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"Think Globally, Act Locally": New York's Evolving Approach to Address Fossil Fuel Electric Use in Proof-of-Work Bitcoin Mining Operations Contributing to Climate Change

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"THINK GLOBALLY, ACT LOCALLY": NEW YORK'S EVOLVING APPROACH TO ADDRESS FOSSIL FUEL ELECTRIC USE IN PROOF-OF-WORK BITCOIN MINING OPERATIONS CONTRIBUTING TO CLIMATE CHANGE

By Adriana Montante

I. INTRODUCTION

Since its introduction in 2008, Bitcoin has remained the most popular and expensive form of cryptocurrency.[1] The digital tender is predominately enabled by the blockchain consensus mechanism, Proof-of-Work (hereinafter "PoW").[2] PoW utilizes enormous amounts of electric energy to authenticate Bitcoin transactions and mine new tokens.[3] It is estimated that, annually, Bitcoin consumes 100.15 terawatt-hours of electricity and generates 55.86 megatonnes of carbon dioxide (hereinafter "CO_2"), which is comparable to the power consumption of Kazakhstan and the carbon footprint of Peru.[4]

As the market for Bitcoin expands, miners are buying or reopening old coal, coal waste, and natural gas power plants to generate behind-the-meter (hereinafter "BTM") power to fuel PoW mining operations.[5] This "coal-to-crypto" pipeline produces energy at an extremely low cost at the expense of reigniting the emission of greenhouse gases (hereinafter "GHGs").[6] Consequently, Bitcoin mining creates significant environmental externalities that directly conflict with societal efforts to curb the climate change crisis.[7]

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[1] *See generally* Sinan Kufeoglu & Mahmut Ozkuran, *Energy Consumption of Bitcoin Mining* (May 24, 2019) (unpublished working paper) (on file with Cambridge Working Papers in Economics) ("The bitcoin network is a peer-to-peer, distributed network. In this network, all nodes are treated as equal peers. The process of making bitcoins is called mining, and the participants are called miners. All transactions are carried out and stored in a distributed ledger: the blockchain. The historic transaction data are contained in the blockchain. A signature between the new block and the previous block is needed for adding a new block to the blockchain. This is done via finding a nonce value that will satisfy the cryptographic hash function, Secure Hash Algorithm 256-bit (SHA-256). The nonce starts with 0 and is incremented by 1 by the miner until the hash of the block is less than or equal to the target value. Once a node finds a hash that satisfies the required number of zero bits, it transmits the block it was working on to the rest of the network. The other nodes in the network then express their acceptance by starting to create the next block for the blockchain using the hash of the accepted block. The finder of the block is rewarded for their efforts with a special transaction.").

[2] *See* Jake Frankenfield, *What is Proof of Work (PoW) in Blockchain?*, INVESTOPEDIA (May 2, 2022), https://www.investopedia.com/terms/p/proof-work.asp#:~:text=Key%20Takeaways,transactions%20and%20mining%20new%20tokens [https://perma.cc/SGE6-T6UR].

[3] *See id.*

[4] *Bitcoin Energy Consumption Index*, DIGICONOMIST, https://digiconomist.net/bitcoin-energy-consumption [https://perma.cc/7UM8-828W] (last visited Apr. 3, 2023).

[5] *See* Jessica McKenzie, *How Bitcoin Makes Burning Fossil Fuels More Profitable Than Ever*, 78 BULL. OF THE ATOMIC SCIENTISTS 203 (July 11, 2022); *see also infra* text accompanying note 62.

[6] Jacob Elkin, *A Pause on Proof-of-Work: The New York State Executive's Branch's Authority to Enact a Moratorium on the Permitting of Consolidated Proof-of-Work Cryptocurrency Mining Facilities*, SABIN CTR. FOR CLIMATE CHANGE, Mar. 2022, at 3-4.

[7] *See* Jael Holzman, *EPA Tackles Coal-to-Crypto Industry Trend*, GREENWIRE, (Jan. 18, 2022, 1:48 PM), https://www.eenews.net/articles/epa-tackles-coal-to-crypto-industry-trend/ [https://perma.cc/4Z66-Y47T].

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Recently, New York State (hereinafter "NYS") has taken an emerging two-prong legislative and administrative approach to mitigate the environmental impact of Bitcoin mining.[8] On November 22, 2022, Governor Hochul signed a statewide, two-year moratorium on new cryptocurrency mining permits at fossil fuel plants that utilize BTM PoW operations.[9] The law is aimed at addressing environmental concerns over the energy-intensive industry.[10]

While the moratorium will not suspend all crypto-mining activities,[11] state administrative agencies can intervene in individual cases to preserve climate change objectives.[12] The NYS Department of Environmental Conservation (hereinafter "DEC") continues to take a case-by-case approach in denying or renewing Clean Air Act (hereinafter "CAA") Title V operating permits, depending upon whether GHG emission limits are upheld.[13] The New York Public Service Commission (hereinafter "PSC") may, in the future, reject the transfer of ownership of power plants to crypto miners if climate concerns are not considered.[14] The purpose of this Note is to propose that other states join a multistate cooperative agreement that follows the NYS framework to mitigate Bitcoin mining's environmental footprint.[15]

This Note proceeds in five parts.[16] Section II describes the prominence of cryptocurrency as a global economic sector and emphasizes its continued growth.[17] This section also explains how PoW operates and why its extraordinary energy consumption is relevant to

[8] *See* S. 6486, 2021 Leg., Reg. Sess. (N.Y. 2021) (establishing a moratorium on cryptocurrency mining operations that use proof-of-work authentication methods); *see also* Letter from Daniel Whitehead, Dir., Div. of Env't. Permits to Dale Irwin, Greenidge Generation, LLC (Jun. 30, 2022) (on file with author) (denying a Clean Air Act Title V operating permit renewal to a cryptocurrency enterprise utilizing proof-of-work mechanisms); *see generally* Lauren Aratani, *Environmental Group Sues New York for Approving Crypto Mining Facility*, THE GUARDIAN (Jan. 13, 2023), https://www.theguardian.com/us-news/2023/jan/13/environmental-group-sues-new-york-crypto-mining#:~:text=Environmental%20group%20sues%20New%20York%20for%20approving%20crypto%20mining%20facility,-Lawsuit%20argues%20move&text=Environmental%20activists%20filed%20a%20lawsuit,of%20an%20upstate%20power%20plant [https://perma.cc/LZT2-CFM4] ("environmental activists filed a lawsuit against a New York state agency on Friday for approving a cryptocurrency mining company's takeover of an upstate power plant.").

[9] *See* N.Y.S. 6486.

[10] *See* Luis Ferre-Sadurni and Grace Ashford, *New York Enacts 2-Year Ban on Some Crypto-Mining Operations*, N.Y. TIMES (Nov. 22, 2022), https://perma.cc/CZ9V-6MGF.

[11] *Id.* ("The bill's supporters have stressed that the legislation will not impact existing mining facilities or stop all crypto-mining activities in the state, just those seeking permits to re-power fossil fuel plants, leaving those that connect directly into the power grid or use renewable energy sources unaffected.").

[12] *See generally* Letter from Daniel Whitehead to Dale Irwin, *supra* note 8; *see also* Aratani, *supra* note 8.

[13] *See* Letter from Daniel Whitehead to Dale Irwin, *supra* note 8.

[14] *See generally* Aratani, *supra* note 8.

[15] *See generally* Jon Truby, *Decarbonizing Bitcoin: Law and Policy Choices for Reducing the Energy Consumption of Blockchain Technologies and Digital Currencies*, 44 ELSEVIER 399 (2018), https://www.sciencedirect.com/science/article/pii/S2214629618301750?fr=RR-2&ref=pdf_download&rr=7b8f23741ef742dc [https://perma.cc/J2YT-ZWK7] ("[T]he design of Bitcoin's mining and trading system requires such a vast consumption of electricity that it is equivalent to powering Denmark. This threatens the planet to the extent that intervention is necessary to prevent similar models emerging. Even the processes involved in a single Bitcoin transaction could provide electricity to a British home for a month, with environmental costs socialized for private benefits.").

[16] *See infra* Section I-V.

[17] *See infra* Section II, A.

today's environmental status.[18] The section concludes that crypto miners are relocating to geographic areas with vacant properties and cheap energy access, such as NYS.[19]

Section III establishes the ineffectiveness of international and U.S. federal law in enforcing climate change GHG curtailment goals.[20] This section highlights the Paris Climate Accord, the Clean Power Plan (hereinafter "CPP"), and Executive Order 14607: "Ensuring Responsible Development of Digital Assets" as examples of ineffective attempts at curbing climate change.[21]

Section IV analyzes NYS's evolving two-prong approach to address GHG emissions from cryptocurrency mining facilities.[22] The section lays out the fundaments of NYS's temporary cryptocurrency moratorium.[23] Complementary, the DEC and the PSC may take a case-by-case approach to suspend operation of cryptocurrency power plants that fall outside the scope of the moratorium.[24]

The final section calls for the creation and implementation of a multi-state cooperative agreement that mirrors NYS's two-prong approach.[25] The proposed agreement will include guiding predicates to be fashioned by each state according to its specific policies and legislation.[26] The section highlights The Regional Greenhouse Gas Initiative (hereinafter "RGGI") and the Interstate Gas and Oil Compact (hereinafter "The Compact") as precedent of earlier multi-state agreements that saw success.[27]

II. BACKGROUND

One must understand the prominent presence of Bitcoin in the global economy to understand the scope of its environmental influence. Therefore, Subsection A provides an overview of the rise of cryptocurrency, and specifically focuses on Bitcoin as the most lucrative type.[28] Subsections B and C concisely review the significance of the climate change crisis and explains how BTM PoW operations are a major contributor. Subsection D describes the growing trend of coal-fired power plants closing throughout the U.S. This subsection highlights how retrofitting dirty fossil fuel plants conflicts with state efforts to transition to renewable or clean energy sources. It also establishes NYS as a "hotbed" destination for crypto miners that are fleeing restrictive crypto laws and in search of cheap energy.[29]

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[18] *See infra* Section II, B-C.

[19] *See infra* Section II, D.

[20] *See infra* Section III.

[21] *See id.*

[22] *See infra* Section IV.

[23] *See id.* at A; *see also* N.Y.S. 6486.

