

PO Box 160
Quaker Street, NY 12141

Dr. Bassett
New York State Department of Health
Corning Tower
Empire State Plaza,
Albany, NY 12237

May 2, 2022

Re: Public Comment for PFAS, Solar Facilities and the Precautionary Principle

Dear Dr. Bassett and the Commission,

Thank you for the opportunity to provide public comment at today's hearing.

New York State intends to use thousands upon thousands upon thousands of acres of prime farmlands, grasslands, as well as federal and state wetlands for the siting of utility scale solar facilities. These energy resources are adjacent to residential wells that are the only source of drinking water for most of rural New York's taxpayers.

Solar panels, lithium-ion batteries and the associated wires and cables are documented to contain PFAS. Of great concern is the anti-reflective and anti-soil coatings applied to the surface of the solar panels. These coatings serve as a hydrophobic surface that sheds snow, water and dirt off the panels. Research of patents and other scientific documents indicate that PFAS is used to create these coatings. Please see the four enclosed letters and supporting documents.

A ten megawatt nameplate capacity solar facility may contain 40,000 solar panels. To reach the CLCPA goals of 60,000 MW there may be 240,000,000 photovoltaic panels. These panels may be replaced every 10 years to increase plant productivity. At time of decommissioning these panels may be disposed of in local landfills.

Research indicates that the coatings deteriorate, sometimes as soon as two weeks. Solar developers report that the coatings deteriorate during the project's lifetime. Companies sell the coatings to be reapplied in the field.

As the coatings deteriorate the chemicals have no where to go but into the soil and groundwater. Deterioration happens at the project site as well as in the landfills.

There is no proof that utility scale solar facilities using millions upon millions of solar panels do not contaminate the soil and groundwaters with PFAS. Concerned citizens request that our towns, county and the state apply the Precautionary Principle and require developers to provide annual soils and water testing for contaminants, specifically PFAS. If PFAS is found then the solar facility must be immediately dismantled. Citizens should not wait for the Health Department to notify us that our farmlands and wells for drinking water are contaminated with PFAS.

In the state's rush to embrace solar energy resources and adhere to the hastily approved Climate Leadership and Community Protection Act regulations we must not forget to protect our farmlands, grasslands, and drinking water from known sources of PFAS.

Thank you for your time and consideration.

Respectfully,
Lynne Bruning
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Enc: September 23, 2021 statement Saving Greene for Article 10 Review Hecate Greene Case 17-F-0619
October 19, 2021 letter Bruning to Town of Duanesburg
November 8, 2021 letter Bruning to Town of Duanesburg
December 30, 2021 letter Bruning to Department of Health



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PFAS and other compounds in solar panels, wiring, and coatings

Renewable energy should offer more than promises that it is good for the environment. The solar industry promotes photovoltaic (PV) technology in the most wholesome terms: generating clean, free power from the sun. This benevolent assessment potentially omits environmental impacts during the manufacturing, operational lifetime, and disposal of solar panels and battery storage systems. Host towns need proof, not simply promises, when evaluating how solar projects may affect their residents and environment, both now and in the future.

Introduction

In July 2021, the Town of Avon, New York adopted Local Law 3 of 2021. This precedent-setting amendment to the local solar law prohibits using solar panels that “utilize or contain any amount of GenX chemicals or polyfluoroalkyl (PFAS) substances.”¹ This position aligns with state and federal laws protecting our water supply. For the long-term safety of Coxsackie residents, Hecate Energy (Hecate) and its successors should agree to a Certificate condition that prior to construction, Hecate will provide documentation verifying that the solar panels and associated electrical equipment used to construct the Greene County Solar Facility (the Facility) do not contain per- and polyfluoroalkyl substances (PFAS), including PFOA, PFOS, and GenX chemicals.

¹ <https://www.avon-ny.org/PDFs--Town%20Clerk/113-2021.pdf>

We would like to believe that Hecate’s commitment to our town’s public health and safety, as well as their desire to avoid potential future liability, would encourage them to give these comments careful consideration. Hecate must rely on manufacturers’ data, which may not be fully transparent for solar panels and lithium-ion batteries, especially when they are manufactured outside of the United States – in this case often in China.

This Certificate condition would help safeguard our soil, surface waters, and ground-water from potential contamination. While such protection would help protect Sleepy Hollow’s water supply, it provides important safeguards for all residents living in the vicinity of the Facility. Hecate and the Town of Coxsackie should perform pre- and post-installation soil and water testing, with annual monitoring. In addition, the installer should fund an escrow account for the Town to hire an independent, certified third-party laboratory for soil and water testing.

PFAS and related compounds

According to the National Institute of Environmental Health Sciences, perfluoroalkyl and polyfluoroalkyl substances (PFAS) are toxic, persistent, and bioaccumulative.² These synthetic fluorochemicals were first developed in the 1930s and have strong carbon-flourine bonds that make the structure repel both oil and water.³ The Green Science Policy Institute details that these manmade chemicals are widely used in building materials such as paints, cleaning products, non-stick coatings, sealants, tapes, wire coverings, glass, solar panels, and batteries.⁴ PFAS is commonly found in foam used to extinguish electrical fires.⁵

These “forever chemicals” have been linked to cancer and other health issues. Certain PFAS do not break down easily, causing them to remain indefinitely in the soil and water. Their potential hazard and persistence in the environment may pose a cumulative danger to public health. PFAS comprise a group of compounds, including PFOA, PFOS and GenX chemicals. The United States Environmental Protection Agency (EPA) has

² <https://www.niehs.nih.gov/health/topics/agents/pfc/index.cfm>

³ <https://www.nature.com/articles/d41586-019-00441-1>

⁴ <https://greensciencepolicy.org/docs/pfas-building-materials-2021.pdf>

⁵ <https://www.gao.gov/assets/gao-21-421.pdf>

identified that the potentially toxic and carcinogenic nature of many of these chemicals demands careful evaluation.^{6, 7}

The disposal of PFAS-containing materials is problematic, as evidenced by the recent cleanup and lawsuits filed against Noralite Hazardous Waste Facility in Cohoes, New York.⁸ In July 2021, the village of Hoosick Falls reached a \$65 million settlement with Saint-Gobain, Honeywell International, 3M, and DuPont for PFOA contamination of their groundwater that affected at least 544 private wells.⁹ Unfortunately the water remains contaminated, and the plant that used PFOA chemicals has been declared a Superfund site.

PFAS legislation in New York State

In 2016, the NYS Department of Environmental Conservation (DEC) issued a regulatory impact statement to 6 NYCRR Part 597 adding PFOA and PFOS as hazardous substances. This ruling was adopted by the DEC in March 2017.¹⁰ In July 2020, NYS passed S.8817 and A.4739-C, which ban the use of PFAS in food packaging.¹¹ And in August 2020, the NYS Department of Public Health (DPH) voted to set the maximum contaminant levels (MCLs) at 10 parts per trillion (10 ppt) for both PFOA and PFOS in our drinking water supply.¹² NYS legislation permits the DPH to require that public water systems are tested for the contaminants and ensure that elevated levels are addressed.¹³

⁶ <https://www.epa.gov/pfas/basic-information-pfas>

⁷ <https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/risk-management-and-polyfluoroalkyl-substances-pfas>

⁸ <https://www.wamc.org/capital-region-news/2020-06-25/cohoes-residents-file-intent-to-sue-norlite-over-burning-firefighting-foam>

⁹ <https://pfasproject.com/hoosick-falls-new-york/>

¹⁰ <https://www.dec.ny.gov/regulations/104968.html>

¹¹ <https://www.nysenate.gov/legislation/bills/2019/s8817>

¹² https://www.health.ny.gov/environmental/water/drinking/docs/water_supplier_fact_sheet_new_mcls.pdf

¹³ <https://news.bloomberglaw.com/environment-and-energy/new-york-moves-on-some-of-strictest-pfas-drinking-water-limits>

PFAS legislation in other states

North Carolina is among the top three states for solar development. By February 2018, residents and the state were questioning the presence of PFAS in solar panels.¹⁴ *The North Carolina State Journal* reported that EPA physical scientist Dr. Mark J. Strynar provided 39 records from the SciFinder database used by the EPA to identify applications of PFAS with solar panels.¹⁵ In August 2018, *The Carolina Journal* reported that the EPA confirmed that PFAS are used in solar panel production.¹⁶ While studies may not be conclusive, the lack of definitive conclusions and transparency raises concerns.

