all getting approved eventually certainly doesn't mean they get built. As you pointed out, there's lots of projects out there that got the regulatory approvals that -- now more of them are more likely to be built than it looked two years ago, but still, that doesn't mean they're all going to get built.There's a lot of other requirements for a project to actually happen.

Now, on pipelines, I would disagree. To me, it's getting ridiculously hard to build interstate pipelines. I represented Atlantic Coast Pipeline, which was a great project that was essentially killed by the regulatory process. There's a bunch of projects like that. The idea that we can't pipe gas to New England is a big problem.

All my clients right now they want to build intrastate pipelines, which kind of works in Texas and Louisiana, but it's not a great model. And part of what we will need to really significantly increase the amount of LNG exports is new pipelines. And to me, you can talk about FERC approval rates as much as you want, but it's getting really, really head to build interstate pipelines right now.

MR. GEE: Let me put a hold on that discussion, park that. We do have a question from one of our online viewers I'd like to read aloud and I'm going to make this a kind of a jump ball to see who wants to take it. So, let me just read it.

This comes from Mark Vatter, V-a-t-t-e-r. I'm just going to read it verbatim. "The tax on emissions equal to their climate damage cost should suffice to optimize them and lower the price of energy by lowering demand. Why regulate supply of LNG on climate grounds when taxing emissions is enough and restrictions on supply raise the price of energy and necessity of hurting the poor?" Who wants to take that question?

AMBASSADOR SIMONYI: Try to get this idea through Congress and then we'll see. It's not going to work, not in the United States.

MR. GEE: There's a problem with the term "tax" I think. It becomes kryptonite to both sides of the aisle.

AMBASSADOR SIMONYI: That's where the whole thing dies, so I don't think we can answer.

MR. GEE: If that were within the realm of political feasibility, operationally, would that work? Would that be a simpler, more elegant process of internalizing the cost of climate mitigation? Some economists say so. I'm not one of them, but I'm not an economist, first of all, so I can't pass judgment on that.

MS. GIANNETTI: There have been some proposals made for, a carbon tax, that I think that organizations like NRDC could be supportive of. I think the concern, and this is again not my area, so I'm speaking as me, is that if we're talking about something that we need to address in order to mitigate significant climate effects, simply doing that through a price of doing business is not going to effectively deal with the challenge.

That being said, I mean, I think that there is general support from most of the environmental community to do whatever we can to divorce ourselves from not internalizing the cost of the energy choices we make.

MR. GEE: Anybody else want to respond.

MR. NEVINS: I'll pass on that one.

MR. GEE: I'm not hearing -- yes. Go ahead, please. Name yourself for the record.

MR. REITER: I'm Harvey Reiter. I'm the editor-in-chief of the Energy Law Journal. So, Ambassador Simonyi, I had a question mostly really for you. I've read about protests in the Czech Republic about rising gas prices and I wonder what effect concerns about that and concerns about the wobbliness of NATO allies in the face of rising prices or with regimes like Turkey and Hungary's autocratic

tendencies, how wobbly is the coalition and how would that affect what the United States needs to do to protect democracies and can do?

AMBASSADOR SIMONYI: Good question. Well, first of all, the Czechs, the Hungarians and the Slovaks are the ones who are exposed to Russian imports the most inside the European Union. So, for the Czechs and the Slovaks this is basically economic. For the Hungarians, it's really them maintaining their close ties to the Russians, of Viktor Orban's closeness to Vladimir Putin, so it's not the same issue.

I have the feeling that part of these protests have been the result of some Russian activity in the region, but I would agree that the level of tolerance in these countries is relatively low.

Now, I want to tell you that I'm totally surprised, positively surprised, at how well the solidarity inside the European Union is holding and the European Union, together, is trying to mitigate the impact of the Russian embargo. So, what I would say is I don't think it's a danger to democracy, per se. It's a danger to the solidarity and the cohesion of the European Union. That's the way I would put it. But I don't know how long this will hold.

And by the way, the one thing we haven't talked about is what happens if Ukraine is a provider of energy, if and when it comes on board as a supplier to Europe? You know that the Ukrainians are now a part of the European Energy Electricity System (ENTSO-E), the European grid, which is an important thing. They switched to the European network on the very day when the Russians attacked the country.

So, that brings me to another point: I'm all in favor of hydrogen. Hydrogen is all the rage in Europe. Shell is building the largest hydrogen facility anywhere in the world. It's the size of three football fields. We will need a hundred of these to meet the demands that will satisfy the 2050 goals. So, therefore, and this is really what I want to get to, is blue, pink, green hydrogen, are all part of the solution and I stress blue as well.

So, I think we might want to start using the expression that I hear more and more from the European Commission. Gas is not the enemy. CO2 is the enemy. Let's figure out how to fix this. I know we are coming to the conclusion of the event, we are under some time pressure, I want to make sure that we set a clear pathway, a clear strategy what we will be doing in terms of LNG exports in not just the next five years, but the next 10, 20 years. The "stranded assets" issue should be part of the debate. The faster we make this clear the more there is a chance that when there is a peace with Russia, between Russia and Ukraine, that people will not revert back to Russian imports, which, by the way, would cloak Europe global green ambitions right there because the way the Russians are producing gas is a disaster and nobody wants to talk about it. So, American gas should not be singled out as the enemy.

MR. GEE: Do you really think that in the end -- let's say Russia sues for peace with Ukraine. They're losing the war under this scenario, is there a possibility that the European countries might revert back to --

AMBASSADOR SIMONYI: Oh, sure. Oh, absolutely. Many in Germany would like this. Oh, absolutely. Absolutely.

So, here is what I think will happen.

MR. GEE: They're addicted to cheap Russian gas?

AMBASSADOR SIMONYI: I will tell you what will happen. I will be a little brutal here.

(Everyone speaking over each other)

AMBASSADOR SIMONYI: I will be a little brutal here. So, the next day after peace breaks out there's a meeting between the Chancellor's office and the leaders of German industry, the chair of Daimler and BASF and you know it, Siemens, and others and they will, say we've got to get back importing Russian gas. It's in our national interest. So, that danger is there if there is no alternative.

MR. GEE: Because it makes them competitive globally.

AMBASSADOR SIMONYI: No. Because that's all they care about. They have no other considerations.

MR. GEE: No energy security interest?

AMBASSADOR SIMONYI: Nothing. None other than doing business and that's my worry.

MR. NEVINS: I hope you're wrong.

AMBASSADOR SIMONYI: Well, I hope I'm wrong. No, no, no, I hope I'm wrong, but I'm painting a dark picture of a possibility and that is why the more intensive and the faster we move to stabilize the U.S./Europe energy relationship long term, the less there is a chance that this will happen.

MR. GEE: We have just a few more minutes left and what I'd like to do is to ask each of panelists to make some closing commentary of what you have gotten out of today's discussion and also your outlook, if you can, put your crystal ball to play. What in your mind would be your best-case scenario of where the United States should be, vis a vis, its European allies in this very difficult period.

So, let me start with Patrick and then Gillian and then Mr. Ambassador I'd like for you to go last. So, Patrick, please go ahead.

MR. NEVINS: Thank you. I enjoyed the conversation. I'm sorry we sandwiched you here, Gillian, a little bit.

My crystal ball is a little bit fuzzy, but I do think that the level of U.S. LNG exports will probably double in the next five years. And a year or certainly two ago, I would've said that's crazy optimistic. I now think that's kind of the baseline and it could certainly be more.

I think that's a good thing for the U.S. I think it's certainly a good thing for Europe. I think it's a good thing for greenhouse gas emissions. I think the policy debate has shifted. If the war ended tomorrow, it would be interesting to see how that changes, but the war is not going to end tomorrow, right?

I would acknowledge there are some important issues that need to be thought about, like the impacts on the communities where the projects are and like the domestic gas prices and is this going to affect domestic gas prices and by how much. The "public interest" is a big topic and there's a lot of arguments to be made, but I would say, just as FERC and DOE have found for a decade, that LNG exports are consistent with the public interest and I think they're going to keep happening, and I think that's a good thing.

MR. GEE: Gillian?

MS. GIANNETTI: Sure. Well, I very much enjoyed this conversation and I'm familiar with sometimes been the token representative of a different point of view, so I'm okay with that.

MR. GEE: But you represented well.

MS. GIANNETTI: I'm actually going to go back to an anecdote from when I was first starting my professional career right out college. I started as a ninth grade English teacher in LaPlace, Louisiana, which is in St. John the Baptist Parish. I'm certain that Pat knows it well. It is right on the coast and is about an hour or so away from Baton Rouge and it is definitely in the heart of the petrochemical industry.

And I walked through the halls of my high school for my first day, and this was a high school that was really struggling with test scores and graduation rates and poverty, and you kind of have a stereotypical view of like what a school like that might look like, right? You know the stereotypical ceiling tiles are falling down -- and that's not what school looked like at all.

State-of-the-Art smart boards, revolutionary science labs -- it looked like a Blue Ribbon School in the wealthiest district in Northern Virginia. All of the laptops that my students had had a giant Shell Oil label on the back. The science lab was the Marathon Oil Science Lab. The smart boards were donated by BP and there were immaculate water fountains lining throughout the halls. And the very first thing the principal told me is, "Don't drink the water. Those are there for show. Do not drink the water. It's not safe. Everybody drinks bottled water because it's not safe because of the impacts of all the petrochemical industries that are around us."

And I continued to see things over and over again where there was clearly a price that was being paid by the local community. So, my closing remark here is that this is a very difficult international problem and folks who try to oversimplify it are missing the fact that the complexity is where the richness can be found and where that good conversations can be found, but it is not as simple as build all the projects and everybody wins. There are people who pay a price. There are people whose lives are affected and that we need to make sure we're not forgetting that in the process.

MR. GEE: Thank you. Mr. Ambassador, please close us out.

AMBASSADOR SIMONYI: No, that's a challenge. I don't think we're that far apart. Definitely a takeaway for me is that maybe we need to pay more attention to the social and individual aspects, but I would strongly argue, and here I side with Pat that we have to make, those who believe in or who are working in the energy security sector, and the few who work in the LNG sector, we have to make a much better case, an even stronger case for why more LNG is not just national security, is a national interest for the United States. That's really my takeaway.

And I truly believe that. This has been a great conversation. I really appreciate it and the culture of conversations like this are really important to make sure that we fix this huge dilemma, balancing energy security and climate. But at the end of the day, I started by saying there's only one way out: a much closer relationship between the United States and Europe.

MR. GEE: Thank you so much and I want to thank all three panelists for a wonderful job today. Patrick, Gillian, Andras, thank you so much for being with us today. Thank you for those of you who took the time to be with us physically live and then thanks to those of you who dialed in online. We hope that this provided at least some clarity on a very difficult issue that affects all of us and will affect all of us for years to come.

And with that, any other thoughts? We bid you farewell. Thank you so much.

THE COAL TRAP: A BROADSIDE AGAINST WEST VIRGINIA ENERGY POLITICS AND ECONOMICS

Kenneth A. Barry*

The author of *The Coal Trap*, James Van Nostrand, speaks with some authority in this blistering indictment of how politicians and utility regulators have sheltered the Appalachian coal industry from trends generally impacting the nation's electric generation business.[1] Van Nostrand flashes his credentials in the opening pages, noting he is the son of a celebrated Iowa utility regulator, Maurice Van Nostrand; worked at the New York Public Service Commission for five years following law school; and represented large electric and gas utilities at a major law firm in the Pacific Northwest for roughly half his career before turning to the groves of academe.[2]

At the time of his midlife job change, the convergence of energy law with environmental practice accelerated with the Supreme Court's 5-4 decision in *Massachusetts v. EPA*, ruling that carbon dioxide emissions fell within the agency's regulatory reach as a "pollutant" under at least one provision of the Clean Air Act.[3] Van Nostrand acknowledges he had little appreciation of climate change prior to his "road to Damascus" moment after he joined the Pace University faculty.[4] There, upon taking charge of the school's Energy Project, he became steeped in environmental law (a specialty at Pace), eventually taking an advanced law degree in the subject.[5] His next stop, in 2011, landed him in the lion's den: he accepted a newly created teaching post as director of West Virginia University Law School's Center for Energy and Sustainable Development.[6] The law school's dean explained she envisioned the Center as a "counterbalance, of sorts, to the dominant role of the extractive industry" and its environmental impacts in the state.[7] *The Coal Trap,* coming some 10 years after his appointment, indicates Van Nostrand took the dean at her word.

One of Van Nostrand's organizing principles is to view the ten years from 2009 to 2019 as a "lost decade" – a framework he repeatedly invokes in interrogating the wisdom of the state's local and Congressional leadership.[8] Another

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1. JAMES VAN NOSTRAND, THE COAL TRAP: HOW WEST VIRGINIA WAS LEFT BEHIND IN THE CLEAN ENERGY REVOLUTION (2022) ("*The Coal Trap*").

2. *Id.* at 2. Van Nostrand mentions that his culminating achievement was "gaining national recognition from the Energy Bar Association as the State Regulatory Practitioner of the Year in 2007," leading him to conclude "it seemed I didn't have much more to accomplish in private law practice." *Id.* at 3.

3. Massachusetts v. EPA, 549 U.S. 497 (2007).

4. *The Coal Trap*, *supra* note 1, at 3-4.

5. *Id.*

6. *Id.* at 4-5.

