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July 1, 2022

Dear members of the Climate Action Council,

AGREE has joined over 50 organizations led by Earthjustice in a comprehensive comment covering most aspects of the Draft Scoping Plan. This additional comment is meant to supplement those more exhaustive comments with a focus on the treatment of nuclear energy in the Draft Scoping Plan.

The Draft Scoping Plan does not take a definitive position on the role of nuclear power in meeting the Climate Leadership and Community Protection (CLCPA) mandates. It does not explicitly endorse new nuclear, nor does it preclude it. It acknowledges some of the downsides of nuclear energy and recommends important analysis be done before extending public support for nuclear plants beyond 2029; yet the underlying integration analysis that informs the draft plan assumes the nuclear plants will continue operating beyond their current licenses. As we will outline below, this is an irresponsible assumption that must be corrected in order to avoid the very real possibility of New York failing to meet the greenhouse gas emissions mandates in the CLCPA. It should not be assumed that these aging reactors will be able to continue operating indefinitely.

Alliance for a Green Economy (AGREE) is a nonprofit headquartered in Syracuse with over ten years of experience in watchdogging the upstate nuclear reactors. AGREE was launched in 2012, on the one-year anniversary of the Fukushima nuclear disaster in Japan with the goal of promoting and educating the public around a carbon-free and nuclear-free future. Since then, AGREE has been working to center our energy system around safety and health, preserve our precious ecosystems, and ensure affordable access to the sustainable energy needed to live healthy, connected, and fulfilling lives.

In 2021, nuclear energy represented 24% of electricity generation in New York.[1] New York's four operating reactors are currently subsidized to the tune of $500 million per year. Important decisions around the role of nuclear energy in New York's future energy mix are coming, sooner rather than later, and the state must be prepared to make these decisions. It is highly unlikely that New York's existing nuclear plants would continue operation beyond 2029 without an extension of New York's costly nuclear subsidies. The current 60-year federal operating licenses for two of the reactors expire in 2029, and a third expires in 2034, prior to the CLCPA's 2040 target.

We support the Climate Action Council's (CAC) recommendations to analyze whether "subsidizing any of the State's remaining nuclear reactors will be necessary for meeting the

[1] NYISO 2022 Power Trends Report, page 25.
https://www.nyiso.com/documents/20142/2223020/2022-Power-Trends-Report.pdf/d1f9eca5-b278-c445-2f3f-edd959611903?t=1654689893527

2040 emissions mandate" and whether there are more cost effective and environmentally friendly alternatives available. We also support the CAC's recommendation to consider the cost, health, safety, community impact, and environmental concerns of nuclear power generation. We strongly recommend that the inflexibility of nuclear and inability to load-follow be considered as part of any reliability analysis. We further support the even stronger recommendations from the Climate Justice Working Group that "a lifecycle analysis of the environmental, health, safety, emissions, and environmental justice impacts of nuclear fuel be conducted and the State proactively plan for the scheduled shutdown of the four reactors upstate."

As we detail in our comments, we are highly concerned about the impacts of nuclear energy on the health and safety of New Yorkers and on communities at every stage of the nuclear fuel chain. The existence of cost-effective alternatives to nuclear power obviates any need to rely on existing or new nuclear plants to achieve our greenhouse gas emissions reduction mandates. In fact, the escalating cost of nuclear power, combined with its other negative impacts, makes it a poor candidate for public investment as a climate solution. In these comments, we will discuss:

I. Flawed assumptions on the costs and operating life of nuclear power plants and complete lack of substantiation for the cost estimate in the scenario where nuclear plants retire as scheduled
II. Lack of consideration for which renewable resources will back up nuclear plants when they are down for scheduled or unscheduled outages
III. Additional analysis on nuclear energy and alternatives is needed
IV. The job creation potential for nuclear energy is low
V. Nuclear generation facilities lead to grave health and safety concerns and violate our environmental justice mandates

Though these comments are limited to the topic of nuclear power, we are committed to phasing out all forms of dirty, unhealthy, costly, and unsustainable energy. New York has led the way in the past by banning fracking in our state, protecting the health and integrity of our water resources and therefore our citizens. We think it's time for New York to once again lead by recognizing the inherent limitations of and problems with nuclear power, and to actively plan for a future in which our nuclear plants retire at or before their respective license expiration dates.

## I. Flawed assumptions on the costs and operating life of nuclear power plants and complete lack of substantiation for the cost estimate in the scenario where nuclear plants retire as scheduled

New York has four operating nuclear reactors:

- R. E. Ginna on the southern shore of Lake Ontario, licensed to operate through 2029, is currently 53 years old
- James A. FitzPatrick near Oswego, New York, licensed to operate through 2034, is currently 47 years old

- Nine Mile Point in the town of Scriba on the shore of Lake Ontario has two nuclear reactors:
    - Unit 1, licensed to operate until 2029, is currently 53 years old
    - Unit 2, licensed to operate until 2046, is currently 34 years old

The Climate Action Council's Integration Analysis assumes that New York's existing nuclear plants will be relicensed, extending their current 60-year operating licenses to 80 years. This is highly speculative, and it is irresponsible to rely on these aging nuclear plants for compliance with our climate law. Without a backup plan, if any of these reactors is not relicensed or shuts down before its license expires -- as has nearly every retired reactor in the US, and can reasonably be expected in New York given the age of nuclear plants closed recently in the US[2] -- New York will risk missing its greenhouse gas emissions goals because it will have not invested in replacement resources such as additional renewable energy, demand response, efficiency, and storage.