[24] *See infra* Section IV, B; *see also* Letter from Daniel Whitehead to Dale Irwin, *supra* note 8; *see generally* Aratani, *supra* note 8.

[25] *See infra* Section V.

[26] *See id.* at B.

[27] *See id.* at A.

[28] *See infra* Section II, A; *see also Today's Cryptocurrency Prices by Market Cap*, COINMARKETCAP, https://coinmarketcap.com/ [https://perma.cc/8VV4-VE3D] (last visited Apr. 3, 2023) (as of April 3, 2023, Bitcoin's market capitalization was over $544 billion, followed by Ethereum at approximately $220 billion).

[29] *See infra* Section II, D; see *also* Marie J. French, *Upstate New York Becomes Hotbed for Cryptocurrency Mining. It Might Not Last*, POLITICO (May 19, 2022, 4:00 PM), https://www.politico.com/news/2022/05/19/

A. The Rise of Bitcoin

Cryptocurrency is a global, digital, encrypted, and decentralized medium of exchange that is used to buy goods and services.[30] Unlike other currencies, cryptocurrency has no central governmental authority to manage and maintain its value.[31] Rather, this task is broadly distributed among users via the internet.[32] Presently, cryptocurrency is the size of the 22nd largest economy, with a global market capitalization of over $1.17 trillion.[33]

In 2009, Bitcoin was introduced as the first decentralized, peer-to-peer network and has remained the largest out of nearly 23,148 other cryptocurrencies.[34] As of April 2023, each Bitcoin is valued at $28,161 and has reached a market capitalization of over $544 billion.[35] Its exponential growth can largely be attributed to its high level of security, lack of fees, payment freedom, transparency, and perceived minimal risks for merchants.[36]

Notably, in November 2022, cryptocurrency suffered a major setback with the collapse of FTX.[37] The meltdown, apparently due to fraud activity, has caused the price of

cryptocurrency-mining-blossoms-in-upstate-new-york-but-it-hasnt-been-well-received-00033354 [https://perma.cc/W9PQ-QZXV].

[30] *See* Kate Ashford, *What is Cryptocurrency?*, FORBES ADVISOR (June 6, 2022), https://www.forbes.com/advisor/investing/cryptocurrency/what-is-cryptocurrency/ [https://perma.cc/4VBC-APJR].

[31] *See id.*

[32] *See id.*

[33] Riley Adams, *75 Cryptocurrency Statistics Show Crypto's Gone Mainstream*, YOUNG AND THE INVESTED, https://youngandtheinvested.com/cryptocurrency-statistics/ [https://perma.cc/JBD6-G2DR] (last updated Mar. 31, 2023); *Today's Cryptocurrency Prices by Market Cap*, *supra* note 28.

[34] *Frequently Asked Questions*, BITCOIN, https://bitcoin.org/en/faq#what-is-bitcoin [https://perma.cc/PPQ2-HYZP] (last visited Apr. 3, 2023) ("Bitcoin, the most well-known cryptocurrency, has paved the way for the growing cryptocurrency asset class, surging to an all-time high of US$68,649.05 on November 10, 2021. Benefiting from excess cash in the market and investor interest, the price of bitcoin rose more than 1,200 percent between March 2020 and November 2021. While bitcoin's bullish ascent crashed in 2022 and it started 2023 around the US$16,000 mark, its price spiked toward the end of Q1, moving up to US$28,161 as of March 21."); *Today's Cryptocurrency Prices by Market Cap*, *supra* note 28.

[35] Lauren Kelly, *Bitcoin: A Brief Price History of the First Cryptocurrency*, BLOCKCHAIN INVESTING NEWS (Mar. 22, 2023), https://investingnews.com/daily/tech-investing/blockchain-investing/bitcoin-price-history/ [https://perma.cc/5YBX-QFX6]; *Today's Cryptocurrency Prices by Market Cap*, *supra* note 28.

[36] *Frequently Asked Questions*, *supra* note 26; *see generally* SATOSHI NAKAMOTO, BITCOIN: A PEER-TO-PEER ELECTRONIC CASH SYSTEM, https://bitcoin.org/bitcoin.pdf [https://perma.cc/TWB8-6H7E] (last visited Nov. 18, 2022) ("We have proposed a system [Bitcoin] for electronic transactions without relying on trust. We started with the usual framework of coins made from digital signatures, which provides strong control of ownership, but is incomplete without a way to prevent double-spending. To solve this, we proposed a peer-to-peer network using proof-of-work to record a public history of transactions that quickly becomes computationally impractical for an attacker to change if honest nodes control a majority of CPU [central processing unit] power. The network is robust in its unstructured simplicity. Nodes work all at once with little coordination. They do not need to be identified, since messages are not routed to any particular place and only need to be delivered on a best effort basis. Nodes can leave and rejoin the network at will, accepting the proof-of-work chain as proof of what happened while they were gone. They vote with their CPU power, expressing their acceptance of valid blocks by working on extending them and rejecting invalid blocks by refusing to work on them. Any needed rules and incentives can be enforced with this consensus mechanism.").

[37] David Yaffe, *How Sam Bankman-Fried's Crypto Empire Collapsed*, N.Y. TIMES (Nov. 14, 2022), https://www.nytimes.com/2022/11/14/technology/ftx-sam-bankman-fried-crypto-bankruptcy.html

Bitcoin and other cryptocurrencies to fall over 60 percent.[38] However, Bitcoin still hovers at reasonably high price compared to 2020, indicating that people are still using crypto and trying to protect their assets.[39] Cryptocurrency has suffered meltdowns in the past and is notorious for making "stunningly epic comebacks."[40]

The world economy may be approaching a digital ecosystem wherein cryptocurrency will remain an essential aspect.[41] El Salvador has become the first country in the world to adopt Bitcoin as a legal tender and other nations may follow suit.[42] Some experts suggest that Bitcoin will continue to predominate the cryptocurrency industry as the leading financial operation, predicting that its price could potentially rise to "$250,000 by 2025 and $5 million by 2030."[43]

B. Proof-of-Work Operations Contribute Substantial Amounts of Greenhouse Gases.

Bitcoin mining uses a distributed ledger called a "blockchain," which includes a record of all transactions, arranged in sequential blocks so no user can spend any of their holdings twice.[44] A user can detect tampering through hashes or long strings of numbers that serve as PoW.[45] "PoW requires nodes on a network to provide evidence that they have expended computational [energy] (i.e. work) in order to achieve consensus in a decentralized manner and to prevent bad actors from overtaking the network."[46] In simpler terms, PoW provides a mathematical problem that miners compete to solve in order to verify a group of transactions, known as a block, to add them to the ledger.[47] The first miner to do so successfully is awarded currency.[48]

PoW is favored over other mechanisms because it allows transactions to be processed securely from peer-to-peer without the need for third party verification.[49] Additionally,

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[https://perma.cc/2Y5Z-G57A] ("[FTX is a now] bankrupt company that was one of the world's largest cryptocurrency exchanges. It enabled customers to trade digital currencies for other digital currencies or traditional money; it also had a native cryptocurrency known as FTT. The company, based in the Bahamas, built its business on risky trading options that are not legal in the United States.").

[38] *See* Paul R. La Monica, *Is the Worse Over for Bitcoin and the Rest of Crypto?*, CNN BUS. (Dec. 4, 2022), https://www.cnn.com/2022/12/04/investing/stocks-week-ahead/index.html [https://perma.cc/S2KC-4GAF].

[39] *See id.*

[40] *See id.* ("This is not the first crypto winter, as long-term fans of bitcoin can attest. There were massive corrections in 2018, the early part of 2020 and the summer of 2021 as well.").

[41] *See* Aleksandra Jaworska, *Benefits of Bitcoin Mining from Economic, Social and Environmental Perspectives-Crypto Mining Asset Manager*, LINKEDIN (Jan. 11, 2022), https://www.linkedin.com/pulse/benefits-bitcoin-mining-from-economic-social-crypto-jaworska [https://perma.cc/LS8Z-BHM8].

[42] *See id.*

[43] *Experts Predict What the Crypto Market Will Look Like in 2022*, YAHOO! (Dec. 20, 2021) https://www.yahoo.com/now/experts-predict-crypto-market-look-200008492.html [https://perma.cc/EBF2-LW94]; *see also* Geri Mileva, *15 Essential Cryptocurrency Stats for 2022*, INFLUENCER MARKETING HUB (July 22, 2022) ("[Bitcoin's] growth, from being worth $500 in 2016 to $29,000 per coin in 2022 speaks to its exponential growth capacity.").

[44] *See* Frankenfield, *supra* note 2.

[45] *See id.*

[46] *Id.*

[47] Ashford, *supra* note 30.

[48] *See id.* ("Bitcoin, for example, rewards a miner 6.25 BTC (which is roughly $200,000) for validating a new block.").

[49] *See* Frankenfield, *supra* note 2.

malicious actors are discouraged from attacking the network because of the sheer computing power required as more entities seek to validate transactions for coin rewards.[50] However, PoW also requires an immense amount of electric energy to operate effectively.[51] The electricity is often generated by burning fossil fuels in electric power plants because it is the most cost effective.[52] This leads to a substantial introduction of CO_2 GHG emissions into the atmosphere.[53]

As of August 2022, "Bitcoin is estimated to account for 60% to 70% of total global" cryptocurrency electricity usage driven by PoW operations.[54] The electricity consumed by PoW mechanisms is, currently, comparable to the total electric consumption of a country, such as Malaysia or Sweden.[55] A single Bitcoin transaction consumes 898.2 kilowatt-hours of electricity and produces 500.98 kilograms of CO_2.[56] This is equivalent to the power consumption of an average U.S. household over 30.79 days and the carbon footprint of 1,110,339 VISA transactions.[57] If the value and use of PoW Bitcoin operations continues to rise, it will require even more electric energy for Bitcoin mining.[58]

The energy-intensive Bitcoin network is difficult to precisely estimate and conceptualize the scope of its environmental impact.[59] Unlike many climate change sources, such as deforestation, livestock farming, or transportation, Bitcoin mining does not produce a physical product.[60] This makes it difficult for people to actualize the substantial environmental costs of the cryptocurrency industry and, therefore, those environmental costs too often go ignored.[61]

Electricity use estimates may be inaccurate or low because many mining facilities do not disclose their location or report their electric energy usage.[62] Day-to-day operations also

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[50] *See* Press Release, The White House, *Fact Sheet: Climate and Energy Implications of Crypto-Assets in the United States* (Sep. 8, 2022) (on file with the author).