7. *Id.* at 4.

8. *The Coal Trap*, *supra* note 1, at 1 (where the notion is introduced).

recurrent theme, one with profound sociological implications, is that the natural resource bounty West Virginia boasts – coal mining since the early 19th century, natural gas drilling since the mid-2000s – is more a curse than a blessing. While this may seem a rather striking assertion since much of the state's economy has looked to coal as its defining industry and, more recently, has hailed the discovery of the Marcellus Shale as a second godsend even as coal mining has waned, the author argues that overreliance on extractive industries often leaves states (or entire nations) underdeveloped because other businesses capable of supporting a more diversified economy with broader employment can't get much of a toehold. This notion of a "resource curse," as the author frequently puts it, is etched into the very title of *The Coal Trap.*

I. THE EPA COMES GUNNING FOR COAL

Van Nostrand chooses the year 2009 as his starting point for the "lost decade" because it coincides with the arrival of the Obama Administration and a concomitant wave of proposed regulations aimed at tamping down coal-burning emissions.[9] Carbon dioxide, once the EPA was emboldened by the *Massachusetts v. EPA* ruling, became target No. 1, but the Mercury and Air Toxics Standard (MATS) rule issued in 2012 played no small part in eroding the viability of several of West Virginia's older coal-fired plants (and associated mining), as well as numerous plants throughout the country.[10] And while the MATS rule was ultimately rejected by the Supreme Court in another 5-4 ruling[11] the damage was done via anticipatory closure of coal plants rendered uneconomic if they had to comply.[12]

The Obama Administration also took aim at coal mining accomplished by dint of mountaintop removal – a practice that, as Van Nostrand relates, has devastating environmental impacts on the ecosystems and communities in the vicinity of the project.[13] Here, no new regulations were needed – only a more coordinated (and stringent) review and permitting process conducted by the three federal agencies involved (the EPA, the Department of Interior, and the Army Corps of Engineers) in applying statues already on the books.[14] Pursuant to a June 2009 memorandum of understanding among the three agencies, the government sharply reduced the number of approved mountaintop removal projects and presumably blunted the deleterious impacts of those projects allowed to proceed.[15]

A crowning endeavor of the Obama Administration to crack down on CO2 emissions is recounted extensively in the section headed "EPA Adopts the Clean Power Plan."[16] Van Nostrand candidly acknowledges that "[t]he Clean Air Act is

9. *Id.* at 5.

10. 549 U.S. at 497.

11. Michigan v. EPA, 576 U.S. 743 (2015).

12. *The Coal Trap*, *supra* note 1, at 25-30.

13. *Id.* at 21-25.

14. *Id.* at 22. The relevant statutes are the Clean Water Act and the Surface Mining Control and Reclamation Act of 1977. *Id.*

15. *Id.* at 23-24. In 2010, EPA issued tougher new water quality standards that "effectively blocked MTR projects from dumping wastes and other pollutants in streams near surface coalmines." *Id.* at 24.

16. *The Coal Trap*, *supra* note 1, at 30-39.

not a great tool for regulating GHG [greenhouse gas] emissions," since CO2 "is invisible and odorless and does not directly lead to the sort of health impacts associated with most of the pollutants regulated under the Clean Air Act."[17] Nonetheless, as he continues, President Obama had become frustrated with his inability to get new GHG legislation (such as "cap and trade") through Congress and turned to the "only remaining tool available."[18] The Clean Power Plan (CPP) – a complex construct envisioning forced "generation shifting" (requiring utilities on a differentiated state-by-state basis to avail themselves of lower-carbon generating sources to achieve prescribed CO2 emission reductions) – gestated over several years and emerged as a final regulation in August 2015.

From there, the ambitious EPA scheme encountered major resistance in the form of litigation, with West Virginia's Attorney General taking the lead. Political cover was not lacking either: Senator Joe Manchin claimed that the CPP exemplified the "Administration's demonizing coal . . . [aiming to] regulate coal into extinction."[19] The governor, for his part, termed the plan "unreasonable, unrealistic, and ultimately unattainable for our state."[20] In reality, Van Nostrand posits, the 37% reduction in emissions prescribed for West Virginia, did not "warrant the widespread 'the sky is falling' response" and could have been attained "in a relatively painless manner that would actually produce positive results for the state in terms of job creation in the emerging clean energy sector."[21]

But it all became moot: the U.S. Supreme Court took the highly unusual step in early 2016 of staying the CPP while litigation proceeded (implying a majority of justices thought EPA was not likely to succeed on the merits).[22] And while the legal fortunes of the CPP received a boost when a much-reduced version of the regulation substituted by the Trump Administration's EPA was rejected and remanded to the agency in early 2021 by the D.C Circuit Court of Appeals, Van Nostrand anticipated that the resuscitation of the Obama-era CPP in the Biden era might eventually experience tough going before the Supreme Court, bolstered by several new conservative members.[23] And that is exactly what happened: the 2015 version of the CPP was held beyond the scope of the Clean Air Act in a ruling coming not long after *The Coal Trap* was published.[24]

Moreover, despite the ruckus over the CPP and its tortured history in court, it all didn't matter much, or so argues Van Nostrand. This converges with another major theme of *The Coal Trap*: that coal-fired generation was sunsetting anyway,

17. *Id.* at 30.

18. *Id.*

19. *Id.* at 32.

20. *The Coal Trap*, *supra* note 1, at 32.

21. *Id.* at 33.

22. *Id.* at 37.

23. *Id.* at 39.

24. *See* West Virginia v. EPA, 142 S.Ct. 2587 (2022). To his credit, Van Nostrand, despite his apparent sympathy for the goals of the CPP and belief it would not damage the economy, conceded in his discussion that the EPA's interpretation of an "obscure" provision of the Clean Air Act was an "aggressive one." *The Coal Trap*, *supra* note 1, at 34.

thanks to the emergence of plentiful shale gas and the increasingly cost-competitive price of renewable generation. As the author puts it in his "Shale Gas Revolution" chapter:

> Within six years [of 2007], natural gas would surpass coal as the leading source of fuel for electricity generation, due to its lower cost and the high efficiency of new natural gas fired combined cycle combustion turbines, especially when compared with the economics of the region's aging fleet of coal plants . . . . Continuing down the coal path simply could not be justified as a matter of economics, even without considering the adverse environmental impacts associated with virtually every stage of extraction, processing, and combustion of coal to generate electricity.[25]

This bleak vision for the future of coal, Van Nostrand recognizes, would not win him many popularity contests in his chosen state of residence. Early in the book, he invokes the "lure associated with the distinct respect commanded by coal miners in West Virginia," quoting at length a resonating speech by former Senator Robert Byrd following a pair of mining disasters in 2006:

> Our Nation's coal miners are vital to our national economy. During World War I, coal miners put in long, brutal hours to make sure that the Nation had coal to heat our homes, power our factories, and fuel our battleships. In World War II, American coal miners again provided the energy to replace the oil that was lost with the outbreak of that global conflict.[26]

But instead of reminiscing on the past glories of the industry on the Senate floor or in the "lost decade" to follow, Van Nostrand contends the state would have been better off repositioning itself to take full advantage of newer technologies for producing power.

II. FRACKING: HOW DOES THAT WORK, AND HOW DID IT WORK OUT FOR WEST VIRGINIA?

Van Nostrand has an interesting take on the shale revolution and its peculiar impacts on West Virginia's electric energy infrastructure. His contention is that, while the advent of shale gas fracking employing improved drilling technologies struck gold, as it were, in West Virginia (along with other Appalachian states), the benefits largely bypassed the state during the "lost decade" due to the hidebound electric utility culture – with residents suffering the consequences. Following a commendably cogent explanation of how fracking is now accomplished with the aid of technological advancements and how it triggered quite the drilling boom in the Marcellus shale region, the author zooms in on the paradoxical repercussions for West Virginia ratepayers.

His core argument is that, while wholesale electricity markets saw dramatic price drops as cheaper natural gas generation, propelled by ever-improving combined cycle gas turbine (CCGT) generation equipment,[27] swamped the FERC-regulated exchanges, squeezing out coal as the power source of choice, West Virginia clung to the solid fossil fuel. Indeed, in a section entitled "West Virginia Utilities Take a Pass on Gas," Van Nostrand states that the two major in-state

25. *The Coal Trap*, *supra* note 1, at 43.

26. *Id.* at 9.

27. *Id.* at 53. An "advanced design" for CCGT units entered the market around 2015, upgrading the efficiency and economies of scale. *Id.*

electric utilities – FirstEnergy and American Electric Power – "generated nearly 100 percent of their electricity with coal plants throughout 'the lost decade' and pretty much continue to do so today."[28]

The author lays this failure – and the missed opportunity to materially lower power costs for ratepayers – at the door of "policymakers . . . from the Governor, to members of the legislature, to the commissioners on the West Virginia Public Service Commission (PSC)" who would have regarded leaning into gas generation as an "act of disloyalty" to the venerable coal industry and its miners.[29] The public utilities, for their part, shirked the national march towards natural gas-fired generation, charges Van Nostrand, because there would be no consequences from a PSC whose record represents a "failure . . . throughout the 'lost decade' to perform its essential function of protecting ratepayers . . . ."[30] Strong stuff, to be sure, and the direct results, the author states, were rate increases between 2008 and 2020 "five times the national average."[31]

Yet another portion of Van Nostrand's "lost decade" panorama depicts how independent power producers (IPPs) attempted to fill the void left by the franchised public utilities, only to get cut off at the pass. He recounts multiple instances of IPP-announced plans to construct major gas-fired power plants in West Virginia that were obstructed by enquiries, hearings, and legal challenges – some launched by public officials, others by coal industry groups. While the various objections were thin at best and eventually were denied, the delays occasioned proved fatal to the realization of many such projects. The book offers a detailed account of how this went down.[32]

Yet another shoe drops when *The Coal Trap* marshals evidence that the glittering promise of widespread prosperity from the Marcellus shale gas reserves in West Virginia ended up providing, instead, another chapter in the state's "resource curse" saga.[33] Van Nostrand describes a handful of major *non*-generation project announcements predicated on the abundance of local natural gas, of which little actually came to fruition. Moreover, a regional study cited by the author reflected that job growth in the counties where shale fracking is centered was a mere 4% between 2008 and 2019 – better than the state's overall average (a *drop* of 2.9%), but materially worse than the national average over that period (plus 10%).[34]

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28. *Id.* at 54.

29. *The Coal Trap*, *supra* note 1, at 53.

30. *Id.* at 54-55.

31. *Id.* To provide a complete picture, it should be noted that, despite losing some of its edge, West Virginia's retail electricity rates in 2020 – the year after Van Nostrand's "lost decade" – remained among the lowest in the country – almost two cents below the national average of 10.59 cents/kwh, almost a full cent per/kwh below the neighboring state of Pennsylvania, and fractionally below the neighboring states of Ohio and Virginia. *State Electricity Profiles*, ENERGY INFO. ADMIN. (Nov. 4, 2021), https://www.eia.gov/electricity/state/.

32. *The Coal Trap*, *supra* note 1, at 55-59 ("The Failed Promises of Natural Gas Resource Curse Revisited").

33. *See id.* at 59-62.

34. Of course, county or state-wide studies of *widespread* economic benefits don't reflect *individualized* benefits to landowners leasing their oil and gas rights to drillers – a wealth stream that must have received a boost from significantly higher natural gas prices in 2022, versus the study period covered by *The Coal Trap.*

III. RENEWABLES LOOM LARGER

In his third chapter, "The Rise of Renewable Energy," Van Nostrand relies on independent study data to show that renewable energy was a "distant third" in driving the reduction in U.S. coal production, second to the surge in natural gas (responsible for 49%) and a decline in end use demand (26%).[35] However, the impact of renewables was "much greater" at the end of the study period (2011 to 2017), he adds. The author suggests the coal industry has only itself to blame, having "decided to spend its 'energy' in the political arena, complaining about the 'war on coal' allegedly being waged by the Obama administration and its environmental regulations" when it could have been investing in improved technological proficiency, as were the natural gas and "clean energy" renewables industries.[36]

Readers may reflect, however, that at least some investment has taken place on a U.S. and global scale in carbon capture, sequestration, and use – a set of enabling technologies to circumvent the primary climate change objection to coal burning – and that the "political" spend of the industry and its allies made at least a dent by securing greater tax incentives for carbon capture projects brought into operation in the Inflation Reduction Act of 2022 passed in August.[37] Coal-fired generation has certainly receded in the wake of natural gas's multi-year renaissance and the improved economics and efficiencies of solar and wind power, but to speak of the "demise of the coal industry," as Van Nostrand does in Chapter 3,[38] arguably goes a bit too far. A U.S. Energy Information Administration report indicates that the electric power sector actually produced *more* coal generation in 2021 than in the prior year (rising to 23% of the U.S. total), although this market share is expected to ease to 20% in 2022, as the ability of the coal industry to meet demand has constrained further inroads in its domestic market share (especially with foreign exports on the rise).[39]

The author faults the state's energy policy leadership for failing to incentivize renewable energy development, although precisely because of this lack, renewables have had a minimal effect on the retreat of the coal industry.[40] The main point of Van Nostrand here is that the state, with its lack of renewable portfolio standards or "rigorous" integrated resource planning, has missed out on the opportunity for a "diverse electricity generating portfolio" to provide a check on the "spiraling electricity costs" of the state.[41]

The third chapter is crucial because it contains Van Nostrand's longer-term prophecy that coal is on its way to being ousted from the generation mix in this country, as other fuels and renewables shoulder out coal in the cost curve. The

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35. *The Coal Trap*, *supra* note 1, at 63.