It is important to note that no nuclear plant in the world has operated longer than 60 years, and no nuclear plant in New York has yet requested an 80-year license extension. Even if New York's facilities were to request an extension, it's unclear at this time whether they would even be granted, seeing as the Nuclear Regulatory Commission (NRC) recently rescinded prior license extensions from 60 to 80 years for several reactors due to legal challenges.[3] Further, it is unlikely that any nuclear plant will continue operating beyond 2029 without an extension of massive public subsidies, because without these subsidies which expire in 2029, nuclear plants cannot profitably operate in New York's wholesale electricity market.

To assume an 80-year lifespan for New York's nuclear plants is not only speculative, but will hinder New York from arriving at a realistic and prudent scoping plan. Nuclear license extensions are unlike other regulatory permit extensions, in that they involve both large legal and regulatory costs and large capital investments to replace and maintain major components and systems, which cannot be economically justified without the 20-year license extension. Total nuclear operating costs have tended to increase substantially following relicensing, due primarily to increased capital and maintenance expenses.

Commendably, late in 2021, the Climate Action Council requested the development of a scenario in which nuclear plants close when their current operating licenses expire. In a presentation provided to the Climate Action Council on December 20, 2021, the analysts concluded that without nuclear relicensing, costs (relative to a reference case) would increase by $8.7 billion. This number was provided with no detail about the underlying assumptions about

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[2] According to the 2021 World Nuclear Industry Status Report, "the average age of the six reactors closed in the U.S. over the five-year period 2016–2020 was 46.2 years (see Figure 35), which remains far below their licensed lifetimes of 60 years." https://www.worldnuclearreport.org/IMG/pdf/wnisr2021-lr.pdf

[3] Swartz, K. E., & Dillon, J. (2022, March 1). *Feds walk back plans for nuclear reactors to run 80 years*. E&E News. Retrieved from https://www.eenews.net/articles/feds-walk-back-plans-for-nuclear-reactors-to-run-80-years/

either the cost of continued nuclear operations or the cost and amount needed of replacement resources.[4] Therefore, this estimate cannot be taken seriously until more detail is provided.

Based on our correspondence with the New York State Energy Research and Development Authority (NYSERDA) seeking more information about how this figure was arrived at, we learned that the cost assumptions do not include continuation of the mammoth amount of public funding that has kept them afloat since 2017. Without this funding, the nuclear facilities in New York State would be uncompetitive and unprofitable, and most, if not all, would close. Therefore, models assuming continued operations of the nuclear power plants in New York must incorporate the costs of keeping uncompetitive reactors open. Failure to include the actual costs of continued nuclear operations creates an inaccurate analysis and misleads the public about the relative cost of alternatives.

We also learned that the RESOLVE model, which estimated that retiring our upstate nuclear facilities would increase costs by $9 billion, uses an unfathomably low cost for nuclear power. The model uses a cost assumption of $197.60/kW-yr, which is far lower than the NYISO 2020 State of the Market estimate of the average generation costs which ranges from $312/kW-yr for a single-unit facility to $231/kW-yr for a multi-unit facility.[5] Importantly, the report notes that the average costs reported by the owners of the Nine Mile Point and Ginna facilities are even higher than the US average. This is due to 1) the advanced ages of Nine Mile Point Unit 1 and Ginna, and 2) their inherently poor economies of scale since they are about half the size of the average reactor. Both are less than half the size of the reactor at Nine Mile Point Unit 2; as a result, Nine Mile Point's total capacity is smaller than the average two-reactor plant, and therefore the average operating costs are higher.

## II. Lack of consideration for which renewable resources will back up nuclear plants when they are down for scheduled or unscheduled outages

Also problematic is the lack of analysis of which resources will be available to replace the fossil fuel generation that currently backs up nuclear power plants when they go down for their weeks' long refueling and maintenance outages or for unexpected technical problems. Though nuclear plants have high capacity factors, they do not, in fact, operate 24/7/365. Every 1.5 to 2 years, the nuclear plants in New York shut down for weeks to undergo refueling and maintenance. Nuclear plants are also subject to other planned and unplanned power outages, requiring a resource that can replace an entire nuclear power generator within minutes. During these unplanned outages, fossil-fueled spinning reserves are kept online to provide backup. For New York to achieve its zero-emissions electricity sector mandate by 2040, this backup cannot be a fossil fuel or another combustion resource, and building additional renewable energy and

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[4] *New York State Climate Action Council Meeting 18, Slide 83*. December 20, 2021. Retrieved from https://climate.ny.gov/-/media/Project/Climate/Files/2021-12-20-CAC-Meeting-Presentation.pdf.

