Energy Intensive and Trade Exposed Industry - Cryptocurrency

I. Introduction

The climate and energy impacts of proof-of-work cryptocurrency mining, such as for Bitcoin, in New York and throughout the United States are staggering and increasing every day.[1] Following China's ban on proof-of-work mining in September 2021, the U.S. is now the largest proof-of-work mining location in the world, accounting for more than one-third of the global market.[2] New York is home to approximately 20% of the country's proof-of-work cryptocurrency mining operations.[3]

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[1] Renee Cho, *Bitcoin's Impacts on Climate and the Environment*, Columbia Climate School (Sept. 20, 2021), https://news.climate.columbia.edu/2021/09/20/bitcoins-impacts-on-climate-and-the-environment/.

[2] *See, e.g.*, BBC, *US Leads Bitcoin Mining as China Ban Takes Effect* (Oct. 13, 2021), https://www.bbc.com/news/technology-58896545; *see also* Letter from Senator Elizabeth Warren et al. to Cryptominers (Jan. 27, 2022) (explaining that the United States' share of global Bitcoin mining increased from 4% in August 2019 to 35% in July 2021).

[3] MacKenzie Sigalos, *New York and Texas are Winning the War to Attract Bitcoin Miners*, CNBC (Oct. 9, 2021), https://www.cnbc.com/2021/10/09/war-to-attract-bitcoin-miners-pits-texas-against-new-york-kentucky.html?utm_term=Autofeed&utm_medium=Social&utm_content=Main&utm_source=Twitter#Echobox=1633780959.

The dramatic increase in fossil fuel-generated electricity consumption caused by proof-of-work cryptocurrency mining operations directly interferes with New York State's ability to reach the greenhouse gas emission reductions and renewable energy mandates established in the Climate Leadership and Community Protection Act ("CLCPA"). New York's proof-of-work cryptocurrency mining operations threaten local health, local ecosystems, local economies,[4] and divert renewable energy away from areas where it is truly needed—all issues that the New York State Energy Research and Development Authority ("NYSERDA"), New York Public Service Commission ("PSC"), New York State Department of Environmental Conservation ("DEC"), New York Department of Public Service ("DPS"), and the New York Independent System Operator ("NYISO") have been working so hard to decarbonize despite fierce fossil-fuel industry opposition.[5] Proof-of-work mining will very likely prevent the State from meeting the statutory mandates of the CLCPA, as described further below.

> An increased use of fossil fueled electricity has terrible consequences for climate, air and water pollution, and is unconscionable during a climate crisis, especially when the Co-Chair of IPCC Working Group III C recently warned that, "[i]t's now or never, if we want to limit global warming to 1.5°C (2.7°F); without immediate and deep emissions reductions across all sectors, it will be impossible."[6]

II. Proof-of-work Cryptocurrency Mining Threatens New York's Climate Goals and Its Grid

The CLCPA's short timeline to achieve 70% renewable energy by 2030 and 100% zero-emissions electricity by 2040, along with a reduction in greenhouse gas ("GHG") emissions by 40% by 2030 and by 85% by 2050 necessitates aggressive GHG emissions reductions, and proof-of-work cryptocurrency mining's insatiable energy appetite makes it more difficult to meet those requirements.[7] In fact, DEC affirmed that New York cannot afford to maintain fossil fuel use by stating, "[t]he continued long-term use of fossil fuels to produce electricity . . . is inconsistent with the State's statutory requirement[s]."[8] To reduce GHG emissions 85% by 2050, with an interim requirement of 40% by 2030,[9] we must rapidly scale up a renewable-powered

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[4] *See* Marissa Solomon, *Gillibrand Commits LIVE ON AIR to Visit FLX & Meet w/Residents on Climate Killing Cryptomining @ Greenidge*, Seneca Lake Guardian (Apr. 27, 2022) (e.g., pointing to the $3 billion agritourism economy, employing approximately 60,000 people in the Finger Lakes), http://readme.readmedia.com/Gillibrand-Commits-LIVE-ON-AIR-to-Visit-FLX-Meet-w-Residents-on-Climate-Killing-Cryptomining-Greenidge/18521058.

[5] *See, e.g.*, *Tier 4 – New York City Renewable Energy*, NYSERDA, https://www.nyserda.ny.gov/All-Programs/Programs/Clean-Energy-Standard/Renewable-Generators-and-Developers/Tier-Four (last visited May 14, 2021); *see also* NYISO, *Power Trends 2021: New York's Clean Energy Grid of the Future, Tale of Two Grids*, at slide 6 (2021), https://www.nyiso.com/documents/20142/21201742/PT-2021-Tale-of-Two-Grids.png/6fbedc32-4316-f11b-3f76-74742258d456?t=1619805707764.

[6] Africa Renewal, *UN Climate Report: It's 'Now or Never' to Limit Global Warming to 1.5 Degrees*, UN News (Apr. 4, 2022), https://www.un.org/africarenewal/magazine/april-2022/un-climate-report-it%E2%80%99s-%E2%80%98now-or-never%E2%80%99-limit-global-warming-15-degrees.

[7] *See* Irene Weiser, Tompkins League of Women Voters, *Bitcoin, Cryptocurrency, Blockchain: The Promise and the Peril*, YouTube (Jan. 13, 2022), https://www.youtube.com/watch?v=qIuMqn2ISA4.

[8] Letter from Daniel Whitehead, Dir. Div. of Env't Permits, DEC, to Andrew Scano, Astoria Gas Turbine Power, *Re: Notice of Denial of Title V Air Permit* 11 (Oct. 27, 2021), https://www.dec.ny.gov/docs/permits_ej_operations_pdf/nrgastoriadecision102721.pdf ("Astoria Title V Permit Denial").

[9] ECL § 75-0107(1).

electrified economy. As the cryptocurrency market continues to grow, the associated increased demand in energy consumption to operate proof-of-work cryptocurrency mining threatens to make the clean energy transition and the likelihood of meeting federal and state-level climate and energy goals much more difficult, if not impossible.

Furthermore, our grid needs to rapidly decarbonize in order to meet CLCPA mandates and to prevent the worst of climate impacts on New Yorkers. Building electrification and transportation electrification will increase the amounts of load coming on to the grid. There is not enough clean energy in New York State (or nearby) to meet all that demand, plus the new load for proof-of-work cryptocurrency mining.

A. Proof-of-work cryptocurrency mining uses an enormous amount of energy, including fossil fuels.

Proof-of-work cryptocurrency mining consumes massive amounts of electricity.[10] Bitcoin's global electricity consumption alone increased more than threefold between the beginning of 2019 and May 2021.[11] Estimates of global energy use are approximately 152 tera-watt hour ("TWh").[12] In fact, in the past five years, proof-of-work's energy use across the United States has risen 320%.[13] Due to this enormous amount of energy usage, Bitcoin's annual global emissions have been estimated by some to be between roughly 60 to 100 million tons of carbon dioxide ("CO_2"), though this is most likely an underestimate given the exponential growth of mining in recent years.[14] Further, a recent congressional memo estimates that the annual emissions from Bitcoin and Ethereum are equal to roughly 15.5 million car tailpipes.[15] Although it is difficult to forecast emissions in coming years given the rapid growth of proof-of-work cryptocurrency mining in the United States after China's ban in September 2021, academics estimate that "cryptocurrency's energy usage will rise another 30% by the end of the decade—producing an additional 32.5 million metric tons of carbon dioxide a year."[16]

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[10] Jon Huang et al., *Bitcoin Uses More Electricity Than Many Countries. How is that Possible?*, N.Y. Times (Sept. 3, 2021), https://www.nytimes.com/interactive/2021/09/03/climate/bitcoin-carbon-footprint-electricity.html.
[11] *Id*.
[12] Bitcoin's network power demand is estimated to be in the range of 57.13 TWh to 343.75 TWh annually. *See Cambridge Bitcoin Electricity Consumption Index*, Univ. of Cambridge, https://ccaf.io/cbeci/index (last visited May 3, 2022).
[13] *See, e.g.*, Yvonne Taylor, *Bitcoin Mining is a Threat to New York's Climate. Here's Why | Opinion*, Lohud (Jan. 14, 2022), https://www.lohud.com/story/opinion/2022/01/14/bitcoin-mining-threat-new-yorks-climate-heres-why/6519094001/; Zach Budryk, *Democrats Press Cryptomining Companies on Energy Consumption*, The Hill (Jan. 27, 2022), https://thehill.com/policy/energy-environment/591714-eight-congressional-democrats-press-cryptomining-companies-on.
[14] *Bitcoin Energy Consumption Index*, Digiconomist, https://digiconomist.net/bitcoin-energy-consumption (last visited June 15, 2022) (estimating Bitcoin's annual carbon footprint at 84.69 million metric tons of CO2, comparable to the carbon footprint of Bangladesh); *see also* Forex Suggest, Global Impact of Crypto Trading, https://forexsuggest.com/global-impact-of-crypto-trading/ (last visited Jan. 21, 2022) (estimating that Bitcoin emits ~57 million metric tons of CO2 annually).
[15] Memorandum from Comm. on Energy & Commerce Staff to the Subcomm. on Oversight & Investigations, *Re: Hearing on "Cleaning Up Cryptocurrency: The Energy Impacts of Blockchain"* (Jan. 17, 2022), https://energycommerce.house.gov/sites/democrats.energycommerce.house.gov/files/documents/Briefing%20Memo_OI%20Hearing_2022.01.20.pdf.
[16] Lois Parshley, *How Bitcoin Mining Devastated This New York Town*, MIT Tech. Rev. (Apr. 18, 2022), https://www.technologyreview.com/2022/04/18/1049331/bitcoin-cryptocurrency-cryptomining-new-york/.

B. Proof-of-work mining places a large new load on the New York State electric grid.

At a recent legislative budget hearing, when asked about the potential impact of the escalating cryptocurrency mining activity in upstate NY on the state's energy grid, NYSERDA President Doreen Harris stated, "[t]here could be a very significant impact on NY load resulting from cryptocurrency mining depending on the penetration of the resource."[17]

To our knowledge, there is no registry of proof-of-work mining facilities in New York State or anywhere in the United States. Data on mining facilities in New York State in Table 1 below, are derived from various news stories, press releases, videos, town board minutes, etc.[18] Based on the information we could locate, there are currently thirteen proof-of-work mining facilities imposing at least a 576-megawatt ("MW") load in New York State. Data on the number of specialized computers, (aka mining rigs or ASICs—Application Specific Integrated Circuits) used at a given site was even harder to come by, but we were able to approximate at least 88,000 mining rigs in New York State, *(see Table 1 below)*. If these mining operations expand to the extent their literature suggests, by the fourth quarter of 2022, there could be up to 1,626 MW of proof-of-work mining operations in New York State.