36. *Id.*

37. *See Inflation Reduction Act Expands the Carbon Capture and Sequestration Tax Credit*, JONES DAY, https://www.jonesday.com/en/insights/2022/08/inflation-reduction-act-expands-carbon-capture-and-sequestration-tax-credit.

38. *The Coal Trap*, *supra* note 1, at 63.

39. *U.S. coal-fired generation declining after brief rise last year*, ENERGY INFO. ADMIN. (Oct. 27, 2022), https://www.eia.gov/todayinenergy/detail.php?id=54419.

40. *The Coal Trap*, *supra* note 1, at 64.

41. *Id.* As previously noted, however, West Virginia still had among the lowest retail electricity costs in 2020, despite its having lost some of its edge. *State Electricity Profiles*, *supra* note 29.

book leans especially hard on the thesis that the time for "clean" renewables has arrived and a radical transition is under way:

For many of the reasons described earlier in this chapter – including that continuing improvement in the cost effectiveness of wind, solar, and battery storage technology – the economic case for coal-fired generation will continue to deteriorate.[42]

Indeed, Van Nostrand cites a 2021 report estimating that 72% of coal capacity is "uneconomic" – a jump of 10 percentage points from that source's estimate in 2020.[43] And in the same chapter, the author takes it a step further, citing a report issued in 2021 by the Institute for Energy Economics and Financial Analysis (IEEFA) suggesting that the days of natural gas are numbered as well:

> The story is not much better for the "other" fossil fuel in West Virginia, natural gas. Of further concern to West Virginia policymakers hoping to continue to ride the fracking boom is IEFFA's conclusion that the "gas bridge" – the notion that natural gas provides a "bridge" between coal as the primary source of electricity generation and a future reliance on renewables – is now "closed" [as solar and wind] are now the least-cost option across much of the United States.[44]

The "closure" of the so-called bridge, Van Nostrand hypothesizes, is certified by the "growing evidence of methane emissions throughout the gas production, distribution, and consumption chain," nullifying any perceived advantage of natural gas over coal in emitting less greenhouse gasses.[45]

The chapter ends with an acknowledgement that the development of renewable resources in West Virginia, while slow as molasses ("there was very little movement toward renewable energy in West Virginia during the 'lost decade'"), has picked up its pace in the last couple of years. Van Nostrand cites specific examples of project announcements and legislative initiatives to expedite utility-scale solar projects.[46] Some wind or solar projects are being spawned by IPPs, while AEP – which Van Nostrand accuses of slow-rolling renewable development in West Virginia in deference to the PSC's preferences – is participating in a 115 MW wind project by purchasing output through a subsidiary in tandem with a Toyota plant aspiring to entirely clean energy consumption.[47]

Summarizing the full content of *The Coal Trap* – a contribution to energy literature which could find a place in a college or law school course – would take many more pages, but the following checklist of the volume's additional chapters (*i.e.,* those not discussed in some detail already) will give the reader a fair idea.

- *From "Friends of Coal" to the "War on Coal": How West Virginia Went from Blue to Red* (Chapter 5):[48] Here, the book traces the public relations campaign conducted by the coal industry during a time

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42. *The Coal Trap*, *supra* note 1, at 72.

43. *Id.*

44. *Id.* at 69.

45. *Id.*

46. *The Coal Trap*, *supra* note 1, at 74.

47. *Id.*

48. *Id.* at 97-119 (Chapter 5: "From 'Friends of Coal' to the 'War on Coal': How West Virginia Went from Blue to Red").

of plummeting coal mine employment (due to mechanization), a shrinking role for the United Mine Workers in communities, and growing environmental damage concerns (especially from mountaintop removal mining) to enhance the image of the industry as still central to West Virginia's identity and economic well-being. The author also elaborates on how the industry and its political allies blamed the Democratic Party's so-called "war on coal" for the decline of the industry, a political maneuver that effectively converted the state from a Democratic to a Republican stronghold.

- *Leadership from Washington, D.C. – The Congressional Delegation that Could Have but Didn't* (Chapter 6):[49] Van Nostrand charges the state's elected representatives to Congress with jumping on the "war on coal" bandwagon during the "lost decade." With large helpings of political lore, the chapter focuses on the roles of major figures like Senators Robert Byrd and Jay Rockefeller (who also served as Governor), both of whom had mixed records during their long careers on supporting coal industry positions. The book credits Byrd with "evolving" late in his political life towards accepting the reality of climate change and the need for the state to diversify its economy. At times, Rockefeller ran interference for the coal industry but at other times chastised the industry for its anti-environmental positions, including its opposition to addressing climate change. There are also portraits of Sen. Shelly Moore Capito (a strong pro-coal, anti-EPA advocate) and Rep. David McKinley (whom Van Nostrand credits with taking a "middle ground" between coal industry positions and climate policies).[50]
- *Manchin in the Middle* (Chapter 7):[51] Like other West Virginia figures profiled in the book, Joe Manchin hails from a "minor" political dynasty. He served in statewide and Congressional office capacities since 1982, rising to a position of extraordinary influence in 2021 as the "most conservative Democrat in the Senate," and a vital vote in getting legislation passed with the parties splitting the Senate 50-50.[52] The chapter describes Manchin's dedication to bipartisanship, as well as his "longstanding ties to the coal industry,"[53] and takes a deep dive into the senator's alleged conflicts of interest and defense of the coal business against Obama Administration coal and climate initiatives. However, the section points out, Manchin has publicly acknowledged that climate change is real and human activity has a lot to do with it – though "elimination of fossil fuel

49. *Id.* at 120-139 (Chapter 6: "Leadership from Washington, D.C. – The Congressional Delegation that Could Have but Didn't").

50. The book notes that McKinley, a "moderate," faced a difficult primary in May 2022 running against another Congressman, Alex Mooney, due to redistricting (with W. Va. losing a seat). *The Coal Trap*, *supra* note 1, at 138. In the event, the Trump-backed candidate won the election (after publication of *The Coal Trap*).

51. *Id.* at 140 *et seq*. (Chapter 7: "Manchin in the Middle").

52. *Id.* at 140.

53. *Id.* at 145.

use [is] not practical."[54] The entire chapter amounts to a mini-biography of Joe Manchin and his outsized role in shaping energy (and fossil fuel) policy, but Van Nostrand dismisses Manchin's mantra that climate change may be addressed through "innovation, not elimination" in the use of fossil fuels as bunk. Central to the author's contention are his twin beliefs that coal can no longer be regarded as a cost-effective fuel and that "there is no breakthrough 'clean coal' technology on the horizon" that can save the industry by dint of "innovation."[55] The book also skewers Manchin for foiling the Biden Administration's "Build Back Better" bill, which Van Nostrand portrays as a "tremendous windfall" for West Virginia.[56]

- *The Failure of the Public Service Commission (PSC) to Serve the Public* (Chapter 8):[57] As the title suggests, this chapter enlarges on the book's earlier contention that the WVPSC has been a supine and abject failure at holding the coal-burning utilities serving in the state accountable. Van Nostrand delves extensively into the personalities and history of actions by the leadership and institutions responsible. This excerpt gives a good idea of how the author unloads on the regulators:

  > it is fair to say that the decisions made at the PSC while Mike Albert was chair were a good deal for the coal industry – no diversification whatsoever away from using coal to generate electricity, and frequent bailouts of coal-burning utilities by authorizing uneconomic coal plants to be placed on the backs of West Virginians during 'the lost decade' – and a very bad deal for ratepayers.[58]

  Van Nostrand also details the history of "integrated resource planning" (IRP) by West Virginia utilities, which he describes as non-existent (at least in a way that allowed public scrutiny) before 2014, and only marginally improved when the state legislature mandated IRP. No less critical is the chapter's account of how West Virginia utilities have addressed demand-side management and conservation approaches – a performance he labels "dismal."[59]
- *The Role of the Legislature in West Virginia's Failed Energy Policies* (Chapter 9):[60] Van Nostrand makes space in his rogues gallery for the state's elected representatives, which "has done more than its share" of harm.[61] Most prominently, he charges the body with

54. *The Coal Trap*, *supra* note 1, at 153.

55. *Id.* at 161.

56. *Id.* The book was published before the revised, reduced version of "Build Back Better" was passed with Sen. Manchin's support.

57. *Id.* at 165 *et seq.* (Chapter 8: "What the Future Could Hold if Leaders Choose to Lead").

58. *The Coal Trap*, *supra* note 1, at 168.

59. *Id.* at 181. It should be mentioned that the author draws a distinction between the West Virginia public utilities controlled by FirstEnergy and those by AEP. *Id.* at 190. The former has pursued "Neanderthal policies" while the latter has been "more enlightened." *Id.* at 188, 190. The book also portrays the WVPSC staff as obstructive in getting conservation and demand response programs implemented. *Id.* at 165-68.

60. *Id.* at 195 *et seq.* (Chapter 9: "The Role of the Legislature in West Virginia's Failed Energy Policies").

61. *Id.*

misleading labeling in its 2009 "alternative and renewable energy portfolio standard," which, he claims, "did nothing" to actually stimulate the development of renewables (instead sanctioning forms of fossil fuels as "alternative" energy).[62] In addition, the chapter explores the "stranglehold" the coal industry has on the legislature that has resulted in an array of statutory actions to help the industry cut costs and salvage its bottom line in more difficult economic times.[63]

- *Bailing Out the Coal Industry on the Backs of West Virginia's Electric Ratepayers* (Chapter 10):[64] Here, Van Nostrand chronicles, in great detail, the history (commencing about 10 years ago) of transactions in which the state's electric utilities sought to transfer coal-fired plants dating from the early 1970s from their *unregulated* merchant power subsidiaries to their *regulated* load-serving entities. The author underscores the inflated prices the utilities proposed, the lack of rigorous analysis of lesser-cost alternatives, and the limited constraints the WVPSC put on the deals in green-lighting them.
- *Coal Operators Get Rich and West Virginia Gets to Clean Up the Mess* (Chapter 11):[65] This chapter deepens a theme of mismanagement by the coal companies themselves, compounded by inept state and federal regulation. In tandem, these factors led to massively underfunded mine site reclamation and other obligations. Van Nostrand explains how a wave of company consolidations in 2009-10 (when coal prices were rising) resulted in overleveraged corporate structures that inevitably went bust when coal prices fell back to earth (as the China boom cooled and cheaper natural gas generation in the U.S. pushed down coal's position in the dispatch stack). The ultimate consequence was a bevy of bankruptcies by companies large and small ("since 2012, more than sixty mine operators have filed for bankruptcy").[66] The chapter goes on to decry how the companies in bankruptcy shed much of their employee pension and benefits obligations as well as their land reclamation and environmental cleanup responsibilities, but executives were able to "walk off with substantial 'retention bonuses.'"[67] The federal law that was *supposed* to require backstop funding of site reclamation obligations through mining company bonding requirements failed because of unsound policies of the West Virginia environmental agency, which was charged with administration of the law, and lax

62. *The Coal Trap*, *supra* note 1, at 195.

63. *Id.*

64. *Id.* at 226 *et seq.* (Chapter 10: "Bailing Out the Coal Industry on the Backs of West Virginia's Electric Ratepayers").

65. *Id.* at 246 (Chapter 11: "Coal Operators Get Rich and West Virginia Gets to Clean Up the Mess").

66. *The Coal Trap*, *supra* note 1, at 246.

67. *Id.* Later in the chapter, Van Nostrand records that the four largest national coal producers managed to avoid almost $2 billion in environmental liabilities and $3.2 billion in retiree benefits through bankruptcy. *Id.* at 252.

oversight at the federal level. The upshot, the book concludes, will be either "billions of dollars" coming from state taxpayers to remediate the environmental damage or "allowing the blight on communities to continue [unabated]."[68]

- *What the Future Could Hold if Leaders Choose to Lead* (Chapter 12):[69] This final chapter is a resumé of the many faults Van Nostrand has already ascribed to the policy leaders and coal industry operators of the Mountain State; the onerous burdens their legacy has imposed on West Virginia; and what "real leadership" might look like – stressing the need for a transition from coal-fired power to "clean energy" alternatives. The author draws lessons from neighboring regions that have, in his view, risen to the challenge of diversifying and reinvigorating the resource-based Appalachian economy.

To understand the sheer breadth of what *The Coal Trap* tackles, it is best conceived of as a wide-angle view of virtually all the policy, legal, and commercial issues impacting the nation's utility business telescoped down to the specific experiences of West Virginia. In this way, the book is valuable as both a broad-based discussion of a considerable spectrum of topical legislative and regulatory issues nationally *and* as a case-study of what has transpired in a state with a long history of mining one fossil fuel (coal) and a more recent history of finding itself in the middle of the Marcellus shale gas belt. At the same time, readers should expect an account viewed through the lens of an advocate – not an impartial, balanced energy historian-analyst. Like any good advocate, Van Nostrand blends fact and opinion into a relatively seamless whole; and while the resulting blend is well worth taking on board – both for its comprehensiveness and specificity – an informed reader will have to parse the key contentions and compare them with other information sources. In short, although the author comes from a utility regulatory background and shows an impressive grasp of the facts, issues, and debates, he views the entirety through a green-tinted prism. Whether readers will find themselves consistently nodding their head, or scratching it, depends on their own points of view.