[5] Patton, D. B., LeeVanSchaick, P., Chen, J., & Naga, R. P. (2021, May). *2020 State of the Market Report for the New York ISO Markets*. Potomac Economics. Retrieved from https://www.potomaceconomics.com/wp-content/uploads/2021/05/NYISO-2020-SOM-Report.pdf

storage to to replace an unexpectedly offline nuclear plant would obviate the need for nuclear power generation at all.

## III. Additional analysis on nuclear energy and alternatives is needed

New York's existing nuclear subsidies, which went into effect on April 1, 2017, are structured so that every two years, the cost escalates, based on the rising value of the Social Cost of Carbon. Overall, between 2017 and 2029, they are estimated to cost ratepayers $7.6 billion. New Yorkers paid approximately $2 billion during the first four years. We are on track to pay $2.5 billion over the next four years. And in the final four years, we are scheduled to pay over $3 billion. These subsidies are paid for by every utility ratepayer in the state through our electricity bills. They were overwhelmingly opposed in public comments to the Public Service Commission in 2016 (by a 4 to 1 ratio). This was a massive failure of our democracy and continues to be a drain on public funds. The commitment to keeping these old facilities open diverts possible funding for renewable resources that are cleaner and less carbon-intensive.[6]

We now have the opportunity to avoid a repeat of the hasty nuclear bailout. As we head toward the expiration of the Ginna and Nine Mile Point Unit 1 licenses, Constellation (the owner of all of the upstate nuclear plants) is likely considering whether to apply to extend the operating licenses another 20 years. The Company has already asked the Nuclear Regulatory Commission for permission to put off filing for that extension until 2024. Constellation will likely require the subsidies to be extended past 2029 in order to justify extending the licenses. Now is a good time for New York to review the costs of the nuclear bailout, and consider our options for replacing nuclear plants now with renewables and efficiency so that we do not wind up with even more costly nuclear subsidies beyond 2029.

In addition to the monetary costs, there are two main reasons that nuclear power must be reexamined within the context of the Draft Scoping Plan. Firstly, as climate change continues to impact our grid, and as grid and load management technology develop, flexibility in our generating facilities will be of great importance. Nuclear power is unable to provide that flexibility, which we detail below. Additionally, nuclear experts warn us that new, distributed, renewable resources are incompatible with larger, centralized, inflexible generators. Pursuing a path in which we put our critical resources into all possible avenues is not as sensible as nuclear proponents would have us believe.

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[6] Alliance for a Green Economy, and Nuclear Information and Resource Service. Replacing FitzPatrick: How the Closure of a Nuclear Reactor Can Reduce Greenhouse Gasses and Radioactive Waste, While Creating Jobs and Supporting the Local Community, Oct. 2015, www.allianceforagreeneconomy.org/replacing_fitzpatrick.pdf.
Cooper, Mark. "Avoiding Nuclear and Fossil Fuel Potholes, a Green New Deal Has a Clear Path to a Clean, Low Cost, Low Carbon, Progressive Capitalist Electricity Energy Sector" April 2019, https://www.vermontlaw.edu/sites/default/files/2019-04/Green%20New%20Deal%2C%20A%20Smooth%20Path.pdf
Lovins, Amory B. "Do Coal and Nuclear Generation Deserve Above-Market Prices?" The Electricity Journal, vol. 30, no. 6, July 2017, pp. 22–30, doi:10.1016/j.tej.2017.06.002.

## A. Baseload generation is an outdated way of thinking about our electrical grid

A common argument for nuclear energy revolves around the idea that nuclear energy provides "baseload generation", which renewables cannot provide due to their intermittent nature. This is quickly being debunked as more and more researchers are finding that renewables are just as, if not more reliable, than nuclear power when paired with thermo-mechanical energy storage (TMES) technologies such as compressed air energy storage, pumped heat energy storage, liquid air energy storage, and pumped hydro.[7] The cost of storage has come down, and will continue to decline according to projections modeled by the Pacific Northwest National Laboratory. Meanwhile, blending different types of renewable energy from diverse locations can greatly reduce the need for storage. According to Budischak et.al, an electric system the size of the PJM Interconnection could be powered on renewable electricity for 90%–99.9% of all hours, at costs comparable to today's, if the mix of generation and storage technologies is optimized.[8] Their study analyzed over 28 billion combinations of renewables and storage, and found only 9-72 hours (out of 4 years) of storage would be needed to fill in the gaps of an entirely renewable grid. The authors further note that a 100% renewable strategy is cost effective even when excess generation is not stored or used.