In December 2020, Marc Fitch of the Yankee Institute reported that the Connecticut Department for Health was concerned about PFAS in solar panels.¹⁷ “We’ve asked the question, have received some information, and have also received some push-back when we ask those questions about whether these panels contain PFAS and different PFAS chemicals.” It is the lack of answers and documentation that is troubling and raises questions of the long term impact of solar panels and battery storage on our soils and drinking water.

PFAS Federal legislation

Federal regulations surrounding PFAS are being adopted rapidly, and further restrictions at the national level are expected. US Representative Debbie Dingell (D-MI-12) sponsored Bill H.R.2467, PFAS Action Act of 2021, to “establish requirements and incentives to limit the use of perfluoroalkyl and polyfluoroalkyl substances, commonly referred to as PFAS, and remediate PFAS in the environment.”¹⁸ The Bill passed the House July 21, 2021 and is awaiting a vote in the Senate.¹⁹ The Executive Office of the President and other advocacy groups such as Consumer Reports support passage of the

¹⁴ <https://nsjonline.com/article/2018/02/solar-panels-could-be-a-source-of-genx-and-other-perflourinated-contaminants/>

¹⁵ https://nsjonline.com/wp-content/uploads/2018/02/perfluoro-and-solar-panels-Reference_02_15_2018_120238-002.pdf

¹⁶ <https://www.carolinajournal.com/news-article/epa-confirms-genx-related-compounds-used-in-solar-panels/>

¹⁷ <https://yankeeinstitute.org/2020/12/03/department-of-public-health-concerned-about-pfas-in-solar-panels-near-drinking-water/>

¹⁸ <https://debbiedingell.house.gov/news/documentsingle.aspx?DocumentID=2975>

¹⁹ <https://www.congress.gov/bill/117th-congress/house-bill/2467>

Bill.^{20,21} Additionally, the Environmental Protection Agency (EPA) proposes reporting and record-keeping requirements for PFAS under the Toxic Substances Control Act (TSCA).²²

The August 3, 2021, *National Law Review* included an article by John Gardella of CMBG3 Law in Boston. He concludes that while the US Senate vote has not been determined, that “the pressure is on the EPA to take regulatory action well beyond just drinking water, and companies absolutely must begin preparing now for regulatory actions that will have significant financial impacts down the road.”²³

PFAS in solar panel and battery manufacturing

Despite industry and a few academic assurances to the contrary, broad research consistently indicates that PFAS chemicals are used in solar panel and battery manufacturing and installation. PFAS is found in the coatings on electrical wires, backing panels, tapes, and adhesives.

Of particular concern is the use of PFAS in anti-reflective coatings (ARC) and anti-soil coatings (ASC) that are used to increase solar panel productivity. Material and Data Safety Sheets detail the contents of products manufactured in the United States. However, at this time, China is the major supplier of polysilicon²⁴ solar panels and batteries.²⁵ Accountability and transparency for materials and products made outside of the United States is questionable. In June 2021, the Biden administration banned import and use of certain solar energy materials and products from China due to the country’s use of forced labor and genocide at polysilicon mines.²⁶

Two types of solar panel coatings are commonly used: anti-reflective coatings (ARC) and anti-soil coatings (ASC)

²⁰ <https://www.whitehouse.gov/wp-content/uploads/2021/07/HR2467.SAP-Final.docx.pdf?source=email>

²¹ https://advocacy.consumerreports.org/press_release/house-votes-to-approve-the-pfas-action-act-hr-2467/

²² <https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/risk-management-and-polyfluoroalkyl-substances-pfas>

²³ <https://www.natlawreview.com/article/congress-presses-forward-pfas-measures>

²⁴ <https://www.solarpowerworldonline.com/2021/05/no-avoiding-it-now-soon-the-top-4-polysilicon-manufacturers-will-be-based-in-china/>

²⁵ <https://www.forbes.com/sites/rrapier/2019/08/04/why-china-is-dominating-lithium-ion-battery-production/?sh=770793d23786>

²⁶ <https://www.ecowatch.com/china-solar-panels-ban-biden-2654961710.html>

Anti-Reflective Coating (ARC)

A bare silicon glass surface may have a reflection index of more than 30%.²⁷ Anti-reflective coatings (ARC) are used to increase solar panel productivity by adding a dielectric coating on the glass surface. This coating textures the glass surface, which results in specific bands of wave lengths to be trapped inside the panel where they can generate additional electricity by coming in contact with the photovoltaic cells.

In their Application Appendix 15-A: Glare Analysis, Hecate Energy states that the panels they expect to use will have an anti-reflective coating, presumably to increase efficiency.

Anti-Soil Coating (ASC)

Dust and dirt can foul the panel surface and hinder the conversion of light to electricity. To maintain steady performance, the panel's surface must be cleaned regularly. Current manual or robotic cleaning methods are expensive and inefficient.

The hydrophobic qualities of ASCs create a non-stick surface that promotes water shedding, resulting in "self-cleaning" solar panels. This coating is applied to the front facing glass surface at the time of manufacture. The water-repelling surface promotes water cohesions, allowing the water droplets to form fully with minimal surface contact. This enhances water droplet shedding and in the process removes dust and dirt from the surface of the panel. ASCs help decrease maintenance costs while increasing the electricity generated. It can be reapplied in the field with products such as 3M AS Liquid 600.²⁸

ASC is typically manufactured with either silicon dioxide (SiO₂) or titanium dioxide (TiO₂) nanoparticles combined with long chains of fluoropolymers. While SiO₂ may be inexpensive it is less durable to environmental elements. TiO₂ appears to be more stable and is reported to be more frequently used for solar panel ASC.

There are increasing concerns about the negative impact of TiO₂ on the environment and human health. In December 2020, California announced the review of titanium dioxide nanoparticle classification under their Safe Water Act Proposition 65.²⁹

Gohar Dar's book *TiO₂ Nanoparticles*, published in February 2020, includes a chapter on "Toxicity of TiO₂ Nanoparticle". This research indicates that lung tumors are found in

²⁷ <https://www.pveducation.org/pvcdrom/design-of-silicon-cells/anti-reflection-coatings>

²⁸ https://www.coatingsworld.com/issues/2012-10/view_paint-amp-coatings-manufacturer-news/3m-rolls-out-pv-anti-soiling-coating/

²⁹ <https://www.paintsquare.com/news/?fuseaction=view&id=23184>

mice that have had long term exposure to TiO₂.³⁰ Chapter 2: “Applications in Nanobiotechnology and Nanomedicine” research indicates safety concerns regarding TiO₂ nanoparticles on aquatic species.³¹

While the potential for titanium dioxide nanoparticles to contaminate our soils is not conclusive, the possibility warrants further investigation. The evidence appears to be mounting, and the developer should carry the burden of proof.

Research papers call for caution and further study of ARC and ACS on solar panels. Natatajan Shanmugam’s May 2020 study “Anti-Reflective Coating Materials: A Holistic Review from PV Perspective,”³² published in *Energies*, provides a 98-page comprehensive report. On page 67 the author states: “The implementation of ARCs on the solar cell would suppress the reflection, and in turn, enhances the PCE, [power conversion efficiency] but their durability with continuous exposure to the environment and performance degradation characteristics are some novel areas where research is required.”