It is also worth underscoring that *The Coal Trap* deals with a world that is constantly changing. For example, natural gas markets have tightened, and prices have firmed, as Europe has turned away from Russian pipeline supplies in the wake of that country's Ukraine invasion. As a result, coal has crept back into the energy supply picture – in both in the U.S. and Europe – more than Van Nostrand would seem to prefer. Further, the natural gas industry may be capable of clamping down on its methane emissions, helping to redeem itself as the "bridge fuel" the author scorns because of the serious greenhouse gas impacts of escaping methane. And part of the European experience in 2021-22 – looking into the chasm of an energy price and shortage crisis (exacerbated by Germany prematurely retiring most of its nuclear energy fleet) – has been to second-guess its quick-cut to heavier reliance on renewable electric energy (primarily wind and solar). Van

68. *Id.* at 266.

69. *Id.* at 267 *et seq.* (Chapter 12: "What the Future Could Hold if Leaders Choose to Lead").

Nostrand, in Chapter 4 (which focuses on the "decarbonization" and distributed generation movements), chastises public utilities for at least rhetorically embracing "zero net carbon" goals, but only by around 2050 – a timeframe he finds much too "sluggish."[70] That is an understandable viewpoint for someone who regards climate change as an imminent crisis, but "how fast" is prudent becomes an issue of legitimate debate when the desire to go all in for "clean energy" is balanced against a utility's reliability obligations.

70. *The Coal Trap*, *supra* note 1, at 80.

THE WOLFBERRY CHRONICLE CHARTS THE RISE OF A SMALL TEXAS OIL COMPANY FROM SLIM PICKINGS TO THE JACKPOT

By Kenneth Barry*

A business book tracing the history of a low-profile, Midland, Texas oil and gas company with nary a villain, scandal, or a larger-than-life wheeler-dealer at its center does not sound like the recipe for a spicy page-turner. However, *The Wolfberry Chronicles and Other Permian Basin Tales from the Henry Oil Company* (*Wolfberry Chronicles*), published in 2021 by company insider Gregory Berkhouse, is anything but dull. The book admirably succeeds on two fronts: first, it provides an engaging narrative of how Jim Henry – a hardworking, fundamentally decent, and only moderately risk-taking petroleum engineer – launched his own exploration and production ("E&P") company at the dawn of the 1970s, building it from scratch into a dynamo worth over half a billion dollars; and, second, it educates the reader along the way on the geological underpinnings and evolution of shale drilling and fracking technology as they vaulted the U.S. into a global leadership position beginning in the early 2000s.

Berkhouse wisely employs a folksy, often droll style to make all that technical and financial information cohere and go down easily. Yet, he strives not to "dumb down" the many business and engineering facets – and challenges – of developing an E&P company seeking its niche between the broad shoulders of the majors. As the author puts it in his introduction:[1]

> Oil is a technical industry. I wanted to make this book interesting and understandable to readers who don't have a petroleum background, but without compromising the technical accuracy. One of my guiding principles . . . was: *accessible to the non-technical, inoffensive to the technical.* To that end, I have provided brief explanations of most of the technical terms and concepts. I have also devoted a few "pull-over" chapters to more fundamental technical terms and concepts.

A couple of pages later, Berkhouse self-identifies as "a geologist and an engineer" but "not a writer," joking that "two out of three ain't bad."[2] He needn't apologize, however. The book not only mines the sweet spot between the overly technical and the simplistic; it also manages to be stylistically lucid and punchy, avoiding the turgidity one might expect from a flattering corporate biography written by a technology-steeped insider.

Another stylistic trick Berkhouse employs to good effect is to end most chapters with a short tease – a peek ahead at an intriguing turn in the story about to

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1. GREGORY BERKHOUSE, THE WOLFBERRY CHRONICLES AND OTHER PERMIAN BASIN TALES FROM THE HENRY OIL COMPANY iii. (2021) ("*The Wolfberry Chronicles*").

2. *Id. at* 1.

unfold. While it doesn't exactly convert the narrative into a whodunit, it averts getting too bogged down in a morass of drilling statistics and corporate personnel shuffling.

It amounts, all in all, to a heartening, surprisingly human tale. We tag along amiably with Jim Henry and his cohorts as they build a company from the ground up; and while there is no single dramatic arc tying the five decades of company history together, we are shuttled back and forth between failures and successes, big and small, as we root for the Henry team to make its mark. About midway through, several threads converge as we learn how Henry's geological and operations managers assemble an assortment of clues to locate, test, and ultimately hit a lucrative (but previously little-known) Permian Basin oil play known as the "Wolfcamp." The "Wolfberry" label featured in the book's title was confected by the characters to link the better-known "Sprayberry" play – which gave Henry Oil its start – with its move into Wolfcamp geological strata to create a transformational double-play accessed via a single wellbore. In the Wolfberry chapters, Berkhouse credits a particular drilling supervisor who joined the Henry team halfway through its growth period with perfecting a new fracking methodology that worked like a charm in coaxing oil out of Wolfcamp geology (though he candidly explains that several other companies in the 1990s were independently reaching similar conclusions).

I. SETTING UP SHOP

The origin story of Henry Oil makes for an important baseline: Berkhouse wants his readers to fully appreciate how Jim Henry, who ended up an ultra-wealthy Midland oil baron and philanthropist, started out as just a middle-class guy with a solid engineering education and enough gumption to incubate his own business after a handful of years working for bigger companies fresh out of college. (We learn over the course of the book that such individual entrepreneurship has been characteristic of the Texas oil and gas culture; little guys can spring up, carve out a space for themselves in the shadow of the industry giants they probably began with, and, with luck and pluck, grow their small businesses into big ones.)

In Chapter 1, titled "The Wonder Years," Berkhouse chronicles how Henry, early in his career as a petroleum engineer for a major company, realized that his own creativity and imagination were "stymied by stodgy management" and that, besides, he wasn't "very good at company politics."[3] He switched jobs to work for smaller companies, but in 1969, just six months after he hooked up with a tiny firm, it folded. He took this setback as an opportunity to strike out on his own. Joining with an older geologist at the same firm – a more colorful personality who complemented Henry's serious side – the two set up a consulting firm, specializing in the Permian Basin's Sprayberry play.

Consulting, we learn, can be the first rung up the stepladder. In Texas, it is quite common for E&P companies to supplement their forces with consultants to tackle particular projects where they may be short staff or lack local expertise.[4]

3. *Id*. at 7.
4. *Id.* at 11.

Evaluating prospects and suggesting drilling locations can be the particular province of consulting geologists and engineers such as Henry and his partner became; and even the field operator mission may be delegated to a consulting firm.[5] In any event, the nascent Henry consulting firm rapidly earned a solid reputation in the Midland area, leading to more requests for its services.

The duo began with virtually no capital – making consulting work basically their only option – yet didn't seek a deeper-pocketed partner to bankroll them; Jim Henry explained their independent streak this way: "We didn't want to get a money partner because we didn't want to share our success with anybody."[6] For basics – office rent and overhead – they took out a small bank loan.[7] The oil market in the waning days of 1969 bespeaks a long-ago era: the commodity sold for $3.35/b; and even adjusted for inflation, that amounts to just $22/b.[8] When Henry's geologist partner was offered an onsite gig in New Mexico to advise on drilling a pair of wells for six weeks, he was paid just $125 *per day;* and their consulting work went for ten bucks an hour.[9]

More money came in the door when an area oilman offered the pair a finder's fee for each drilling prospect they generated, plus an overriding royalty on resulting lease production.[10] And that trickle became a stream when business acquaintances hired them for $7000 to do a comprehensive study of prospects in the Sprayberry formation, a sprawling and increasingly active oil play in the Permian Basin.[11] As a result of this work, Henry's budding firm earned a reputation as Sprayberry experts and were invited to spearhead more multi-well deals (the first of which unluckily fell through).[12] By early 1971, Henry Oil was hanging in there, surviving on consulting work when a bigger break with greater responsibility arose: it was asked to supervise a Sprayberry drilling program as "operator of record," rather than just consultants.

By late 1971, with an assortment of drilling projects under their wing, Henry and his partner were at last "making real money."[13] Its oil field successes now resulted in deeper- pocketed outfits stepping in to buy working interests in their well drilling programs. Increasingly in the role of operators, the partners drilled more wells – 19 in 1972, 22 in the next year – and benefitted from international tensions pushing up the price of oil.[14] In these years, Henry Oil added staff, but in early 1977 the geology partner decided it was time to scale back on his working life. This was the first in a long litany of personnel departures and arrivals that *The Wolfberry Chronicle* dutifully records. The reader unfamiliar with the industry soon learns that such coming and goings, and the unique talents and drive individuals bring to the table, are a major determinant in how an aspiring oil and gas

5. *The Wolfberry Chronicles*, *supra* note 1, at 11.
6. *Id.* at. 13.
7. *Id.*
8. *Id.* at 14.
9. *The Wolfberry Chronicles*, *supra* note 1, at 14.
10. *Id.* at 15.
11. *Id.* at 16-17.
12. *Id.* at 18.
13. *The Wolfberry Chronicles*, *supra* note 1, at 23.
14. *Id.* at 29-30.

firm fares. In Berkhouse's telling, working side by side in a family business like Henry Oil also produces lasting friendships, and departures, however sad, were uniformly on good terms.

II. OIL AND GAS EXPLORATION 101

As previously noted, *The Wolfberry Chronicle* takes pains to teach the lay reader about the nuts and bolts of the oil and gas industry – both the business-running aspects and the technology. Berkhouse relishes describing incidents when Henry drilling projects ran into difficulties. These can be rather menacing, especially when the textbook solution for an unruly well doesn't fix the issue at hand, and supervisors have to improvise.[15] Such undesired adventures, one imagines, make for spirited storytelling after-hours.

A key, though less dramatic, chapter is dubbed "Permian Basin Rocks for Jocks." A digression from the main storyline of the book, the chapter explains in geologic terms just what the Permian Basin is, how it came to be, and the ways in which this ancient seabed occupying what's now West Texas accumulated all that organic sediment[16] that now yields oil. The section also reminds us that "rock-solid" is a relative term; sedimentary rock has variable degrees of both *permeability* and *porosity.*[17] The tighter the formation, we learn, the more hydro-fracturing or "fracking" comes into play to release the embedded hydrocarbons.

Shale is labeled a "special case" of sedimentation by Berkhouse. It is formed when plankton (an omnibus term for "all manner of micro critters") dies and joins the "underwater rain of inorganic silt and clay blanketing the sea floor," turning together into rock, or "source rock" if it contains above a certain percentage of organic carbon."[18] The author then observes that this kind of rock becomes the "major source of the earth's . . . oil and gas."[19]

The geology chapter, inevitably laden with terms and concepts that may be unfamiliar to readers not steeped in geology, is relatively heavy going, but it's leavened by Berkhouse's characteristically jocular tone. It may require going back and re-reading, but it is helpful in following the exploration saga that unfolds, leading the Henry team to develop those prolific "Wolfberry" wells.

III. GETTING THE FRACKING RECIPE RIGHT

Another salient aspect of *The Wolfberry Chronicles* is its detailing how the Henry team – spearheaded in this case by Dennis Phelps, an operations engineer

15. A not uncommon situation arising in the book is where a well nearing completion "kicks" – meaning the pressure of a just-tapped reservoir temporarily overcomes the control substances (such as "drilling mud") and devices used to regulate the flow of oil or gas released by the project. An extreme version is the classic "blowout." Equipment failures at this stage can also be an issue. Throughout the book, Berkhouse livens up the chronicling of routine well-drilling with tales of how the company dealt with problematic wells and the human factor that goes into these incidents.

16. The geology section also delves into the various types of sedimentation yielding different rock types. The nature of the sediment is crucial in pursuing oil-bearing formations (*i.e.,* those rich in "carbonates," composed of broken shells). *Id.* at 37-39.

17. *Id.* at 42-45.

18. *The Wolfberry Chronicles*, *supra* note 1, at 40.

19. *Id.*

lured out of early retirement – built a better mousetrap when it came to the fracking process. Phelps, then working for ARCO, had been experimenting with alternative engineering approaches to fracking.[20] His process insights, coupled with Henry Oil's growing interest in probing the Wolfcamp geological zone, led to a resounding boom in the company's oil production.