Nuclear facilities are also perhaps too inflexible to meet the needs of a grid with high levels of renewable generation, which is changing hourly, daily, and season-to-season. Variable renewable energy sources and shifting demand require a flexible complementary energy resource that can follow both load and fluctuate around the availability of wind and solar. Nuclear reactors cannot provide this flexible resource. It is neither safe nor economical for nuclear reactors to load-follow - nuclear power generation consists of, almost entirely, fixed and sunk costs, and the facilities only generate revenue when they are in operation. Therefore, lowering the power output to follow grid demand actually increases generation costs and results in additional lost revenue. This is due to the high degree of thermal inertia with which nuclear reactors operate: they cannot adjust their power output very rapidly to meet fluctuations or spikes in demand, and doing so increases the likelihood of equipment failures and power surges that could precipitate a nuclear accident. Powering up and down a nuclear reactor involves complex fission dynamics that need to be carefully managed. Routinely operating a reactor with varying power outputs would introduce operational challenges and safety risks.

The concept of baseload power is archaic and a holdover from a time before the development of renewable resources and advanced grid management technology, which has given rise to an environment in which flexibility makes for better system resilience and reliability.

A study like the one in the 2013 Budischak et. al. paper may be helpful in identifying how best to build out necessary, new resources cost-effectively. New York has the benefit of a wide variety

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[7] In fact, in the old utility paradigm, "baseload" generation did not inherently ensure reliability, without the combination of load-following and peaking generation sources needed to meet the demand for electricity at each moment. The requirement of spinning reserves was instituted by grid authorities to ensure baseload generation sources could be instantaneously replaced if they become suddenly unavailable.

[8] Budischak, Cory, et al. "Cost-Minimized Combinations of Wind Power, Solar Power and Electrochemical Storage, Powering the Grid up to 99.9% of the Time." Journal of Power Sources, vol. 225, Mar. 2013, pp. 60–74, doi:10.1016/j.jpowsour.2012.09.054.

of renewable resources and locations, including the large state-owned hydroelectric generating facilities, massive offshore wind potential, and significant onshore wind and solar potential. Rooftops in New York City alone could host more than 5,000 MW of rooftop solar[9], and NREL found that the state as a whole could host 8,600 MW of rooftop solar.[10] We recommend that the CAC commission or conduct a similar study to determine how best to reach a 100% renewable energy grid in their final version of the Scoping Plan.

### B. Nuclear facilities and renewable resources are fundamentally incompatible

More and more observational data and scenario planning research is finding that nuclear energy tends to crowd out renewable energy sources. The Draft Scoping Plan process is supposed to ensure that we meet the goals outlined in the CLCPA, so we are concerned to see nuclear characterized as a complement to renewable resources, as referenced on page 177.[11] The plan must not simply assume that "nuclear generation [provides] a complement to the increasing amount of variable generation renewables being added to the grid." A future in which we do not examine this claim and continue to pour vast amounts of money into nuclear energy may see us miss our carbon emissions reductions targets and unnecessarily and uneconomically complicate transmission system reliability.

Grid modeling shows that nuclear is not in fact a good complement for renewable resources. Pairing nuclear generation with renewables pushes up the Levelized Cost of Energy (LCOE) for renewable sources, which, if built as flexible sources to meet variable demand, reduces their utilization and thus increases their cost per kwh. A 2020 study of 123 countries over 25 years reveals that not only do countries pursuing nuclear programs fail to reach appreciable carbon reductions, but they also drain funds that could have been put towards building out renewable alternatives. This is due to the fact that nuclear energy and renewable generation are fundamentally incompatible. Each strategy requires specific engineering designs that lock the system into one pathway and crowds out the other; transmission and distribution systems in which a grid structure is optimized for large scale centralized power production such as baseload nuclear, will make it more challenging, time-consuming and costly to introduce small-scale, distributed renewable power.[12]

We are also concerned by the characterization of nuclear energy as "carbon-free", also on page 177 of the draft scoping plan. Many studies that examine the upstream and downstream impacts of uranium mining, enrichment, and fuel fabrication, the construction of nuclear facilities, and the removal, disposal, transportation, and storage of nuclear waste show that nuclear energy is decidedly not pollution-free or carbon-free. There is also a wide breadth of

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[9] Sustainable CUNY. (2011). NY Solar Map and Portal. City University of New York. Retrieved July 1, 2022, from https://www1.cuny.edu/sites/sustainable/solar/ny-solar-map-and-portal/

[10] Gagnon, P., Margolis, R., Melius, J., Phillips, C., & Elmore, R. (2016, January). *Rooftop Solar Photovoltaic Technical Potential in the United States: A Detailed Assessment*. Retrieved from https://www.nrel.gov/docs/fy16osti/65298.pdf

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[12] Sovacool, Benjamin K., et al. "Differences in Carbon Emissions Reduction between Countries Pursuing Renewable Electricity versus Nuclear Power." Nature Energy, vol. 5, no. 11, Oct. 2020, pp. 928–35, doi:10.1038/s41560-020-00696-3.

studies which quantify and document the severe environmental and health impacts of nuclear power and fuel chain wastes on host communities that we touch on below.