ARC and ASC resist some stresses, but not others:

[T]he coatings may resist the harsh environmental stresses such as damp heat and humidity freeze, but they are susceptible to damage under UV exposure. XPS analysis revealed a clear reduction in fluorine in the composition of the coating after exposure to UV and outdoor testing.³³

Kenan Isbilir’s 2019 thesis at Loughborough University studies the “performance and durability of anti-reflective and anti-soiling coatings on solar cover glass”³⁴ His thesis investigated the durability of commercially available two types of single layer (ARC1 and ARC2) and one multilayer anti-reflective (MAR) commercially available coatings, as well as ASCs. After testing several coatings, he concludes that:

The durability of these coatings against UV light and abrasion resistance would need to be improved if they are to be applied to PV cover glass.

In 2020, Gizelle C. Oehler found that certain ASC break down in as little as two weeks:

³⁰ <https://onlinelibrary.wiley.com/doi/abs/10.1002/9783527825431.ch2>

³¹ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3720578/>

³² https://www.researchgate.net/publication/341556138_Anti-Reflective_Coating_Materials_A_Holistic_Review_from_PV_Perspective

³³ https://www.researchgate.net/publication/329506058_Testing_of_an_Anti-Soiling_Coating_for_PV_Module_Cover_Glass

³⁴ https://repository.lboro.ac.uk/articles/thesis/The_performance_and_durability_of_anti-reflective_and_anti-soiling_coatings_on_solar_cover_glass/8132048/1

Surprisingly, the coatings began to degrade quickly, and the effect was clear after only two weeks of exposure. Degradation resulted in decreasing water contact angle and increasing roll-off angles. As observed by Bhaduri et al., the degradation was much faster than anticipated because the outdoor environment combines the stresses tested in the laboratory [31]. Degradation was caused by a number of mechanisms including solvent release, fluorine loss, thinning of the coating, and increasing surface macro-roughness.³⁵

The location or accumulated amounts of the degraded chemicals is not discussed in these studies. It is logical to assume that the chemicals sloughing off with the rainwater are deposited into the underlying soil, groundwater and aquifers. The cumulative effect of tens of thousands of solar panels for 35 or more years would most likely permanently contaminate the site's groundwater, soil, and stormwater runoff. If coatings are reapplied during the projects lifetime then additional concerns are raised. How is the ground protected during reapplication? How often is the coating reapplied to the panels on site? Improper disposal of broken and decommissioned solar panels may permanently contaminate landfills and any nearby aquifers. If regulations continue to become more restrictive, how will the panels be disposed of, and is the decommissioning fund adequate?

Millions upon millions of solar panels will be used and disposed of within New York State during the next two decades. Periodic upgrades and damage or defects will need to be addressed long before the end of the project's life.³⁶ Developers should carry the burden of proof that their materials and products do not contain PFAS. Towns and taxpayers should trust but verify all materials provided by the developers. The people cannot afford the risk that solar panels and storage batteries may contaminate our drinking water and soil, either upon installation, during use, or during disposal. It seems doubtful that developers' required liability coverage would be sufficient for a large-scale PFAS cleanup project.

In June 2021, Niagara County adopted an Extended Producer Responsibility (EPR) law to protect their landfills from being overburdened by the disposal of solar panel waste. The law requires "producers of solar panels sold in the county to finance and manage their safe reuse and recycling when decommissioned."³⁷ Phone calls to Greene and Columbia county landfills have not provided confirmation that they will accept large quantities of solar panels, either today or in the future. One company suggested contacting We Recycle Solar, which is located in Arizona. State and federal laws for PFAS are

³⁵ https://repository.lboro.ac.uk/articles/journal_contribution/Testing_the_durability_of_anti-soiling_coatings_for_solar_cover_glass_by_outdoor_exposure_in_Denmark/11558853

³⁶ <https://hbr.org/2021/06/the-dark-side-of-solar-power>

³⁷ <https://www.productstewardship.us/news/571089/Niagara-County-Passes-Nations-2nd-Solar-Panel-Producer-Responsibility-Law.htm>

likely to become more numerous and stringent. The town and county should consider the possibility of PFAS contamination from solar panels deposited in our local landfills and require developers to prove that their installations will not include products containing PFAS.

Industry Response

Manufacturers of ARC and ASC may understand the environmental concerns and toxicity risks of their products. A few companies are beginning to provide non-toxic coatings. One company's solution is a proprietary nanoparticle coating that is an environmentally friendly.

WattGlass has addressed and overcome many of the issues typical of other antireflective coatings (ARCs): things such as toxicity, shelf life, and durability. WattGlass is happy to offer a non-toxic, water based, long shelf-life solution to existing ARC technologies that is easily implemented as a drop in replacement.³⁸

Solar ARC surpasses the performance of conventional coatings and is resistant to particulate soiling while remaining non-hazardous and 100% water-based. Typically, these coatings result in tradeoffs between performance and functionality and utilize hazardous materials such as solvents, acids, and fluorocarbons. Not with WattGlass.

If Watt Glass feels it is important to stress their environmentally friendly non-fluorocarbon solution again and again, it raises the obvious question: what are the other companies using, and how might their products harm our soil, water, and public health?

What's next

On August 19, 2021, OxyChem announced that it was closing its Niagara Falls plant, the site of America's first major environmental disaster, Love Canal. In 1988, NYS Department of Health Commissioner David Axelrod called the Love Canal incident a "national symbol of failure to exercise a sense of concern for future generations."³⁹

Solar energy resources are marketed as an environmentally-friendly way to generate electricity. However, research indicates that solar panels, coatings, wire coverings, tapes, adhesives and batteries contain PFAS that may permanently harm our soils and poison our drinking water.

³⁸ <https://www.wattglass.com/technology>

³⁹ <https://www.nytimes.com/1988/08/05/nyregion/after-10-years-the-trauma-of-love-canal-continues.html>

An October 2020 Bloomberg Law article provides insight into upcoming PFAS regulations in relation to the Development of renewable energy in New York State.

Overall, along with the CLCPA, the new Siting Law and the expected PFAS regulations fundamentally change long-standing environmental paradigms in New York State. The flurry of regulations expected from Albany in the next few years will usher in a new era of environmental regulation quite different from today. Those well prepared for the transition will be positioned to prosper from it, while those who are not will fall behind or find their business plans or goals outdated or not fully achievable.⁴⁰

Conclusions

Renewable energy developers are responsible to their investors. Not the town. Not the neighbors. And not the environment. Solar projects are held by individual LLCs whose only asset may be an aging infrastructure built on leased ground. At time of decommissioning – or evidence of contaminants – it is unlikely that there will be a deep-pocketed corporation to bring the site into compliance with current or future EPA and DEC standards.

The July 2021 ruling on the Fieldwood Energy, LLC bankruptcy case sets precedent that previous oil well owners, and the insurance companies that issue them bonds, are responsible for the cleanup cost of wells.⁴¹ Insurance company trends with oil and gas may become the standards for the renewable energy sector, making it difficult and costly to insure solar power plants.

Prior to construction, Hecate Energy should be held responsible to neighboring residents and Coxsackie's municipal government by providing documentation that the solar panels, coatings, and electrical infrastructure specified for the project do not contain PFAS or other toxic chemicals. Attempting to remedy a “forever chemical” such as PFAS contamination over more than a thousand acres of solar coverage would likely be impossible.

While there are a few alternative options that may be safer, these products are more expensive and are manufactured in smaller quantities. Utility-scale solar power plants require hundreds of thousands, if not millions, of photovoltaic panels at the time of installation. The ability to manufacture and deliver this quantity is limited to the very largest

⁴⁰ <https://news.bloomberglaw.com/environment-and-energy/impact-of-new-yorks-renewable-energy-permitting-program-pfas-regulation>

⁴¹ <https://www.bondexchange.com/oil-industry-woes-lead-to-massive-changes-in-the-insurance-industry/>

suppliers, most of them based in China, where Material Data and Safety Sheets are limited and if provided the information is questionable.