[17] Seneca Lake Guardian, *Gov Hochul + DEC Punt Decision on Greenidge Generation Air Permits Again* (Mar. 31, 2022), https://www.senecalakeguardian.org/index.php?tray=content&tid=1SLGtop4&cid=1SLG141.
[18] Provided by Fossil Free Tompkins.

Table 1: Known Proof-of-work Mining Facilities Currently Operating in New York State

Mining Facility	MW	Electric Source	# Machines	Status
Coinmint NCDC Massena, Old Alcoa W	250 --> 435	NYPA, hydro	46,000 → 81,000	Operating @ 250; 185 request pending NYISO review
Greenidge LLC Coal → Gas power plant Seneca Lake, Dresden	25 – >100	Onsite Gas Generation Carbon offsets, 2MW solar proposed	17,300 →31,700	Operating @ 25MW, propose increase to 100MW. **Already 10x increase GHG emissions.** DEC air permit renewal pending 3/31/22
Fortistar (Digihost) Operating gas peaker plant N. Tonawanda	35 --> 55	Gas	9400	Proposal to convert pending PSC decision. DEC air permit renewal soon. Convert to RNG or Hydrogen? 14 containers @700 rigs each
Somerset, Lake Mariner Retired coal plant, Barker	0 - 250 --> 500	Hydro, grid mix		NYPA approved 90 MW hydro. Town approved; construction underway.
Cayuga, TeraWulf Retired coal plant Cayuga Lake, Lansing	0 --> 100	Hydro, grid mix		NYPA approved 2.5 MW hydro. Possible 100-200 MW solar? No active proposal w Town.
Wattum Niagara Falls area	5 –> 50	Hydro Grid mix		Operating 5MW now. Expand to 50MW in 2022.
Weitsman Owego	8 --> 115	Grid mix	2500 ->35,000	Operating 8 MW now. 100 more pending. Interconnection app?
Massena Containers	2 –> 20	Hydro Grid mix		Multiple. Town issued moratorium
Mechanicsville	4	Hydro		Operating.
US Bitcoin Niagara Falls	45	Hydro Grid mix	12,600	Operating. 18 containers@ old DuPont site in Niagara Falls x 700 rigs per container
Bit Digital / Blockfusion Niagara Falls	150	Hydro Grid mix		GM coal plant along Niagara River
Plattsburgh NCDC	10	Hydro Grid mix		
Digihost American Axle Buffalo	42	Hydro Grid Mix		
TOTAL	576 MW now 1336 – 1626 MW by Q4 2022		87,800 known	

To put the above cryptocurrency mining load in perspective, consider the following: For the year 2020, NYISO reports that the State used 150,198 gigawatt hours ("GWh") electricity.[19] Thus, the 576 MW (5,046 GWh) load we have identified for active, known instances of proof-of-work mining is 3.35% of NYS's 2020 energy use. If the proof-of-work mining expansion to 1,626 MW (14,244 GWh) by Q4 2022 occurs—this would be a whopping 9.5% of NYS's 2020 energy use.[20]

C. Proof-of-work cryptocurrency mining operations will make it harder to achieve New York State renewable energy commitments.

Adding demand from proof-of-work cryptocurrency mining to the New York grid could increase capacity problems, especially downstate.[21] In order to simultaneously meet CLCPA renewable energy mandates while also rapidly electrifying the building and transportation sectors, the NYISO projects the need to install 15,000 MW new solar and 8,700 MW land-based wind by 2030.[22] To accomplish this task in the next eight years is daunting. In addition, new transmission lines will need to be installed to convey this energy from where the land is upstate to where the load is downstate.

Clearly allowing underutilized fossil fuel power plants to engage in proof-of-work mining of digital assets 24/7/365 would take the State (and the country) in the wrong direction relative to meeting renewable energy and greenhouse gas reduction goals.

To satisfy the voracious appetite of proof-of-work mining for electricity with renewable energy sources while also meeting the State's ambitious renewable energy goals is likely not feasible. A likely result is that fossil-fueled power plants will need to continue operation in order to satisfy the added grid load from proof-of-work mining activities.

By way of example, 100 MW energy drawn from the grid is not the same as installing 100 MW renewable resources. In New York State, solar has a capacity factor of approximately 14%,[23] meaning that one would need to install 714 MW solar to generate the equivalent of 100 MW grid power. Similarly, the capacity factor for wind in New York State at present is approximately 29%,[24] meaning that one would need to install 100/0.29 = 345 MW wind to produce 100 MW grid power. Applying these capacity factors to the current 576 MW proof-of-work cryptocurrency mining in New York State would require adding an additional 4,144 MW (27%) of solar energy to the 15,000 MW needed by 2030 as NYISO indicated, and a colossal

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[19] NYISO, *Delivering the Grid of the Future: How Markets Support Climate & Policy Goals*, at slide 10, https://www.nyiso.com/documents/20142/2225523/How-Markets-Support-Climate-and-Policy-Goals.pdf (last visited June 15, 2022).
[20] Provided by Fossil Free Tompkins.
[21] *See* Severin Borenstein, *Crypto Mining for a More Stable Grid?*, Energy Inst. at HAAS (Mar. 21, 2022), https://energyathaas.wordpress.com/2022/03/21/crypto-mining-for-a-more-stable-grid/.
[22] NYISO, *2019 Caris Report: Congestion Assessment and Resource Integration Study* 5–6 (2020), https://www.nyiso.com/documents/20142/2226108/2019-CARIS-Phase1-Report-Final.pdf/bcf0ab1a-eac2-0cc3-a2d6-6f374309e961.
[23] NYISO, *Power Trends 2020: The Vision for a Greener Grid* 18 (2020), https://www.nyiso.com/documents/20142/2223020/2020-Power-Trends-Report.pdf/dd91ce25-11fe-a14f-52c8-f1a9bd9085c2.
[24] *Id.*

11,614 MW (77% increase) to provide enough solar power to cover the 1,626 MW added proof-of-work mining load anticipated by Q4 of 2022. Alternatively, adding wind for 576 MW would entail adding 1,986 MW wind, at 4 MW per turbine, equal to adding another 496 turbines—a 23% increase over the 2,200 turbines already planned. To cover the 1,626 MW load anticipated by Q4 2022 would require an additional 5,607 MW wind, or 1,401 additional turbines by 2030—an increase of 64% over the NYISO-planned build out. Investigative studies will be essential for understanding what necessary additions would need to be made to the transmission system to provide interconnection and hosting for this added capacity.

Further, as indicated above in the Table 1 list of current mining operations in the State, much of the current proof-of-work mining activity is taking place near Niagara Falls and the St. Lawrence River hydro plants. Mining facilities are utilizing the State's few sources of baseload renewable energy, while not providing any additive renewable energy or storage resources to the grid to compensate.

D. Proof-of-work cryptocurrency mining operations could displace renewables away from residential and commercial uses as well as hard-to-decarbonize industries.

Across the country, the cryptocurrency mining industry has been arguing that proof-of-work cryptocurrency mining could "stabilize" the grid. Grid experts are doubtful. For example, a recent analysis by UC Berkeley's Energy Institute found that "[a]dding demand will just make a grid tighter and increase capacity problems."[25] In addition, it is patently unfair for miners to add enormous new loads on the grid and then seek to be paid, handsomely, to take that load off the grid during emergencies or peak times, at the expense of ratepayers.[26] As explained recently by

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[25] Borenstein, *supra* note 24.

[26] *See, e.g.*, MacKenzie Sigalos, *Bitcoin Miners Say They're Helping to Fix the Broken Texas Electric Grid – and Ted Cruz Agrees*, CNBC (Dec. 4, 2021) ("Miners commit to buying a certain amount of power, and either use it for mining if the grid doesn't need it, or sell it back at a profit if the grid demands it."), https://www.cnbc.com/2021/12/04/bitcoin-miners-say-theyre-fixing-texas-electric-grid-ted-cruz-agrees.html; Naureen S. Malik & Michael Smith, *Crypto Mania in Texas Risks New Costs and Strains on Shaky Grid*, Bloomberg (Mar. 15, 2022) ("Upgrades to the power system will be needed because the grid 'can't handle all of this new load,' said Evan Caron, a former power trader in Austin who invests in energy technology. New investments in the transmission system are typically shared among Ercot's consumers and show up in their utility bills."), https://www.bloomberg.com/news/articles/2022-03-15/crypto-mania-in-texas-risks-new-costs-and-strains-on-shaky-grid Chris Tomlinson, *Crypto Could Raise Texas Electricity Prices if Not Planned Well*, Houston Chronicle (Apr. 15, 2022) ("Crypto-miners often brag they can shut down in five seconds if the grid needs the power, but rising cryptocurrency values make voluntarily 'saving the grid' less attractive. Miners are enrolling in ERCOT programs where they are paid to shut down, creating an additional cost."), https://www.houstonchronicle.com/business/columnists/tomlinson/article/Crypto-could-raise-Texas-electricity-prices-if-17081552.php; Sabrina Toppa, *In Texas, an Influx of Crypto Miners May Mean Higher Elec. Bills for Consumers*, The Street (Mar. 16, 2022) (explaining that "upgrades to the local electricity grid may soon involve an increase in electricity fees for consumers across the Lone Star state"), https://www.thestreet.com/crypto/news/in-texas-the-influx-of-crypto-miners-may-mean-higher-electricity-bills; Karin Rives, *Crypto Mining Industry's Greening Campaign Raises New Questions*, S&P Global (May 4, 2022) ("[C]oncerns are growing that the industry could be using too much of the state's wind capacity and could drive up power prices for homes and businesses."), https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/crypto-mining-industry-s-greening-campaign-raises-new-questions-69679254; *see also* Ariana Garcia, *Can Texas' Power Grid Withstand Cryptocurrency Mining?*, Governing (Nov. 2, 2021), https://www.governing.com/next/can-texas-power-grid-withstand-cryptocurrency-mining.

a professor at the Berkeley HAAS Energy Institute, "the crypto mining business model is based on buying electricity at wholesale prices or on a real-time variable price tariff. . . . That means the mining companies get paid for taking demand off the grid that they never would have put on the grid at those high prices anyway."[27]

The recent challenges to the state of Texas's grid are illustrative, where proof-of-work miners have also flocked for access to cheap but GHG-intensive electricity. For comparison, ERCOT, the independent system operator of Texas, estimates that proof-of-work cryptomining alone will account for 6 GWs of new demand over the next two years—with peak demand in 2022, a 7.7% increase over 2021 demand.[28] Due to the immense increase in load from proof-of-work cryptomining operations alone, regardless of electrification loads expected from transportation and building electrification in the coming decade or from new renewable energy needed for *truly* green, clean hydrogen, ERCOT is instituting additional processes and requirements for new large-scale crypto miners seeking to connect to the state's power grid.[29] On March 25, 2022, ERCOT released a notice instructing utilities to submit studies on the impact of miners and other large users tapping the grid before they can get "approval to energize." [30] ERCOT's new rule applies to both new projects and expansions, as well as projects at the site of power generation, and projects that do not have their own power generation, specifically: any project that will add 20 MW of demand on the site of a generator within the next two years, and any project that will add 75 MW of demand without its own power generation on site within the next two years, will have to undergo a review process.[31] NYISO should consider additional processes and differential rates like these for crypto miners in New York State who tax our grid and raise rates as they divert cheap renewable energy for essential home and commercial use.[32]