[51] *See* Elkin, *supra* note 6, at 3.

[52] *See* French, *supra* note 29.

[53] *See* Samantha T. Edgell, Comment, *Toto, I've a Feeling the Environment Isn't Safe from Cryptocurrency Anymore: The Degrading Ecological Effects of Bitcoin and Digital* Currencies, 32 VILL. ENV'T L. J. 69, 76 (May 2021).

[54] Press Release, The White House, *supra* note 50.

[55] Ivanontech, *Exploring Proof-of-Work's Electricity Consumption*, MORALIS ACAD. (Apr. 28, 2022), https://perma.cc/A5UW-NASE.

[56] *Bitcoin Energy Consumption Index*, *supra* note 4.

[57] *Id.*

[58] *See* Edgell, *supra* note 53, at 75 ("For example, miners may be able to extract their first Bitcoin for X watts of electricity, but it could take 100X watts to mine their tenth Bitcoin.").

[59] *See id*.

[60] *See id*.

[61] *See id*.

[62] OFF. OF SCI. & TECH. POL'Y, CLIMATE AND ENERGY IMPLICATIONS OF CRYPTO-ASSETS IN THE UNITED STATES (Sept. 2022); *see* MANDY DEROCHE ET AL., THE ENERGY BOMB: HOW PROOF-OF-WORK CRYPTOCURRENCY MINING WORSENS THE CLIMATE CRISIS AND HARMS COMMUNITIES NOW 3 (2022) ("Tracking down the energy sources—or even just the consumption—of proof-of-work cryptocurrency mining in the United States is difficult. The industry is notoriously opaque, and little-to-no reporting requirements exist at either the state or federal level. The most reliable sources of information are a patchwork of filings before the

fluctuate due to market dynamics.[63] To reduce uncertainties, policymakers have wisely urged all mining facilities to report their actual electricity usage and to make that information readily accessible by all.[64]

C. The Relationship Between Increasing Greenhouse Gases and Climate Change

Climate change is the long-term shift in temperatures and weather patterns caused by global warming, which is largely attributable to human activities, primarily due to burning fossil fuels.[65] Burning fossil fuels generates GHGs which trap the sun's heat and consequently, raises the earth's temperature through the greenhouse effect.[66] The last decade was the warmest on record, with the Earth now being 1.1°C warmer than it was in the late 1800s.[67] Extreme weather events, including floods, droughts, heatwaves, storms, and wildfires, are occurring at an alarming rate and are linked to global warming.[68] The continued rise of GHG emissions requires immediate action on all fronts to help in the efforts to preserve our environment for future generations.[69]

1. Air Pollutants Generated from Bitcoin Mining

Bitcoin mining often utilizes coal-fired electric power plants to generate electricity.[70] In this process coal is burned to produce steam, which drives a turbine that, with a generator, produces electricity.[71] Warm water, air pollutants, including GHGs, and coal ash are produced as waste during the operation.[72] Air pollutants deposited into the atmosphere include particulate matter, sulfur dioxide, nitrogen oxide, and CO_2.[73]

Securities and Exchange Commission (SEC) by publicly traded cryptocurrency companies, environmental permit applications, utility and other energy filings, and local reporting.").

[63] OFF. OF SCI. & TECH. POL'Y, *supra* note 62.

[64] *See* OFF. OF SCI. & TECH. POL'Y, *supra* note 62; *see also* Letter from Elizabeth Warren et al., U.S. Sen., to Michael Regan, Adm'r, Env't Prot. Agency & Jennifer Granholm, Sec'y, Dep't of Energy (July 15, 2022) (on file with author).

[65] *See What Is Climate Change?*, U.N., https://www.un.org/en/climatechange/what-is-climate-change [https://perma.cc/5THK-VTHJ] (last visited Nov. 19, 2022).

[66] *See id.*

[67] *See id.*

[68] *See United in Science: We are Heading in the Wrong Direction*, U.N CLIMATE CHANGE (Sept. 13, 2022), https://unfccc.int/news/united-in-science-we-are-heading-in-the-wrong-direction [https://perma.cc/B6P2-W5WP].

[69] *See id.* (statement by World Meteorological Organization Secretary-General, Peter Taalas) ("Climate science is increasingly able to show that many of the extreme weather events that we are experiencing have become more likely and more intense due to human-induced climate change. We have seen this repeatedly this year, with tragic effect. It is more important than ever that we scale up action on early warning systems to build resilience to current and future climate risks in vulnerable communities.").

[70] *See* Holzman, *supra* note 7.

[71] JOEL B. EISEN ET AL., ENERGY, ECONOMICS AND THE ENVIRONMENT, 283 (Saul Levmore et al.eds., 5th ed. 2020).

[72] *Id.*

[73] *Id.*

Poor air quality resulting from fossil fuel pollution contributes to environmental degradation and human health risks.[74] Sulfur dioxide combines with moisture in the air to create sulfuric acid; this falls as acid rain, directly harming vegetation and aquatic habitats.[75] Nitrogen oxide, a precursor to smog, damages the ozone layer, which humans rely on to prevent the sun's ultraviolet rays from hitting the earth's surface.[76]

GHGs produced from fossil fuel generated electricity, including CO_2, are major contributors to climate change.[77] CO_2, a heat-trapping gas, contributes to global warming and alteration of weather patterns.[78] Notably, if the electricity used in PoW comes from fossil fuels, its carbon footprint and GHG emissions disproportionately contribute to climate change, with nearly 65.4 megatonnes of CO_2 released into the atmosphere each year.[79]

2. Behind-the-Meter Electric Energy System

Many Bitcoin miners utilize BTM generation systems, as opposed to in-front-of-the-meter[80], to power PoW operations.[81] A BTM system provides local, self-generated electricity that can be used on-site without passing through a meter or interacting with the electric grid.[82] This system functions by burning fossil fuels, like coal, in electric power plants, rather than buying electricity from the grid.[83] The electricity grid complies with state required mandates, like renewable energy portfolio standards that help to control the amount of GHG emissions. [84]

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[74] *See id.* at 285; *see also Ambient (Outdoor) Air Pollution*, WHO, https://www.who.int/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health [https://perma.cc/6QEN-LASC] (last visited Nov. 19, 2022) ("Air pollution is one of the greatest environmental risks to health. By reducing air pollution levels, countries can reduce the burden of disease from stroke, heart disease, lung cancer, and both chronic and acute respiratory diseases, including asthma.").

[75] *See* EISEN ET AL., *supra* note 71, at 285.

[76] *See id.*

[77] *See id.*

[78] *See id.*

[79] Elkin, *supra* note 6, at 3.

[80] *See* Jacob Marsh, *Behind-the-Meter: What You Need to Know*, ENERGYSAGE (Sept. 12, 2019), https://news.energysage.com/behind-the-meter-overview/ [https://perma.cc/6LCE-GNNB] ("If electricity has to pass through your electric meter to reach your property, that electricity came from in front of the meter, or the grid. If electricity doesn't need to pass through an electric meter to reach your property, that electricity came from a BTM system. All electricity end customers sit behind the meter.").

[81] *See* Elkin, *supra* note 6, at 2.

[82] Marsh, *supra* note 80.

[83] *See generally* Martin Roeck & Thomas Drennen, *Life Cycle Assessment of Behind-the-Meter Bitcoin Mining at US Power Plant*, 27 INT'L J. LIFE CYCLE ASSESSMENT 363-654 (2022) ("behind-the-meter Bitcoin mining not only goes against local climate initiatives but also poses a significant danger to national initiatives due to feasible scalability, caused by the availability of existing infrastructure and favorable financials.").

[84] *See Renewable Portfolio Standard*, N.Y. ENERGY RSCH, & DEV. AUTH., https://www.nyserda.ny.gov/All-Programs/Clean-Energy-Standard/Important-Orders-Reports-and-Filings/Renewable-Portfolio-Standard [https://perma.cc/7YE4-HD2D] (last visited Oct. 10, 2022) ("[T]o fulfill the 2015 New York State Energy Plan, the State set its sights on 70 percent of New York's electricity coming from renewable energy by 2030, established officially by the Clean Energy Standard.").

BTM generation is especially attractive to crypto miners because they do not have to buy electricity at the market price and can save money on purchased power costs.[85]Also, by not selling the electricity generated, they legally avoid being regulated as a "public utility" because they do not provide electric service to the public.[86] Additionally, they can buy and retrofit coal-fired power plants that are closed or are closing in the near future at a relatively cheap price.[87] They only need to abide by (or with) air emission permits required under the federal CAA or other state climate change laws.[88]

D. The Growing Availability of Coal-Fired Electric Power Plants

Throughout the U.S., already built coal-fired electric plants are closed or closing soon because of climate change GHG (CO_2) concerns and competition from other cleaner, less expensive sources of energy.[89] Although coal-fired electric power plants have no specific life span, power plant owners and operators have reported that they plan to shut down 28% of the utility-scale coal-fired electric generating capacity in the U.S. by 2035.[90] U.S. coal fired

[85] *See* Roeck & Drennan, *supra* note 83 ("Locating the data center at the plant ("behind the meter") eliminates distribution costs and minimizes efficiency losses associated with grid networks. By mining Bitcoin, the plan remains lucrative outside of peak load and pricing periods."); *Electricity Explained: Factors Affecting Electricity Prices*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/energyexplained/electricity/prices-and-factors-affecting-prices.php [https://perma.cc/PN3N-YL29] (last visited Oct. 10, 2022) (in 2021, the U.S. annual average industrial price of electricity was about 7.26¢ per kilowatt-hour).

[86] *See* Mark F. Sundback et al., *Electricity Regulation in the United States: Overview*, WESTLAW (July 1, 2020), https://1.next.westlaw.com/Document/Ieb49d7b91cb511e38578f7ccc38dcbee/View/FullText.html?navigationPath=Search%2Fv1%2Fresults%2Fnavigation%2Fi0ad6ad3b000001878d5ff952af39dd8c%3Fppcid%3D72428a996d4741e995d33e899a33abb0%26Nav%3DKNOWHOW%26fragmentIdentifier%3DIeb49d7b91cb511e38578f7ccc38dcbee%26parentRank%3D0%26startIndex%3D1%26contextData%3D%2528sc.Search%2529%26transitionType%3DSearchItem&listSource=Search&listPageSource=d4e55212849255400ad4753efc1f1de2&list=KNOWHOW&rank=1&sessionScopeId=b29383fae8255f2e08ffd29fc25e84f05eb206ee28c2034f4f97d958ee59784f&ppcid=72428a996d4741e995d33e899a33abb0&originationContext=Search%20Result&transitionType=SearchItem&contextData=%28sc.Search%29 [https://perma.cc/4JM4-Q77A] ("States generally have jurisdiction over local distribution, retail sales of electricity within a state from one entity to an end user, and the siting and construction of transmission facilities, generation facilities and distribution systems.").