Nuclear facilities are highly carbon-intensive when their total lifecycle is considered. The mining, milling, and enrichment of uranium and building and maintenance of nuclear power plants all require a great deal of energy, all of which currently comes from fossil fuels. The decommissioning of nuclear reactors and the storage and transportation of radioactive waste are also fossil fuel-intensive. Nuclear is estimated to have a carbon footprint of 66 g/kWh on a lifecycle basis, which is about twice solar PV's footprint (at 32 g/kWh) and six to seven times wind's (9-10 g/kWh).

There are some that insist nuclear energy is the only way that we *will* meet our climate goals, because without nuclear power the state would be forced to build more gas facilities. Luckily, in 2020, Physicians, Scientists, and Engineers for Healthy Energy (PSE Healthy Energy) analyzed how we can meet the energy demands of New York State with no new gas infrastructure. Citing NYISO's own Indian Point deactivation assessment, PSE found, "Had these [new gas] facilities not been constructed, renewables, storage, and energy efficiency alone could have feasibly met local capacity requirements following Indian Point's closure." PSE Healthy Energy also found that, since the 2017 Indian Point closure agreement was signed, the State has been making progress on replacing Indian Point with clean energy: "In total, clean resources that have recently been deployed or are under development will contribute roughly 20,000 GWh annually by 2024, exceeding Indian Point's annual generation of 16,334 GWh in 2018." The analysis also found that "beyond the 20,000 GWh estimate, an additional 3,400 GWh of solar generation and 20,200 GWh of cumulative energy efficiency savings relative to 2019 will be deployed by 2025 if New York meets its CLCPA targets for distributed solar and energy efficiency."

More recently, researchers at Synapse Energy Economics confirmed that a combination of solar, wind, and energy efficiency improvements are on track to replace Indian Point's energy production by 2022. In their 2021 report prepared for Riverkeeper, projected that deployments of wind and solar photovoltaic energy in New York State, in addition to existing wind and solar resources, will amount to approximately 1.7 times the annual output of Indian Point Energy Center by 2025, and more than 2.7 times its annual output by 2030.

The PSE research and the Synapse Study show that energy efficiency and renewable energy is on track to replace Indian Point without the need for alternative fuels. Notably, they both hold an important lesson: New York could and should have been more proactive in deploying renewables and efficiency while preventing new gas plants from being constructed in the lead-up to the Indian Point closure.

## IV. The job creation potential for nuclear energy is low

The Just Transition Working Group Job Study provides an important look into the future of our clean energy sector. In both the low-carbon fuels scenario and the accelerated transition away from fossil fuel scenario, the potential for job growth in solar, offshore and onshore wind,

distribution, transmission, and storage is staggering. The study estimates an additional 66,661 to 71,690 jobs by 2050.

Equally important is that the study does not find significant job growth in the nuclear energy sector. According to their sector by sector sensitivity analyses, employment in natural gas generation, other fossil generation, and nuclear subsectors dwindles to 5,000-5,500 jobs by 2040. This includes scenarios which extend the operating life of the upstate nuclear reactors to 80 years, a lifespan which is unfeasible at worst and expensive at best as discussed above.

The scoping plan must lay out a concrete and proactive plan for workers that will be displaced by a changing industry. Worker retraining and paid apprenticeships must be made available to anyone who wishes to begin a career in renewables. It is well past time that the state grapples with the fact that the subsidies being spent on nuclear amounts to a wildly expensive jobs and local tax revenue program. For example, at the time of the bailout, there were a total of 2,105 jobs at the four reactors combined. At $500 million per year, New York is spending $237,529 per job each year and $3.6 million per job over the course of the program. With proactive planning, New York could have instead provided just transition funds for impacted workers and communities and funded lower cost, cleaner alternatives to nuclear subsidies.[13] In addition, nuclear reactor decommissioning -- utilizing the billions of dollars in established trust funds already paid for by New Yorkers -- creates a unique opportunity to sustain a large amount of the nuclear workforce for 10-20 years. However, lack of attention to the oncoming nuclear financial crisis and massive political pressure from a minority of industrial and special interests resulted in this irrational policy.

Any new jobs created in the clean energy sector must be union jobs that pay livable wages and offer benefits that result in a life with dignity. We feel strongly that the scoping plan must do a better job of laying out how worker justice will be achieved, how it will support workers by implementing job and wage standards, and how the state plans to address the racial disparity in clean energy sector jobs. The tremendous growth that the clean energy, building decarbonization, and energy efficiency sectors have experienced and still have yet to experience is a testament to the urgency of this task.