In New York, this equally enormous amount of energy use (20% of the country's mining) threatens to undo our State's climate efforts to date, and at a time when New York needs to drastically reduce consumption of fossil fuels across its economy, prolongs the usage of fossil fuels by diverting renewable energy sources away from where it is needed to achieve New York's climate and energy goals. If proof-of-work cryptocurrency mining operations run on fossil fuels—with the resultant spewing of toxic air and increasing climate pollution, and

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[27] Borenstein, *supra* note 24 (emphasis added).
[28] Naureen S. Malik, *Crypto Miners' Electricity Use in Texas Would Equal Another Houston*, Bloomberg (Apr. 27, 2022), https://www.bloomberg.com/news/articles/2022-04-27/crypto-miners-in-texas-will-need-more-power-than-houston; Michael Smith, *Texas Governor Eyes Bitcoin to Fortify the Electric Grid*, Bloomberg (Jan. 27, 2022), https://www.bloomberg.com/news/articles/2022-01-27/texas-governor-eyes-bitcoin-mining-to-fortify-the-electric-grid.
[29] *See* Naureen S. Malik, *Texas Grid's Review of Crypto Miners Connection May Take Months*, Bloomberg (Apr. 4, 2022), https://www.bloomberg.com/news/articles/2022-04-04/texas-grid-s-review-of-crypto-miners-connection-may-take-months.
[30] ERCOT, W-A032522-01, *Market Notice re Interim Large Load Interconnection Process* (Mar. 25, 2022), https://www.ercot.com/services/comm/mkt_notices/detail?id=fc84b65f-72fe-4704-9974-b52974cdb81e.
[31] Bloomberg Wire, *Texas now requiring crypto miners to seek 'approval to energize' before plugging into grid*, Dallas Morning News (Mar. 30, 2022), https://www.dallasnews.com/business/energy/2022/03/30/texas-now-requiring-crypto-miners-to-seek-approval-to-energize-before-plugging-into-grid/; Chris Reeder & Miguel Suazo, *ERCOT Now Requires Cryptocurrency Miners to Provide Information on Their Impact to the Texas Power Grid*, JDSupra (Apr. 6, 2022), https://www.jdsupra.com/legalnews/ercot-now-requires-cryptocurrency-6065651/.
[32] *See id.*

generation of enormous amounts of electronic waste—they contravene New York's several statutory mandates of the CLCPA.

Even when powered by renewables, the explosion of proof-of-work mining threatens New York's climate goals by diverting renewables from being sent to the grid that is rapidly electrifying and the State will not be able to ensure that the limited renewable energy that exists today goes where the state's energy is most demanded. Contrary to proof-of-work cryptocurrency mining proponents, mining is not a catalyst for growth in clean energy. Clean energy is already cost-effective, efficient, and decentralized in comparison to dirty fossil fuel plants, even without the presence of cryptocurrency mining.

In actuality, cryptocurrency mining companies are predominantly utilizing fossil fuel generation,[33] to mine for cryptocurrency. And even where clean, renewable energy technologies like solar or wind are being used to mine, many operations do not have commitments for renewable-only power supply. Further, considering how volatile the cryptocurrency market is and the fact that cryptocurrency mining companies come and go, there are serious implications for what happens when a cryptocurrency mining facility leaves an area and the economics of the renewable energy project becomes unable to properly compete in an open market, thereby potentially becoming stranded.

Crypto miners also often assert that they can spur renewable energy growth. But renewable energy costs are already low, [34] its growth is exponential,[35] and it does not need crypto

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[33] While proponents of proof-of-work cryptocurrencies claim that mining makes use of excess renewable generation, thereby reducing curtailment and helping to financially support renewable power development, miners have largely relied on baseload power supplied primarily by fossil fuels. Guest Contributor, *Cryptocurrency Mining and Renewable Energy: Friend or Foe?*, Smart Energy Int'l, (May 25, 2021), https://www.smart-energy.com/renewable-energy/cryptocurrency-mining-and-renewable-energy-friend-or-foe/.

[34] According to a 2020 report by the International Energy Agency, solar power now offers the "cheapest electricity in history" with technology cheaper than coal and gas in most major countries, and an estimated 43% increase in solar output expected by 2040. Simon Evans, *Solar is Now 'Cheapest Electricity in History', Confirms IEA*, CarbonBrief (Oct. 13, 2020), https://www.carbonbrief.org/solar-is-now-cheapest-electricity-in-history-confirms-iea; Utility-scale solar and wind power costs have dropped 90% and 71% respectively in the last 10 years, now costing less than gas, geothermal, coal, or nuclear. Ula Chrobak, *Solar Power Got Cheap. So Why Aren't We Using It More?*, Popular Science (Oct. 8, 2021), https://www.popsci.com/story/environment/cheap-renewable-energy-vs-fossil-fuels/.

[35] PJM, a regional transmission organization that coordinates the movement of wholesale electricity across 13 Mid-Atlantic and Midwest states, plus the District of Columbia, had over 288,609 MW in their interconnection queue at the end of December 2021, with projects including 136,293 MW of solar, 74,498 MW of energy storge, 34,152 MW of hybrid projects that combine storage and renewables, 25,336 MW of onshore wind and 18,330 MW of offshore wind. Ethan Howland, *PJM Stakeholders Advance Interconnection Reform Plan to speed Process, Clear Clean Energy Backlog* (Feb. 11, 2022) https://www.utilitydive.com/news/pjm-interconnection-reform-plan-renewable/618707/; Currently, developers have more than 2,000 solar, wind, battery storage and hybrid solar plus storage projects waiting for approval in the PJM interconnection queue, totaling nearly 300 GW of generating capacity that, if built, could generate power for 68 million homes and support approximately 1.7 million jobs. Jeff Dennis & Kat Burnham, *In PJM, Renewable Energy Projects Are Getting Stuck* (Feb. 10, 2022), https://blog.aee.net/in-pjm-renewable-energy-projects-are-getting-stuck; The Midcontinent System Operator (MISO), similarly has more than 64,000 MW of wind and solar in their interconnection queue, and is working on proposals to assist renewable energy developers to bring their projects to market quicker. Kelley Welf, *Miso Leads in Renewable Energy Interconnection* (Sept. 1, 2021), https://www.renewableenergyworld.com/solar/misos-improved-interconnection-process-saves-precious-time/#gref.

mining operations to prop it up. Even if cryptocurrency mining companies only used excess renewable energy that would otherwise be curtailed, there are serious implications with wasting energy at a time when we need to be placing that energy in energy storage technologies for dispatch at peak usage times. The answer to any purported stranded renewable energy is increased investments in battery storage and transmission, which the State is laudably doing.[36] The answer is not using that renewable energy for private gain by a crypto-mining operation that has no incentive to develop clean resources other than for their own use private profits.

Building and transportation electrification will further increase demand on the grid, and green hydrogen proposals would also require copious amounts of zero-emissions energy. [37] Simply put, there is not enough clean energy in New York State to meet all that required demand and also supporting the extensive demands of proof-of-work cryptocurrency mining.

Increases in proof-of-work cryptocurrency mining in New York State would undoubtedly interfere with the achievement of a net zero electric sector because it increases New York's

[36] PSC has approved contracts for renewable energy and transmission projects expected to deliver up to $5.8 billion in overall societal benefits statewide, including GHG reductions and air quality improvements, and $8.2 billion in economic development. *See* NYSERDA, *Largest Renewable Energy and Transmission Projects in New York State in 50 Years* (April 14, 2022), https://www.nyserda.ny.gov/About/Newsroom/2022-Announcements/2022-04-14-Governor-Hochul-Announces-Approval-of-Contracts; To date, the Commission has authorized offshore wind solicitations, funded programs to support the electrification of buildings, supported both large scale and distributed clean energy project development, and instituted a coordinated planning process to evaluate local transmission and distribution system needs to support the State's full transition to renewable generation. *See*, *e.g.*, Order Adopting Modifications to the Clean Energy Standard, *Proceeding on Motion of the Commission to Implement a Large-Scale Renewable Program and a Clean Energy Standard*, N.Y. Dep't of Pub. Serv. Case No. 15-E-0302, (Oct. 15, 2020) (Docket No. 826), https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={EAAF1A1E-2A05-49A7-A4D1-C5755E5BE536}; *Proceeding on Motion of the Commission to Implement Transmission Planning Pursuant to the Accelerated Renewable Energy Growth and Community Benefit Act*, N.Y. Dep't of Pub. Serv. Case No. 20-E-0197, Order on Phase 1 Local Transmission and Distribution Project Proposals (Feb. 11, 2021) (Docket No. 58), https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={F8CA2C7D-F6A9-480D-8329-AA0312C5F3E4}.

[37] The limited clean renewable energy is also needed for the green hydrogen buildout as presently envisioned by the Biden administration. For clean hydrogen power generation, there cannot be grey or blue hydrogen, only hydrogen powered entirely by renewable energy. *See, e.g.*, Dep't of Energy, *DOE Seeks Public Input on New Hydrogen Hubs, Clean Hydrogen Manufacturing Programs to Decarbonize Industry, Transportation Sectors and Provide Healthier Air for All* (Feb. 15, 2022), https://www.energy.gov/articles/doe-establishes-bipartisan-infrastructure-laws-95-billion-clean-hydrogen-initiatives; *see also* Sasan Saadat & Sara Gersen, *Reclaiming Hydrogen for a Renewable Future: Distinguishing Oil & Gas Industry Spin from Zero-Emission Solutions*, at 24–26, Earthjustice (2021), https://earthjustice.org/sites/default/files/files/hydrogen_earthjustice.pdf (citing Jeffrey Goldmeer et al., Hydrogen as a Fuel for Gas Turbines at 3–4, Gen. Elec. (2021)), https://www.ge.com/content/dam/gepower-new/global/en_US/downloads/gas-new-site/future-of-energy/hydrogen-fuel-for-gas-turbines-gea34979.pdf.

dependence on fracked gas resources for capacity generation.[38] The CLCPA requires upstream emissions from a fossil fuel-fired electric generating facility to be included in the calculation of GHG emissions.[39] Upstream emissions include "greenhouse gases produced outside of the state that are associated with the generation of electricity imported into the state and the extraction and transmission of fossil fuels imported into the state." ECL § 75-0101(13). Historically, upstream emissions make up around 30–40% of sectoral emissions for electricity generation.[40]

New York State currently generates more than half of its capacity basis from gas plants.[41] Without focusing now on meeting the 2030 mandate, the State risks retaining and installing even more gas capacity than could possibly run—and consequently installing less renewable capacity than the State must run—to achieve a minimum of 70% renewable generation and ensure that overall statewide emission reductions reach 40% by 2030.