[87] *But see* Holzman, *supra* note 7.

[88] *See Basic Information About Operating Permits*, EPA, https://www.epa.gov/title-v-operating-permits/basic-information-about-operating-permits [https://perma.cc/G5WY-VSS6] (last visited Aug. 30, 2022); *see also Our Climate Act*, *infra* note 178.

[89] *See Factbox: U.S. Coal-Fired Power Plants Scheduled to Shut*, REUTERS (Oct. 28, 2021), https://www.reuters.com/business/energy/us-coal-fired-power-plants-scheduled-shut-2021-10-28/ [https://perma.cc/E88J-3A8S]; *see also 2022 Renewable Energy Industry Outlook*, DELOITTE (Sept. 2021) ("Rapid technology improvements and decreasing costs of renewable energy resources, along with the increased competitiveness of battery storage, have made renewables one of the most competitive energy sources in many areas."); *see also* Oliver Milman, *U.S. Renewable Energy Farms Outstrip 99% of Coal Plants Economically – Study*, THE GUARDIAN (Jan. 20, 2023), https://www.theguardian.com/us-news/2023/jan/30/us-coal-more-expensive-than-renewable-energy-study [https://perma.cc/4A8T-BQ2N] ("Coal in the US is now being economically outmatched by renewables to such an extent that it's more expensive for 99% of the country's coal-fired power plants to keep running than it is to build an entirely new solar or wind energy operation nearby.").

[90] *Of the Operating U.S. Coal-Fired Power Plants, 28% Plan to Retire by 2035*, U.S. ENERGY INFO. ADMIN. (Dec. 15, 2021), https://www.eia.gov/todayinenergy/detail.php?id=50658 [https://perma.cc/RK7R-TPT3] ("The average operating coal-fired generating unit in the United States is 45 years old. The units that have reported plans to retire are not necessarily the oldest ones operating; some units built in the 1980s and 1990s are also

electricity has continued to fall from 23% in 2021, 20% in 2022, and 19% in 2023.[91] As of January 2023, there are 240 coal plants still active in the U.S.[92]

In 2021, states enacted more than 70 renewable energy and climate change policies.[93] Illinois, a major coal-producing state, adopted a comprehensive climate legislation that exemplifies the trend away from coal created energy.[94] The law includes a plan to shut down all Illinois coal-fired plants by 2045 while creating statewide renewable-energy infrastructure.[95] Nearly $500 million in funding was allocated over a twenty-year period to incentivize owners to convert their coal plants to solar installations.[96]

Efforts to combat climate change have made coal plants less useful as a source of electric energy for the grid and has sparked a movement towards renewable energy.[97] For example, green hydrogen is an emerging electric energy source which is particularly desirable because hydrogen is the most abundant material on Earth and produces almost zero GHGs when burnt.[98] In 2021, major European companies, including Shell and RWE, created a green hydrogen pipeline from offshore wind plants in the North Sea.[99]

It is projected that by 2030 the overall value of the renewable energy market will grow from 880 billion dollars to nearly 2 trillion dollars.[100] Evidently, the growth of renewable energy and shift away from coal would indicate that more and more coal-fired electric power plants will be idle in the foreseeable future and will be available for use in Bitcoin operations.[101]

Upstate New York has become a leading destination for crypto miners to retrofit closed or closing coal-fired electric power plants to fuel Bitcoin mining.[102] NYS has abundant "hydroelectric and nuclear power, relatively low electricity prices and vacant, cheap, empty properties with untapped electrical infrastructure."[103] Proponents of the industry argue that this

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scheduled to retire. When they retire, the retiring units will have approximately 50 years of service, based on their planned retirement dates.").

91 *Short-Term Energy* Outlook, U.S. ENERGY INFO. ADMIN. (Jan. 10, 2023), https://www.eia.gov/outlooks/steo/report/coal.php [https://perma.cc/EC4D-VSSU].

92 *Number of Coal Power Plants by Country 2023*, WORLD POPULATION REV., https://worldpopulationreview.com/country-rankings/number-of-coal-power-plants-by-country [https://perma.cc/BET4-JEUH] (last visited Jan. 16, 2023).

93 *See 2022 Renewable Energy Industry Outlook*, *supra* note 89.

94 *See* Stephen Joyce, *Illinois Governor Signs Bill Shutting Coal Plants for Good*, BLOOMBERG L., (Sept. 15, 2021) https://news.bloomberglaw.com/environment-and-energy/illinois-governor-signs-bill-shutting-state-coal-plants-for-good [https://perma.cc/3LDK-4WPK].

95 *Id.*

96 *Id.*

97 *See 2022 Renewable Energy Industry Outlook*, *supra* note 89.

98 *See* Bernard Marr, *The Five Biggest New Energy Trends in 2022*, FORBES (Mar. 1, 2022), https://www.forbes.com/sites/bernardmarr/2022/03/01/the-five-biggest-new-energy-trends-in-2022/?sh=d1a73ccba574 [https://perma.cc/T4F4-NV8X].

99 *Id.*

100 *See id.*

101 *See generally* Holzman, *supra* note 7.

102 *See* French, *supra* note 29.

103 *Id.*

occurrence can help boost the struggling economy of Upstate New York through job creation.[104] Opponents worry NYS's goal of reducing carbon emissions will be compromised, as well as the quality-of-life of local communities.[105]

III. INEFFECTIVE INTERNATIONAL AND NATIONAL EFFORTS

This part provides a concise overview of the challenges impeding international and national efforts to control the climate crisis thus far, which leaves the task with individual states and local governments to address. Subsection A focuses on the difficulties in implementing an international climate change treaty. Here, the Paris Climate Accord illustrates the challenge. Subsection B addresses the limitations on the U.S. federal government's ability to enact GHG control measures to mitigate climate change. The CPP and Executive Order 14607 demonstrate the difficulty of passing influential environmental regulations.

A. The International Climate Change Regime

To date, there has been no effective global regime in place to regulate the impact GHG emissions have on climate change.[106] Although countries generally agree on the science behind climate change and global warming, there has been a failure to assign responsibilities or to set enforceable emission-reduction goals.[107]

Binding international law treaties with effective enforcement provisions can help to provide policy solutions to global GHG emissions externalities that contribute to climate change and global warming.[108] Unfortunately, international negotiations over the past half century to create enforceable caps on GHG emissions have largely failed.[109] The largest GHG emitters, in considering the costs of reducing emissions against the implications of climate change, have yet to agree and comply with goals or targets for limiting GHG emissions.[110]

Internal political conflicts may also prevent a country from becoming a party to an enforceable international treaty process even if it may be ultimately in their overall best interest to do so.[111] Difficulties associated with reaching agreement coupled with nationalism have resulted in delay and failure to form a global binding climate change treaty.[112]

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[104] *See id.*

[105] *See id.* (describing excessive noise pollution and undesirable presence of large smokestacks of the Greenidge cryptocurrency coal-fired power plant); *see also* Elizabeth Kolbert, *Why Bitcoin is Bad for the Environment*, THE NEW YORKER (Apr. 2021) ("Bitcoin mining drove up the cost of electricity in the city so dramatically that, in 2018, Plattsburgh enacted a moratorium on new mining operations"); *c.f. Our Climate Act*, *infra* note 178 ("[N.Y.S.' Climate Act] will provide opportunities for residents and communities alike to partner with businesses, schools, and government to create a green economy and build a more sustainable future.").

[106] *See* Lindsay Maizland, *Global Climate Agreements: Successes and Failures*, COUNCIL ON FOREIGN REL. (last updated Nov. 17, 2021), https://www.cfr.org/backgrounder/paris-global-climate-change-agreements [https://perma.cc/CDA7-A9T9].

[107] *See id*.

[108] *See* J. Scott Holladay & Michael A. Livermore, *Regional Variation, Holdouts, and Climate Treaty Negotiations*, 4(2) J. BENEFIT-COST ANALYSIS 131-32 (2013).

[109] *See id.*

[110] *See id.*

[111] *See id.* at 131-32.

[112] *See id.*

For example, the Paris Agreement highlights the difficulties of a successful international effort.[113] It aspires to limit global warming to well below 2°C, preferably to 1.5°C, compared to pre-industrial levels by reducing greenhouse gas emissions.[114] Currently, there are 196 signatories who have pledged to undertake these ambitious efforts and who have agreed to submit nationally determined plans for climate action every five years.[115]

The Paris Agreement's goals are laudable; however, they lack enforcement.[116] If a country fails to uphold their pledges no concrete legal consequences ensue.[117] Rather, a country may be asked to meet with a global committee of neutral researchers to create a new climate plan to meet pledges.[118] One reason a signatory will uphold their pledge, is not for fear of being punished, but because, internally, their citizens want them to cooperate in curbing GHG emissions in response to the climate crisis and want to be viewed by the world in a favorable light.[119] The U.S. temporarily withdrew from the Paris Agreement in 2020 under the Trump administration.[120]

Notably, if the growth of Bitcoin currency continues to accelerate, it is projected that it's PoW GHG emissions alone could push global warming above 2°C within less than three decades, well above the Paris Agreement and mostly without international legal consequence.[121] It is also estimated that the emission reduction pledges for 2030 need to be seven times higher to reach the overall goal of the Paris Agreement.[122]

B. U.S. Federal Climate Change Initiatives Have Been Problematic and Ineffective.

The U.S. is historically the largest GHG emitter and is estimated to have imposed more than 1.9 trillion dollars in damage to other countries from the effects of its fossil fuel

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[113] *See The Paris Agreement*, U.N. FRAMEWORK CONVENTION ON CLIMATE CHANGE, https://unfccc.int/process-and-meetings/the-paris-agreement [https://perma.cc/S5HE-G6FH] (last visited Aug. 31, 2022).