## V. Nuclear generation facilities lead to grave health and safety concerns and violate our environmental justice mandates

Nuclear facilities, uranium mines, and the whole process of enrichment and transport of the uranium has severe consequences for the communities which surround these operations. The communities bearing the largest burden from nuclear energy generation are Indigenous peoples, low-income communities, and communities of color. There is a huge body of research that details the dirty and dangerous lifecycle of nuclear energy which we can only touch on here, though we urge the Council to listen to the Climate Justice Working Group and examine the

[13] Alliance for a Green Economy, and Nuclear Information and Resource Service. Replacing FitzPatrick: How the Closure of a Nuclear Reactor Can Reduce Greenhouse Gasses and Radioactive Waste, While Creating Jobs and Supporting the Local Community, Oct. 2015, www.allianceforagreeneconomy.org/replacing_fitzpatrick.pdf.

impacts of nuclear generation on environmental justice communities. First and foremost, the characterization by nuclear advocates that nuclear energy is clean is absurd. Nuclear reactors require uranium fuel, which must be mined where it is available in the Southwest U.S., Canada, and around the world. The fact that uranium, a radioactive material and toxic heavy metal, is mined in communities whose surrounding land and water bodies are polluted yet do not benefit from the energy produced from that process, is itself deeply unjust.

As a result of decades of uranium extraction for nuclear power and nuclear weapons, environmental racism, colonialist exploitation of Indigenous peoples, and weak environmental laws, Indigenous communities disproportionately suffer contamination of their air, land, and drinking water. There are over 15,000 abandoned uranium mines in the U.S.[14], and over 230 million tons of mill tailings,[15] disproportionately affecting Indigenous peoples.[16] Now that the U.S. is importing over 80% of its uranium supply, those impacts are being exported to Indigenous peoples in other countries.

The rest of the nuclear fuel chain entails similar environmental contamination and injustices. Rural and Latinx communities have been targeted for uranium enrichment and fuel fabrication, generating hundreds of thousands of tons of depleted uranium and radioactive, toxic effluents. The same is true of the back end of the fuel chain, with both so-called “low-level” radioactive waste and high-level radioactive waste (irradiated nuclear fuel and reprocessing waste) which will remain environmentally hazardous for over a million years. All of the existing and proposed radioactive waste dumps in the U.S. are located in the following Black, Indigenous, and Latinx communities according to the 2010 American Census:

**Low-Level Radioactive Waste**

- EnergySolutions, Barnwell, SC:[17] 47% African-American, median income $26,722.
- Waste Control Specialists, Andrews County, TX: 49% Hispanic, median income $34,036.
- Energy Solutions, Clive, UT: Skull Valley Goshute treaty land.[18]

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[14] “About Uranium Mines.” AbandonedMines.gov, Bureau of Land Management, www.abandonedmines.gov/wbd_um.html. Accessed 7 Apr. 2021.
[15] “Uranium Maps and Statistics.” Www.wise-Uranium.org, WISE Uranium Project, 23 Dec. 2020, www.wise-uranium.org/umaps.html?set=tail.
[16] Onondaga Nation, et al. Nuclear Reactors Are Not “Green.” 30 Jan. 2020, www.allianceforagreeneconomy.org/sites/default/files/NukeRedPaper1-30-20.pdf.
[17] “Landfilling low-level radioactive waste is a problem for all states.” Rachel’s Hazardous Waste News #69. March 21, 1988. Annapolis, MD. https://www.ejnet.org/rachel/rhwn069a.htm
[18] Endres, Danielle. “From wasteland to waste site: the role of discourse in nuclear power's environmental injustices.” *Local Environment* 14:10, 917-937. November 1, 2009. http://dx.doi.org/10.1080/13549830903244409

- US Ecology (Nuclear Engineering), Beatty, NV:[19] Western Shoshone, 1863 Treaty of Ruby Valley.[20]

**High-Level Radioactive Waste**

- Yucca Mountain Project: Western Shoshone, 1863 Treaty of Ruby Valley.
- Waste Isolation Pilot Plant, Carlsbad, NM:[21] 43% Hispanic.
- Holtec Consolidated Interim Storage (CIS), Lea County, NM:[22] 51.1% Hispanic.
- Interim Storage Partners CIS, Andrews County, TX: 49% Hispanic, median income $34,036.
- Private Fuel Storage CIS (licensed, later canceled): Skull Valley Goshute Reservation, UT.
- Private CIS (proposed, later canceled by tribal vote), Mescalero Apache Reservation, NM.[23]

In addition to the predictable health and environmental impacts from uranium mining and nuclear waste, nuclear reactors are subject to a number of problems which can arise unexpectedly. While the Fukushima Daiichi nuclear reactor meltdown is the most prominent example of one such error, there have been a number of recent safety incidents at nuclear plants in New York. Nine Mile Point 1 and FitzPatrick both have the same design as the Fukushima Daiichi reactors; this design is known to have flaws that compromise public safety in the case of a meltdown. That includes the reactor containment systems, which are virtually certain to fail in a meltdown scenario, as occurred at all three operating reactors at Fukushima Daiichi in 2011. Nine Mile Point 2 is a reactor of very similar design, with similar containment system weaknesses. A number of grave safety concerns arise from the storage of spent fuel rods as well, considering their high levels of heat and radioactivity and their onerous storage requirements.[24] A disaster involving one of the irradiated fuel pools at any of these reactors could release more radioactivity than a reactor meltdown, and result in contamination of tens of