Reputable solar panel manufacturing companies that freely provide Material Data and Safety Sheets may be limited. Solar developers that provide toxicity guarantees on their panels being free of dangerous chemicals may be even fewer. While the level of toxicity of ARC and ASC may lack clarity, the coatings' exposure to the elements and where the sloughed-off chemicals will be deposited is not. The chemicals are likely to enter the soil and groundwater.

When reviewing this Application, the Siting Board must not rely on good intentions. As has been noted throughout this proceeding, multiple solar projects will be constructed in the watershed of Sleepy Hollow Lake. Measures should be taken to determine that panels, electrical infrastructure, and wiring for these projects is PFAS-free.

What we are discussing here is a matter of public health and safety, we encourage the Board to require developers to provide specification sheets, and to describe preventive measures, testing policies, and Material and Data Safety Sheets in order to protect Coxsackie public health and to protect the town from future liability. Preventative measures – not after-the-fact remediation – are the answer to avoiding PFAS contamination of soil, stormwater runoff, drinking water, and aquifers surrounding the project.

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Supervisor Tidball and the Town Board
Jeffery Schmitt and the Planning Board
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Transmitted via email: town clerk jhowe@duanesburg.net, rtidball@duanesburg.net,
bwenzel@duanesburg.net, mdeffer@duanesburg.net and jschmitt@duanesburg.net

October 19, 2021

RE: Precautionary Principle for PFAS at Oak Hill Solar 1, LLC and Oak Hill Solar 2, LLC

Dear Chairman Jeffery Schmitt and the Planning Board,

Saving Greene's October 12, 2021 letter to the Town of Duanesburg Planning Board should have drawn the Town Board and the Planning Board's attention to the very real possibility that PFAS were used in the manufacturing of products that may be used in solar panels and associated equipment at Oak Hill Solar 1, LLC and Oak Hill Solar 2, LLC. The October 15, 2021 letter from PrimeAE to the Town Planner, Dale Warner does not mention PFAS or include any precautionary principle measures, such as soil and ground water testing before and after construction, and annually for the lifetime of the proposed solar and battery storage project.

The purpose of this letter is to once again inform the town and planning boards that the majority of solar panels being installed today are made in Asia, where there may be lack of oversight, lack of environmental restrictions and lack of reporting material and safety data. The Applicant has not provided Material and Data Safety Sheets for the products proposed for Oak Hill solar and battery storage projects. PFAS are known to be used in the manufacture of some solar panels. The Project site soils are all either poorly drained or wetlands and steeply sloped towards residents' only source of drinking water: individual wells drilled adjacent to their homes. The site also drains into a tributary of the Schoharie Creek which feeds into the Hudson River. The site sits all or partially over a principle aquifer.

The Town's lack of due diligence to protect our soil, surface and ground waters, and major aquifer is contrary to our town's Comprehensive Plan. The Town's lack of action flies in the face

of common sense. The Board's lack of oversight concerning possible PFAS contamination of the soil, ground water and aquifer may expose the town to EPA, NYS, and resident litigation, and possibly long term financial devastation. I request that the Town Board and Planning Board perform due diligence and apply the precautionary principle concerning PFAS in the products proposed by the Applicant and that the town require the Applicant to provide escrow so that the town can hire a third-party independent environmental engineering firm to perform pre- and post-construction soil and water testing as well as annual testing for the lifetime of the project.

Town of Duanesburg's Comprehensive Plan

On December 2, 2020, the Town of Duanesburg ("the Town") issued its Comprehensive Plan¹ for the future of Duanesburg. Members of the Town Board and the Town Planning Board set out to update the prior fifteen-year-old plan, which was recognized as outdated. The Town's own Vision Statement in the Comprehensive Plan states: "*We encourage the preservation of our attractive and cultural landscape....We are committed to **sustaining our** valuable economic and **natural resources**, particularly agricultural land use, open spaces, natural habitats, and fresh watersheds. **We support thoughtful growth and development**...."* [emphasis added].

The plans for the Town of Duanesburg to have certain companies install utility scale solar power plants that may also include battery energy storage systems, at least part of which sit atop aquifers, without confirmation, certification, or even assurance of any kind that the products used on the solar plants are PFAS-free contradict the Vision Statement of the Town's Comprehensive Plan. For the reasons explained in this report, the Town's desire to proceed without documentation or warranties of any kind leaves the Town open to future state and federal legal liabilities that will have substantial financial consequences for Duanesburg residents and the Town as a whole.

Concerns About Anti-Reflective Coating on Solar Panels

The purpose of anti-reflective coatings is to increase productivity which in turn increases the investor revenue. The EPA regulates products imported into the United States that contain PFAS under the Toxic Substances Control Act (TSCA).² The EPA specifically dictates that goods containing certain PFAS "**...as a surface coating** can not be imported into the United States without EPA review." [emphasis added] The EPA goes on to state in its TSCA Significant New Use

¹ https://www.duanesburg.net/sites/g/files/vyhlif4351/f/pages/duanesburg_2021_comprehensive_plan_final.pdf

² <https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/risk-management-and-polyfluoroalkyl-substances-pfas>

Rule (SNUR)³ related to PFAS and extraordinarily relevant requirement that directly relates to solar panels:

*“EPA considers any [long-chain PFAS]...from table 1 and table 2 [of the SNUR] **containing coating on any surface of any article**, whether the coating is applied to the interior facing surface or the exterior facing surface of an article... to be covered by the SNUR.” [emphasis added]*

If the manufacturer of the solar panels that will be used in the Town of Duanesburg have imported materials of any kind (or the panels in their entirety) that contain certain PFAS, they are likely required to disclose the information to the EPA and receive approval from the EPA for the PFAS use in the product. If the manufacturer is required to provide this information to the EPA, then there is absolutely no reason why the Town should not insist that it also receives the same information so that it can make a fully informed decision. The Town must insist on this as part of its due diligence process in deciding whether to approve this project. Failing to do so, or at least failing to require the manufacturer to certify to the lack of PFAS in the solar panels, turns a blind eye to potential PFAS information about these products that may exist in EPA records due to the manufacturer’s disclosure.

The Federal PFAS Landscape & Implications To the Town

President Joe Biden and Vice Present Kamala Harris campaigned on the promise of aggressively addressing environmental concerns and pushing through environmental initiatives for the country. The environment was, in fact, one of the top three campaign promises that the Biden-Harris administration made. Bound within the environmental promises made—to a level never seen by a prior administration—were promises to address PFAS issues:

Instead of making empty promises with no follow-through, Biden will tackle PFAS pollution by designating PFAS as a hazardous substance, setting enforceable limits for PFAS in the Safe Drinking Water Act, prioritizing substitutes through procurement and accelerating toxicity studies and research on PFAS.⁴

Every action taken thus far by the Biden Administration and EPA Administrator Michael Regan shows a demonstrated commitment to follow through with the campaign promises with respect to PFAS.