[114] *Id.*

[115] *Id.*

[116] *See* Kathryn Tso, *How are Countries Held Accountable Under the Paris Agreement?*, MIT CLIMATE PORTAL (Mar. 8, 2021), https://climate.mit.edu/ask-mit/how-are-countries-held-accountable-under-paris-agreement [https://perma.cc/AQW7-GG48].

[117] *See id.*; *see also* Matt McGrath, *Climate Change: US Formally Withdraws from Paris Agreement*, CNN (Nov. 4, 2020), https://www.bbc.com/news/science-environment-54797743 [https://perma.cc/2DPA-6EYZ] (explaining that a country can exit the agreement once three years have passed from ratification).

[118] Tso, *supra* note 116.

[119] *Id.*

[120] McGrath, *supra* note 117.

[121] Camila Mora et. al., *Bitcoin Emissions Alone Could Push Global Warming Above 2°C*, 8 NATURE CLIMATE CHANGE 931 (2018).

[122] *United in Science: We are Heading in the Wrong Direction*, *supra* note 68.

use.[123] While the U.S. has committed to minimize its environmental externalities[124] the national effort has been met with difficulties and limitations.

1. The Clean Power Plan

In August 2015, President Obama and the Environmental Protection Agency (hereinafter "EPA") announced the CPP under the CAA to reduce CO_2 GHG emissions, inter alia, from fossil fuel electric power plants.[125] The plan outlined achievable standards that gave each state the opportunity to create its own cost-effective solutions towards clean energy consistent with the CPP.[126] The EPA has projected that, under the CPP, by 2030 the electric sector's CO_2 pollution would be reduced by 32% nationally and there would be 870 million fewer tons of carbon GHG pollution released into the atmosphere, relative to 2005 levels.[127] Unfortunately, the plan was largely abandoned by the incoming Trump administration which sought to keep coal power plants open and their GHG emission levels largely unaffected.[128]

In the recent decision in *West Virginia v. Environmental Protection Agency*, the Supreme Court held that Congress did not grant the EPA the authority to implement emission caps on fossil fuel electric power plants[129] under the CAA.[130] Section III(d) of the CAA authorizes the EPA to regulate emissions of non-criteria, non-hazardous air pollutants from stationary sources through identification of the "best system of emission reduction" that is

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[123] Oliver Milman, *Nearly $2tn of Damage Inflicted on Other Countries by US Emissions*, THE GUARDIAN (July 21, 2022), https://www.theguardian.com/environment/2022/jul/12/us-carbon-emissions-greenhouse-gases-climate-crisis [https://perma.cc/C98W-LVGG] ("Developing countries and climate activists have pushed for 'loss and damage' payments to be made to those who are suffering the most from global heating through heatwaves, floods and drought. But the US, which is responsible for around a quarter of all emissions to date, has resisted setting up such a fund, citing fears that it would be held legally liable for the damages caused by its voracious appetite for fossil fuels such as oil, coal and gas.").

[124] *See National Climate Task Force*, WHITE HOUSE, https://www.whitehouse.gov/climate/ [https://perma.cc/9RAN-LWU8] (last visited Nov 20, 2022) ("After rejoining the Paris Agreement and restoring U.S. leadership on the world stage, President Biden created the first-ever National Climate Task Force, with more than 25 Cabinet-level leaders from across agencies working together on groundbreaking goals: Reducing U.S. greenhouse gas emissions 50-52% below 2005 levels in 2030; Reaching 100% carbon pollution-free electricity by 2035; Achieving a net-zero emissions economy by 2050; Delivering 40% of the benefits from federal investments in climate and clean energy to disadvantaged communities").

[125] *See What is the Clean Power Plan?*, NAT'L RES. DEF. COUNCIL (Sept. 29, 2017), https://www.nrdc.org/stories/what-clean-power-plan [https://perma.cc/6P25-8BWW].

[126] *See id.*

[127] *Id.*

[128] *See* Jeff Brady, *Trump Administration Weakens Climate Plan to Help Coal Plants Stay Open*, NPR (June 19, 2019), https://www.npr.org/2019/06/19/733800856/trump-administration-weakens-climate-plan-to-help-coal-plants-stay-open [https://perma.cc/Y3CE-946J].

[129] West Virginia v. E.P.A. et al., 142 S.Ct. 2587, 2599-60 (2022) ("Since passage of the Act 50 years ago, EPA has exercised this authority by setting performance standards based on measures that would reduce pollution by causing plants to operate more cleanly. In 2015, however, EPA issued a new rule concluding that the "best system of emission reduction" for existing coal-fired power plants included a requirement that such facilities reduce their own production of electricity, or subsidize increased generation by natural gas, wind, or solar sources. The question before us is whether this broader conception of EPA's authority is within the power granted to it by the Clean Air Act.")

[130] *Id.* at 2599. ("The Clean Air Act authorizes the Environmental Protection Agency to regulate power plants by setting a 'standard of performance' for their emission of certain pollutants into the air.")

"adequately demonstrated."[131] Despite these plain words, the Supreme Court held that the EPA does not have the power to set emission caps based on the electric generation shifting approach outlined in the CPP without additional, new congressional authorization.[132]

Rather, the major questions doctrine was invoked whereby in certain extraordinary cases involving statutes that confer authority upon an administrative agency, the agency must, nonetheless, point to clear congressional authorization for the authority it claims.[133] The EPA, from the majority's view, was unable to point to a clear congressional authorization to systematically control GHG emissions from fossil fuel coal plants since GHG emission issues were not an issue when the CAA was enacted.[134] This decision creates an obstacle for the federal government and the Biden administration to renew the CPP and reduce fossil fuel electric generation emissions to over 50% below 2005 levels.[135]

Currently, national GHG emissions have only fallen approximately 15% from 2005 levels, leading some experts to call into question whether the GHG emission goal is even plausible.[136] Under the present political climate, Congress is unlikely to act or authorize federal GHG emission regulations of coal fired electric power plants considering the *West Virginia* decision.[137]

2. Executive Order to Ensure Responsible Development of Digital Assets

On March 9, 2022, President Biden issued Executive Order 14607: "Ensuring Responsible Development of Digital Assets."[138] The Order explicitly prioritizes reduction of environmental externalities, including air pollution stemming from cryptocurrency mining.[139] Under the executive order, the EPA, the Secretary of Energy, and all other relevant agencies must submit a report on how distributed ledger technology impedes efforts to tackle climate change nationally and globally.[140]

While the report must address potential uses of blockchain technology that will mitigate negative environmental consequences, it does not require any agencies to transition to

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[131] *Id.* at 2599.

[132] *Id.* at 2595.

[133] *Id.* at 2610.

[134] *See* Alice C. Hill, *What Does the Supreme Court's Decision in West Virginia v. EPA Mean for U.S. Action on Climate?*, COUNCIL ON FOREIGN REL. (July 19, 2022, 12:19 PM), https://www.cfr.org/blog/what-does-supreme-courts-decision-west-virginia-v-epa-mean-us-action-climate [https://perma.cc/832W-H53X].

[135] *See id.*

[136] *See id.*

[137] *See id.*; *see also West Virginia*, 142 S.Ct. 2587.

[138] *See* Exec. Order No. 14067, 87 Fed. Reg. 14143, 14145 (Mar. 9, 2022).

[139] *See id.* ("The United States has an interest in ensuring that digital asset technologies and the digital payments ecosystem are developed, designed, and implemented in a responsible manner that … reduces negative climate impacts and environmental pollution, as may result from some cryptocurrency mining.").

[140] *Id.* at 14148 ("The report should specifically address: (a) potential uses of blockchain that could support monitoring or mitigating technologies to climate impacts, such as exchanging of liabilities for greenhouse gas emissions, water, and other natural or environmental assets; and (b)implications for energy policy, including as it relates to grid management and reliability, energy sufficiency incentives and standards, and sources of energy supply.").

a more sustainable framework and imposes no enforceable federal constraints on GHG emissions from cryptocurrency PoW operations.[141]

IV. NYS'S EMERGING TWO-PRONG LEGISLATIVE AND ADMINISTRATIVE APPROACH TO CURTAIL BITCOIN GREENHOUSE GAS EMISSIONS

This part discusses NYS's evolving two-prong approach to address GHG emissions from Bitcoin mining. Subsection A focuses on the new state law imposing a moratorium on BTM PoW operations.[142] Subsection B analyzes the state's administrative approach, which complements the statewide moratorium. NYS agencies may continue to exercise their authority over GHG emissions from cryptocurrency operations on a case-by-cases basis in situations that fall outside the scope of the moratorium. Here, two examples illustrate this complementary agency approach. First, the DEC rejected a CAA Title V permit to the cryptocurrency facility, Greenidge Generation (hereinafter "Greenidge")[143] and second, potentially, by the PSC in the ongoing Fortistar case.[144]

A. A Statewide Law Imposing a Moratorium on Bitcoin Mining

In January 2023, NYS enacted a law that places a moratorium on all Bitcoin mining using PoW operations for the next two years.[145] The law provides in relevant part as follows:

> 1. For the period commencing on the effective date of this section and ending two years after such date, the department, after consultation with the department of public service, shall not approve a new application for or issue a new permit pursuant to this article, or article seventy of this chapter, for an electric generating facility that utilizes a carbon-based fuel and that provides, in whole or in part, behind-the-meter electric energy consumed or utilized by cryptocurrency mining operations that use proof-of-work authentication methods to validate blockchain transactions.
>
> 2. For the period commencing on the effective date of this section and ending two years after such date, the department shall not approve an application to renew an existing permit or issue a renewal permit pursuant to this article for an electric generating facility that utilizes a carbon-based fuel and that provides, in whole or in part, behind-the-meter electric energy consumed or utilized by a cryptocurrency mining

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[141] *See id.*

[142] *See* N.Y. S. 6486.

[143] *See* Letter from Daniel Whitehead to Dale Irwin, *supra* note 8.

[144] *See* Aratani, *supra* note 8.

[145] *See* Ferre-Sadurni & Ashford, *supra* note 10 (statement by Governor of NYS, Kathy Hochul) ("[The bill is] a key step for New York as we work to address the global climate crisis.") (statement by Assemblywoman Anna Kelles) ("This bill will create the pause we need in the current trend of purchasing old power plants in New York for corporate profits and allow us to properly evaluate the impact of this industry on our climate goals before it is too late… Reactivating old retired power plants that use fossil fuels as an energy source is a move in the wrong direction and we cannot afford to go backward.").