E. Proof-of-work mining increases the operation of fossil fueled power plants.

Companies and private-equity firms have invested significantly in proof-of-work mining facilities in New York and throughout the U.S.[42] We frequently hear from the Bitcoin community about the merits of financial decentralization, but the reality does not seem to bear out that utopian dream.[43] Because of the immense amount of capital needed to purchase enough application-specific integrated circuit ("ASIC") miners[44] to competitively mine bitcoin, there are fewer miners today compared to even a few years ago.[45] In 2021, before China banned mining, a whitepaper published by the National Bureau of Economic Research found that the top 10% of crypto miners control 90% of mining and just 0.1% (about 50 miners) control close to 50% of all

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[38] First, New York State currently generates more than two-thirds of its capacity basis from natural gas plants. *See N.Y. State Profile and Energy Estimates*, U.S. Energy Info. Admin., https://www.eia.gov/state/analysis.php?sid=NY (last updated Oct. 21, 2021); Second, Greenidge was able to get permission for a pipeline from Pennsylvania to supply its fracked natural gas, with immense upstream GHG emissions. For example, at full plant capacity and including upstream emissions, plant emissions at Greenidge could be over 1,127,061 short tons of CO2e per year. The CLCPA requires accounting of GHG emissions associated with the extraction and transmission of fossil fuels imported into the state using a 20-year time horizon. This form of net accounting necessitates using upstream fossil fuel cycle factor data that cover extraction, processing and transmission/distribution of natural gas, coal, and petroleum into the state. 6 NYCRR § 496.4; *See also* ECL § 75-0105(3); Astoria Title V Permit Denial, *supra* note 8 at 5.

[39] The CLCPA requires accounting of GHG emissions associated with the extraction and transmission of fossil fuels imported into the state using a 20-year time horizon. This form of net accounting necessitates using upstream fossil fuel cycle factor data that cover extraction, processing and transmission/distribution of natural gas, coal, and petroleum into the state. 6 NYCRR § 496.4; *See also* N.Y. E.C.L. § 75-0105(3); Astoria Title V Permit Denial, *supra* note 8 at 5.

[40] N.Y. Climate Action Council, *Meeting 13* at 27 (July 22, 2021), https://climate.ny.gov/-/media/Migrated/CLCPA/Files/2021-07-22-CAC-Meeting-Presentation.ashx.

[41] *See N.Y. State Profile and Energy Estimates*, U.S. Energy Info. Admin., https://www.eia.gov/state/analysis.php?sid=NY (last updated Oct. 21, 2021).

[42] *See, e.g.*, *supra* note 17.

[43] *See* Khristopher J. Brooks, *Bitcoin Has Its Own 1% Who Control Outsized Share of Wealth*, CBS News (Dec. 21, 2021), https://www.cbsnews.com/news/bitcoin-cryptocurrency-wealth-one-percent/.

[44] Paul Kim, *ASIC Mining: Computers Built Specifically For Mining Cryptocurrency*, Insider (Mar. 16, 2022), https://www.businessinsider.com/personal-finance/asic-mining.

[45] Kristina Zucchi, *Is Bitcoin Mining Still Profitable?*, Investopedia (June 10, 2022), https://www.investopedia.com/articles/forex/051115/bitcoin-mining-still-profitable.asp.

mining—which directly translates to "ownership" of Bitcoin.[46] It has been surmised that the concentration of mining wealth is even more pronounced in the U.S. today.[47]

In New York, those entities are resurrecting and extending the life of old, inefficient, fossil-fueled power plants to mine proof-of-work cryptocurrency—yet again, resulting in significant greenhouse gas emissions and the resurgence of dire environmental pollution and injustice consequences. Two upstate New York power plants in particular tell a worrying story:

In North Tonawanda, New York, just outside Buffalo, is the fossil gas Fortistar North Tonawanda ("FNT") power plant where a new owner intends to convert the little-used 60 MW gas turbine facility to mine proof-of-work cryptocurrency 24/7, 365 days per year. Over the past five years, the FNT plant operated at 2–13% capacity factor emitting relatively small amounts of CO_2, nitrogen oxide ("NO_x"), and other harmful air pollutants.[48] If the plant operates every day at full capacity, the potential emissions from the facility will sharply increase to 339,068 tons of CO_2 per year—a nearly **3,000%** increase in its CO_2 emissions—while also significantly increasing emissions of NO_x, particulate matter, carbon monoxide, and volatile organic compounds.[49] This significant increase in air pollution will impact several nearby environmental justice areas.[50]

In addition, increased operation of the power plant significantly increases clean water intake and discharge of hot water. The FNT facility plans to use 500,000 gallons of water per day

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[46] Igor Makarov & Antoinette Schoar, Nat'l Bureau of Econ. Rsch., Working Paper 29396, *Blockchain Analysis of the Bitcoin Market* 4 (Oct. 2021), https://www.nber.org/system/files/working_papers/w29396/w29396.pdf (note: this analysis was for the time period before China banned mining); *see also* Emily Graffeo, *Bitcoin Is Still Concentrated in a Few Hands, Study Finds*, Time (Oct. 25, 2021), https://time.com/6110392/bitcoin-ownership/ (showing that it is believed that the concentration of mining and wealth is even more stark in the U.S. today).

[47] *See* Paul Vigna, *Bitcoin's 'One Percent' Controls Lion's Share of the Cryptocurrency's Wealth*, The Wall Street J. (Dec. 20, 2021), https://www.wsj.com/articles/bitcoins-one-percent-controls-lions-share-of-the-cryptocurrencys-wealth-11639996204; Laurence Fletcher, *Hedge Funds Expect to Hold 7% of Assets in Crypto Within Five Years*, Financial Times (June 15, 2021), https://www.ft.com/content/4f8044bf-8f0f-46b4-9fb7-6d0eba723017; Khristoper J. Brooks, *Bitcoin Has Its Own 1% Who Control Outsized Share of Wealth*, CBS News (Dec. 21, 2021), https://www.cbsnews.com/news/bitcoin-cryptocurrency-wealth-one-percent/; Gregory Zuckerman, *Mainstream Hedge Funds Pour Billions of Dollars into Crypto*, The Wall Street J. (Mar. 9, 2022), https://www.wsj.com/articles/mainstream-hedge-funds-pour-billions-of-dollars-into-crypto-11646808223.

[48] *Air Markets Program Data*, Env't Prot. Agency ("EPA"), https://ampd.epa.gov/ampd/ (last visited May 5, 2022) (filtering by Customized Data Queries > 'All Programs' > 'Emissions', 'Unit Level' > 'Facility Attributes' > 'Daily,' > 'Facility ID and Name': 'Fortistar North Tonawanda Inc' > 'Select All' under Emissions Unit).

[49] DEC, Facility ID: 9291200059, Air Title V Permit Renewal to Fortistar North Tonawanda Inc., (Issued Nov. 09, 2016), https://www.dec.ny.gov/dardata/boss/afs/permits/929120005900013_r2.pdf.

[50] N.Y. Dep't of Env't Conservation ("DEC"), *Potential Environmental Justice Area (PEJA) Communities*, ArcGIS, https://www.arcgis.com/home/webmap/viewer.html?url=https://services6.arcgis.com/DZHaqZm9cxOD4CWM/ArcGIS/rest/services/Potential_Environmental_Justice_Area__PEJA__Communities/FeatureServer&source=sd (filtering results to display: PEJA, 15000US360290091074, Census Block Group 15000US360290091074, Census Block Group 15000US360630232003, and Census Block Group 15000US360630232003); *see also* EPA, *EJSCREEN: EPA's Environmental Justice Screening and Mapping Tool*, https://ejscreen.epa.gov/mapper/ (according to EPA's EJScreen, the area around the FNT plant has a disproportionately high ozone index when compared to the New York average).

for cooling purposes, which will discharge to the local wastewater treatment plant.[51] That will account for approximately 12% of the City of North Tonawanda's current total water usage.[52] This significant additional thermal discharge comes at a time when the city can least afford it and in contrast, where clean energy jobs and economies abound. The North Tonawanda water treatment plant recently discovered that it needs $3 million in emergency repairs and $30 million for long term repairs.[53]

In another instance, on the western shores of Seneca Lake, amongst the productive vineyards and farms of the Finger Lakes, is the Greenidge Generating Station. Like FNT, in recent years Greenidge was operating infrequently[54] and is now operating 24/7/365 to mine cryptocurrency. In 2020, the Greenidge CFO stated "[w]ithout the crypto mining operation, we would not be running most of the time."[55] Indeed for six years, the plant did not operate at all.[56] The Greenidge facility emissions history tells the story, *(see Table 2 below)*:

[51] Digihost, *Full Environmental Assessment Form* 5 (Aug. 12, 2021), https://www.northtonawanda.org/documents/legal%20notice/fortistar%20amended%20seqr_2.pdf (finding that the City's current usage averages 4 million gallons per day).
[52] *Id*.
[53] Thomas J. Prohaska, *North Tonawanda Asks for $30 Million in Emergency Aid to Repair Sewer Plant*, Buffalo News (Mar. 12, 2022), https://buffalonews.com/news/local/government-and-politics/north-tonawanda-asks-for-30-million-in-emergency-aid-to-repair-sewer-plant/article_91b32598-a145-11ec-b35d-7314fe498fd0.html.
[54] After only a few years of operating as an electric generating facility, the facility's owners realized that there was not enough demand for electricity to make operating the facility profitable. Greenidge's CFO stated that rather than close the power plant, they decided to convert the facility to a Bitcoin mining operation. *See* John Christensen, *Power Plant to Add Data Center*, Chronicle-Express (July 31, 2019), https://web.archive.org/web/20190731061907/https:/www.chronicle-express.com/news/20190731/power-plant-to-add-data-center - expand.
[55] *Digital Assets: Greenidge Gen, Once a Coal Plant, Is Now a Profitable Crypto Miner*, DailyAlts (Aug. 19, 2020) https://dailyalts.com/digital-assets-greenidge-gen-once-a-coal-plant-is-now-a-profitable-crypto-miner/.
[56] *Power Sector Emissions Data*, EPA, https://www.epa.gov/airmarkets/power-sector-emissions-data; https://ampd.epa.gov/ampd/ (last visited May 4, 2022), (filtering by Customized Data Queries > 'All Programs' > 'Emissions', 'Unit Level' > 'Facility Attributes' > 'Daily,' 'Select All' under Emissions Unit). These numbers do not include upstream emissions. For a full recitation of the facts and issues concerning the air permit at Greenidge, please see the Comments from Seneca Lake Guardian et al., *in Opposition to the Draft Title V Air Permit for Greenidge Generating Station, located at 590 Plant Road, Dresden, New York 14441* (Nov. 19, 2021), https://earthjustice.org/sites/default/files/files/2021-11-19_slg-cpfl-fft-sc-ej-comments-to-dec.pdf.