³ <https://www.regulations.gov/document/EPA-HQ-OPPT-2013-0225-0232>

⁴ Biden-Harris election campaign website, Environmental Justice section, <https://joebiden.com/environmental-justice-plan/>

Drinking Water Standards

The EPA is in the final stages of the regulatory process for setting drinking water limits for PFAS under the Safe Drinking Water Act. Just one month into office, Biden's EPA announced final Regulatory Determinations for PFOA and PFOS, which is the final step before the EPA announces an enforceable standard.⁵ Just five months later, the EPA issued an announcement that it was broadening its investigation of a drinking water standard **for all PFAS as an entire class**.⁶

When the EPA sets enforceable PFAS drinking water standards, enforcement actions by the New York Department of Conservation will increase as the state looks to locate sources of PFAS contamination to drinking water sources. In states like New York, which have already set out to identify and remediate PFAS-contaminated sites that are polluting drinking water, the costs are staggering:

- New Hampshire: \$30 million in overall PFAS remediation projects as of 2017, with \$14 million alone spent on one pollution site (the Coakley Landfill)
- Michigan: \$23.2 million at sites across the state
- New York: \$10 million budgeted for one Superfund site in Hoosick Falls, NY to develop alternate drinking water sources for the town due to PFAS
- New York: \$23.5 million settlement from Taconic Plastics Ltd to the Town of Petersburg for PFOA in the town's drinking water.
- Massachusetts: \$2.95 million spent by Town of Barnstable for PFAS remediation of drinking water; \$13 million budgeted by City of Westfield for PFAS remediation⁷

The above are just costs associated with remediation. Towns and municipalities are increasingly finding themselves embroiled in lawsuits in which towns find themselves with no recourse but to file a lawsuit against another town that they sourced drinking water from in order to pay for PFAS-contaminated water.⁸ Finally, in situations where a town or region's drinking water is contaminated by PFAS, private citizens are bringing more and more lawsuits seeking

⁵ February 22, 2021 EPA announcement regarding PFOA and PFOA final Regulatory Determination: <https://www.epa.gov/newsreleases/epa-takes-action-address-pfas-drinking-water>

⁶ July 12, 2021 EPA announcement regarding CCL 5 and PFAS regulation as a class <https://www.epa.gov/newsreleases/epa-takes-action-address-pfas-drinking-water>

⁷ Safer States 2019 publication: https://saferchemicals.org/wp-content/uploads/2019/02/safer_states_costs_of_pfas_contamination.pdf (state specific citations supporting data found within Safer States document)

⁸ <https://www.natlawreview.com/article/georgia-pfas-lawsuits-will-impact-product-manufacturers>

compensation for damages stemming from alleged polluted land, diminished property values, and health effects due to consumption of PFAS-contaminated water.⁹

The Town of Duanesburg should be extremely concerned about the potential financial ramifications that can stem from PFAS runoff from the solar panels and components installed as part of the project, PFAS contamination that could result from cracked or damaged panels on the site once installed, buried cables, battery energy storage, and PFAS pollution to the land in the event of a fire¹⁰ or other event on such a potentially hazardous site. All of these events leave PFAS chemicals with but one place to go: into the soil.

What geological or hydrogeological studies have been done by the Town or the solar panel manufacturers to ensure that in such an event, PFAS runoff will not contaminate the only source of drinking water for the neighbor Mrs Biggs, whose well is less than 600 feet from the Project? The site contains 100% poorly drained soils that drains down a steep slope to Schoonmaker Road where there are eight homes with wells. Adjacent to Schoonmaker Road is a tributary that drains into the Schoharie Creek, which feeds into the Hudson River. PFAS contaminate plumes can travel great distances through soils and ground waters. The Delanson Reservoir is only three miles from the Oak Hill Solar facilities.

Have the Town or the manufacturers conducted environmental assessment studies that consider the potential for PFAS contamination of other water sources that may ultimately feed drinking water sources of other towns? Further, we understand, and the Full Environmental Assessment Form confirms, that the solar panel sites are located either entirely or in part on top of aquifers that supply drinking water. This siting only exacerbates the concern for future water or drinking water source pollution. The New York Department of Environmental Conservation's own website states clearly the foremost concern with PFAS contamination from the solar projects:

...the most productive aquifers consist of unconsolidated deposits of sand and gravel that occupy major river and stream valleys or lake plains and terraces. These aquifers typically form flat areas that are suitable for development and generally provide an ample ground-water supply. **Because of development, coupled with the high permeability of these deposits and shallow depth to the water table, makes these aquifers particularly susceptible to contamination from point sources....**¹¹ [emphasis added]

⁹ <https://www.natlawreview.com/article/pfas-paper-mill-lawsuit-adds-additional-companies>

¹⁰ One organization found that approximately 350 solar systems had incidents of fire through February 2019. <https://pv-magazine-usa.com/2019/08/22/there-are-solar-power-fires-per-year/>

¹¹ <https://www.dec.ny.gov/lands/36118.html>

The State of New York recognizes publicly that aquifers are particularly susceptible to contamination. The Town must recognize and share the state's concern and ensure, through all the measures laid out in this report, that Duanesburg's water sources are not exposed to pollution risks from PFAS.

It is too easy to brush these concerns aside by believing that in the event of a water pollution event with respect to PFAS that the EPA or the New York Department of Environmental Conservation ("DEC") would look to the solar panel manufacturers as the responsible parties for the cleanup costs. First, that view is overly simplistic, as there is no exemption that the Town of Duanesburg would enjoy that would protect it from EPA or DEC action for cleanup costs. Second, if the solar panel manufacturers were held accountable, it is likely that they would in turn try to obtain contributory damages from other parties that it believes may be at fault, which would include the Town. Third, the majority of manufacturers are located in Asia, which may be beyond any jurisdiction in the United States and there is a reasonable chance that they could pay anything towards remediation costs.

CERCLA Law Concerns

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), also known as the Superfund law, allows the EPA to force "responsible parties" to clean up land or sites that are polluted with chemicals that are designated as "hazardous substances" under CERCLA.¹² What should be particularly concerning to the Town in this instance is that under CERCLA, there is no requirement that a specific amount of a hazardous substance be present on the site before the EPA can hold a party liable for the cleanup costs; the release of *any* quantity of a hazardous substance can establish liability.¹³ The EPA's liability attribution would not merely extend to the company owning or operating the solar panels in the current instance; rather, the EPA makes clear that even landowners can be held liable under CERCLA.

In 2020 alone, the EPA reported that it disbursed or obligated over \$258 million for Superfund site cleanups, and the funds were all obtained from parties that the EPA believed were responsible.¹⁴ The EPA also reported that over the life of CERCLA, over \$4.7 billion had been collected from responsible parties for cleanup of hazardous substances. Several years ago, the EPA paid for a report that, in part, studied how much per designated site was spent to clean up the site. The results should be alarming to the Town. The EPA estimated that responsible parties spent an average of \$32 million per site in cleanup costs through 1991.¹⁵ A University of

¹² <https://www.epa.gov/superfund/superfund-cercla-overview>

¹³ <https://www.epa.gov/enforcement/superfund-liability>

¹⁴ <https://www.epa.gov/superfund/superfund-remedial-annual-accomplishments#2020funding>

¹⁵ https://www.epa.gov/sites/default/files/2018-03/documents/ee-0265_1-4_acc.pdf

Tennessee study, the results of which are cited in the EPA report, found that CERCLA / Superfund sites costed an average of between \$35 million and \$101 million in remediation costs, depending on cleanup levels needed.¹⁶ Also remediation is not always possible; many sites remain contaminated but are simply monitored.

Currently, PFAS are not designated by the EPA as “hazardous substances.” However, the Biden administration’s campaign website clearly states “Biden will tackle PFAS pollution by designating PFAS as a hazardous substance....”¹⁷ CERCLA allows the EPA to investigate sites and hold parties responsible for actions that polluted the land in question, *even for actions prior to the designation of a chemical as a “hazardous substance.”* Without requiring the solar panel manufacturers or suppliers to certify what, if any, PFAS are in the solar panels or the components, the Town may be opening itself up to significant financial liability once a CERCLA designation is made by the EPA. Similar to liability issues under the Safe Drinking Water Act, the EPA has the power under CERCLA to hold any party responsible for all or part of cleanup costs, including entities whose negligence (in this instance, in the lack of due diligence) contributed to the pollution events. Even if the EPA were to only pursue the solar panel manufacturers for CERCLA cleanup costs, the manufacturers would almost surely file a lawsuit against the town and any other party that it believes shared in the negligence that led to the pollution in an effort to defray cleanup costs.