> operation that uses proof-of-work authentication methods to validate blockchain transactions if the renewal application seeks to increase or will allow or result in an increase in the amount of electric energy consumed or utilized by a cryptocurrency mining operation that uses proof-of-work authentication methods to validate blockchain transactions.[146]

The legislation requires the DEC to develop a generic environmental impact statement (hereinafter "GIS") to consider the issues of cryptocurrency mining that uses PoW authentication methods underpinning Bitcoin.[147] The GIS should include the number of PoW mining locations in the state, the amount and sources of energy used, the amount of GHGs emitted from operations, including any anticipated increase, and public health impacts.[148]

This first-in-the-nation moratorium has inspired environmentalists to push for similar regulations throughout the country, as they continue to worry that closed or closing coal-fired electric plants will be reopened.[149] Moreover, there is some indication that cryptocurrency businesses may be deterred from investing in the state for fear of being shut down.[150]

B. NYS Administrative Agencies May Complement the State-Wide Moratorium.

Fossil-fueled electric power plants used in PoW operations may be exempt from the moratorium if they are "grandfathered in"; meaning they have already submitted permit applications prior to the enactment of the moratorium.[151] However, NYS administrative agencies may continue to act in relevant individual cases that fall outside the scope of the moratorium. Part I analyzes how the DEC administers permits to power plants that align with federal air pollution legislation, using Greenidge as an example. Part II showcases how the New York PSC can enforce state climate change objectives by monitoring the transfer of ownerships among fossil fuel electric power plants, using the Digihost transfer as an example.

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[146] N.Y.S. 6486.

[147] *Id.*

[148] *Id.*

[149] *See* Marie J. French, *New York Partially Banned Cryptocurrency Mining. Now Environmentalists Want More.*, POLITICO (Jan. 7, 2023, 7:00 AM), https://www.politico.com/news/2023/01/07/new-york-cryptocurrency-mining-ban00072564#:~:text=Gov.%20Kathy%20Hochul's%20November%20signing,a%20model%20for%20other%20states. [https://perma.cc/GA9Q-WTK6].

[150] *See id.* ("The law is likely to scare off companies from coming to New York for fear of further restrictions, some owners said, and it comes as the digital currency market has also crashed following the bankruptcy of Bahamas-based crypto exchange FTX – leaving the industry with additional uncertainty.").

[151] *See id.* ("The moratorium bill exempted the only two power plants currently burning fossil fuels to run cryptocurrency mining machines, carving out any that had already submitted permit applications.").

1. The DEC Denies Greenidge Generation a Title V Operating Permit

The DEC acted to deny a GHG emissions permit to a cryptocurrency enterprise that fell outside the scope of the moratorium.[152] Title V of the CAA establishes a facility-based operating emissions permit program to be implemented by states that clarifies the control of GHG air emissions from facilities, such as coal-fired electric power plants.[153] A permit is required for any facility that has actual or potential emissions of any air pollutant, including fossil fuel GHGs, at or above the threshold of 100 tons per year.[154] The DEC is the NYS delegated agency under the Title V permit program from the EPA and therefore, holds the authority to administer or rescind permits.[155] NYS has reinforced its commitment to abide by this program to promote its environmental policy.[156]

The DEC exercised its administrative power when it denied the Greenidge facility[157] a permit renewal for its misalignment with Title V.[158] In 2014, Greenidge purchased a closed coal-fired power plant and applied for a Title V operating permit to restart electric generation.[159] Greenidge specified in its application that it would convert the facility to natural gas and would use it as a "peaking capacity" plant, to provide electricity to the state energy grid in times of high demand.[160] Greenidge never indicated that it would engage in cryptocurrency mining or use all of the electricity produced for itself.[161]

On June 30, 2022, the DEC denied a Title V operating permit renewal to the Greenidge facility considering its new, changed stated purpose and its increase in GHG emissions:[162]

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[152] *See* Letter from Daniel Whitehead to Dale Irwin, *supra* note 8.

[153] *See* 42 U.S.C. § 7661(c)(a) (2013) ("Each permit issued under this subchapter shall include enforceable emission limitations and standards, a schedule of compliance, a requirement that the permittee submit to the permitting authority, no less often than every 6 months, the results of any required monitoring, and such other conditions as are necessary to assure compliance with applicable requirements of this chapter, including the requirements of the applicable implementation plan."); *see also Basic Information About Operating Permits*, *supra* note 88.

[154] *Who Has to Obtain a Title V Permit?*, EPA, https://www.epa.gov/title-v-operating-permits/who-has-obtain-title-v-permit [https://perma.cc/4X7C-5CUM] (last visited Aug. 30, 2022).

[155] *See Air Pollution Control Permit Program*, N.Y.S. DEP'T OF ENV'T CONSERVATION, https://www.dec.ny.gov/permits/6069.html [https://perma.cc/59A2-Q38G] (last visited Aug. 30, 2022).

[156] *See id.* ("It is the policy of the State of New York to 'maintain a reasonable degree of purity of the air resources of the state, which shall be consistent with the public health and welfare and the public enjoyment thereof, the industrial development of the state, the propagation and protection of flora and fauna, and the protection of physical property and other resources, and to that end to require the use of all available practical and reasonable methods to prevent and control air pollution.'").

[157] *See* Kolbert, *supra* note 105 ("The Greenidge Generating Station in Dresden, New York, sits on the shores of Seneca Lake, about an hour southeast of Rochester. It was originally built in the nineteen-thirties to run on coal; over the decades, new units were added, and older ones shuttered. The power station ceased operations in 2011, and it sat idle until it was purchased by a private-equity firm and converted to run on natural gas.").

[158] *See* 42 U.S.C. § 7661(d)(b) ("If any permit contains provisions that are determined by the Administrator as not in compliance with the applicable requirements of this chapter, including the requirements of an applicable implementation plan, the Administrator shall, in accordance with this subsection, object to its issuance.").

[159] Letter from Daniel Whitehead to Dale Irwin, *supra* note 8.

[160] *See id.*; *see also* Kolbert, *supra* note 105.

[161] *See* Letter from Daniel Whitehead to Dale Irwin, *supra* note 8.

[162] *See id.*

> (1) the actual GHG emissions from the Facility have drastically increased since the time of the Title V permit issuance in 2016 and since the effective date of the [Climate Act] in 2020; (2) this increase in GHG emissions is primarily due to the fact that Greenidge has substantially altered the primary purpose of the Facility's operation, from providing electricity to the grid in a "peaking" capacity to powering its own energy-intensive PoW cryptocurrency mining operations behind-the-meter; and (3) renewal of the Title V permit would allow Greenidge to continue to increase the Facility's actual GHG emissions through the increased combustion of fossil fuels, for the benefit of its own behind-the-meter operations.[163]

Greenidge does not want to pursue a less energy-intensive method of cryptocurrency mining, such as proof-of-stake, in comparison to PoW.[164] It also did not suggest that it would reduce its GHG emissions by switching to alternative renewable energy or by purchasing electricity from the State electricity grid.[165] Thus, Greenidge is not in compliance with the renewable portfolio standards of the State.[166]

It is estimated that if Greenidge devoted 100% of its self-generated, BTM, fossil-fueled, electric generation to Bitcoin mining, annual GHG emissions would total 656,983 metric tons of CO_2.[167] To put things into perspective, this is comparable to the annual emissions of 140,000 passenger vehicles or burning 600 million pounds of coal.[168] Its continued operation would result in significant environmental degradation.[169]

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[163] *Id.*

[164] Letter from Daniel Whitehead to Dale Irwin, *supra* note 8; *see* Hiroko Tabuchi, *In Coinbase's Rise, a Reminder: Cryptocurrencies Use Lots of Energy*, N.Y. TIMES (Apr. 14, 2021), https://www.nytimes.com/2021/04/14/climate/coinbase-cryptocurrency-energy.html [https://perma.cc/D4WF-SJQJ] ("'Proof-of-stake' method … doesn't force miners to compete to add blocks to the blockchain, and instead awards miners new blocks based on how much cryptocurrency they already own.").

[165] Letter from Daniel Whitehead to Dale Irwin, *supra* note 8; *see Story of Our Grid*, NYSERDA, https://www.nyserda.ny.gov/About/Publications/Energy-Analysis-Reports-and-Studies/Electric-Power-Transmission-and-Distribution-Reports/Electric-Power-Transmission-and-Distribution-Reports---Archive/New-York-Power-Grid-Study/Story-of-Our-Grid#:~:text=Key%20Takeaways%3A,%2Dstate%20and%20imports)%20resources [https://perma.cc/ADC5-5YV5] (last visited Oct. 31, 2022) ("NYS achieves its '70% renewables to meet load in 2030' and '100% clean energy to meet load in 2040' targets with a renewable mix of offshore wind, land-based wind, utility solar, distributed solar, and hydro (in-state and imports) resources.").

[166] *See Renewable Portfolio Standard*, *supra* note 84 ("New York's Clean Energy Standard (CES) is the most comprehensive and ambitious clean energy goal in the State's history. The CES is designed to fight climate change, reduce harmful air pollution, and ensure a diverse and reliable low carbon energy supply.").

[167] Roeck & Drennen, *supra* note 83, at 355.

[168] *Id.*

[169] *See generally* French, *supra* note 29 ("Environmental groups have also raised concerns about the impacts on water quality and aquatic life. Like many combustion plants located on shorelines, Greenidge sucks up water for cooling and dumps it back at an elevated temperature. Greenidge's warm water, which its own review shows is on average 9 degrees higher than at intake, is discharged into the Keuka Outlet.").