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[19] Associated Press. “Radioactive waste dump fire reveals Nevada site's troubled past.” *The Guardian.* October 25, 2015. https://www.theguardian.com/us-news/2015/oct/25/radioactive-waste-dump-fire-reveals-nevada-troubled-past

[20] Eberhardt Bobb, Bonnie. “A soil contamination survey of Timbisha Shoshone tribal lands without close proximity to the Nevada Test Site.” Tupippuh Project. Retrieved April 2021. Death Valley, CA. http://www2.clarku.edu/mtafund/prodlib/tuppipuh/tuppipuh.pdf

[21] Murphy, Brenda L., & Kuhn, Richard G. (2006). Scaling Environment Justice: The Case of the Waste Isolation Pilot Plant (NEI-SE--613). Andersson, Kjell (Ed.). Sweden https://inis.iaea.org/collection/NCLCollectionStore/_Public/37/101/37101563.pdf

[22] Montoya Bryan, Susan. “New Mexico sues US over proposed nuclear waste storage plans.” Associated Press. March 29, 2021. https://abcnews.go.com/Business/wireStory/mexico-sues-us-proposed-nuclear-waste-storage-plans-76752491

[23] Noah Sachs. “The Mescalero Apache Indians and Monitored Retrievable Storage of Spent Nuclear Fuel: A Study in Environmental Ethics” 36 Nat. Resources J. 881 (1996). Available at: https://digitalrepository.unm.edu/nrj/vol36/iss4/7

[24] Alvarez, Robert. Spent Nuclear Fuel Pools in the U.S.: Reducing the Deadly Risks of Storage. Institute for Policy Studies. May 24, 2011. Washington, DC. https://ips-dc.org/wp-content/uploads/2011/05/spent_nuclear_fuel_pools_in_the_US-final.pdf

thousands of square miles, displacing hundreds of thousands of people.[25] As one of the states with, historically, the largest numbers of reactors in the U.S., the inventory of irradiated fuel in New York is among the greatest in the country, with over 4,000 metric tons stored at the reactor sites. The upstate reactors generate nearly 80 tons more every year.

In addition, nuclear reactors routinely release radioactive waste into air and water, and leaks and groundwater contamination are endemic industry-wide. Contamination of surrounding communities results in cancer and other diseases and health impacts. For instance, increases in childhood leukemia have been documented near reactor sites,[26] and site-specific health studies have identified a wide array of disease and health problems.[27]

### A. Environmental Justice and the Upstate Nuclear Plants

The aforementioned 2020 "Red Paper" published by the Onondaga Nation, Haudenosaunee Environmental Task Force, and American Indian Law Alliance provides perhaps one of the best compilations of the environmental racism experienced by Indigenous peoples in New York and across the U.S., perpetrated by the nuclear industry and the governments that support it.[28]

The Red Paper discusses how the nuclear plants in Oswego County impact the Onondaga Nation, including:

- The direct harm that would result to the Onondaga people, Nationlands, and waters from the continued operations of these aging nuclear reactors and from any accidental release of radiation, or worse.
- How the three aging nuclear reactors in Scriba are interfering with the stewardship responsibilities of the Nation leaders to protect the natural world for future generations.
- The dangers to the Onondaga Nation, its waters, and its people from the current transport of nuclear wastes down Interstate Route 81, directly through the Nation's currently recognized territory.

From uranium mining to waste storage, the paper details how Indigenous nations and the environment in which they practice traditional lifeways are impacted by mill tailings, abandoned open pit uranium mines; surface water and groundwater contamination from uranium, arsenic, copper, lead, molybdenum, selenium, sulfate, thorium, tritium, vanadium and radium; thermal pollution and massive withdrawals of water from aquifers and lakes; energy and water intensive

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[25] von Hippel, Frank N., and Michael Schoeppner. "Reducing the Danger from Fires in Spent Fuel Pools." Science & Global Security, Vol. 24, No. 3, 141-173. http://dx.doi.org/10.1080/08929882.2016.1235382

[26] Fairlie, Ian. "A hypothesis to explain childhood cancers near nuclear power plants." *Journal of Environmental Radioactivity.* Volume 133, July 2014, Pages 10-17. https://www.sciencedirect.com/science/article/abs/pii/S0265931X13001811

[27] Citizens Awareness Network. "The Carcinogenic, Mutagenic, Teratogenic and Transmutational Effects of Tritium." April 1994 (Updated January 2001). Shelburne Falls, MA. http://nukebusters.org/pdfs/Health_Tritium2006.pdf

[28] Onondaga Nation, et al. Nuclear Reactors Are Not "Green." 30 Jan. 2020, www.allianceforagreeneconomy.org/sites/default/files/NukeRedPaper1-30-20.pdf

cooling of spent fuel rods; the release of radioactive gasses from nuclear power plants such as xenon-135 and krypton-85; and more.