Table 2: Greenidge Generating Station Emissions 2009–2022

Year	Days of Operation[57]	Approx. Annual Capacity Factor[58]	CO2 (tons/ year)	No. of Miners	Fuel source
2009	267	~34%	455,795	0	Coal
2010	358	~65%	599,105	0	Coal
2011[59]	77	~10%	113,357	0	Coal
2012	0	0%	0	0	*none*
2013	0	0%	0	0	*none*
2014	0	0%	0	0	*none*
2015	0	0%	0	0	*none*
2016	0	0%	0	0	*none*
2017	135	~17%	124,009	0	Gas
2018	147	~19%	119,304	0	Gas
2019[60]	48	~6%	39,406	0	Gas
2020	**343**	**~42%**	**228,303**	**6,900 miners[61]**	**Gas**
2021	353	~51%	278,846	15,300 miners[62]	Gas
2022	Every day	Increasing	91,530 (for 01/01–03/31/2022)[63]	32,500 miners[64]	Gas

The Greenidge plant also discharges hot water from the plant, and the plant owners are permitted to discharge 134 million gallons of water daily into a nearby trout stream at temperatures of *up to 108 degrees Fahrenheit*.[65] This high quantity of thermal pollution endangers the Keuka Outlet and Seneca Lake—potentially impacting health and wildlife habitability, including but not limited to potential harmful algal blooms, migration and loss of biodiversity, oxygen depletion, direct thermal shock, and changes in dissolved oxygen.[66]

As high-profile as they are, the conversion of Greenidge Generating Station and Fortistar North Tonawanda from low-capacity plants to round-the-clock mining operations are just two examples of how a low-capacity power plant can ramp up operations to increase their profits at the expense of local air and water and increase GHG emissions that accelerate the impending climate crisis. Indeed, Senator Kirsten Gillibrand stated in her September 8, 2021 letter to the

[57] Days with less than three hours of operation were not included.
[58] The annual capacity factor is a percentage measurement of actual generation in relation to potential maximum generation on an annual basis. For example, a generator with a 1 MW capacity operating at full capacity for a year (8,760 hours) would produce 8,760 megawatt-hours of electricity. The generator's annual capacity factor would be 100%. NYISO, *New York's Clean Energy Grid of the Future*, Glossary at 49 (2021), https://www.nyiso.com/documents/20142/2223020/2021-Power-Trends-Report.pdf/471a65f8-4f3a-59f9-4f8c-3d9f2754d7de.
[59] Based on its emissions, it appears that the power plant operated for the three months of 2011 before going offline.
[60] The year before Greenidge changed the operations at the plant to begin mining.
[61] Greenidge Generation Holdings Inc., Sec. & Exch. Comm'n, *Form S-1/A*, at 2 (Oct. 5, 2021), https://sec.report/Document/0001193125-21-291578/.
[62] *Id*. at 13.
[63] Projected annualized CO2 emissions for 2022, if no more miners are installed. *Id*.
[64] *Id*. at 3.
[65] Seneca Lake Guardian, *Facts Matter: Greenidge Bitcoin Mining Expansion* (Mar. 10, 2021), https://senecalakeguardian.org/Facts-Matter-Greenidge-Bitcoin-Mining; *see also* DEC, *Water Withdrawal Permit*, Permit ID 8-5736-00004/00015, (effective 09/11/2017), https://treichlerlawoffice.com/water/greenidge/WaterPermit_Final_2017-09-11_.pdf.
[66] *See, e.g.*, *Causes and Effects of Thermal Pollution*, Arcadia: Blog, (Aug. 2, 2017), https://blog.arcadia.com/causes-effects-thermal-pollution/.

EPA that "the potential consequences of the plant's Bitcoin mining operations and the effect on local emissions and air quality" are significant and require full assessment.[67] Senator Chuck Schumer also recently "urged the Environmental Protection Agency (EPA) to exercise its oversight powers under the Title V Clean Air Act and Clean Water Act and closely review Greenidge Generation Plant's permit renewal application" because "[t]he EPA and NYSDEC regulate such plants to keep these negative impacts on our health and the environment to a minimum, while maximizing the public good" and "[t]his increase in emissions may bring profits to the plant's owners, but it does not provide the same pub[l]ic good to the surrounding community. . . ."[68]

Notably, as New York and the U.S. transition to renewable energy resources, there will be an increasing number of fossil fuel power plants that operate less frequently. Evaluation of NYISO's 2021 Load and Capacity Data spreadsheet identifies a potential 22,891 MW capacity from fossil fueled power plants operating at less than 30% capacity factor—all of which, under current lack of regulations, could be utilized for proof-of-work mining operations.[69] Indeed, a March 2021 opinion piece in the Albany Times Union, penned by the President and CEO of the Independent Power Producers of New York titled "There's a Role for Natural Gas in the Renewable Energy Future" foreshadowed such a turn, describing Greenidge's transition to crypto mining as a "model for innovation."[70]

F. Electricity prices for local residents and businesses spike when proof-of-work mining moves into town.

Several New York localities have seen their local electricity prices rise when proof-of-work cryptocurrency miners move into town.

For example, in Plattsburgh, New York, residents' electricity bills increased 30% when a mining boom came to town a few years ago.[71] As a result, the New York Municipal Power Agency ("NYMPA"), an association of thirty-six municipal power authorities, petitioned the State Public Service Commission to prevent high-density load customers, specifically cryptocurrency companies, from requesting disproportionately large amounts of power (in some

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[67] Letter from Senator Kirsten Gillibrand to Michael Regan, EPA Administrator, Re: Greenidge Bitcoin Plant Title V Permit (Sept. 8, 2021), https://www.gillibrand.senate.gov/imo/media/doc/Gillibrand%20Letter%20to%20EPA%20on%20Greenidge%20Bitcoin%20Plant%20Title%20V%20Permit%20-%20Updated.pdf.

[68] Press Release, Sen. Charles E. Schumer, *Citing Environmental Concerns, Schumer Calls on EPA to Review Air Permit For Greenidge Power Plant Cryptocurrency Mining Facility*, (Oct. 12, 2021), https://www.schumer.senate.gov/newsroom/press-releases/citing-environmental-concerns-schumer-calls-on-epa-to-review-air-permit-for-greenidge-power-plant-cryptocurrency-mining-facility-senator-reveals-emisions-from-plant-have-recently-increased-tenfold-and-with-ownership-planning-to-expand-virtual-mining-operation-pollution-from-mining-will-only-increase.

[69] Provided by Fossil Free Tompkins (citing NYISO, *2021 Load and Capacity Data*, at 80 (2021), https://www.nyiso.com/documents/20142/2226333/2021-Gold-Book-Final-Public.pdf/b08606d7-db88-c04b-b260-ab35c300ed64).

[70] Gavin Donohue, *There's a Role for Natural Gas in the Renewable-Energy Future*, Times Union (Mar. 2, 2021), https://www.timesunion.com/opinion/article/There-s-a-role-for-natural-gas-in-the-15993563.php.

[71] Patrick McGeehan, *Bitcoin Miners Flock to New York's Remote Corners, but Get Chilly Reception*, N.Y. Times (Sept. 19, 2018), https://www.nytimes.com/2018/09/19/nyregion/bitcoin-mining-new-york-electricity.html.

cases amounting to up to 33% of municipal utility's total load).[72] Concerns about electric rates, noise complaints, and unsightly server setups ultimately led the town of Massena to issue a moratorium on crypto operations while public hearings are conducted to consider their continued impact in the small town.[73] Cryptocurrency companies that require high quantities of power increase bulk power supply costs with little to no capital investment in the local community. A recent study found that Plattsburgh residents and small businesses paid $244 million more in higher electric bills due to crypto's arrival.[74] After NYMPA increased rates for supplemental electricity used by high-density load customers, large-scale cryptocurrency data centers were forced to move from Plattsburgh to Massena, which is not a NYMPA member, as their costs increased over $1 million more than the year prior when they were allowed to buy market-rate electricity.[75]

Other parts of the country have and continue to face the same issues. For example, in eastern Washington, the Chelan County Public Utility District was overwhelmed by demand for cheap hydropower from crypto miners, and had to institute two moratoriums on new mining operations and a new rate structure to discourage miners from placing further strains on their grid.[76] Many cryptocurrency miners left the area because of the rate changes,[77] and when miners leave an area, there is a recurring concern across the country that they might "leav[e] ratepayers to cover the costs of upgrades that may no longer be needed."[78] For example, a congressional memo cited to a cryptocurrency mining operation in Washington state that "declared bankruptcy in 2018, leaving more than $700 thousand in unpaid utility and electricity bills."[79]

For a fuller discussion of the economic and ratepayer impacts on local residents and municipalities, we refer to the comments submitted by Dr. Colin Read and Buffalo Niagara Waterkeeper, as well as our partners' New York-focused comments filed in response to the

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[72] Paul Ciampoli, *Public Power Can Charge Cryptocurrency Firms Higher Rates: N.Y. PSC,* Am. Pub. Power Ass'n (Mar. 16, 2018), https://www.publicpower.org/periodical/article/public-power-can-charge-cryptocurrency-firms-higher-rates-ny-psc.

[73] Keith Benman, *Massena Seeks Public's Input on Cryptocurrency Mining*, 7 News WWNY (Feb. 15, 2022), https://www.wwnytv.com/2022/02/15/massena-seeks-publics-input-cryptocurrency-mining/.

[74] Laura Counts, *Power-hungry Cryptominers Push Up Electricity Costs for Locals*, Berkeley Hass (Aug. 3, 2021), https://newsroom.haas.berkeley.edu/research/power-hungry-cryptominers-push-up-electricity-costs-for-locals/; *see also* Mateo Benetton et al., *When Cryptomining Comes to Town: High Electricity-Use Spillovers to the Local Economy*, SSRN (May 14, 2021), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3779720.

[75] McKenzie Delisle, *Mining Operation Moves Out of City for Winter*, Press-Republican (Nov. 11, 2019), https://www.pressrepublican.com/news/local_news/mining-operation-moves-out-of-city-for-winter/article_4c86c044-4e1e-5ad6-8e6d-0ad19b875e35.html.

[76] *See* Steve Wright, Testimony before the Subcommittee on Oversight and Investigations, House Energy & Com. Comm. Hearing: Cleaning Up Cryptocurrency: The Energy Impacts of Blockchains at 2 (Jan. 20, 2022), https://energycommerce.house.gov/sites/democrats.energycommerce.house.gov/files/documents/Witness%20Testimony_Wright_OI_2022.01.20.pdf.