2. The NY Public Service Commission has the Authority to Approve or Reject the Transfer of Ownership of Power Plants.

In September 2022, the New York PSC by declaratory order approved the transfer of ownership of the occasionally utilized natural gas-fired power plant, Fortistar, to a 24/7/365 Bitcoin mining operation facility utilizing BTM PoW, Digihost.[170] Digihost's takeover preceded the enactment of the moratorium and therefore, was not subject to its provisions.[171] However, Digihost's operations could increase GHG emissions up to 3500%.[172]

Under the declaratory ruling, the New York PSC stated that its limited review does not include environmental concerns, including compliance with the Climate and Leadership Protection Act (hereinafter "CLCPA").[173] Moreover, its interpretation of existing statutes, rules, or regulations is not subject to the State Environmental Quality Review Act (hereinafter "SEQRA"), and therefore, can be issued without further SEQRA review.[174]

In January 2023, environmental groups, The Clean Air Coalition of Western New York, and the Sierra Club, sued NYS for transferring ownership to Digihost.[175] In their complaint, they argue that Digihost's operations at the facility will undermine the emission-reduction goals of the NYS CLCPA and runs counter to the public interest.[176] They further argue, that the CLCPA broadly requires the state to conduct environmental reviews when making ownership transfer decisions, to ensure climate objectives are met.[177]

The CLCPA was enacted in July 2019 to reduce statewide GHG emissions.[178] The Climate Action Council created a Scoping Plan that will aid NYS to achieve its climate agenda of reaching carbon neutrality.[179] The CLCPA requires NYS to reduce economy wide GHG

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[170] Nydia Guiterrez, *Environmental Groups File Lawsuit Challenging New York Public Service Commission's Approval of Fracked Gas-Powered Crypto Mining Operations*, EARTHJUSTICE (Jan. 13. 2023), https://earthjustice.org/press/2023/environmental-groups-file-lawsuit-challenging-new-york-public-service-commissions-approval-of-fracked-gas-powered-crypto-mining-operations [https://perma.cc/25WX-N6US]; *see* Case 21-M-0238, N.Y.S. P.S.C. (Sept. 15, 2022) ("Digihost is a wholly owned subsidiary of Digihost Technology Inc. (DTI) and was formed for the purposes of acquiring the indirect ownership interests in Fortistar. DTI is a British Columbia company that is publicly traded blockchain technology company primarily focused on cryptocurrency mining.").

[171] *See* Aratani, *supra* note 8.

[172] Gutierrez, *supra* note 170.

[173] Case 21-M-0238, N.Y.S. P.S.C. ("Pursuant to PSL §§70 and 80, the Commission must review and approve proposed transfers of ownership interests in jurisdictional facilities and properties. These review processes have been adapted over time to accommodate lightened ratemaking regulation policies. Entities subject to lightened regulation operate in competitive markets and, therefore, must support PSL §§70 and 80 transfer requests with a demonstration under the Wallkill Presumption that the transaction would not present an opportunity to exercise either horizontal or vertical market power, or otherwise harm the interests of captive ratepayers of fully regulated utilities.").

[174] *See id.*

[175] *See id.*

[176] *Id.* ("Those opposed to the Proposed Transaction point to the noise, emissions, and water use impacts of the Facility and maintain that repurposing the use for energy-intensive cryptocurrency mining operations threatens the efforts to address climate change and meet the objectives of the CLCPA.").

[177] *See* Aratani, *supra* note 8.

[178] *Our Climate Act*, NEW YORK STATE, https://climate.ny.gov/ [https://perma.cc/GM7J-XCSR] (last visited Aug. 30, 2022).

[179] *See id.*

emissions by 40% by 2030 and no less than 85% by 2050 from 1990 levels.[180] If the current litigation re the Fortistar case is successful, the New York PSC would have to consider GHG emissions related to that power plant in exercising its transfer approval authority, notwithstanding the moratorium.[181]

V. THE SOLUTION: EXPANSION OF THE TWO- PRONG APPROACH TO A MULTISTATE COOPERATIVE AGREEMENT

This Note proposes the creation of a multistate cooperative agreement that would mimic and expand NYS's two-prong legislative and administrative approach. That is, states in a region would join to impose a moratorium on fossil fuel electric power plants that facilitate BTM PoW Bitcoin operations. The agreement would announce that the multistate moratorium would not preclude relevant agencies in each state from regulating facilities that emit substantial amounts of GHGs.

The overall efforts of such a multistate cooperative agreement would be to deter "forum shopping" or relocation, that is, if a miner is unable to perform operations in one locality they could relocate to another state with less restrictive laws.[182] Unlike other financial markets, cryptocurrency is unique in that it is a portable market that does not need to be in proximity to end users.[183] In theory, it only requires internet access and connection, so miners have the independence to operate from any locality.[184]

The proposed multistate cooperative agreement would limit and diminish the issue of relocation by reducing areas where miners are welcome to utilize fossil fuel BTM PoW cryptocurrency operations. Subsection A elaborates on the likelihood of success of this note's proposed solution by looking at two past multistate approaches that operated relatively

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[180] *Id.*

[181] *C.f.* Case 21-M-0238, N.Y.S. P.S.C. ("Sierra Club and Earthjustice filed joint comments objecting to Digihost's plan to use the electric output from the Facility for on-site "behind-the-meter" cryptocurrency production because it could undermine emission reduction objectives in the Climate Leadership and Community Protection Act (CLCPA). They also note their separate request to the New York State Department of Environmental Conservation to consider the environmental impacts when the air permits for the Facility are renewed.").

[182] *See* Mackenzie Sigalos, *China is Kicking Out More Than Half the World's Bitcoin Miners – and a Whole Lot of Them Could be Headed to Texas*, CNBC (June 15, 202, 2:12 PM), https://www.cnbc.com/2021/06/15/chinas-bitcoin-miner-exodus-.html [https://perma.cc/8SM5-M6G5] (discussing "the great mining migration" in China) ("After failing to meet Beijing's climate targets, province leaders decided to give bitcoin miners two months to clear out, explicitly blaming its energy misses on crypto mines… Because miners at scale compete in a low-margin industry, where their only variable cost is typically energy, they are incentivized to migrate to the world's cheapest sources of power… 'Chinese miners or miners that were domiciled in China are looking to Central Asia, Eastern Europe, the U.S. and Northern Europe.'"); *see also* Letter from Elizabeth Warren to Michael Regan, *supra* note 56 ("Mining operations for Bitcoin, the largest cryptocurrency by market cap, are increasingly moving onshore, with the United States' share of global mining increasing from 4 percent in August 2019 to nearly 38 percent in January 2022 – meaning that over a third of the global computing power dedicated to mining Bitcoin is now drawn from miners in the U.S., in part due to a government crackdown in China last year.").

[183] Sigalos, *supra* note 182.

[184] *See id.*

successfully in the oil industry and electric sector.[185] Subsection B suggests fundamental guiding predicates for each state to follow in participating in the multistate agreement.

A. States Acting Cooperatively to Form a Successful Multistate Agreement

A concern is that Bitcoin miners will likely seek to buy closed or closing coal-fired electric power plants in other localities as they did in NYS.[186] A multistate moratorium agreement may operate to block the emergence of miners utilizing fossil fueled BTM PoW operations by adapting the NYS two-prong approach[187] to a multistate region. If numerous states cooperatively adopt the NYS model, it could evolve into a single state cooperative approach. There are long-standing energy precedents for such multistate cooperative approaches.[188]

1. Interstate Compact to Conserve Oil and Gas Act

The Compact was enacted in 1935 to address waste and over exploitation of unregulated petroleum extraction.[189] In part, The Compact prevented forum shopping by oil developers for a jurisdiction with the least governmental regulation over oil drilling and production by adopting a uniform approach to oil well development regulation.[190] In the early 1900s, "overproduction of oil outstripped the demands of the market to buy it, the capacity of pipelines to transport it, and the ability of the refineries to convert it into saleable products."[191] Unsold oil went to waste or was stored in open surface pits, that were prone to fire and seepage.[192] Additionally, the industry was concentrated by corporate mergers and acquisitions, until the judiciary stepped in to ban monopolistic practices in 1911.[193]

The Compact sets out a multistate non-enforceable, voluntary oil production quota and other means to encourage uniform cooperative state preservation of oil and gas.[194] A multistate government body, the Interstate Oil and Gas Compact Commission (hereinafter "The Commission"), was formed to facilitate programs created to gather and share information, technologies, and regulatory methods.[195]

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185 *See infra* Section V.A.1, 2.

186 *See* Sigalos, *supra* note 182 ("Texas is an ideal destination for miners, thanks to its abundance of solar and wind power, its unregulated market, and its crypto-friendly political stance.").

187 *See supra* Section IV.

188 *See infra* Section V.A.1, 2.

189 *Our History*, *supra* note 19; *see* An Interstate Compact to Conserve Oil and Gas, Pub. L. No 91-158, 83 Stat. 436 (1969).

190 JAMES E. HICKEY ET AL., ENERGY LAW AND POLICY (1989).

191 *Id.*

192 *Id.*

193 *Id.*

194 *See id.*

195 *Our History*, INTERSTATE OIL & GAS COMPACT COMMISSION, https://iogcc.ok.gov/history [https://perma.cc/TQ3D-HS4B] (last visited Nov. 12, 2022); *see also* An Interstate Compact to Conserve Oil and Gas art. VI. ("Each State joining herein shall appoint one representative to a commission hereby constituted and designated as 'The Interstate Oil Compact Commission', the duty of which said shall be to make inquiry and ascertain from time to time such methods, practices, circumstances, and conditions as may be disclosed for bringing about

Today, there are over thirty oil producing states that are participants; a notable increase from the six states that were initial participants in 1935.[196] The Commission continues to support its member states through federal funded projects designed to promote the conservation of oil and natural gas sources, while protecting the health, safety, and the environment.[197]

2. The Regional Greenhouse Gas Initiative

RGGI is a cooperative effort to limit and reduce GHG emissions from large fossil fuel electric power plants among twelve Eastern states: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and Virginia.[198] Participating states adopted a uniform approach, which, among other matters, acts to dissuade electric utilities and electric generating merchants from forum shopping for lax GHG emission locations.[199]

RGGI is composed of CO_2 Budget Trading Programs from each participating state that limit their emissions of CO_2 from large fossil fuel electric power plants by issuing CO_2 allowances, that can be traded in regional CO_2 allowance auctions.[200] In 2022, the RGGI emissions cap was 156,828,784 CO_2 allowances and the adjusted cap was 137,738,454 CO_2 allowances.[201]

To ensure compliance, all twelve state programs are required to limit CO_2 allowances equal to their CO_2 emissions over a three-year control period.[202] Allowances must equal 50% of the emissions cap during each control period; this will prevent one state from over emitting by purchasing an abundance of allowances.[203]

The results of RGGI have been successful.[204] CO_2 emissions have dropped over 35%, which is largely attributable to shifting away from coal, increased energy efficiency, and a

conservation and the prevention of physical waste of oil and gas, and at such intervals as said commission deems beneficial it shall report its findings and recommendations to the several States for adoption or rejection.").