Preceding an in-depth account of this development, Berkhouse provides an enlightening capsule history of fracking. While the term has only come into broad national awareness in the 2000s, the roots of fracking lie deep. The author relates that not long after the oil industry got going in 1859, drillers realized that most wells need a form of artificial stimulation. The medium for "shooting the well," as the expression went, was first gunpowder and then nitroglycerin. The dangers of handling explosives were an accepted but very real risk.[21]

Fracking took a leap forward towards *hydro*-fracking in the mid-1930s. By that time, acid had become a preferred medium for well stimulation. A chemist employed by Dow Chemical, Dr. Sylvia Stoesser (as it happens, the first woman chemist employed by Dow), discovered additives to the acid that would reduce corrosion to equipment (an undesirable side effect of acidizing) and, in the process, documented how pressurizing the fluid pumped into the well help trigger rock fractures at the target depth of the wellbore.[22] While Dr. Stoesser was experimenting with brine wells, not oil, she and her supervisor published their findings in *World Petroleum Magazine,* suggesting the implications of pressurized fluid injection for oil exploration.[23] The chapter goes on to narrate how hydrofracking became more and more common in the decades that followed, with various protocols recommended for the use of thickening additives (to increase the pressure impact) and sand as a fracture "proppant."[24]

What Dennis Phelps deduced, first for ARCO and then, coming out of retirement, for Henry was that *less* sand, *less* viscosity, but *wider* pipes and *more* water pressure (along with certain specifications for perforating the well in the target zone on completion) was both cheaper and potentially more effective. Dubbed "slickwater fracking" (referring to friction-reducing additives), Phelps's fracking recipe was picked up by Henry and applied to the new Wolfcamp/Sprayberry (or "Wolfberry") dual-target wells which Henry's geologists were hot on the trail of.[25]

IV. HENRY OIL HITS THE BIGTIME

As the company's early efforts around 2003 employing Phelps's fracking method confirmed his findings, Henry turned its attention to the Wolfberry project. The company's geologist studied the available data on other companies' past wells in the target areas – good, bad, or indifferent – and then prognosticated the extent of the formation.[26] As exploratory wells drilled by Henry itself proved promising,

20. *Id.* at 166-67.
21. *Id.* at 150-51.
22. *The Wolfberry Chronicles*, *supra* note 1, at 152-53.
23. *Id.*
24. *Id.* at 154-55.
25. *Id.* at 172 *et seq.*
26. *The Wolfberry Chronicles*, *supra* note 1, at 182-95 (Chapter 11: "Birth of the Wolfberry").

the firm leased more and more acreage, joining up with deeper-pocketed partners (eventually, Chevron as the acquirer of Unocal).[27] Henry remained the well operator, and took an increasing (if still minority) equity interest, as its confidence in the play (and finances) grew.

The drilling program, and the revenues of the company, snowballed in the mid-2000s. The steadily climbing market price of oil helped, too. At first, Henry tried to keep its objectives and results on the downlow to keep competition in the dark. Secrecy can only go so far. but the company did manage to accumulate a huge amount of acreage and increase its market value exponentially by locating and more intensively drilling developmental wells (wells drilled in proven areas).[28] Departures of key leadership team members – generally to start their own E&P firms – pockmarked these years of hard-earned success, but the holes were filled with new hires and internal promotions.

The financial bonanza made possible by Henry Oil's Wolfberry initiative leads to some surprising corporate upheavals, but that last part of the story should be left to the reader's discovery. The denouement of Henry's glory days occupies the final pages, including an extended period of doldrums accompanying its radical restructuring, downsizing, and management swings.[29] The best war story in the book – the nearest thing to a page-turner – is saved for last, documenting Henry's first adventure in horizontal drilling (which the company got around to only in late 2013). It was an epic "learning experience," as everything seemed to go haywire.[30] But we apprehend how the integration of horizontal drilling techniques in the Permian in the 2000s, coupled with the "slickwater" fracking pioneered by Henry, turbocharged the productivity of the region's shale deposits.

V. CONCLUSION

Throughout *The Wolfberry Chronicles,* Berkhouse wants his audience to appreciate that the founder and his family insisted on sharing their good fortune with their employees, through generous bonuses and options to buy working interest shares in new drilling projects. Jim Henry's charitable donations to the community are likewise underscored. The biography of Henry Oil, the book stresses, is above all a tale of a decent man whose enterprising spirit, ability to attract like-minded managers with a "win-win" approach to business deals, and customarily conservative financial practices led to considerable success, despite the roller coaster of oil and gas prices and the inevitable encounters with failure on some projects.

This reviewer would have found helpful the inclusion of a few maps and diagrams accompanying certain chapters. Not all readers are as familiar with West Texas locations as the author. And while technical terms are usually well-explained, there are a few lapses into industry cant that could stand a bit of elaboration. However, these lapses are few enough; Berkhouse molds this welter of personalities, drilling projects, production data, and placenames stretching over 50

27. *Id.* at 214-15.

28. *Id.* at 231.

29. *Id.* at 243 *et seq.* (Chapter 16: "Transitions").

30. *The Wolfberry Chronicles*, *supra* note 1, at 267 *et seq.* (Chapter 17: "Henry Goes Sideways").

years into a comprehensible and informative whole. It should appeal to a wide audience of those interested in a deeper understanding of the evolution and transformative technical changes behind the growth in North America's oil and gas industry.[31]

31. The company's moral ethos has a strong religious undercurrent that surfaces on several occasions. It is encapsulated in Jim Henry's quoted remark in the final chapter: "What I'd like is for the basic principle of our company to continue. I want this to be Christian company . . . . It is what drives us, what is at the heart of our company." *Id.* at 281. This may discomfort readers of other denominations, and gave this reviewer pause. But it's plainly who Jim Henry is, and the book is in no small part his biography. We also learn in that chapter that, as an engineer, Henry rates the potential of nuclear as a "clean energy" option above solar and wind. *Id.* at 280-81.

HOW THE WORLD REALLY WORKS: THE SCIENCE BEHIND HOW WE GOT HERE AND WHERE WE'RE GOING

by Vaclav Smil
Reviewed by Mosby G Perrow IV*

At the end of this summer, speaking to a room full of energy executives, their employees, and their service providers, a CEO of a Fortune 500 energy company declared that in the wake of the Inflation Reduction Act, the laws of economics have been suspended. But, he added, the laws of physics cannot be. Such is the thrust of Vaclav Smil's latest book, *How the World Really Works: The Science Behind How We Got Here and Where We're Going*.[1]

A Distinguished Professor Emeritus at the University of Manitoba in Winnipeg, Canada, Smil is a favorite of C-suite officers at energy companies. His many volumes of books are filled with exquisite details that unpack the realities of energy infrastructure; he takes a scientific and methodical approach to civilization's building blocks, reveling in detail, layer-by-layer, down to the atoms and millijoules of life and its surroundings.

For example, in one of Smil's earlier books, *Energy and Civilization: A History*, he begins with the provocative yet unimpeachable statement that "Energy is the only universal currency: one of its many forms must be transformed to get anything done." That book forges a dense narrative from the energy packed in prehistoric diets (wooly mammoths offered 10-12 MJ/kg while large monkeys a mere 5-6 MJ/kg) through the "great transition" to fossil fuels with England the first to shift from plants (16-19 MJ/kg for hard woods) to coal (31-33 MJ/kg for anthracites), setting the stage for industrialization. *Energy and Civilization* includes approximately 70 pages of source references and a timeline for energy-related developments starting around 1,700,000 with the Oldowan stone tools and ending with the average concentration of atmospheric CO2 reaching 400 ppm in 2015.

Smil has written a half dozen or so books on energy alone. They are dense, but not dry. David Keith, a climate scientist at Harvard University, reportedly called Smil "a slayer of bullshit."[2] In an age where facts and opinions often seem to be treated interchangeably, especially when it comes to our energy policies and efforts to address anthropomorphic climate change, we would do well for Smil to have a wider audience.

Enter Smil's *How the World Really Works*.

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1. Vaclav Smil, How the World Really Works: The Science Behind How We Got Here and Where We're Going (2022) (ebook) ("*How the World Really Works*").

2. Paul Voosen, *The Realist*, 359 SCIENCE 1320 (2018).

Intentionally less dense than his academic work, Smil's latest book draws on decades of research—his own and others—and presents essential topics in compelling terms accessible to any curious reader. The book is structured around six topics underpinning life for modern humans: Energy, Food Production, Our Material World, Globalization, Risk, and the Environment. The book ends with a chapter on "The Future" and begins with an introduction: "Why Do We Need This Book?"

According to Smil, the gap between "wishful thinking" and reality is vast, but the contest of ideas can only proceed in a rational way if all sides share "at least a modicum of relevant information about the real world, rather than trotting out their biases and advancing claims disconnected from physical possibilities."[3]

How did we get here? Smil suggests that urbanization and mechanization are two culprits. But he also points to what is perhaps the more structurally engrained and less visible reason: "the poor, and declining, understanding of those fundamental processes that deliver energy (as food or as fuels) and durable materials (whether metals, non-metallic minerals, or concrete) is that they have come to be seen as old fashioned."[4]

And so it is that the "best minds" do not go into "soil science," but instead lawyers, economists, code writers, and money managers earn high rewards for work "completely removed from the material realities of life."[5] Thus, *How the World Really Works* is effectively a crash course for lawyers, guns, and money.

Beginning with "the only universal currency," Smil invites the reader to imagine a probe approaching Earth every 100 years that is programed to make a second pass for a closer inspection if it detects a previously unobserved kind of energy conversion. For billions of years, the probe passes without a second pass over volcanic eruptions, earthquakes, and storms. The probe makes very few "second passes" over the course of hundreds of millions of years: it investigates the first, single-celled photosynthetic microbes in shallow seas 3.5 billion years ago; it looks at cyanobacteria converting CO2 and water into new organic compounds and releasing oxygen hundreds of millions of years later; it witnesses the Cambrian explosion 541 million years ago and the rise of organisms. Things get more interesting for the probe. The stage is set for humans.

> Not long afterwards, the probes nearly miss the significance of a mechanical shift with enormous energetic implications: many four-legged animals briefly stand or awkwardly walk on two legs, and more than 4 million years ago this form of locomotion becomes the norm for small ape-like creatures that begin spending more time on land than in trees.[6]

From two legs, over several hundred thousand years, develops the first external energy conversion, or as Smil puts it, "extrasomatic use of energy—external to one's body; that is, any energy conversion besides digesting food."[7] This changes everything for the apes – their diet expands because they can now eat food

3. *How the World Really Works*, *supra* note 1, at loc. 129.
4. *Id*. at loc. 92.
5. *Id*.
6. *Id.* at loc. 244.
7. *How the World Really Works*, *supra* note 1, at loc. 253.

that was previously hard to digest. They can live in colder climates, warming their bones by the fire. They can keep away dangerous animals and forge tools for hunting.

By beginning in this way – and each chapter follows a unique and creative entry point for these "soil science" topics – Smil manages to highlight how truly extraordinary, revolutionary, and expedited our world has become with each advance in energy conversion from plant and animal energy to exploiting fossilized plants and animals. In 1800, plant fuels supplied more than 98 percent of our heat and light and 90 percent of all mechanical energy needed for farming, construction, and manufacturing was supplied by human or animal muscle. "The world of 1850 is much more akin to the world of 1700 or even of 1600 than that of the year 2000."[8] By 1950, fossil fuels supply nearly three-quarters of primary energy and more than 80 percent of all mechanical energy.

Smil helps the reader observe this change from a variety of angles. "An average inhabitant of the Earth nowadays has at their disposal nearly 700 times more useful energy than their ancestors had at the beginning of the 19th century."[9] Or in terms of gain, "the 20th century saw a nearly 40-fold gain in useful energy; since 1800 the gain was about 3,500-fold."[10] Or in terms of physical labor, "it is as if 60 adults would be working non-stop, day and night, for each average person; and for the inhabitants of affluent countries this equivalent of steadily laboring adults would be, depending on the specific country, mostly between 200 and 240."[11]

Smil explains this dramatic increase in access to energy through the eyes of physicists and economists, quoting Erwin Schrodinger "what an organism feeds upon is negative entropy" and referencing Alfred Lotka's idea that "those organisms that best capture the available energy hold the evolutionary advantage."[12] In economic terms, we have built "a system for extracting, processing and transforming energy as resources into energy embodied in products and services."[13] Smil's point is that no one can understand the world without "at least a modicum of energy literacy."

The chapter then goes on to explain the difference between energy and power, how different forms of energy have certain advantages and drawbacks, why energy density matters, and what all of this means for the energy transition. What is so fascinating about Smil's exploration of these topics is that they do not read like textbook or encyclopedic entries. Smil is telling a story made powerful through his years of research and writing on the subjects he unpacks. And unlike what the title might suggest, Smil does not patronize the reader, and his style is far from smug or condescending. Rather, his prose reads like a stimulating conversation with a friendly professor talking to another professor who happens to be in a different field.

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8. *Id*. at loc. 302.
9. *Id*. at loc. 339.
10. *Id.* at loc. 335.
11. *How the World Really Works*, *supra* note 1, at loc. 343.
12. *Id*. at loc. 357.
13. *Id*. at loc. 367.

Perhaps the downside to this approach is that his conclusions tend to be somewhat blander than the stimulating history Smil weaves. According to the energy chapter in *How the World Really Works*, "our civilization is so deeply reliant on fossil fuels that the next transition will take much longer than most people think."[14] Not quite the eureka moment one might expect from the buildup of four billion years of history. But this is by design. From the outset, Smil views his job as that of scientist, not advocate.

And so go similar deep dives focusing on food production, the material world, globalization, risk, and the environment. There is much wisdom in these chapters and fantastic juxtapositions of facts. For example, on food production, the rapid rise in the number of people we are able to feed – "1950 the world was able to supply adequate food to about 890 million people, but by 2019 that had risen to just over 7 billion: a nearly eight-fold increase in absolute terms!") – is explained through well-curated details – "In two centuries, the human labor to produce a kilogram of American wheat was reduced from 10 minutes to less than two seconds."[15] As with many of the chapters, this rapid rise in our ability to feed the world depends, in large part, on our ability to exploit more efficient conversions of energy through fossil fuels.