[77] *Id*; *see also* Corbin Hiar, *Crypto Mining Gulps Power. Can It Help Renewable Energy?*, E&E News (Jan. 21, 2022), https://subscriber.politicopro.com/article/eenews/2022/01/21/crypto-mining-gulps-power-can-it-help-renewable-energy-285435.

[78] Naureen S. Malik & Michael Smith, *Crypto Mania in Texas Risks New Costs and Strains on Shaky Grid*, Bloomberg (Mar. 15, 2022), https://www.bloomberg.com/news/articles/2022-03-15/crypto-mania-in-texas-risks-new-costs-and-strains-on-shaky-grid.

[79] Comm. on Energy & Com., *supra* note 16 at 9.

Biden Administration Executive Order and Request for Information on the climate and energy impacts of digital assets.[80]

III. Mitigation Strategies the Climate Action Council Should Seriously Consider to Avert a Climate Crisis for All New Yorkers

With such a significant likelihood of the cryptocurrency mining industry derailing our State's climate and energy commitments, several mitigation strategies should be considered. Yet, none appear as possibilities in the draft scoping plan. This is an enormous oversight for an industry that already uses 576 MW of state energy resources and is estimated to use 1,626 MW of state energy resources by the end of this calendar year.[81]

A. The Final Scoping Plan should recommend a temporary moratorium on proof-of-work mining until the impacts on the state's climate and energy can be ascertained and mitigated.

The Governor is currently considering a partial temporary moratorium on any new or expanded proof-of-work mining operations at fossil-fueled power plants until a General Environmental Impact Statement ("GEIS") under the State Environmental Quality Review Act ("SEQRA") can be conducted. 2022 NY Senate-Assembly Bill S6486D, A7389C. The bill via the GEIS requirement, seeks to address the climate and local pollution impacts of fossil-fueled mining operations, concerns raised by the strain on the grid created by the enormous new energy demand in the State from mining, as well as the diversion of renewables needed for other economic sectors to meet the CLCPA's statutory mandates.[82]

In recognition of this, recently, forty-five state legislators sent a letter to the Governor stating:

> We cannot meet these critical CLCPA goals to break our current dependency on fossil fuels as a state if we are simultaneously significantly increasing our total state energy consumption from fossil fuel sources.[83]

Recent letters to the Governor echo this sentiment. In addition to a partial temporary moratorium, or if the Governor cannot implement such much-needed remedies before the

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[80] *See* Dr. Colin Read, Dep't of Econ & Finance, SUNY Plattsburgh, *Who Pays for Bitcoin Mining?* (2022) [attached as Exhibit A]; Comments by Buffalo Niagara Waterkeeper, *re: Request for Information on the Energy and Climate Implication of Digital Assets* (May 09, 2022) [attached as Exhibit B]; Comments by Seneca Lake Guardian et al., *re: The Energy and Climate Implications of Digital Assets in New York State* (May 09, 2022) [attached as Exhibit C].

[81] Provided by Fossil Free Tompkins; *see also* n. 19, Table 1.

[82] *See* Earthjustice, *Statewide Organizations, Faith Based Groups, Labor Union, and Businesses Come Together to Urge Governor Hochul to Deny Greenidge Generation Cryptocurrency Mining Facility Permit; Adopt Moratorium Cryptocurrency Mining* (Oct. 13, 2021), https://earthjustice.org/news/press/2021/statewide-organizations-faith-based-groups-labor-union-and-businesses-come-together-to-urge-governor-hochul-to; Marie French, *Cryptocurrency Industry Fights Proposed NY Moratorium. Here is What's at Stake*, POLITICO (Jan. 28, 2022), https://www.politico.com/news/2022/01/29/cryptocurrency-industry-fights-proposed-ny-moratorium-here-is-whats-at-stake-00001994.

[83] Letter from Assembly Member Anna R. Kelles & Senator Kevin S. Parker et al. to Gov. Kathy Hochul & DEC Commissioner Basil Seggos, Re: Greenidge Generating Station (Oct. 6, 2021).

scoping plan is finalized, New York State should consider the following complimentary strategies to mitigate the enormous climate and energy impacts of proof-of-work mining.

B. The State should strictly review all air and water permits for any proof-of-work mining operations as likely inconsistent with the CLCPA.

The State should deny any air or water permit or renewal for any proof-of-work mining operations as inconsistent with the CLCPA.[84] As described in November 2021 comments from Seneca Lake Guardian, The Committee to Preserve the Finger Lakes, Fossil Free Tompkins, Sierra Club, and Earthjustice to DEC about the Greenidge plant, the Clean Air Act, the CLCPA, and SEQRA all contain provisions that give DEC ample authority and multiple opportunities to deny air and water permits for proof-of-work cryptocurrency mining operations.[85] DEC should not renew or grant water permits for any proof-of-work mining operations. Because of the current reliance on fossil fuel power plants and the massive amounts of water needed to cool off their operations, proof-of-work mining also poses enormous threats to accessible, clean water as well as to the ecosystems that rely on clean water. Thermal discharges into freshwater lakes in particular can create conditions that are conducive for algal blooms.[86] When combined with agricultural runoff and rising temperatures due to climate change, these warmer water discharges have been demonstrated as catastrophic for a local environment.[87] As mentioned above, the Greenidge power plant is allowed to discharge 134 million gallons of water at up to 108 degrees Fahrenheit under its existing permit.[88] In the case of Fortistar North Tonawanda, the city of North Tonawanda must expend over $30 million dollars[89] to upgrade its wastewater infrastructure to accommodate discharging the estimated 500,000 gallons of hot water per day from the plant.[90]

C. PSC should refuse to grant permission for proof-of-work mining operations as inconsistent with the CLCPA.

As described in the letters from the Sierra Club Atlantic Chapter and Earthjustice in PSC Case No. 21-M-0238, behind-the-meter proof-of-work cryptocurrency mining operations are not

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[84] *See, e.g.*, CLCPA § 7(2); Comments from Seneca Lake Guardian et al., *supra* note 60; Astoria Title V Permit Denial, *supra* note 8; Letter from Daniel Whitehead, Dir. Div. of Env't Permits, DEC, to Brenda D. Colella & Danielle E. Mettler-LaFeir, Danskammer Energy LLC., *Re: Notice of Denial of Title V Air Permit* (Oct. 27, 2021), https://www.dec.ny.gov/docs/permits_ej_operations_pdf/danskammerdecision102721.pdf ("Danskammer Title V Permit Denial").

[85] Comments from Seneca Lake Guardian et al., *supra* note 60.

[86] Kathleen M. Kowalski, *Harmful Lake Erie Algal Blooms Worsened by Power Plant Pollution*, Energy News Network (Jan. 25, 2016), https://energynews.us/2016/01/25/harmful-lake-erie-algal-blooms-worsened-by-power-plant-pollution/.

[87] Rob Herman, *Toxic Algae Blooms are on the Rise*, Sci. Am. (Sept. 7, 2016), https://blogs.scientificamerican.com/guest-blog/toxic-algae-blooms-are-on-the-rise/.

[88] Seneca Lake Guardian, *Facts Matter: Greenidge Bitcoin Mining Expansion* (Mar. 10, 2021), https://senecalakeguardian.org/Facts-Matter-Greenidge-Bitcoin-Mining; *see also* DEC, *Water Withdrawal Permit*, Permit ID 8-5736-00004/00015, (effective 09/11/2017), https://treichlerlawoffice.com/water/greenidge/WaterPermit_Final_2017-09-11_.pdf.

[89] Prohaska, *supra* note 57.

[90] Digihost, *supra* note 55.

in the public interest under both the CLCPA and the Public Service Law.[91] The Public Service Commission itself has stated "New York is committed to ensuring energy intensive industries in general, including cryptocurrency mining, comply with the emissions limits set forth under the CLCPA and advancing the State's climate goals."[92]

The conversion of retiring, retired, or low-capacity power plants for 24/7/365 data centers and bitcoin mining operations undermines our collective ability to meet the mandatory emissions reductions and equity goals in the CLCPA. Any decision by PSC that allows for significant increases in GHG emissions (*see* Greenidge Generation's increases in Table 2 above) from these operations is inconsistent with the CLCPA.

D. The State should establish a registry for proof-of-work mining over a certain megawatt threshold.

Determining which sites have begun proof-of-work mining is difficult to ascertain, whether it be a power plant, a purported "data center," or an industrial operation. Many can operate as of right now under existing laws, regulations, and permits with no additional oversight. Mining operations can negotiate private contracts with merchant generators or utilities for discounted rates. Given the unregulated nature of crypto mining, it is notoriously difficult to determine how much energy a particular entity is using, what fuel source the mining operation relies on, or estimate how much a particular entity is mining in general. Without a standardized methodology to collect data to properly estimate energy consumption from cryptocurrency mining, estimates will continue to vary widely. Without accurate information, it is nearly impossible for the State (and it goes without saying, the impacted communities, local groups, and interested residents) to understand the environmental impact a mining operation can have on a community or the planet.

Despite how little we know about mining operations, what we do know for certain is that the expansion of crypto currency mining in the United States increases air and water pollution, strains the electrical grid, and can increase electricity rates of local residents.

It would be beneficial for the public and local communities to know which power plants, data centers, and industrial operations near them are planning to convert to proof-of-work mining, and to know which energy sources they will be using, to assess potential local impacts, climate impacts, and to monitor CLCPA compliance.

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[91] *See* Earthjustice and Sierra Club Response Letter to FNT Letter, *Petition of Fortistar North Tonawanda Inc. and Digihost International Inc. for a Declaratory Ruling Regarding Application of Section 70 and 83 of the New York State Public Service Law and the Alternative, Approval of the Proposed Transaction Pursuant to Sections 70 and 83*, N.Y. Dep't of Pub. Serv. Case No. 21-M-0238 (Jan. 27, 2022) (Docket No. 13), https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={11800B32-7569-44E8-A99D-26C2B2B8ADAC}. Section 70(5) of the Public Service Law states: "No consent shall be given by the commission to the acquisition of any stock in accordance with this section unless it shall have been shown that such acquisition is in the public interest." Section 83(5) of the Public Service Law also states: "No consent shall be given by the commission to the acquisition of any stock in accordance with this section unless it shall have been shown that such acquisition is in the public interest."

[92] Testimony of the Public Service Commission, Assembly Standing Committee on Environmental Conservation et al. on Cryptocurrency Mining and the CLCPA at 4 (Oct. 27, 2021).

Thus, the Final Scoping Plan should call for the establishment of a crypto mining registry which would allow for increased transparency between the public commenting processes and can inform other state agencies of the changes occurring in day-to-day operations. The registry could also inform NYISO and the utilities serving that additional power load about the potential strain such operations will place on the grid.[93] The Department of Financial Services has a registry of cryptocurrencies,[94] and a registry of proof-of-work miners could be set up in a similar way.