Unlike the federal government, New York was the first state to designate PFOA as a hazardous substance under its state version of the CERCLA law.¹⁸ In April 2016, New York added PFOS to the hazardous substance list. Similar to the federal CERCLA regulations, New York’s designation allows the state to investigate potential sources of PFOA and PFOS contamination and hold polluting parties and landowners responsible for cleanup costs.¹⁹ By February 2019, New York had added 19 additional PFAS to its list of “contaminants of concern” and required existing or new state-designated “Superfund” sites to test for all 21 PFAS that the state found to be of concern.²⁰ The Town has received no documented assurances that any of the solar panels, batteries, or other components do not contain PFOA, PFOS, or any other type of PFAS, including the 19 PFAS that New York considers chemicals of concern. While manufacturing of PFOA and PFOS has largely ceased in the United States, those chemicals continue to be used in other countries in a variety of products, which is especially relevant since many solar panel components are manufactured in China. Further, as the evidence in this report shows, solar

¹⁶ Colglazier, Cox. and Davis, 1991, pp. 6'-05, cited within the report in footnote 13.

¹⁷ Biden-Harris election campaign website, Environmental Justice section, <https://joebiden.com/environmental-justice-plan/>

¹⁸ <https://www.dec.ny.gov/chemical/108831.html>

¹⁹ <https://www.dec.ny.gov/regulations/104968.html>

²⁰ https://alphalab.com/images/NYDEC_emergcontsamplimgext.pdf

panels contain types of PFAS well beyond simply PFOA and PFOS. The Town is potentially exposing itself to devastating financial consequences from its current-day decision to allow a project to proceed without having received proper environmental assurances.

October 2021 PFAS Actions by New York

On October 5, 2021, the New York State Department of Environmental Conservation released water quality guidance values for PFOA and PFOS. The state's recommendations are undergoing public comment until November 5, 2021.²¹ The significance of the guidance values is that the state is now pursuing regulating two types of PFAS in more than just drinking water: in this instance, both ground and surface water. The proposal shows several things, including New York's continued aggressive pursuit of remediation of all current or future sources of the state's water, whether drinking water or not. Once passed, New York will have some of the only ground and surface water regulations for PFAS in the country, and by far the most aggressive. The proposed permissible limits of PFOA and PFOS in ground and surface water are 6.7 parts per trillion for PFOA and 2.6 parts per trillion for PFOS.

These regulations should concern the Town given the potential for water pollution from PFAS stemming from the solar panels as detailed in this report, especially with regard to anti-reflective coatings that are routinely applied to panels. The Town has, in fact, already stated in its Comprehensive Plan that included in its vision for the Town is a commitment to sustaining fresh watersheds.²² The Town claims that it values protecting its water as one of the core values and visions of the Town as it moves into the future. There is no possible way that the Town can be said to uphold its vision if it pushes through a solar panel project that may result in harm to the very water resources that the Town committed itself to protect.

The EPA Requires PFAS Disclosures – Why Not Duanesburg?

Saving Greene specifically recommended that the Town to require the solar panel manufacturer and installer to certify that their panels either do not contain PFAS or, if they do, which known PFAS are contained in the panels. The Town of Avon, New York recently passed a Solar Law that prohibits solar panels and equipment that contains PFAS and GenX. The EPA already insists that certain businesses disclose PFAS information used in its manufacturing processes, and so the Town should insist on the same disclosure of information.

²¹ <https://www.dec.ny.gov/press/123915.html>

²² https://www.duanesburg.net/sites/g/files/vyhlf4351/f/pages/duanesburg_2021_comprehensive_plan_final.pdf

Under the EPA's Toxic Release Inventory (TRI), the EPA tracks certain toxic materials that may pose a threat to human health and the environment.²³ To do so, the EPA requires certain industries to report how much of certain chemicals are released into the environment. On June 22, 2020, the EPA added 172 PFAS chemicals to the TRI list, and in 2021, three additional PFAS were added to the list.²⁴ The EPA therefore recognizes the potential risk to human health and the environment of 175 types of PFAS, and requires industries discharging them to inform the EPA of that information.

Applicants documents

The Applicant dropbox contains a folder "Module Information," which was uploaded September 13, 2021. The folder contains information for two different manufacturers of solar panels: Vikram Somera 380 -420 Watt VSMDHT.72.AAA.05 panels and Stave 310-330 Watt CHSM6612P panels. It unclear which panel the Applicant may use or if they many change solar panel specifications after the building permit is issued without the Town's approval. A Material and Data Safety Sheet detailing products used in manufacturing is not provided for either panel. The Town's lack of due diligence and potential lack of oversight during the construction process may expose the town and residents to PFAS and other contaminates used in the solar projects' components.

Additionally, the folder contains a six page document from Dongguan CSG Solar Glass Co, Ltd., which provides some information about the anti-reflective coating and that the warranty is for six (6) months. A second 25 page document from Dongguan CSG Solar Glass CO, Ltd. provides some information about ARC Solar Glass but omits any information about the anti-reflective coating chemical composition and manufacturing process. Curiously these documents, and the Applicant's emphasis, is how anti-reflective coating reducing glare, but it is well documented that the purpose of anti-reflective coatings is to trap certain wavelengths inside the solar panel to increase the generation of electricity. Reports show that the use of antireflective coatings may increase solar panel productivity by as much as 3 percent.

Additional Research

In addition to Saving Greene's October 12, 2021 letter, I have attached to this correspondence some additional information for your consideration. The two patents and DuPont information sheet clearly state that PFAS is used in the manufacture of solar panels.

²³ <https://www.epa.gov/toxics-release-inventory-tri-program/what-toxics-release-inventory>

²⁴ <https://www.epa.gov/toxics-release-inventory-tri-program/addition-certain-pfas-tri-national-defense-authorization-act>

1. "An overview of the uses of per- and polyfluoralkyl substances (PFAS) published in Environmental Science: Process & Impacts Issue 12, 2020. Clearly states that "In the energy sector, PFAS are known to be employed in solar collectors and photovoltaic cells, and in lithium-ion, vanadium redox, and zinc batteries."
2. Patent Application Publication US 2014/0000674A1 for "Photovoltaic Module Back-sheet and Process of Manufacture filed by DuPont De Nemours and Company."
3. Patent Number US 8,344,238 B2 for "Self-Cleaning Protective Coatings for use with Photovoltaic Cells" filed by Chris M. Gronet and Janes K. Truman issued on January 1, 2013.
4. "DuPont Frontsheet Materials Dupont Teflon Films" indicates that the films are fluoropolymers and that the Teflon films may "last for years without degradation." It is doubtful that the films will last for the 35-40 year projected lifetime of the Project.

In Conclusion

I request that the town uphold our Comprehensive Plan and protect the soils, ground waters and drinking water supply for the residents of Duanesburg. Require the Applicant to provide Material and Data Safety Sheets and provide escrow for the pre- and post-construction soil and water testing as well as annual testing for the lifetime of the project. Contaminating the soils with PFAS would very likely be in violation of Zoning Ordinance 14.6.2.a: "such use is reasonably necessary or convenient to the public health, welfare or the economic or social benefit of the community"; 14.6.2.4.c.2: "the proposed use will not have a significant negative effect on existing adjacent land uses"; 14.6.3.1.8: "cause harmful waste to be discharged into sewer, streams, or bodies of water or to be stored on said properties." The town should look towards the future by protecting its natural resources today.

Thank you for your time and consideration.

Respectfully,

Lynne Bruning

720-272-0956

lynnebruning@gmail.com

Cc: Supervisor Roger Tidball and the Duanesburg Town Board

Enc: Four page listing of additional PFAS research

October 12, 2021 Saving Greene letter and PFAS Report

ARTICLES / STUDIES TESTING PFAS USE IN SOLAR CELLS

(Article) Facts about Solar panels: PFAS Contamination

By Dr. Annick Anctil, Michigan State University

- Academic research on how PFAS could potentially be used in photovoltaic (PV) solar panels. *(Studies are outlined below)*
 - “Self-cleaning hydrophobic nanocoating on glass: A scalable manufacturing process,” *Mater. Chem. Phys.*, vol. 239, Jan. 2020.
 - Son et al., “A practical superhydrophilic self-cleaning and antireflective surface for outdoor photovoltaic applications,” *Sol. Energy Mater. Sol. Cells*, 2012.; H. C. Han et al.
 - “Enhancing efficiency with fluorinated interlayers in small molecule organic solar cells,” *J. Mater. Chem.*, vol. 22, no. 43, 2012.
- Three parts on solar panels potentially having presence of PFAS: Self-cleaning coat, adhesives, substrate.
 - Self-Cleaning Coat: Confusion comes from the fact that some other commercialized self-cleaning coating options do make use of PFAS-based chemicals, although even those do not degrade under normal use.