The chapter on materials investigates the rise and uses of what Smil calls the four pillars of modern civilization: cement, steel, plastics, and ammonia. The chapter systematically explains why these materials are so ubiquitous, how we depend so heavily on them, and why these are so difficult to substitute with less carbon intensive materials. In keeping true to form, this is not a dry recitation of facts, but a presentation of "ah-ha" details that reveal old truths in illuminating context.

For example, there is a section that explains the billions and billions of tons of steel and cement we use by reviewing famous milestones in architecture and industrial design beginning with the sixteen-story Ingalls Building in Cincinnati which was the world's first reinforced concrete skyscraper in 1903 to the 164.8 kilometer Danyang-Kunshan Grand Bridge in China completed in 2010. Smil notes that "in just two years—2018 and 2019—China produced nearly as much cement (about 4.4 billion tons) as did the United States during the entire 20th century (4.56 billion tons)."[16]

Perhaps the most intriguing chapter in the book is the one on risk. Smil attempts to unpack how we look at risk and how civilization is at its core an attempt to reduce risk. He explores risk perception versus risk tolerance and voluntary versus involuntary risk before providing thoughts on existential risks. There are lessons here, too. Smil calls them truisms: "most people and most governments find it difficult to deal properly with low-probability but high-impact (high-loss) events" and "we habitually under-estimate voluntary, familiar risks while we repeatedly exaggerate involuntary, unfamiliar exposure" and "the lessons we derive in the aftermath of major catastrophic events are decidedly not rational."[17]

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14. *Id.* at loc. 385.
15. *How the World Really Works*, *supra* note 1, at loc. 845, 929.
16. *Id*. at loc. 1864.
17. *Id*. at loc. 3170.

This discussion of risk, and our ability and inability to properly account for and respond to risk, leads naturally to the chapter on the environment. Here, what is at stake is put simply: "Quests to avoid unnecessary energy use, to reduce air pollution and water, and to provide more comfortable living conditions should be perennial imperatives, not sudden desperate actions aimed at preventing a catastrophe."[18] Through data and pithy explanation, Smil explores oxygen, water, food, and climate change.

Smil concludes this relatively concise, but incredibly detailed book with "The Future." What should we expect? Noting a familiar clash between catastrophists and cornucopians, Smil suggests that "Apocalypse and singularity offer two absolutes: our future will have to lie somewhere within that all-encompassing range."[19] *How the World Really Works* begins and ends with the similar refrain that "a realistic grasp of our past, present, and uncertain future is the best foundation for approaching the unknowable expanse of time before us."[20]

In the end, there is no prescription, no prediction, and no revolutionary theory to launch a movement. Rather, *How the World Really Works* is a crash course on the basics of our modern world. It should be required reading for anyone embarking, advancing, or reflecting on a career in energy law or policy. We should teach the book in our schools and give copies to our leaders in need of tools for rational decisions and actions on our most pressing problems.

18. *Id.* at loc. 3628.

19. *How the World Really Works*, *supra* note 1, at loc. 3925.

20. *Id*. at loc. 4359.

PENNEAST PIPELINE CO. V. NEW JERSEY: RIGHT OF PRIVATE CORPORATION TO TAKE STATE LAND UPHELD UNDER THE NATURAL GAS ACT

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I. INTRODUCTION

In *PennEast Pipeline Co., v. New Jersey*, the United States Supreme Court reversed the United States Court of Appeals for the Third Circuit[1] holding that the power of eminent domain conferred under Section 7 of the Natural Gas Act ("NGA") to private parties that have been granted certificates of public convenience and necessity by the Federal Energy Regulatory Commission ("FERC") includes the power to sue states in condemnation proceedings. This is so because

1. PennEast Pipeline Co. v. New Jersey, 141 S.Ct. 2244 (2021).

the states consented to federal eminent domain power in the "plan of the convention"[2] and the "power is complete" to include the ability to undertake condemnation proceedings to enforce the right.[3] The majority held further that the federal eminent domain power can be exercised by the government or delegated to private entities.[4] Therefore, since FERC granted PennEast Pipeline Company ("PennEast") a certificate, the Court held that PennEast is able to exercise the federal eminent domain power under the Natural Gas Act to institute condemnation proceedings to acquire property—including property either owned by the state of New Jersey, or in which New Jersey held a property interest—for a 116-mile natural gas project that FERC approved in January 2018.[5] The Court also rejected a contention under Section 19 of the NGA that the Third Circuit lacked jurisdiction to hear the disputes below.[6]

In contrast, the primary dissent authored by Justice Barrett and joined by Justices Gorsuch, Thomas, and Kagan raised a fundamental dispute with the majority.[7] The dissenters were not convinced that the federal eminent domain power was so solidified or encompassing at the time of ratification of the Constitution.[8] Rather, the dissenters would have held that the proceeding below—essentially a legal action to take state land by the PennEast pipeline—would simply have been barred by the Eleventh Amendment's prohibition on hearing in any federal court "any suit in law or equity, commenced or prosecuted against one of the United States by Citizens of another State, or by Citizens or Subjects of any Foreign State."[9]

Before discussing the majority and dissenting opinions, this Note provides below some potentially helpful background on eminent domain and sovereign immunity as well as on the development of the Natural Gas Act and its later amendment to allow certificate holders the right of eminent domain.

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2. This term, according to the *PennEast* majority, "is shorthand for 'the structure of the original Constitution itself.'" *Id.* at 2258. The Federalist Papers written following the Constitutional Convention in 1781 use the term "plan of the convention;" however the term is not well-defined there either. Cf. THE FEDERALIST No. 2 (John Jay) ("They who promote the idea of substituting a number of distinct confederacies in the room of the *plan of the convention*, seem clearly to foresee that the rejection of it would put the continuance of the Union in the utmost jeopardy.") (emphasis added); THE FEDERALIST No. 81 (Alexander Hamilton) ("I admit, however, that the Constitution ought to be the standard of construction for the laws, and that wherever there is an evident opposition, the laws ought to give place to the Constitution. But this doctrine is not deducible from any circumstance peculiar to the *plan of the convention*, but from the general theory of a limited Constitution[.]") (emphasis added). While "plan of the convention" may extend beyond simply the "structure of the original Constitution," the *PennEast* decision treats it as meaning the essential bases and assumptions, stated or otherwise, upon which the Constitution rests. *PennEast Pipeline Co.*, 141 S.Ct. at 2258.

3. *Id.* at 2259.

4. *Id.* at 2263.

5. *Id.* at 2253, 2263.

6. *PennEast Pipeline Co.*, 141 S.Ct at 2244.

7. *Id.*

8. *Id.* at 2259.

9. *Id*. at 2264; *see* U.S. CONST. amend. XI.

II. BACKGROUND

A. Eminent Domain in the United States

Debate over the use of eminent domain—i.e., the power to secure property rights for the use of the sovereign—in the United States dates to the country's inception[10] but was not reflected in the Constitution until adoption of the Fifth Amendment in the Bill of Rights following founders' concerns, including those of Thomas Jefferson, that the federal government could grow too powerful.[11] The Fifth Amendment's Takings Clause states "nor shall private property be taken for public use, without just compensation."[12] In 1833, the Supreme Court held in *Barron v. Mayor and City Council of Baltimore* that the Fifth Amendment only applied to the federal government and did not offer relief to citizens who were aggrieved by alleged takings by the state or local governments.[13] Eventually, the incorporation doctrine made eminent domain along with most of the Bill of Rights applicable to the states and local governments through the development of the 14th Amendment due process jurisprudence.[14]

B. State Sovereign Immunity

1. History of State Sovereign Immunity

As with eminent domain, state sovereign immunity is derived from the English feudal common law system.[15] Discussing these origins in *Nevada v. Hall*, for instance, the Supreme Court said no lord could be sued by a vassal in his own court, but each petty lord was subject to suit in the courts of a higher lord.[16] Since the King was at the apex of the feudal pyramid, there was no higher court in which he could be sued.[17] The King's immunity rested primarily on the structure of the feudal system and secondarily on a fiction that the King could do no wrong.[18]

The framers considered including sovereign immunity in the Constitution.[19] However, the notion did not achieve constitutional status until after the Supreme

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10. However, the powers of eminent domain can be traced at least as far back as the English Magna Carta of 1215. *See* Edward J. Sullivan, *A Brief History of the Takings Clause*, https://landuselaw.wustl.edu/articles/brief_hx_taking.htm.

11. *Id*.

12. U.S. CONST. amend. V.

13. Sullivan, *supra* note 10. *See* Barron v. Mayor and City Council of Baltimore, 32 U.S. 243 (1833).

14. Sullivan, *supra* note 10. *See* Chicago Burlington and Quincy R.R. v. City of Chicago, 166 U.S. 226 (1897).

15. Miles McCann, *State Sovereign Immunity*, NAT'L ASS'N OF ATTORNEYS GEN. (Nov. 11, 2017), https://www.naag.org/attorney-general-journal/state-sovereign-immunity/#fn9. *See* Nevada v. Hall, 440 U.S. 410 (1979).

16. *Hall,* 440 U.S. at 414-15 (citing 1 F. Pollock & F. Maitland, History of English Law 518 (2d ed. 1899); David E. Engdahl, *Immunity and Accountability for Positive Governmental Wrongs*, 44 U. COLO. L. REV. 1, 2–5 (1972)).

17. *Id.* at 415.

18. *Id.*

19. *See* McCann, *supra* note 15.

Court decision in *Chisolm v. Georgia*.[20] In *Chisolm*, a citizen of South Carolina sued the state of Georgia to recover a Revolutionary War debt, and the Court held that there was no protection for the state of Georgia when sued by a citizen of another state.[21] Shortly after this opinion, Congress realized the need for state sovereign immunity and ratified the Eleventh Amendment almost unanimously.[22] The Eleventh Amendment states, "[t]he judicial power of the United States shall not be construed to extend to any suit in law or equity, commenced or prosecuted against one of the United States by Citizens of another State, or by Citizens or Subjects of any Foreign State."[23] Courts have generally recognized the doctrine of sovereign immunity was a presumed power to the new federal government created by the Constitution.[24] However, the Eleventh Amendment is subject to multiple interpretations,[25] also providing ample basis for debate in the *PennEast* decision.

C. Natural Gas Act

1. A Need for Regulation

When natural gas distribution networks grew across state lines, state governments could no longer effectively regulate natural gas pipelines and prices.[26] In the Supreme Court case *Missouri v. Kan. Nat. Gas Co.*, the Court ruled that the Commerce Clause prohibited state regulation of interstate pipelines, and, should Congress choose to do so, that they would have to be regulated by the federal government and not states.[27] Thus, coming out of the 1920s, no federal law governed interstate sales and transportation of natural gas;[28] yet, despite being neither regulated by state or federal laws, concerns remained. Two years before the passage of the Natural Gas Act of 1938, the Federal Trade Commission issued a report on the natural gas pipelines and the "ineffective regulation of pipeline construction."[29] This report highlighting the monopolistic tendencies of interstate pipelines to charge higher prices was among several bases leading to the passage of the Natural Gas Act of 1938.[30]

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20. *Id.; see* Chisolm v. Georgia, 2 U.S. 419 (1793).

21. 2 U.S. at 419.

22. *See* McCann, *supra* note 15.

23. U.S. CONST. amend. XI.

24. Gregory C. Sisk, *A Primer on the Doctrine of Federal Sovereign Immunity*, 58 OKLA. L. REV. 443-44 (2005).

25. *See generally PennEast,* 141 S.Ct. 2244; McCann, *supra* note 15.

26. *The History of Regulation*, NATURALGAS.ORG (2013), http://naturalgas.org/regulation/history/.

27. Missouri v. Kan. Nat. Gas Co., 265 U.S. 298, 309-10 (1924). *See* Robert Christin et al., *Considering the Public Convenience and Necessity in Pipeline Certificate Cases Under the Natural Gas Act,* 38 ENERGY L.J. 115, 118 (2017).

28. Christin et al., *supra* note 27, at 117.

29. *Id.*

30. *Id.*; *see* NATURALGAS.ORG, *supra* note 26.

2. The Regulatory Impact of the Natural Gas Act of 1938

The Natural Gas Act of 1938 gave the Federal Power Commission (now FERC) jurisdiction to regulate the transportation and sale of natural gas in interstate commerce.[31] Specifically, the NGA states, "the business of transporting and selling natural gas for ultimate distribution to the public is affected with a public interest, and that federal regulation in matters relating to the transportation of natural gas and the sale thereof in interstate and foreign commerce is necessary in the public interest."[32] According to the congressional committee reports accompanying the legislation that became the NGA, the purpose of the NGA was to regulate what the states were barred from regulating by the Supreme Court's rulings[33] in *Missouri v. Kansas Natural Gas Co.* as well as in *Pub. Utils. Comm'n of R.I. v. Attleboro Steam & Elec. Co*.[34]

The NGA also provides natural gas companies the ability to apply for and receive certificates of public convenience and necessity from FERC to construct facilities for the interstate transportation of natural gas.[35] Further, the NGA provides that the FERC shall grant the application for a certificate of public convenience if the proposed project "is or will be required by the present or future public convenience and necessity."[36]

3. The 1947 Amendment to the Natural Gas Act

Even though the NGA enabled the FPC to issue certificates of public convenience, there was no mechanism in the Act for companies to secure property rights along routes of proposed projects.[37] Thus, at least from the inception of the NGA, pipeline companies were left to either attempt to negotiate with property owners or were at the mercy of each individual state's eminent domain procedures.[38] In many cases, pipeline projects were illusory due to the strict applications of eminent domain.[39] For example, some states allowed the exercise of their state eminent domain power only if the pipeline would benefit its residents, whereas others wholly barred companies from using eminent domain because their "statutory or

31. *A Brief History of Natural Gas*, AM. PUB. GAS ASS'N, https://www.apga.org/apgamainsite/aboutus/facts/history-of-natural-gas. The Federal Power Commission is now known as the Federal Energy Regulation Commission due to the passage of the Department of Energy Organization Act of 1977. *Id.*

32. 15 U.S.C. § 717(a) (1988).