One important required component of the registry would be to ensure that operations that mine cryptocurrency disclose their energy sources, with specificity. Many cryptocurrency mining operations advertise the use of renewable energy to mine, without detailing the source or amount of the energy used. The public should know and would benefit from being able to ascertain how much wind, solar, coal, or other energy source, is being used for the mining of cryptocurrency by every miner.

E. The State should increase system benefit charge surcharge on high-density load customers that have established or expanded operations in New York State since the passage of the CLCPA.

In 1996, PSC established a Systems Benefit Charge ("SBC") as a surcharge on electric bills based on volumetric use to provide funding to public policy initiatives not addressed by competitive electricity markets.[95] In 1998, PSC determined that SBC funds should be targeted to programs that support energy efficiency, research and development, and low-income energy affordability.[96] Since then, the SBC program provides funding to these programs and more as part of the Clean Energy Fund, with existing utility customers paying an average of over $300 million per year into the Clean Energy Fund.[97] Unfortunately, the new high-energy load from proof-of-work mining operations have not paid into the system, yet is taking advantage of the low-cost clean energy resources that New York State residents and businesses have been subsidizing for over 20 years. We urge that in order to ensure that New York's statutory climate commitments are met and that electricity and gas rates paid by customers throughout New York are just and reasonable, that PSC increase the SBC surcharge to high-intensity users that have come into operation or increased load by more than 8,760 MWh per year since the CLCPA went into effect.[98] In doing so the State should exempt high intensity uses attributable to beneficial electrification of buildings or EV charging, and may want to consider other benefits to the State such as direct jobs created per MW hour or other metrics.

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[93] Borenstein, *supra* note 24.
[94] Department of Financial Services, *Virtual Currency Businesses: Regulated Entities*, https://www.dfs.ny.gov/virtual_currency_businesses (last visited June 16, 2022).
[95] *See* N.Y. Dep't of Pub. Serv., *Systems Benefits Charge*, https://www3.dps.ny.gov/W/PSCWeb.nsf/All/58290EDB9AE5A89085257687006F38D1 (last updated June 3, 2014).
[96] *Id*.
[97] N.Y. Pub. Serv. Comm'n, Case No.14-M-00094, *Order Authorizing the Clean Energy Fund Framework* at app. J-1 (effective Jan. 21, 2016), https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={B23BE6D8-412E-4C82-BC58-9888D496D216}.
[98] Provided by Fossil Free Tompkins. Power density limit of 8,760 MWh per year is based on a 1 MW load operating 24/7/365.

F. The CAC should encourage DEC and PSC to establish and require best management practices for high-density load energy users, including but not limited to energy efficiency requirements.

One mitigation strategy the CAC could consider is setting a minimum energy efficiency limit, set around a kilowatt-hour (kWh) per transaction or block to ensure that the methodology being used in New York State to mine blockchain/cryptocurrency is the best available technology and uses the least amount of energy, such as the proof-of-stake method, the federated consensus method, the proof-of-authority method, and the open representative voting method, among others. The efficiency limit could tighten over time to eventually eliminate proof-of-work mining.

G. The State should consider reforms for high-density-load businesses such as proof-of-work cryptocurrency mining operations.

One mitigation strategy the CAC could consider is setting a power density limit that sets a cap on the number of kilowatts of energy consumption or load per thousand square feet. A power density limit could be set at an initial limit and tightened over time to allow existing operations to adjust operations over time to mitigate their impacts.

The CAC should also consider clarifying the authority to regulate behind-the-meter power generation for high-density and high-load energy generation not in compliance with the CLCPA or not in the public interest and to incentivize proper energy regulation over a new industry that is both burning additional fossil fuels and diverting renewable energy from the State's grid.

For proof-of-work mining operations that are using energy from the State's grid, the State could ensure that ratepayers do not unduly pay higher rates due to their energy use.

Look no closer than the City of Plattsburgh for a roadmap, which instituted such a power density limit, which successfully mitigated the climate and energy impacts of mining in their municipality when rates increased significantly during the peak winter demand due to new electricity demands from crypto-mining. The New York Municipal Power Authority studied and then mitigated the ramifications of high-density load businesses and instituted several rate-payer protections.[99] The CAC should consider a study to assess the impacts that High Density Load

[99] N.Y. Pub. Serv. Comm'n, Case No. 18-E-0126, *Order Approving Rider A* (Mar. 2018) (showing that just *two* high density load customers with a combined demand of 11 MW caused energy costs to increase over $200,000 for ratepayers in January, during the winter peak demand).

users, such as cryptocurrency data centers, will have on the residential rates, as seen in Plattsburgh.[100]

The CAC should consider similar state-wide or utility-service area studies by PSC or NYISO to protect New York utility ratepayers, such as a review of location-based marginal price changes before and after proof-of-work mining operations began, and look at seasonal differences and multiple other variables, and develop rate-payer mitigation strategies.

Additionally, because some front-of-the meter proof-of-work miners can cease operations or relocate easily, thereby allowing the possibility that utility bills could go unpaid, New York State should establish a revenue assurance in the form of an upfront deposit or letter of credit to be used as a way to protect customers in the event that a high-density-load customer does not pay its utility bills.

H. The State should require high-density-load customers to purchase New York State renewable energy certificates for any site that has added more than 8760-megawatt hour per year load since the CLCPA was enacted.

Proof-of-work mining operations have clustered in the Niagara Falls/Buffalo and Massena areas where they take advantage of low-cost power. Many of these operations boast on their websites and marketing materials that they are using renewable energy, a statement that presumably attracts investors. Yet in New York State, to be able to properly claim the use of renewable energy, one must purchase Renewable Energy Credits through the New York Generation Attribute Tracking System.[101]

We urge the CAC to recommend that NYSERDA and PSC study policy mechanisms to require high-density load customers that have added more than 8,760 MWh/yr load since CLCPA's passage be required to purchase RECs on a schedule of 10% in 2023, 20% in 2024, 30% in 2025, etc. to offset their energy use by 70% by 2030 and 100% by 2040, thereby spurring renewable energy development (on the grid, not behind the meter) to offset their energy use. As mentioned above in the discussion of SBC charges, the State should exempt high intensity uses attributable to beneficial electrification of buildings or EV charging and may want to consider other benefits to the State such as direct jobs created per MW hour or other metrics.

I. The CAC should encourage that PSC and DEC establish requirements for waste heat to be recycled or used.

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[100] An analysis by UC Berkeley's Haas School of Business found that cryptocurrency mining operations in Plattsburgh, NY were directly linked to the increase in the monthly electricity bills of small businesses by $12 and residential customers by $8—equivalent to $165 million and $79 million extra annually, respectively—with little or no economic benefit. Mateo Benetton et al., *supra* note 78; *see also* Laura Counts, *supra* note 78. In fact, at a recent congressional hearing, one witness testified offering that the utility he ran had to institute two moratoriums on new mining operations and a new rate structure to discourage miners from chasing short-term gains. Steve Wright, *supra* note 80; Corbin Hiar, *supra* note 81.

[101] *See New York Generation Attribute Tracking System (NYGATS) Frequently Asked Questions*, NYSERDA, https://www.nyserda.ny.gov/All-Programs/NYGATS/Renewable-Energy-Credits-Policy-Change/FAQ (last visited June 16, 2022).

One major by-product of proof-of-work mining is the excess heat created by the energy-intensive computational efforts.[102] To mitigate the heat waste, one mitigation strategy the CAC could consider is setting a minimum threshold of waste heat to be recycled or used.[103] Examples include waste heat being recycled to power a greenhouse in Norway[104] and supplying waste heat for residential and industrial purposes in Singapore.[105]

J. The CAC should call for PSC and NYPA to consider requirements for public power authorities to halt all discounted energy allocations to proof-of-work mining.

The New York Power Authority offers low-cost hydropower allocations to several upstate communities that ensure economic development and a form of relief for residents to have access to a cheap, clean source of power.[106] The State should ensure that allocations are not diverted from residents to large-scale proof-of-work mining operations. Hydro-powered plants mining Bitcoin already exist throughout New York, including but not limited to operations in

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[102] Marco Streng, *How Heat From Crypto Mining Farms Could Be Recycled into Energy for Greenhouses*, NASDAQ (Dec. 23 2020), https://www.nasdaq.com/articles/how-heat-from-crypto-mining-farms-could-be-recycled-into-energy-for-greenhouses-2020-12-23.

[103] *See* Kate Marsh et al., Sabin Ctr. For Climate Change Law, *Compilation of Recommendations to Reduce Greenhouse Gas Emissions in New York State* 144 (July 30, 2020), https://climate.law.columbia.edu/sites/default/files/content/CLCPA%20Proposal%20Recommendations%20_0.pdf. Waste heat capture and reuse is needed to reduce the carbon intensity of industrial operations within the state. As Plattsburgh Mayor Colin Read suggested when discussing the growing energy demand of cryptocurrency mines in Plattsburgh, "I'd much rather see our power going to companies that are providing jobs, products or services that benefit Plattsburgh . . . [o]r tailor their industry so the waste heat they wish to dissipate can be returned to the communities which depend on that power to heat their homes." Press Release, Adirondack N. Country Ass'n, *Boom or Bust: Economic Impacts of Cryptocurrency* (May 21, 2018), https://www.adirondack.org/sites/default/files/Press%20release_%20Cryptocurrency%20Summit.pdf.

[104] *Genesis Mining Announces Pilot Project*, PR Newswire (Dec. 15, 2020), https://www.prnewswire.com/news-releases/genesis-mining-announces-pilot-project-to-recycle-crypto-mining-farm-energy-waste-into-energy-for-greenhouses-301192973.html.

[105] Zhiyuan Sun, *This Singapore Tech Company Says Its Recycling 90% of Waste Heat From Bitcoin Mining*, Cointelegraph (Nov. 22, 2021), https://cointelegraph.com/news/this-singapore-tech-company-says-its-recycling-90-of-waste-heat-from-bitcoin-mining.

[106] *See*, *e.g.* PSC Tariff Rule A – allowing municipal utilities to charge higher rates to high-density load customers. NYPA, *2020 Report to the Governor and Legislative Leaders on Power Programs for Economic Development* 26–34 (April 2021), https://www.nypa.gov/-/media/nypa/documents/document-library/governance/2020govrep.pdf.

Mechanicville and Massena, New York.[107] No allocations at all should be made to any operation which is not in the local or state public interest or to any operation which is inconsistent with the CLCPA.

K. The CAC should request that all State Economic Development Agencies identify and halt all subsidies to proof-of-work mining.

State and local economic development agencies should not support proof-of-work mining operations powered by fossil fuels in the State of New York. CLCPA §§ 7(2) and 7(3) impose duties on "all state agencies, offices, authorities and divisions" to take no action that might interfere with the emissions reduction mandates of the statute without justification or disproportionately burden disadvantaged communities.[108] This includes funding decisions by economic development agencies that are inconsistent with or interfere with the mandates of the CLCPA.