Self-Cleaning Hydrophobic Nanocoating on Glass: a Scalable Manufacturing Process

S. Maharjan et al., Mater. Chem. Phys., vol. 239, Jan. 2020.

- Materials used in self-cleaning Coat: Trichloro(1H,1H,2H,2H-perfluorooctyl) silane (TCPFOS) (97%) and isopropanol were purchased from Sigma-Aldrich and were used without any further modification. Nitric Acid (ACS reagent, 70%) was purchased from Sigma-Aldrich and was diluted down with deionized water to achieve a pH of 3. Polycrystalline 0.1 μm diamond suspension (MetaDi®) and polishing cloth (MasterTex, PSA, 8 in) were purchased from Buehler. Saline solution (10% w/v) was prepared by dissolving 100 g of NaCl in 1000 mL of water.
- TCPFOS is a PFAS. The study specifically looks to determine whether TCPFOS is suitable for surfaces such as solar panels as a self-cleaning coating. The study concludes that “[TCPFOS] are therefore well suited for a range of applications including self-cleaning of solar panels.”

Enhancing efficiency with fluorinated interlayers in small molecule organic solar cells (*Web link*)

J. Mater. Chem., vol. 22, no. 43, 2012

- This study presents a simple approach to improve the performance of small molecule based organic solar cells (OSCs) by inserting a fluorinated buffer layer (e.g. PFAS) at the hetero interface of bilayer devices. As demonstrated in this work, the PFAS modification reduces the surface energy of the conventional PEDOT : PSS photoanode and results in a significant improvement in the pentacene based OSC.
- Concurrently, the accumulated negative charges of the fluorinated PFAS layer result in the development of interfacial dipole moments that in turn lead to an enhanced built-in potential across the devices, and consequently enhanced hole transport efficiency
- [Link to Study](#)
- This study specifically sets out to study whether PFAS improves the efficiency of solar panels, and concludes that the PFAS will lead to greater efficiencies.

MENTIONS OF PFAS USE IN SOLAR ENERGY - ACADEMIC STUDIES

Polyfluoroalkyl-silica porous coatings with high antireflection properties and low surface free energy for glass in solar energy application (*Web link*)

Volume 509, 15 April 2020, 144864

- *Available for purchase at the following [Study Link](#)*
- **Abstract:** Polyfluoroalkyl-silica porous coating stacks with durable antireflection (AR) properties have been obtained for photovoltaic (PV) application. The aim was to obtain a low surface energy coating, devised to mitigate soiling adherence, without losing the AR properties of a baseline coating. Those optical properties were inalterable after accelerated aging tests, which sustains the reliability of the materials for solar energy applications.

An overview of the uses of per-and polyfluoroalkyl substances (PFAS)

Environ. Sci.: Processes Impacts, 2020, 22, 2345-2373

- In the energy sector, PFAS are known to be employed in solar collectors and photovoltaic cells, and in lithium-ion, vanadium redox, and zinc batteries. In addition, fluoropolymers are also used to coat the blades of windmills.

- Under PFA Use Categories and subcategories: Solar collectors and photovoltaic cells listed.

Mechanical properties and field performance of hydrophobic antireflective sol-gel coatings on the cover glass of photovoltaic modules

Solar Energy Materials and Solar Cells, Volume 216, October 2020, 110694

- *Full Study available for purchase at the following [Study Link](#)*
- **Highlights:** Abrasion resistance of polyfluoroalkyl silica layer improved with inner dense layer.
- **Abstract:** Properties of methyl-silylated silica and **polyfluoroalkyl-silica** mono- and bi-layer stacks were compared to achieve the most rational AR design based on a proper trade-off between cost-efficiency, processability, optical properties, mechanical properties and reliability during real life operation.

PATENTS RELATED TO SOLAR PANEL COATING PRODUCTS

DuPont – US Patent for Photovoltaic Module Back-Sheet

- **Abstract:** An integrated back-sheet for a photovoltaic module is provided. A process for forming the back-sheet includes the steps of providing a fluoropolymer film...When incorporated into a photovoltaic module, the polymer layer of the back-sheet is adhered directly to the rear surfaces of a plurality of solar cells.
- List of materials and chemicals provided on Page 10-11.
- This is a patent by DuPont for a component (a sheet) used within photovoltaic solar panels. See page 9 of the patent, which states “A 5 mil thick cell support release sheet made of Teflon PTFE was place over the PVF film of the laminate, followed by a PTFE based heat bumper.” PTFE is a type of PFAS. This is direct evidence that even American-made solar components utilize PFAS.

Patent – Self-Cleaning Protective coatings for use with photovoltaic cells

- **Abstract:** Systems and materials to improve photovoltaic cell efficiency by implementing a self-cleaning function on photovoltaic cells and on albedo surfaces

associated with photovoltaic cell assemblies are provided. Materials for protecting albedo surfaces that surround photovoltaic cell assemblies, thereby maximizing energy input into the photovoltaic cell assemblies, are provided.

- Table 1 – Exemplary materials for assembling layer 208 and 306
- Table 1 of this patent is key. On page 18 of the PDF (and what is page 14 of the patent) is a section in the table titled “water-repellent fluor-resin.” There are at least 10 PFAS listed in this portion of the chart. This is direct evidence of use of PFAS in self-cleaning agents for photovoltaic solar panels.

OTHER MATERIALS

Interstate Technical Regulatory Council PFAS Guidance

- **Page 38 of PDF (page 33 of document):** “Solar industry includes Polymer and nonpolymer PFAS types. Fluoropolymer films (such as FEP, PVDF) to cover solar panel collectors, electrolyte fuel cells, PTFE expansion joint materials for power plants.”
- This would be evidence of a regulatory council acknowledging that solar panels utilize PFAS components.

DuPont Frontsheet Materials – DuPont Teflon Films

- Dupont Teflon FEP and EFTE films are used to make solar panels for portable and grid-connected applications.
- Material sheet includes information on light transmission and power output for Feflon FEP films.
- This is a DuPont information sheet that makes crystal clear that they sell fluoropolymers for solar panel coating applications. Fluoropolymers are a sub-set of the PFAS category. Also note numerous references specifically to Teflon, the trademarked brand name for a host of fluorine-containing polymers (i.e. – PFAS).

P.O. Box 160
Quaker Street, NY 12141

Jeffery Schmitt, Chairman
Planning Board
Town of Duanesburg
5853 Western Turnpike
Duanesburg, NY 12056

November 8, 2021

Re: PFAS Concerns at Oak Hill Solar 1, LLC and Oak Hill Solar 2, LLC

Dear Chairman Schmitt and the Planning Board,

I am writing to supplement my prior letters and reports to the Town of Duanesburg's ("the Town") Planning Board for three specific reasons. First, during the recent October 21, 2021 Planning Board ("Board") meeting, there were several comments made by a representative from New York State Energy Research and Development Authority ("NYSERDA") as well as a representative from Amp Solar that need to be responded to. Second, I would like to supplement my prior letters to the Planning Board with EPA documents that were released after the October 21, 2021 meeting that directly relate to the PFAS issues we are considering. Third, I would like the Planning Board to consider an example from Endicott, New York in which PFAS precautionary principles were followed to protect the town from a proposed project that might have led to PFAS pollution in the town and region.