196 JAMES E. HICKEY, *supra* note 190; *Current Projects*, INTERSTATE OIL & GAS COMPACT COMM'N, https://iogcc.ok.gov/current-projects [https://perma.cc/5VJK-JPCU] (last visited Nov. 20, 2022).

197 *See Current Projects*, *supra* note 196.

198 *The Regional Greenhouse Gas Initiative*, RGGI, https://www.rggi.org/program-overview-and-design/elements [https://perma.cc/JTF6-XTN7] (last visited Oct. 6, 2022).

199 *See id.*

200 *Id.*

201 *Id.*

202 *Id.*

203 *See id.*

204 *See The Regional Greenhouse Gas Initiative: A Fact Sheet*, CERES, https://www.ceres.org/sites/default/files/Fact%20Sheets%20or%20misc%20files/RGGI%20Fact%20Sheet.pdf [https://perma.cc/9E4S-56TN] (last visited Apr. 4, 2023) (discussing reduction of GHGs, economic growth, low electricity prices, health impacts and implications for the clean power plan) ("RGGI states are well positioned to meet the EPA Clean Power Plan's carbon reduction requirements. As the CPP provides flexibility for multi-state compliance planning and the use of a mass-based program with tradeable allowances, the RGGI program presents an economically favorable model for other states looking to comply with the Clean Power Plan.").

growing use of renewable energy.[205] Since its creation, $1.3 billion in net economic benefits has accrued across the region, including economic growth, increased jobs, reductions in electricity costs and decreased emissions.[206]

B. The Proposed Multistate Cooperative Agreement

This Note proposes that NYS's evolving two-prong moratorium model on the use of closed or closing fossil fuel power plants by PoW Bitcoin operations should be expanded and serve as the basis for a multistate cooperative agreement. The cooperative agreement invites any state with Bitcoin mining facilities and closed or closing coal-fired power plants to voluntarily become a party.[207] The agreement would be formed with the general notion that the climate crisis is a global problem, and it is exacerbated by GHGs, specifically CO_2, emissions[208] from fossil fuel BTM PoW Bitcoin mining operations.

The purpose of a multistate agreement would be to deter Bitcoin miners from "forum shopping" for favorable state regulations that would enable continued fossil fuel electric use from closed or closing coal-fired power plants. States, of course, are ultimately free to negotiate the terms, scope, and content of any multistate agreement. Ideally, such an agreement would be guided by collective state acceptance of the following predicates which would form the core of the agreement:

1. The broad purpose of such an agreement is to deter the use of closed or closing fossil fuel power plants to provide electricity for PoW cryptocurrency operations for the duration of an applied moratorium period. [209]

2. States accept a duty to cooperate in reaching the agreement and in implementing any such agreement.

3. States accept a duty in good faith[210] to achieve meaningful agreement consistent with effective reduction of GHG emissions contributing to climate change from PoW cryptocurrency operations.

4. States agree to adopt methods to collect and show all relevant data related to GHG emissions from PoW cryptocurrency operations and to

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[205] *Id.*

[206] *Id.*

[207] *C.f.* An Interstate Compact to Conserve Oil and Gas art. I. ("This agreement may become effective within any compacting state at any time as prescribed by that state, and shall become effective within those states ratifying it whenever any three of the States of Texas, Oklahoma, California, Kansas, and New Mexico have ratified and Congress has given its consent. Any oil-producing state may become a party hereto as hereinafter provided.").

[208] *See supra* Section II, C.; *see also The Regional Greenhouse Gas Initiative*, *supra* note 198.

[209] *C.f.* N.Y.S. 6486 (implementing a 2-year moratorium on BTM PoW Bitcoin mining operations).

[210] *See* U.C.C. § 1-201 (amended 2001) ("'Good Faith' … means honesty in fact and the observance of reasonable commercial standards of fair dealing.").

> make all data collected freely available to the public in a timely matter.[211]
>
> 5. States accept and encourage all relevant state agencies, acting within their respective jurisdictions and authority, to complement any multistate moratorium agreement in exercising their regulatory duties for permission and approvals that might not be covered by the moratorium.[212]
>
> 6. A committee called "The Interstate Bitcoin Mining Energy Compact Commission" will be comprised of members from each participating state will be formed to facilitate communication, promulgate innovative ideas, and ensure compliance.[213]

These predicates will establish the parameters that must be set by all participants to the cooperative agreement. Acting as a guideline, states should feel free to adopt other pillars as they deem fit or that better align with their own regulatory authority, consistent with the six predicates.[214]

VI. CONCLUSION

This Note has explained the use of closed or closing fossil fuel electric power plants by BTM PoW Bitcoin mining. It has estimated that such operations, if allowed to continue, will contribute disproportionately to GHG emissions exacerbating climate change.[215] It has

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[211] *C.f.* An Interstate Compact to Conserve Oil and Gas art. VI. (; *see* Kyra Bell-Pasht & Dana Krechowicz, *Why Does Access to Good Climate Data Matter?*, WMO (2015), https://public.wmo.int/en/resources/bulletin/why-does-access-good-climate-data-matter [https://perma.cc/3GFD-X5HF] ("Both private and public sector decision-makers need accessible, credible and relevant climate information to increase resilience to the more intense and frequent weather extremes scientists foresee as a potential consequence of climate change… governments have a key role to play.").

[212] *See supra* Section IV, B.

[213] *C.f.* An Interstate Compact to Conserve Oil and Gas art. VI. ("Each State joining herein shall appoint one representative to a commission hereby constituted and designated as 'The Interstate Oil Compact Commission', the duty of which said commission shall be to make inquiry and ascertain from time to time such methods, practices, circumstances, and conditions as may be disclosed for bringing about conservation and the prevention of physical waste of oil and gas, and at such intervals as said commission deems beneficial it shall report its findings and recommendations to the several States for adoption or rejection.").

[214] *C.f. State Statutes & Regulations*, THE REGIONAL GREENHOUSE GAS INITIATIVE, https://www.rggi.org/program-overview-and-design/state-regulations [https://perma.cc/SEG9-8D9T] (last visited Nov. 20, 2022) ("Through statutes or regulations based on the RGGI Model Rule, each state has established individual CO_2 Budget Trading Programs based upon its own statutory or regulatory authority. Together, these compose a regional cap and market for allowances. Each state's CO_2 Budget Trading Program limits emissions of CO2 from electric power plants, issues CO_2 allowances and establishes participation in regional CO_2 allowance auctions. In addition to their individual CO_2 Budget Trading Programs, the RGGI states have established a variety of goals and commitments related to climate and energy.").

[215] *See* MANDY DEROCHE ET AL., *supra* note 62 ("Based on the current grid generation mix and estimated Bitcoin energy consumption, we estimate Bitcoin mining in the United States is responsible for between 11 to 76 million

addressed NYS's evolving two-prong approach, including a moratorium on such operations,[216] and suggested expanding such a moratorium to the basis of a multistate cooperative agreement in the future. In cases that fall outside the scope of a moratorium, state administrative agencies may have the authority to enforce GHG emission limitations by approving or rejecting major operating decisions.[217]

The negative environmental GHG emissions implications of Bitcoin mining has sparked an environmental call for the decarbonization of the global cryptocurrency industry by 2040.[218] NYS has taken a proactive approach to begin to achieve this goal, in response to crypto miners entering the state to retrofit closed or closing coal-fired electric power plants to fuel their BTM PoW operations.[219] The failure of global and national efforts to diminish GHG emissions up to this very day supports the notion that local solutions are now, more than ever, necessary to address GHG emissions challenges like those posed by PoW cryptocurrency operations.[220]

If it is accepted that the potential of Bitcoin to evolve as a powerful, permanent presence in our global economic system is a very real possibility,[221] a multistate cooperative agreement as proposed in this note will help to assure that PoW operations do not exacerbate the exponential threat of mankind's GHG emissions contributing to global climate change.[222] Bitcoin mining operations need to alter their methods to help curb the climate crisis together with localities in an enforceable way.[223] The proposed solution within this Note is a feasible method to address an imminent environmental existential threat to the world.

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annual excess tons of CO_2 in the last year, with a central estimate of 27.4 million tons CO_2. For context, that is about three times as much CO_2 as was emitted by the largest coal plant in the United States in 2021.").

[216] *See supra* Section IV, A.

[217] *See supra* Section IV, B.

[218] *See* CRYPTO CLIMATE ACCORD, https://cryptoclimate.org/accord/ [https://perma.cc/5JXU-S8EH] (last visited Aug. 8, 2022).

[219] *See* N.Y.S. 6486; *see generally* French, *supra* note 29.

[220] *See* Hill, *supra* note 134.

[221] *See* Jaworska, *supra* note 41; *e.g.*, MANDY DEROCHE ET AL., *supra* note 62 ("Today, the scale of cryptocurrency mining is expanding rapidly in the United States. Cryptocurrency mining is now the largest source of electricity demand for some utilities. In Texas alone, we tracked 2,234 MW of cryptocurrency mining facilities, almost entirely built since mid-2021. Eight of the facilities are between 150 to 300 MW each. A single 300 MW facility might host nearly 100,000 machines, consuming enough electricity to power, on average, nearly 49,000 nearby homes. Unlike many industrial operations or even data centers that reduce energy usage at off-peak times, these facilities typically run 24 hours a day, seven days a week, 365 days a year, at full capacity.").

[222] *See The Effects of Climate Change*, NASA, https://climate.nasa.gov/effects/ [https://perma.cc/6A3Y-A5AH] (last visited Oct. 10, 2022).

[223] *See* Press Release, The White House, *supra* note 50; *see also* MANDY DEROCHE ET AL., *supra* note 62 ("In the absence of a comprehensive strategy to reduce all emissions from the power sector, adding this [Bitcoin energy consumption] massive amount of new electricity demand will drive up emissions. Until the grid and all new generation build-out has been completely decarbonized, proof-of-work cryptocurrency miners will never exclusively rely on renewable energy to power their operations. But cryptocurrency mining threatens to derail or reverse decarbonization in ways that go beyond simply adding electrical load. At a moment when the cost of fossil fuel generation exceeds wind or solar alternatives, the economic fundamentals of cryptocurrency mining distort the U.S. energy market and drive increased coal and gas generation.").