L. The CAC should request that NYSERDA evaluate the number of jobs created per megawatt hour expended.

Economic development agencies should also evaluate the number of jobs created per megawatt hour expended. Even as cryptocurrency mining generates a flurry of climate, energy, and environmental justice issues, it offers few benefits to the local community in terms of job creation.[109] As outlined in a congressional memo, the number of jobs is extremely limited due to

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[107] *See*, *e.g.*, Bob Joseph, *First Look as Adam Weitsman Sets Up Owego Crypto Mining Farm*, WNBF (Dec. 20, 2021), https://wnbf.com/adam-weitsman-sets-up-owego-crypto-mining-farm/ (finding that in Owego, Tioga County, a crypto mining farm under development plans to install 35,000 mining units that run entirely on renewable energy); NYPA, *2020 Report to the Governor and Legislative Leaders on Power Programs for Economic Development* 26–34 (April 2021), https://www.nypa.gov/-/media/nypa/documents/document-library/governance/2020govrep.pdf (citing that NYPA allocated 1.32 MW per year in reduced rate power to the owner of the Owego crypto mining farm, Weitsman Shredding LLC, as well as 90 MW to Somerset Operating Company LLC and 2 MW to Cayuga Operating Company LLC, which are both retired coal plants being repurposed as data center enterprises); *CleanSpark Announces Agreement with ESG-Focused Crypto-Miner, Coinmint*, PR Newswire (July 14, 2021), https://www.prnewswire.com/news-releases/cleanspark-announces-agreement-with-esg-focused-crypto-miner-coinmint-301333316.html (Coinmint's facility in Massena expects to deploy nearly 25 MW of power primarily derived from hydroelectiric sources); *AEC's Hydroelectric Plant Mechanicville Repurposed for Bitcoin Mining*, Coinspeaker (July 9, 2021), https://www.coinspeaker.com/aec-hydroelectric-plant-bitcoin-mining/; Corey Kilgannon, *A Bitcoin Boom Fueled by Cheap Power, Empty Plants and Few Rules*, N.Y. Times (Dec. 5, 2021), https://www.nytimes.com/2021/12/05/nyregion/bitcoin-mining-upstate-new-york.html.

[108] *See also* ECL § 75-0101; "The public service commission, the New York state energy research and development authority, the department of health, the department of transportation, the department of state, the department of economic development, the department of agriculture and markets, the department of financial services, the office of General Services, the division of housing and community renewal, the public utility authorities established pursuant to titles 1, 1-A, 1-B, 11, 11-A, 11-B, 11-C and 11-D of article 5 of the public authorities law and *any other state agency* shall promulgate regulations. . ." CLCPA § 8 (emphasis added); Michael B. Gerrard, *The Effect of New York's New Climate Law on Municipalities: Deep but Uncertain,* 20 N.Y. Zoning Law & Practice Report 6 (2019), https://climate.law.columbia.edu/sites/default/files/content/NYZLPR_03.pdf.

[109] Steve Wright, *supra* note 80. (Steve Wright, former head of the Bonneville Power Administration and Chelan County Public Utility District: "we heard substantial reservations from our community about supporting cryptocurrency mining due to . . . [the] relatively low number of local jobs per unit of electricity consumed.")

the highly automated nature of cryptocurrency mining and the limited need for skilled technicians on-site.[110]

M. The State should consider regulating electronic waste disposal in large quantities.

Proof-of-work mining results in enormous amounts of electronic waste ("e-waste") which can cause significant harm to the environment and human health.[111] Proof-of-work mining generates approximately 31 metric kilotonnes of e-waste every year, which is comparable to the e-waste produced by the whole country of the Netherlands.[112] The mining devices used for proof-of-work quickly go obsolete, often lasting less than two years.[113] The e-waste generated from proof-of-work mining is significant, and experts predict it will continue to increase as proof-of-work mining operations increase in scale.[114] Much of this waste is sent to low-income communities around the state, the country, and the world who bear the harms of this toxic waste.[115] The CAC Waste Advisory Panel should also examine these serious implications in New York from this tremendous amount of waste.

N. The State should consider regulating noise pollution.

[110] Comm. on Energy & Com., *supra* note 16 at 9.
[111] *Id; See also*, Megan Avakian, *E-waste: An Emerging Health Risk,* Nat'l Inst. of Env't Health Scis. (Feb. 2014), https://www.niehs.nih.gov/research/programs/geh/geh_newsletter/2014/2/spotlight/ewaste_an_emerging_health_risk_.cfm; *Cleaning Up Electronic Waste (E-waste)*, EPA, https://www.epa.gov/international-cooperation/cleaning-electronic-waste-e-waste (last updated Nov. 2, 2021) ("Without proper standards and enforcement, improper practices may result in public health and environmental concerns, even in countries where processing facilities exist.").
[112] BBC, *Bitcoin Mining Produces Tonnes of Waste*, (Sep. 20, 2021), https://www.bbc.com/news/technology-58572385; Alex de Vries & Christian Stoll, *Bitcoin's Growing E-waste Problem*, 175 Res., Conservation & Recycling 105901 (Dec. 2021), https://www.sciencedirect.com/science/article/pii/S0921344921005103; *Bitcoin Electronic Waste Monitor*, Digiconomist, https://digiconomist.net/Bitcoin-electronic-waste-monitor/ (last updated Sep. 13, 2021).
[113] Joachim Klement, *Geo-Economics: The Interplay Between Geopolitics, Economics, and Investments* 106 (CFA Inst. Rsch. Found. 2021).
[114] *See* Mark Peplow, *Bitcoin Poses Major Electronic-Waste Problem*, Chem. & Eng'g News (Mar. 14, 2019), https://cen.acs.org/environment/sustainability/Bitcoin-poses-major-electronic-waste/97/i11.
[115] Peter Howson & Alex de Vries, *Preying on the Poor? Opportunities and Challenges for Tackling the Cocial and Environmental Threats of Cryptocurrencies for Vulnerable and Low-income Communities*, 84 Energy Rsch. & Soc. Sci. 102394 (2022).

Proof-of-work mining generates a tremendous amount of noise that can be heard miles from those operations.[116] Proof-of-work mining operations typically generate noise at certain decibel levels dependent on the size of the operation. The CAC should consider measures to mitigate the noise levels from such generation and propound requirements for insulation and declining noise limits over time to give existing operations time to ramp down or reduce the noise impacts. The federal government has noise regulations in place to protect public health and welfare, and state regulations if they do not already exist should be explored to mitigate the enormous noise pollution generated by the hundreds to thousands of mining rigs set up at each location.[117]

IV. Conclusion

As crypto continues to grow, the associated surge in energy consumption to maintain proof-of-work cryptocurrency mining threatens to make the clean energy transition and meeting federal and state-level climate and environmental justice goals much more difficult, if not impossible. While the impacts of large-scale cryptocurrency operations have been mostly felt in small towns by local residents bearing the brunt of local air and water pollution, and with increased electricity costs, the consequences of allowing cryptocurrency mining operations to expand unmitigated are far too great to ignore.

The ever-increasing public health and environmental threat that cryptocurrency mining poses requires state attention and addressing. Without proper standards and the federal action, proof-of-work cryptocurrency mining will elongate the life of fossil fuels and will divert renewable energy from where it is needed most to avert the worst of the climate crisis.

Thank you for the opportunity to provide comments concerning the impacts of proof-of-work cryptocurrency mining in New York State.

Respectfully submitted,

Acadia Center
All Our Energy
Alliance for a Green Economy
Brookhaven Landfill Action and Remediation Group
Catskill Mountainkeeper

[116] *See*, *e.g.*, Jeff Keeling, *Professor: Bitcoin Mining's Model Brings Not Just Noise, but Environmental Cost That's Under Scrutiny*, WJHL (May 18, 2021), https://www.wjhl.com/news/local/professor-bitcoin-minings-model-brings-not-just-noise-but-environmental-cost-thats-under-scrutiny/; Robert Houk, *Officials Press Bitcoin Company to Find a Solution to Noise Issues*, Johnson City Press (Aug. 23, 2021), https://www.johnsoncitypress.com/news/officials-press-Bitcoin-company-to-find-a-solution-to-noiseissues/article_78e62c44-0434-11ec-af1c-bf43ccb2b545.html; Andy Koen, *Noise Complaint Over Crypto Mining Business Led City To Buy New Equipment*, KOAA News (July 26, 2019), https://www.koaa.com/news/covering-colorado/noise-complaint-over-crypto-mining-business-led-city-to-buy-new-equipment; Andy Fox, *What's That Noise? One of World's Largest Bitcoin Facilities is Too Loud, VB Neighbors Say*, Wavy (Aug. 15, 2018), https://www.wavy.com/news/whats-that-noise-one-of-worlds-largest-Bitcoin-facilities-is-too-loud-vb-neighbors-say/; *Norway Council May Shut Down Noisy Bitcoin Miner*, The Local, (Aug. 21 2018) https://www.thelocal.no/20180821/norway-council-may-shut-down-noisy-Bitcoin-miner/.

[117] Noise Control Act of 1972, 42 U.S.C. § 4901–4918; Quiet Communities Act of 1978; *see also* Vipal Monga, *Bitcoin Mining Noise Drives Neighbors Nuts—a Giant Dentist Drill That Won't Stop*, Wall Street J. (Nov. 12, 2021), https://www.wsj.com/articles/bitcoin-mining-noise-drives-neighbors-nuts-giant-dentist-drill-that-wont-stop-11636730904.

Clean Air Coalition of WNY
Climate Reality Project, Capital Region NY Chapter
Climate Reality Project, Finger Lakes Greater Region NY Chapter
Climate Reality Project, Hudson Valley and Catskills Chapter
Climate Reality Project, Long Island Chapter
Climate Reality Project, NYC
Climate Reality Project, Westchester NY Chapter
Climate Reality Project, Western New York Chapter
Climate Solutions Accelerator of the Genesee-Finger Lakes Region
Coalition for Outreach, Policy & Education
Committee to Preserve the Finger Lakes
Community Food Advocates
CUNY Urban Food Policy Institute
Dryden Resource Awareness Coalition
Earthjustice
Environmental Advocates NY
Fossil Free Tompkins
Gas Free Seneca
Grassroots Environmental Education
Green Education and Legal Fund
HabitatMap
Hotshot Hotwires
Long Island Progressive Coalition
Nassau Hiking & Outdoor Club
Network for a Sustainable Tomorrow
New Clinicians for Climate Action
North Brooklyn Neighbors
NY Renews
People of Albany United for Safe Energy
PUSH Buffalo
Roctricity
Sane Energy Project
Seneca Lake Guardian
Sierra Club
South Shore Audubon Society
Sustainable Finger Lakes
University Network for Human Rights
UPROSE
WE ACT for Environmental Justice