A REGIONAL RESPONSE TO CLIMATE CHANGE:
SCENIC HUDSON'S ROLE IN THE HUDSON VALLEY'S TRANSITION TO RENEWABLE ENERGY

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Climate change presents an existential threat to Scenic Hudson's core mission of preserving land and farms, creating parks and protecting the ecological integrity and beauty of the Hudson Valley. In order to preserve the resources we as an organization have promised to protect, we must be part of the solution in mitigating climate change.

TO REDUCE GREENHOUSE GAS (GHG) EMISSIONS, NEW YORK STATE ENERGY POLICY SHIFTS ELECTRICITY PRODUCTION FROM FOSSIL FUEL TO RENEWABLE ENERGY SOURCES

In keeping with the Paris Agreement to limit warming to no more than 2°C, New York State has developed a comprehensive strategy to ensure that the state's GHG emissions are reduced consistent with this pact.

One of the most important ways to reduce the GHG emissions that cause climate change is to phase out fossil fuel electricity generation and transition to renewable energy sources such as solar, wind and hydropower. New York has adopted multiple policies and plans to incentivize the development of renewable energy in the interest of reducing GHG emissions and mitigating climate change. These ambitious policies will transition the state's energy supply from one based on major fossil-fuel energy generating stations to one that integrates large-scale renewable energy generation as well as smaller-scale distributed energy resources into the grid.[1]

New York's current State Energy Plan[2] includes the following goals:

- A 40% reduction in GHG emissions from 1990 levels.
- 50% of electricity generation must come from renewable energy sources by 2030.
- A 23% decrease in energy consumption in buildings from 2012 levels.

On July 18, 2019, Governor Andrew Cuomo signed the Climate Leadership and Community Protection Act into law. Among other things, this law accelerates the state's renewable energy goals:

- 70% of electricity generation must be from renewable energy sources by 2030 (the "70x30" goal).
- 100% of electricity generation must be carbon-free by 2040.[3]

[1]The three main policies supporting this shift are Reforming the Energy Vision (REV), the State Energy Plan (SEP), and the Renewable Energy Standard (RES).
[2] The current State Energy Plan was adopted in 2015; it is anticipated a new Energy Plan will be released in 2019.
[3] It is important to note that 100% carbon-free electricity is not equivalent to 100% renewable energy.

ALL SCALES AND TYPES OF RENEWABLE ENERGY MUST BE DEPLOYED IN NEW YORK TO MEET STATE RENEWABLE ENERGY TARGETS, WITH LARGE-SCALE SOLAR CRITICAL TO SUCCESS

The transition to 50%, 70% or even 100% clean energy will require that new renewable energy projects be built at both the grid-scale (power sold wholesale to the New York State Independent System Operator [NYISO] statewide electric grid, like a traditional power plant) and community or distributed scale (power sold directly to customers) to replace fossil fuel generation.

To meet renewable energy goals, we must deploy a wide range of solutions and all kinds of renewables. While state policy seeks to grow our supply of smaller, distributed resources—including rooftop solar—the backbone of our energy system will remain large-scale generation. Small-scale facilities alone cannot serve the electricity needs of New York State, nor are local distribution grids generally sufficient to transport the amount of power needed.

Location of new renewable energy generation is largely influenced by physical factors, such as the suitability of wind conditions in the northern and western regions of the state. All existing major hydropower resources and wind power projects, and nearly all currently proposed land-based wind power projects, are located in the northern and western regions of the state – hundreds of miles from the high-demand, or high "load," located in the New York City metropolitan region in the southeast. With respect to large-scale solar, availability of sufficient and unutilized land to site grid-scale projects is key. The existing imbalance presents a need to address how the renewable energy will get to the load centers of the state. The existing transmission system is insufficient to transport all of the existing upstate renewables downstate, much less accommodate additional capacity, and construction of high-voltage transmission lines is subject to intense public opposition.

New York's wholesale electricity market design also encourages investment in areas where the demand for electricity and capacity is the highest. Utilities that provide electricity to consumers are required to purchase virtually all of their capacity from electricity supply providers within their own zone or region rather than throughout the rest of the state or outside it.[4]

All of these facts lead to the inescapable conclusion that to reach the state energy goals, rooftop, community- and grid-scale solar must all be constructed in the Hudson Valley.

THE TRANSITION TO RENEWABLE ENERGY WILL BRING ADDITIONAL BENEFITS TO THE HUDSON VALLEY

Scenic Hudson supports appropriately sited solar energy facilities in the Hudson Valley due to the need to limit the effects of climate change and avoid the worst economic, environmental and human health damage. However, there are additional benefits to solar development.