33. Christin et al., *supra* note 27, at 118; *see* Phillips Petroleum Co. v. Wisconsin, 347 U.S. 672 (1954) (Frankfurter, J., concurring) (citing H.R. Rep. No. 709, 75th Cong., 1st Sess. 1-2; S. Rep. No. 1162, 75th Cong., 1st Sess. 1-2).

34. *Kansas Natural Gas Co.*, 265 U.S. 298 (1924); *see* Pub. Utils. Comm'n of R.I. v. Attleboro Steam & Elec. Co., 273 U.S. 83 (1927). This restriction arises from what has been called the "dormant Commerce Clause." *See, e.g.*, Brief for Respondent, PJM Power Providers Grp. v. FERC, No. 21-3068 (3d Cir. 2021).

35. 15 U.S.C. § 717 (c)(1)(A) (1988). *See* Christin et al., *supra* note 27, at 118.

36. *See* Christin et al., *supra* note 27, at 118. *See* 15 U.S.C. § 717f(e) (1988).

37. *PennEast Pipeline Co.*, 141 S.Ct. at 2252.

38. *Id.*

39. *Id.*

state constitutional provisions denied state eminent domain power to corporations from other States."[40]

In response to this patchwork regime, Congress amended the Natural Gas Act in 1947[41] to authorize certificate holders to exercise the federal eminent domain power.[42] As a result of the amendment, Section 7(h) of the NGA now states:

> When any holder of a certificate of public convenience and necessity cannot acquire by contract, or is unable to agree with the owner to compensation to be paid for . . . it may acquire the same by the exercise of the right of eminent domain in the district court of the United States for the district in which such property may be located.[43]

While Congress may have sought to set to put to rest the question of whether certificated pipelines had full authority to obtain all land rights necessary for the construction of the pipeline, the *PennEast* case demonstrated there remains some room for interpretation of this provision. Thus, the case would present a question of which of these doctrines adopted during the Constitutional Convention did Congress intended to prevail, when it modified that Natural Gas Act more than 70 years ago.

III. ANALYSIS

In 2015, PennEast Pipeline Company (hereinafter "PennEast") filed an application with FERC for a certificate of public convenience and necessity to build a 116-mile natural gas pipeline.[44] FERC then published the notice of PennEast's application in the Federal Register.[45] The published notice received thousands of comments in writing as well as at public hearings.[46] Then, FERC drafted an environmental impact statement, which also received a multitude of comments.[47] PennEast considered the comments and finalized the adjustment of the pipeline route.[48] In 2018, FERC approved the certificate of public convenience and necessity for PennEast's pipeline project.[49]

Shortly thereafter, PennEast filed various complaints in the federal district court in New Jersey[50] seeking orders of condemnation as well as orders granting preliminary injunctive relief under the federal power of eminent domain according to the Natural Gas Act.[51] Ultimately, the District Court granted PennEast's requested relief, over several objections, including a request for dismissal based on

40. *Id.*; *see* S. Rep. No. 429, 80th Cong., 1st Sess., 2-3 (1947).
41. *PennEast Pipeline Co.*, 141 S.Ct. at 2252.
42. *Id.*
43. *Id.*
44. *Id.* at 2253.
45. *PennEast Pipeline Co.*, 141 S.Ct. at 2253.
46. *Id.*
47. *Id.*
48. *Id.*
49. *PennEast Pipeline Co.*, 141 S.Ct. at 2253.
50. *Id.*
51. In re Penneast Pipeline Co., 2018 WL 6584893 (D.N.J. Dec. 14, 2018) ("2018 Condemnation Order").

the Eleventh Amendment.[52] New Jersey timely appealed, moving to stay the District Court's order and to expedite the appeal.[53] Before the Third Circuit, New Jersey renewed its Eleventh Amendment argument that the District Court did not have subject-matter jurisdiction to hear PennEast's complaints.[54]

The United States Court of Appeals for the Third Circuit held the delegation of the federal government's power of eminent domain and its power to hale sovereign states into federal court are separate and distinct.[55] The Court of Appeals avoided the specific question of whether the federal government can delegate its power to override a state's Eleventh Amendment immunity.[56] Instead, it pointed to the fact that the text of the NGA does not suggest that Congress intended the NGA to confer the power to override a state's Eleventh Amendment immunity.[57] The Court of Appeals vacated the District Court's order and remanded the matter for the dismissal of any claims against New Jersey.[58] The Supreme Court then granted certiorari to determine whether the NGA authorizes certificate holders to condemn land in which a state claims an interest.[59]

A. This Case Does Not Present Any Jurisdictional Issues

The United States filed an *amicus* brief raising the issue of jurisdiction relating to the Third Circuit's ability to review FERC's certificate order.[60] The United States argued that the Third Circuit lacked jurisdiction to decide the question under 15 U.S.C. § 717r(b),[61] which gives the reviewing court exclusive jurisdiction to "affirm, modify, or set aside such order."[62] The United States argued that the court with exclusive jurisdiction to hear the condemnation issues was the D.C. Circuit because it was the court responsible for reviewing the underlying certificate order.[63] However, both PennEast and New Jersey agreed that New Jersey did not seek to modify the FERC order, but instead raised a defense against the condemnation proceedings initiated by PennEast.[64] The Court agreed with PennEast and

52. *Id.*

53. In re PennEast Pipeline Co., 938 F.3d 96, 102 (3d Cir. 2019).

54. *Id.* at 102-03.

55. *Id.* at 99-100. *See* Jackson Bowker, Note, *The Issues of Condemning State-Owned Property Pursuant to the Natural Gas Act: In Re PennEast*, 41 ENERGY L.J. 403 (2020).

56. *Id.* at 100. *See generally* Bowker, *supra* note 55.

57. *PennEast Pipeline Co.*, 938 F.3d at 100.

58. *Id.*

59. *PennEast Pipeline Co.*, 141 S.Ct. at 2254.

60. *Id.*

61. *Id.*

62. *Id.*

63. Brief for the United States as Amicus Curiae Supporting Petitioner, PennEast Pipeline Co. v. New Jersey, 141 S.Ct. 2244, 2252 (2021) (No. 19-1039), 2021 WL 930156, at *4, 15.

64. *PennEast Pipeline Co*., 141 S.Ct. at 2254.

New Jersey and held that § 717r(b)[65] did not present a jurisdictional bar to the Third Circuit's decision.[66]

B. The NGA Inherently Authorizes Condemnation Suits through the Federal Eminent Domain Power

As discussed in more detail below, whereas the Third Circuit held that the Natural Gas Act did not convey to private parties the authority to exercise the federal right of eminent domain as against state property interests, the Supreme Court's decision to reverse the Third Circuit pivots on the concept of a "complete" power of eminent domain. First, the majority set out to establish the existence of a broad federal power of eminent domain, including powers to take state land. Second, the opinion demonstrates these eminent domain powers have been delegated to private entities for the purpose of taking state land. The reason for this is the majority's assertion that the power of eminent domain is "complete in itself" and therefore includes the fundamental consent of states to be sued that was part of the assumptions on which the Constitution was based. Thus, when the NGA was amended in 1947 it conferred the federal eminent domain power onto private entities that had obtained certificates of public convenience and necessity pursuant to Section 7 of the NGA from the FPC,[67] including the power to levy condemnation proceedings against another state for pipeline construction.

1. The Federal Eminent Domain Power is Rooted in American History

Establishing the broader federal power of eminent domain, the majority provided a historic overview of eminent domain, first noting that eminent domain has been established for thousands of years dating back possibly even to biblical times[68] and was later termed as such by a Dutch lawyer named Hugo Grotius.[69] Later in England and its colonies, the Crown passed statutes allowing the use of the eminent domain power to construct roads, bridges, river improvements, and other projects.[70] The opinion noted that neither the Constitution nor the Bill of Rights included the words "eminent domain."[71] However, the power was recognized in the Takings Clause of the Fifth Amendment.[72] Quickly noting examples of federal authorization of eminent domain powers in areas of exclusive federal jurisdiction,[73] the majority then explored precedent at the end of the second half

65. *Id.*; *see* 15 U.S.C. § 717r(b) (2005).

66. *PennEast Pipeline Co*., 141 S.Ct. at 2254; *PennEast Pipeline Co*., 938 F.3d at 96. *See* City of Tacoma v. Taxpayers of Tacoma, 357 U.S. 320, 341 (1958)).

67. *PennEast Pipeline Co*., 141 S.Ct. at 2244.

68. *Id.* at 2254-55; *see* Abraham Bell, *Private Takings*, 76 U. CHI. L. REV. 517, 524-25 (2009).

69. *PennEast Pipeline Co.*, 144 S.Ct. at 2255; *see 2* De Jure Belli ac Pacis 807 (1646 ed., F. Kelsey transl. 1925).

70. *PennEast Pipeline Co*., 144 S.Ct. at 2255*; see* William B. Stoebuck, *A General Theory of Eminent Domain,* 47 WASH. L. REV. 553, 561-562 (1972).

71. *PennEast Pipeline Co.*, 144 S.Ct. at 2255.

72. *Id.*

73. *Id.*; s*ee* Act of Mar. 3, 1809, 2 Stat. 539 (1809).

of the 19th century, where the Supreme Court developed the federal eminent domain power case law to include property strictly located within a state's boundaries.[74] *Kohl* held that the Constitution provided the federal government with the power to condemn private lands within a state, and that power "can neither be enlarged nor diminished by a State. Nor can any State prescribe the manner in which it must be exercised."[75] Seventy years later in *Oklahoma ex rel. Phillips,* the Supreme Court recognized the federal eminent domain power to include state-owned land.[76] In that case, the Supreme Court reasoned that just because the land is owned by the state, state ownership is "no barrier to its condemnation by the United States."[77] However, because the question before the Court involved PennEast's delegated use of eminent domain under the Natural Gas Act, not the exercise of eminent domain by the federal government itself, the issue was not yet fully resolved.

2. Even the Delegation of the Federal Eminent Domain Power is Rooted in American History

To address the next issue of whether a private entity may exercise delegated federal eminent domain power, the majority pointed to examples of private delegation as common practice from the early years of the United States.[78] For instance, the Court cited examples of the federal government authorizing private parties to exercise the power of eminent domain through direct condemnation proceedings as early as 1809.[79] Then, 20 years after *Kohl*, in *Luxton,* the Court extended the ability of private delegatees to exercise the federal eminent domain power within state boundaries.[80] In *Luxton*, the Court reasoned that Congress "may, at its discretion, use its sovereign powers, directly or through a corporation created for that object."[81]

Crucial to the decision, the majority then discussed a federal circuit case arising in New Jersey, where New Jersey sought an injunction to stop construction of a bridge on state-owned lands.[82] In *Stockton*, Supreme Court Justice Bradley, riding circuit, reasoned that if Congress chose a proper corporation, "whether of the state or out of the state," that corporation is proper for the completion of a project.[83] Also, Justice Bradley recognized that if the state's argument were to have prevailed, then every time interstate lines were to be crossed, the state would have to give consent and that would be impracticable because some state-owned land

74. *PennEast Pipeline Co*., 144 S.Ct. at 2255.

75. *Id.* (quoting Kohl v. United States, 91 S.Ct. 367, 374 (1876)).

76. *Id.* (citing Oklahoma ex rel. Phillips v. Guy F. Atkinson Co., 313 U.S. 508 (1941)).

77. *PennEast Pipeline Co.*, 144 S.Ct. at 2255 (citing *Oklahoma ex rel. Phillips,* 313 U.S. at 534).

78. *Id.*

79. *Id.* at 2256; *see* John F. Hart, *The Maryland Mill Act*, 1669-1766, 39 AM. J. LEGAL HIST. 1 (1995); *see also* Act of Mar. 3, 1809, 2 Stat. 539; *see also* Act of Mar. 2, 1831, 4 Stat. 477.

80. *PennEast Pipeline Co*., 144 S.Ct. at 2256. *See* Luxton v. North River Bridge Co., 153 U.S. 525 (1894).

81. *PennEast Pipeline Co*., 144 S.Ct. at 2256 (citing *Luxton,* 153 U.S. at 530).

82. *Id.*; *see* Stockton v. Baltimore & N. Y. R. Co., 32 F. 9 (C.C.N.J. 1887).