The paper also details specific incidents within each nation affected, such as the 1979 Church Rock Mill Tailings Spill in the Navajo Nation, the discharge of 5 million gallons of liquid radioactive waste into Cattaraugus Creek in the Seneca Nation, the burning of nuclear waste within 1.5 miles of Tuscarora Nation territory, the abandonment of irradiated uranium processing sites on Lakota land, and various other harmful activities in the Pueblo, Western Shoshone, Yucca Mountain, Diné (Navajo Nation), Hualapai, Havasupai, White Mesa Band of the Ute Mountain Utes, Spokane, Dene, and Canoe Lake Cree First Nations. Many of the activities leading up to the mass contamination of Indigenous lands also infringe upon the treaties established between these nations and the U.S. government, such as the trucking of uranyl nitrate (a highly radioactive and explosive liquid waste product) down Route 81 through recognized territory of the Onondaga Nation. The contamination of air, water, and land on such a massive scale has undeniable health impacts, and the authors of the Red Paper expose the numerous and well documented health impacts to the miners and Indigenous nations by neighboring mining sites, such as lung cancer, fibrosis, bone cancer, impaired kidney function, gene mutations, and chromosome changes.

In addition, there is a constant threat of fires or explosions from unstable irradiated fuel rods on Onondaga Nation Territory which, according to a 1997 report by the Brookhaven National Laboratory for the Nuclear Regulatory Commission, could result in 28,000 cancer fatalities and render 188 square miles around the storage site uninhabitable. Note that this is an underestimate considering the radiation-control zone of Chernobyl is more than 6,000 square miles, equal to roughly two-thirds the area of the State of New Jersey.[29] Additionally, a more recent analysis from the Nuclear Regulatory Commission found that a release of cesium-137 from a high-density spent fuel pool would displace an average of 4.1 million individuals from the surrounding 9,266 square miles.[30] Another study finds that 14,285 square miles to 57,915 square miles could be contaminated by as much as 15 Curies/square kilometer should cesium-137 be released to the atmosphere in a spent-fuel-pool fire, the same kind of accident that precipitated the Chernobyl disaster.[31] Another analysis of a potential spent-fuel-pool fire specific to Indian Point estimates that a release of 42 million Curies of cesium-137, the amount of fuel present in the Indian Point Unit 2 pool in 1998, would render more than 36,000 square miles of land uninhabitable thereby displacing those New Yorkers.[32] This body of work along with the meticulous accounting of nuclear incidents specific to upstate reactors in the Red Paper makes clear that continuing a program for nuclear generation in our state places at risk both present and future generations of Indigenous peoples and their sovereign lands.

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[29] Alvarez, Robert. Spent Nuclear Fuel Pools in the U.S.: Reducing the Deadly Risks of Storage. Institute for Policy Studies. May 24, 2011. Washington, DC. https://ips-dc.org/wp-content/uploads/2011/05/spent_nuclear_fuel_pools_in_the_US-final.pdf

[30] von Hippel, Frank N., and Michael Schoeppner. "Reducing the Danger from Fires in Spent Fuel Pools." Science & Global Security, Vol. 24, No. 3, 141-173. http://dx.doi.org/10.1080/08929882.2016.1235382

[31] Alvarez, Robert et. al. (2003). "Reducing the Hazards from Stored Spent Power-Reactor Fuel in the United States." Science and Global Security, 11:1–51. DOI: 10.1080/08929880390214124

[32] Thompson, Gordon. (2003). "Robust Storage of Spent Nuclear Fuel: A Neglected Issue of Homeland Security." Institute for Resource and Security Studies. Cambridge, MA.

The CLCPA makes specific commitments to environmental justice that the Draft Scoping Plan must honor and prioritize. In addition to creating Environmental Justice and Climate Justice working groups that advise the Climate Action Council, the Act specifies that activities undertaken to comply with the CLCPA regulations must not result in disproportionate burdens on disadvantaged communities. It is imperative that New York policy makers consider the impact of continuing nuclear generation on host communities, the Onondaga Nation, and environmental justice communities at all ends of the nuclear fuel chain. Given the health and environmental impacts outlined above, the final version of the Scoping Plan must act to protect vulnerable communities from further harms.

## V. Conclusion

We thank the Climate Action Council, the Climate Justice Working Group, and all of the members of the various advisory panels for their work on the Draft Scoping Plan. This level of comprehensive analysis and planning has never been done for New York's energy system. It is both helpful and a central tenet of democratic principles for people at every level to understand what it's going to take to address climate change, and just as importantly, what we have to gain. If we can come to a Final Scoping Plan that is committed to phasing out all forms of dirty energy, and if we follow that plan, we will have a more prosperous, healthy, and resilient society.

We thank the Climate Action Council for your consideration of our recommendations and look forward to seeing them addressed.

Sincerely,

Jessica Azulay
Executive Director
Alliance for a Green Economy
[redacted]

Avni Pravin
Deputy Director
Alliance for a Green Economy
[redacted]