[4] Utilities are required to ensure that sufficient capacity exists to meet power supply needs during peak demand. Central Hudson, Capacity Zone, available at: https://www.cenhud.com/capacityzone/index.

Increased reliance on renewables can improve the reliability and resilience of our electricity system. Moving to clean energy also will provide energy security, as it decreases dependence on fossil fuels, which are finite and often foreign-sourced.

Switching to renewable energy supplies also will reduce air and water pollution that causes public health impacts like breathing problems, neurological damage, cancer and other serious issues. Wind, solar and hydroelectric systems generate energy without emitting air pollution. Renewable energy generation does not come with the risks associated with fossil fuel extraction. Solar energy requires little or no water to produce electricity, and does not pollute water or compete with other water needs such as drinking water or farming.

Solar also results in consumer cost-savings. Once a facility is constructed, maintenance and energy production costs are nearly zero. Energy from the sun is inexhaustible, so it isn't subject to market fluctuations. Because energy from the sun is strongest at the same times energy use peaks, solar reduces the need for fossil fuel "peaker plants" and reduces the cost of electricity for all customers. Most of the costs of solar energy come from the installation of the solar panels, so jobs created are typically local and have a positive impact on the local economy. In addition, despite not placing the same demands on local resources like schools, roads and infrastructure that other types of development might, solar projects can bring substantial tax ratables to communities.

WITH SCENIC HUDSON'S LEADERSHIP, THE HUDSON VALLEY CAN SERVE AS A MODEL FOR HOW A REGION CAN RESPOND TO CLIMATE CHANGE

Scenic Hudson began its climate change initiatives focused on helping communities adapt to rising sea levels and other consequences of climate change. In 2010, Scenic Hudson began work on its sea level rise mapper, first published in 2012. Following the devastation wreaked on the Hudson Valley by Hurricanes Irene and Lee in 2011 and Sandy in 2012, Scenic Hudson launched its Sea Level Rise Task Force initiative, partnering with especially vulnerable communities to develop plans to adapt to a rising Hudson River.

Scenic Hudson adopted a new Strategic Plan in 2017. One of the three pillars of the plan is "strengthening resiliency," which explicitly calls for the organization to develop new climate-mitigation policies consistent with conservation values. As a direct result of the strategic plan, Scenic Hudson has articulated its vision for achieving our goal of strengthening resiliency:

Vision for the Valley: To rapidly transition the Hudson Valley to a sustainable, low-carbon region increasingly powered by renewable energy in order to mitigate climate change, while protecting and preserving the region's invaluable scenic, historic, agricultural, environmental and economic resources.[5]

The lands that Scenic Hudson has protected and prioritized for conservation are at serious risk. As climate change presents new dangers for Hudson Valley communities while at the same time making existing vulnerabilities worse, it is a growing threat to human health and safety, the

[5] Scenic Hudson, 2018: Clean Energy, Green Communities: A Guide to Siting Renewable Energy in the Hudson Valley, available at: https://www.scenichudson.org/sites/default/files/renewables-siting-guide_web.pdf

environment and economic growth. As a region, the Hudson Valley must plan proactively and take action to adapt to these new threats, while also making the changes necessary to mitigate the worst impacts of climate change by reducing emissions of the greenhouse gases that cause it.

Scenic Hudson supports the state policies that seek to increase our renewable energy supply to reduce GHG emissions. Scenic Hudson is playing a significant role in the state's effort, in accordance with our traditional conservation principles. We are working to identify a path forward for maximizing the development of solar energy sources in our region while protecting the important ecological, agricultural and visual resources that make the Hudson Valley such an amazing and beautiful place to call home. The central goal is to establish the Hudson Valley as a regional model for promoting and accelerating renewable energy development while implementing siting techniques that avoid and mitigate impacts to natural resources.

THE WORST POTENTIAL IMPACTS OF LARGE-SCALE SOLAR PROJECTS CAN BE AVOIDED AND MITIGATED UNDER SCENIC HUDSON'S SITING AND DESIGN PRINCIPLES

Reaching the 70x30 goal will require a significantly accelerated level of development of renewable energy generation facilities over the next 11 years, along with the upgrade and expansion of existing distribution and, likely, transmission infrastructure. **The transition to a renewable energy supply can and must be made in a manner that substantially protects the Hudson Valley's priceless natural resources, iconic views, farmlands and historic sites.**

Scenic Hudson developed the following siting principles, which form the basis of our renewables siting guide *Clean Energy, Green Communities*, published in 2018:

- prioritize development on previously disturbed areas
- protect agricultural lands and promote co-location
- protect natural beauty
- protect ecological resources
- protect historic and cultural resources
- maintain the purpose of conserved lands
- avoid and minimize new transmission and distribution lines
- use construction and operation best practices
- promote sustainable renewable energy development through planning and zoning

A challenge for Scenic Hudson's opposition to new fossil fuel infrastructure and desire to have it replaced by renewable energy is that fossil fuel energy generation has a much smaller direct physical footprint than a solar energy facility. For example, a gas-fired power plant can be sited on a few acres in the corner of an industrial park and, other than exhaust stacks that can create visibility concerns, these are often out-of-sight, out of mind. Solar has a relatively intense direct land use, with approximately 5-10 acres needed for every MW of electricity produced.

At the same time, the environmental and community impacts of solar facilities are far less than those that result from fossil fuel power generation. Solar facilities do not need massive amounts of water for cooling; parking and traffic accommodations for large amounts of on-site personnel; or fuel delivery via truck, rail or pipeline. Solar energy systems also do not result in the type of

impacts associated with regulated industrial or commercial uses (noise, traffic, pollution) that would mandate permitting them only in industrial and commercial districts. After construction, such facilities are quiet and clean, and generally have few if any on-site employees, making them more compatible with residential districts. Solar energy systems are also unlike traditional fossil fuel power plants, which require substantial amounts of water for steam turbines.

Scenic Hudson uses all available tools and resources to compel project developers to avoid or mitigate to the maximum extent practicable the potential impacts of proposed projects to the resources our mission directs us to protect. Creating model mitigation packages for projects proposed today will set a positive precedent for all projects that follow.

Visual concerns can often be addressed substantially through sensitive siting and design and attention to the aesthetics of an installation. Solar panels need to absorb light in order to convert it to energy and use non-reflective glass in order to maximize absorption. Solar panels are therefore generally less reflective than water or windows. If there is a concern that a particular system may cause glare at certain times of the year and day, a glare analysis can be conducted. Scenic Hudson has approached evaluation of visual impacts from a regional rather than local perspective—in other words, prioritizing impacts to public resources of broad importance over impacts to individual private property—consistent with how we evaluate many other types of development. Our analysis is more locally focused when and if a project is proposed in or will be visible from a designated scenic area or historic district.

Solar energy systems do not necessarily pose the same level or type of risk to agricultural lands and practices as does new housing or commercial development. If sited properly, these systems can be designed to avoid or minimize impacts to highest value agricultural soils. Development of renewable energy projects need not always eliminate the possibility of maintaining other uses on a site or irreversibly take up valuable "green space." For example, if properly sited, designed, constructed and operated, solar facilities in agricultural areas can provide support for nearby pollinator-dependent crops, provide an income stream for farmers to continue farming on other lands, and even allow for co-location of energy and agricultural production. The potential exists for reducing impacts and even for successful co-location of grid-scale solar projects with agricultural operations. Solar energy systems also can include native vegetation and plants beneficial to pollinators growing beneath the panels. In addition, revenues from solar development on one part of a farm can make it possible for the farmer to continue to farm the remainder of the property.

Previously disturbed sites or even brownfields or other contaminated sites can be good locations for renewable energy projects of small or medium scale. The cleanup and reuse of contaminated or other previously disturbed properties for renewable energy generation can provide many benefits, including preserving greenfields, reducing blight, increasing property values and creating jobs. Unfortunately, these sites are typically not large enough to accommodate grid-scale solar installations.

Solar facilities also can be sited near historic structures if done in a way that does not compromise significant features or adversely affect historic character. Visual impacts to historic sites can be minimized by locating rooftop collectors at a setback from the front façade, locating

the system on an addition or a secondary structure (if available) and by utilizing vegetative screening.

The sole source of noise in a solar energy facility is the inverters, which convert the DC energy produced by the panels to AC, so it can be taken up by the electricity grid. Inverters produce noise at a level of 45 decibels at 10 meters, slightly less than a refrigerator. Solar installations that move to track the sun can also generate a low level of noise, but it is generally not audible above ambient noise levels outside the fenced area of a facility.

Solar energy arrays can and should be sited and laid out to comply with wetland and water resource protection buffers and other provisions, and to protect rare species and habitats. In addition, solar facilities should be located so that tree removal is limited to the extent practicable.

Decommissioning plans are required by New York State's Article 10 process for solar facilities over 25 megawatts, and can ensure that a facility site is properly restored after an energy project reaches the end of its useful life. Municipalities can also require decommissioning plans for smaller facilities under their jurisdiction. Private mechanisms like conservation easements can also be a means to require site restoration and limit future uses of a site once a solar facility is decommissioned. Unlike fossil fuel energy production, solar does not leave significant long-term impacts on the land after decommissioning.