83. *PennEast Pipeline Co*., 144 S.Ct. at 2256*; see* Stockton, 32 F. at 14.

would be crossed.[84] The majority then noted that three years later, in *Cherokee Nation*, the Supreme Court fully adopted Justice Bradley's reasoning and extended it to include "Indian Nations or tribe[s]."[85]

Thus, the majority concluded, it had been common practice for the federal government to invoke eminent domain as well as to delegate it to private parties since its inception, within state boundaries, including against state property.[86]

The Court next explained there are two ways that the United States can take property under its eminent domain power: (1) the United States can enter into the physical possession of property without authority of a court order and award compensation later, or (2) the United States can institute condemnation proceedings under various acts of Congress providing authority for such takings.[87] The Court stated that 15 U.S.C. §717f(h) follows this path by allowing the government to initiate takings if no agreement is reached with landowners or in the alternative, to initiate condemnation proceedings.[88]

The Court found that when Congress amended the NGA, there was no dispute that §717f(h) was designed to solve the issue of "[s]tates impeding interstate pipeline development by withholding access to their own eminent domain procedures."[89] Due to the newly amended NGA, at that time and in the decades that followed, it was "understood . . . that State's property interest would be subject to condemnation."[90] Following the path already established by the Court, it concluded that by its terms, NGA §7f (h) delegates to certificate holders the power to condemn any necessary rights-of-way, including land in which a state holds an interest.[91]

3. New Jersey's and the Dissenters' Arguments That Sovereign Immunity Protections Should Have Prevented PennEast's Actions Fail to Achieve a Majority

The majority used the remainder of the opinion to address New Jersey's claim (that was also shared by the principal dissenters) that sovereign immunity would have barred PennEast's condemnation action, and New Jersey's separate claim that the NGA did not speak with the sufficient clarity to authorize PennEast's condemnation actions.[92] The majority held that these claims fell to the proposition

84. *PennEast Pipeline Co.*, 144 S.Ct. at 2256; *see Stockton*, 32 F. at 17.

85. *PennEast Pipeline Co.*, 144 S.Ct. at 2255-56; s*ee* Cherokee Nation v. Southern Kansas Ry. Co., 135 U.S. 641 (1890).

86. *PennEast Pipeline Co.*, 144 S.Ct at 2257.

87. *Id.*; *see* United States v. Dow, 357 S.Ct. 17, 21 (1958).

88. *PennEast Pipeline Co*, 144 S.Ct at 2257.

89. *Id.* (citing S. Rep. No. 429, at 2-4).

90. *Id.* (citing *Natural Gas Act: Hearing on S. 734 Before the S. Comm. On Interstate and Foreign Commerce,* 80th Cong. 105 (1947)).

91. *Id.* at 2257.

92. *PennEast Pipeline Co.*, 141 S.Ct. at 2244.

that the eminent domain power, as agreed at the "Plan of the Convention," was "complete."[93]

With respect to the contention that sovereign immunity bars condemnation suits against nonconsenting states, the majority disagreed on the following logical progression: states may be subject to suit under various circumstances, including if they consented in the "plan of the convention;" and the states consented to the exercise of the federal eminent domain power in the "plan of the convention," including in condemnation proceedings brought by private delegatees. Thus, Justice Barrett and her joining dissenters erroneously would "divorce the eminent domain power from the power to bring condemnation actions."[94] And for the same reasons, the majority asserted, the argument advanced by Justice Gorsuch, joined by Justice Thomas, that the Eleventh Amendment divests federal courts of subject-matter jurisdiction over suits like those filed by PennEast falls to the fact that consent to eminent domain proceedings is "inherent in the constitutional plan."[95]

Lastly, the majority addressed New Jersey's argument that the Natural Gas Act did not unequivocally delegate the federal government's exemption from state sovereign immunity to PennEast.[96] However, the majority stated the issue again is controlled by "whether the United States can delegate its eminent domain power to private parties"[97] and held that, regardless of whether the federal government must speak with "unmistakable clarity when delegating its freestanding exemption from state sovereign immunity," there is no equivalent requirement when the federal government authorizes a private entity to exercise its eminent domain power i.e., "[s]tates thus have no immunity left to waive or abrogate when it comes to condemnation suits by the Federal Government and its delegatees."[98] Therefore, the Supreme Court held that condemnation actions such as those pursuant to 15 U.S.C. § 717f(h) do not offend state sovereign immunity because states consented to the federal eminent domain power at the Convention.[99]

4. Focusing on the Dissenters' Point of View

The Court spilt in this case was a 5-4 decision, with the opinion of the Court written by Chief Justice Roberts.[100] Justices Breyer, Alito, Sotomayor, and Kavanaugh joined the majority, while Justices Gorsuch[101] and Barrett[102] wrote dissenting opinions.

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93. *Id.*; *see* Torres v. Texas Dep't of Pub. Safety, 142 S.Ct. 2455 (2022) (applying *PennEast* understanding of "complete" powers in decision allowing returning veterans to sue states to enforce federal right to reclaim prior jobs).

94. *Id.* at 2260.

95. *Id.* at 2263.

96. *PennEast Pipeline Co*., 141 S.Ct. at 2262.

97. *Id.*

98. *Id.* at 2262-63.

99. *PennEast Pipeline Co*., 141 S.Ct. at 2263.

100. *See generally PennEast Pipeline Co. v. New Jersey*, 141 S.Ct. 2244 (2021).

101. *Id.* (joined by Justice Thomas).

102. *Id.* (joined by Justices Thomas, Gorsuch, and Kagan).

a. Should Federal Courts Have Heard this Case?

Justice Barrett's dissent targeted the notion that New Jersey surrendered its sovereign immunity to condemnation suits at the Convention.[103] The dissent began at the outset by declaring that neither the Indian Commerce Clause, Interstate Commerce Clause, nor the Intellectual Property Clause allow abrogation of immunity from suit.[104] She also contended that there is only one exception to the general rule that Congress cannot circumvent state sovereign immunity by resort to Article I, and that is under the Bankruptcy Clause.[105] Therefore, Justice Barrett argued, condemnation suits do not fall within this exception.[106]

Justice Barrett's dissent attacked the idea that states surrendered their sovereign immunity with respect to eminent domain at the Convention.[107] First, it stated "the Constitution enumerates no stand-alone eminent-domain power."[108] She argued that case precedent allows the federal government to exercise the right of eminent domain only "so far as is necessary to the enjoyment of powers conferred upon it by the Constitution."[109] The dissenters claimed the taking of property is an exercise of another Constitutional power, the Commerce Clause augmented by the Necessary and Proper Clause.[110] Therefore, when Congress allows a private party to take property in service of a federally authorized project, it is choosing a means by which to "carry an enumerated power into effect."[111]

Second, Justice Barrett's dissent stated that for a state to surrender immunity at the Convention implies that eminent domain occupies a unique place in the constitutional structure.[112] However, because a "taking is a garden-variety exercise of an enumerated power" like the Commerce Clause,[113] the dissenters argued, it is the federal government that has the power to take land – because "states have no sovereign immunity as against the Federal Government" – but this does not confer the same powers to a private entity to bring a condemnation suit against a nonconsenting state.[114]

The dissent also disagreed with the meaning of the cases cited by the majority. Where the majority said precedent fully supported a private party bringing a condemnation action against a state, Justice Barrett and the other dissenters claimed the majority could not "muster even a single decision involving a private condemnation suit against a State, let alone any decision holding that the States

103. *PennEast Pipeline Co*., 141 S.Ct. at 2265 (Barrett, J., Dissenting).
104. *Id.* at 2266.
105. *Id.*
106. *Id.*
107. *PennEast Pipeline Co*., 141 S.Ct. at 2265 (Barrett, J., Dissenting).
108. *Id*. at 2265.
109. *Id.*; *see Kohl*, 91 U.S. at 372; *see generally* McCulloch v. Maryland, 17 U.S. 316 (1819).
110. *PennEast Pipeline Co*., 141 S.Ct. at 2267 (Barrett, J., dissenting).
111. *Id*.
112. *Id.*
113. *Id.*
114. *PennEast Pipeline Co*., 141 S.Ct. at 2267 (Barrett, J., Dissenting).

lack immunity from such suits."[115] Rather, the dissenters contended, the precedents cited by the majority all involve suits brought by states, the United States, private parties against each other, and suits brought by Indian tribes against private parties, none of which truly implicate sovereign immunity.[116] The dissent also focused on the length of time between significant holdings in the development of eminent domain case law—long after the ratification of the Constitution—to assail the idea the history "unequivocally establishes that States surrendered their immunity to private condemnation suits in the plan of the convention."[117] Rather, the dissenters concluded that since history is the only place left to evaluate evidence of states consenting to private condemnation suits, and no evidence of states consenting exists, the majority did not provide compelling evidence to show that "immunity to private condemnation suits" was surrendered at the Convention.[118]

Lastly, Justice Barrett's dissent disputed the central notion of the majority's opinion that the power of eminent domain is "complete in itself" and that immunity of states from suit would render invalid the federal power of eminent domain.[119] Rather, as an extension of the constitutional limits on the federal government, the Eleventh Amendment is part of the "constitutional design" in that it is strictly designed to make it difficult for Congress to set sovereign immunity aside and allow private condemnation suits.[120] Moreover, the dissenters said, the eminent domain power belongs to the United States not PennEast.[121] Ultimately, the dissent concluded that the states did not surrender their sovereign immunity to suits authorized by Congress's Commerce Clause power and, therefore, the lack of historical evidence of private suits brought against nonconsenting states shows that state sovereign immunity is completely applicable in this case and should bar PennEast's suits.[122]

Justice Gorsuch's dissent asserted there are two types of immunities, one of which Chief Justice Roberts does not completely address, adding to the confusion of Eleventh Amendment precedent.[123] The first is known as "structural immunity," which the dissent stated is based on the structure of the Constitution, so it applies to both federal and state tribunals, regardless of the plaintiff's state citizenship or non-U.S. citizenship.[124] Also, Justice Gorsuch's dissent stated that structural immunity relates to personal jurisdiction so the sovereign can waive the immunity by consent.[125] The second type, according to the dissent, is called "Elev-

115. *Id.* at 2268.

116. *Id.*

117. *Id.* (stating it took 75 years for the Supreme Court to expand the eminent domain power to apply to private land within a state and another 77 years before it applied eminent domain to lands owned by a state).

118. *PennEast Pipeline Co*., 141 S.Ct. at 2268-69 (Barrett, J., Dissenting).

119. *Id.* at 2269.

120. *Id.* at 2270.

121. *Id.* at 2244.

122. *PennEast Pipeline Co.*, 141 S.Ct. at 2271.

123. *Id.* at 2263 (Gorsuch, J., Dissenting).

124. *Id.* at 2264.

125. *Id.*; *see* Franchise Tax Bd. of California v. Hyatt, 139 S.Ct. 1485 (2019).

enth Amendment immunity," which "sometimes does less than structural immunity" and "sometimes the amendment does more."[126] The Gorsuch dissent stated the majority conflated the structural immunity definition with the definition of "Eleventh Amendment immunity."[127] Citing the Eleventh Amendment, the Gorsuch dissent argued that "it eliminates federal judicial power over one set of cases: suits filed against states, in law or equity, by diverse plaintiffs."[128] Therefore, it imposed an Article III subject matter jurisdiction barrier and admitted no waivers, abrogation, or exceptions.[129] When applying these standards and the text, Justice Gorsuch's dissent reasoned that since PennEast, a citizen of another state, brought a suit of law or equity against New Jersey in a federal court, it triggered subject-matter jurisdiction and therefore federal courts should not entertain this suit.[130] However, the dissent did note that since neither party addressed this possibility, "there is no mandatory sequencing of jurisdictional issues."[131] Nonetheless, Gorsuch's dissent argued that the jurisdictional issue could be considered on remand in the lower courts before proceeding to the merits.[132] Justices Gorsuch and Thomas would have barred the suit from a federal court to begin with, instead of letting it journey up to the Supreme Court.[133]

IV. CONCLUSION

PennEast Pipeline Co. v. New Jersey may represent a safe haven for pipeline companies with certificates in-hand that are seeking to bring condemnation suits against states.[134] Although there is no certainty surrounding the future applications of this case, it could open the door to future condemnation suits by private companies against states.[135] Effectively, the Supreme Court has at once etched a strong power of eminent domain that can be exercised by private parties already holding the power, or delegated to private parties in the future by Congress, and at the same time, raised significant questions about the sources of and true extent of a state's immunity from suit.

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126. *PennEast Pipeline Co*., 141 S.Ct. at 2264 (Gorsuch, J., Dissenting).

127. *Id.* at 2263.

128. *Id.* at 2264 (Gorsuch, J., Dissenting)*; see* William Baude & Stephen E. Sachs, *The Misunderstood Eleventh Amendment*, 169 U. PA. L. REV. 609, 612 (2021).

129. *PennEast Pipeline Co.*, 141 S.Ct. at 2264-65 (Gorsuch, J., Dissenting).

130. *Id.* at 2265.

131. *Id.*; *see* Sinochem Int'l Co. v. Malaysia Int'l Shipping Corp., 549 U.S. 422, 431 (2007).

132. *PennEast Pipeline Co.*, 141 S.Ct. at 2265 (Gorsuch, J., Dissenting).

133. *Id.* at 2263-65.

134. Brief of Respondent New Jersey Conservation Foundation, PennEast Pipeline Co., v. New Jersey, 141 S.Ct. 2244 (2021) (No. 19-1039), 2021 WL 1255340, at *22.

135. *Id*. at *24-26.

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