Finally, while solar energy requires a larger direct footprint on the land than fossil fuel power plants, the overall amount of land in the Hudson Valley expected to be used for solar is quite small. The New York State Department of Public Service has developed estimates of the amount of solar energy that will be produced in each region to reach the 50x30 Renewable Energy Standard. Using these estimates, Scenic Hudson calculated that approximately one-tenth of one percent of the land in the Hudson Valley—approximately 6,000 to 7,000 acres—will need to be dedicated to solar energy to reach this initial goal. Reaching the 70x30 goal will likely increase the amount of land needed slightly, but would not change the fact that the percentage of overall land area dedicated to solar in the Hudson Valley will be very small.

THE CLIMATE CHANGE CRISIS DEMANDS ADAPTATION AND MITIGATION RESPONSE NOW

Failure to limit global warming will have direct and significant impacts in the Hudson Valley. The 2018 National Climate Assessment states that less distinct seasons are already altering ecosystems and environments in ways that adversely affect tourism, farming and forestry in our region. Changing climate also threatens the health and well-being of people in the Hudson Valley through more extreme weather, warmer temperatures, degradation of air and water quality, sea level rise and increased flooding. These environmental changes are expected to lead to health-related impacts and costs, including additional deaths, emergency room visits and hospitalizations, and a lower quality of life.[6]

Accelerated sea level rise, driven globally by land-based ice melt and expansion of the seas due to temperature increase, will impact the Hudson River's shoreline (erosion), communities

[6] https://nca2018.globalchange.gov/downloads/NCA4_Ch18_Northeast_Full.pdf

(flooding) and ecology. High sea level rise projections adopted by the New York State Department of Environmental Conservation (DEC) for the Mid-Hudson Region are 9 inches in the 2020s to 71 inches by 2100; for the New York City/Lower Hudson Region, the high projections are 10 inches and 75 inches (over six feet), respectively[7]

Rising sea levels and storms will cause localized floods and threaten shoreline infrastructure and development. A 6-foot rise in sea level in the Hudson River valley would present risk of inundation and flooding to thousands of people and households and would affect rail lines, brownfields, hazardous waste sites, and waste water treatments plants.[8] Sea level rise may result in loss of ecologically vital tidal wetlands along the Hudson River, and warmer temperatures will lead to an increase in the frequency of high intensity storms and more damage to the landscape, including conserved lands, farms, parks and preserves.[9]

Climate change presents a dire threat to the Hudson Valley's irreplaceable natural resources, iconic beauty and quality of life. In order to preserve the resources we as an organization have promised to protect, Scenic Hudson must take a leadership role in achieving a regional solution to mitigate climate change.

CONCLUSION

As we transition to a clean energy future, it is important to keep the potential impacts of solar facilities in context. We are nearing the end of two centuries of intense use of fossil fuels, which has had dramatic impacts on our ecosystem and landscape. From extraction to transportation to refining to burning, arguably no other activity has been as damaging to human health and the environment as the use of fossil fuels. No matter which way you look at it, using solar is dramatically less harmful to our environment. Today's solar projects utilize the best available technology, but solar is becoming more efficient and less expensive every day, and technological advances in the field are expected to continue at a rapid pace. When today's projects are decommissioned in approximately 30 years, it is likely that equivalent amounts of electricity will be produced from a much smaller footprint, further minimizing potential impacts.

Scenic Hudson's approach to renewable energy development in the Hudson Valley, while distinguished by the demonstrable climate benefits of such projects, is not different from our fundamental approach to other type of development. First, Scenic Hudson evaluates the potential impacts and benefits of a project through a regional lens. Second, staff works through the appropriate regulatory processes to ensure that significant impacts are avoided, minimized or mitigated to the greatest extent possible. Third, while Scenic Hudson believes that both large- and small-scale solar must be built in the Hudson Valley to meet the state's energy goals, and therefore promotes solar energy generally, any support for a particular project is contingent on a demonstration that it avoids or mitigates significant impacts and has integrated the principles outlined in our siting guide.

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[7] 6 N.Y.C.R.R. Part 490, Projected Sea Level Rise – Express Terms, http://www.dec.ny.gov/regulations/103877.html

[8] *See* Columbia University Hudson River Flood Impact Decision Support System, http://fidss.ciesin.columbia.edu/.

[9] *See* Scenic Hudson marsh migration model, https://www.scenichudson.org/sites/default/files/protecting-the-pathways.pdf