I care deeply about the Town, the community, its natural resources and beauty, and I am concerned that failing to take simple steps now in 2021 may have devastating consequences a few years in the future from an environmental pollution standpoint. As you saw in my letter to the Town dated October 19, 2021 and Saving Greene's report to the Town dated October 15, 2021, there are three simple steps that I strongly feel will protect the Town if it decides to move forward with the solar project: (1) require the Applicant to provide written verification from the manufacturers of the solar panels that none of the panels or components contain PFAS; (2) require the Applicant to conduct pre- and post-construction soil and water testing to ensure that no PFAS contamination occurred during construction; and (3) require the Applicant to do an annual test of soil and water for the lifetime of the project to ensure that PFAS runoff issues are either of no concern or, if detected, can be addressed immediately.

Responses To October 21, 2021 Board Meeting

PFAS Concerns Are Not Two Years Old

The NYSERDA representative that spoke to the Planning Board meeting began by suggesting that PFAS concerns only began to emerge when news of PFAS pollution concerns hit the media in 2018, which subsequently caused PFAS to be considered an environmental risk. In addition, some of his comments suggested that areas such as the Cape Fear River are the only areas that the EPA is concerned about with respect to PFAS due to the fact that a PFAS manufacturing plant is located adjacent to the river. Both of these assertions are simply not true. The EPA has been investigating PFAS issues since at least 1998, as is evidenced by the EPA's Consent Orders with DuPont from 2006 and 2009 regarding PFOA (one type of PFAS) pollution in West Virginia.¹ There was, in fact, a civil lawsuit filed in 2001 in Parkersburg, West Virginia regarding the PFAS pollution by the PFAS manufacturer, which the EPA was well aware of because Attorney Rob Bilott, who represented the plaintiffs, was constantly providing documents to the EPA with respect to PFAS and pollution concerns.²

The EPA Is Not Only Targeting A Select Few Industries For PFAS

Similarly, the NYSERDA representative indicated that in 2020, the EPA targeted certain industries with respect to PFAS, including metal plating, landfills, firefighting foam users, and a few others. He went on to suggest to the Board that these industries are the only ones that the EPA is concerned about with respect to PFAS. This is simply not true. The initiative that the NYSERDA representative is referencing is the EPA's "Multi Industry PFAS Study – 2021 Preliminary Report."³ However, the purpose of the EPA's study of these industries was that the EPA believes that they are contributing to PFAS pollution of the environment ***by way of direct effluent discharge into rivers***. That is not an issue for the Town with respect to the solar project, but as my letter of October 19, 2021 makes clear, the EPA and President Biden's initiatives with respect to PFAS go well beyond industry types and focus on avenues of PFAS pollution, including drinking water, soil contamination, air pollution, and surface water. Below is a more detailed discussion of the EPA's Strategic Roadmap For PFAS, which was released on October 19, 2021, and explicitly states that one of the EPA's core missions with respect to PFAS in the

¹ <https://www.epa.gov/sites/default/files/2016-05/documents/dupont-fs0309.pdf>

² See Attorney Rob Bilott's book "Exposure: Poisoned Water, Corporate Greed, and One Lawyer's Twenty-Year Battle Against DuPont", 2019.

³ https://www.epa.gov/system/files/documents/2021-09/multi-industry-pfas-study_preliminary-2021-report_508_2021.09.08.pdf

next three years is to “hold polluters accountable.” There is no limitation on the industry types that the EPA will target, as the NYSERDA representative indirectly suggested.

NYSERDA’s “Three-Part Test”

Next, there was a discussion regarding factors that would need to be explored before NYSERDA’s representative would apparently be comfortable recommending not to proceed with the solar panel project. In short, he created a three-part test to consider:

1. Evidence of PFAS content in the solar panels;
2. Evidence that the PFAS type in the panels is toxic to human health; and
3. Evidence that the PFAS in the panels will erode off the panels to a degree that they would pollute water and soil.

He concluded this portion of the discussion by saying that all of these elements are “virtually unknown.”

PFAS In Solar Panels and Components

The entire reason that the above elements that NYSERDA laid out are “virtually unknown” is because the Applicant is not being required to, nor are they providing, any evidence from the solar panel and component manufacturers that the products either do or do not contain PFAS. That is the starting point from which all preventative planning for the Town must begin, and it is a simple, cost-free step that places no burden on the Town whatsoever. If the panels and components truly have no PFAS in them whatsoever, shouldn’t it be easy enough for the manufacturer to represent that in writing to alleviate concerns that the Town may have? The fact that the manufacturers are refusing to put a “PFAS free” statement in writing should tell us all something, as should their refusal to disclose that their products contain PFAS (and if so, what type of PFAS).

Instead, we were presented with a statement at the Board meeting from Amp Solar’s representative that they have in writing from the manufacturer a statement that there are “no toxic components in the anti-reflective coating” that they use.⁴ This is a smokescreen that everyone should be skeptical of and the Town simply cannot rely on. “No toxic components” by whose standards? The EPA’s? The Chinese government, since panel parts, including the glass with anti-reflective coating, are being sourced from Dongguan CSG Solar Glass Company Ltd, a

⁴ As a side point, any letters with any such statements must be provided to the Town and entered into the record. Simply relying on Amp Solar’s verbal representations about what documents do or do not say from the manufacturer is not sufficient.

Chinese company? By the company's own judgment about what is or is not "toxic"? The manufacturer can get away with a statement about "non-toxic" because at this time, the EPA has not yet established enforceable standards for PFAS; however, as I detailed in the October 19th letter and as detail further below with respect to the Strategic Roadmap by the EPA, those standards are unquestionably coming very soon. Instead of relying on subjective and artfully crafted language about toxicity from a manufacturer with every interest in having this project proceed, we must insist that the manufacturer what equates to "no PFAS" (or, if there are PFAS, which types).

In addition, throughout the Board meeting, multiple references were made by NYSERDA's representative and Amp Solar's representative to a generalized information sheet from the Graham Sustainability Institute at the University of Michigan that solar panels do not customarily use PFAS.⁵ Why are we relying on a broad-sweeping statement by a specialized department that is funded by a grant from Department of Energy to support solar? The University has likely never tested the solar panels being used for the project in our Town's instance to determine whether or not they do contain PFAS. Why are we relying on statements about what is "customarily" done, when that leaves open the possibility (which was in fact supported by the NYSERDA representative when he stated that certain solar panels do indeed have PFAS) that the Town's panels may fall within an exception that could have significant consequences? We should not be so willing to rely on a single statement by an unconnected third party that was not specific to the Town's situation to consider our due diligence obligation satisfied. Instead, we must insist that the manufacturers put in writing assurances that the products that will be used in the Town are PFAS free, or, if not, what specific PFAS they contain.

PFAS Toxicity To Human Health

NYSERDA's representative opined that no one really knows the toxicity to human health of PFAS, and he suggested that as a result, the solar panel project should not be denied due to a "virtually unknown." This is absolutely not the case and the Town needs to consider the well-established and recognized information readily available that shows clear toxicity connections to human health for certain PFAS.

First, as I mentioned above, a lawsuit was filed in 2001 in West Virginia over PFAS pollution. As part of that lawsuit, an agreement was reached that approximately 70,000 citizens would undergo medical testing, paid for by the PFAS manufacturer, and an agreed-upon neutral science panel of experts would study the blood of the citizens, their medical history, and reach conclusions about possible health effects of one type of PFAS (PFOA) on humans. The science panel was referred to as the C8 Science Panel (C8 being a name by which PFOA is referred to). They conducted

⁵ <http://graham.umich.edu/media/pubs/Facts-about-solar-panels--PFAS-contamination-47485.pdf>

their studies for eight years and their findings were released publicly.⁶ The findings are crystal clear: "...the Science Panel concluded that there was a probable link to C8 exposure [and the following diseases]: diagnosed high cholesterol, ulcerative colitis, thyroid disease, **testicular cancer**, **kidney cancer**, and pregnancy-induced hypertension." (emphasis added)

Given the long-standing above concerns about PFOA and toxicity effects, PFAS manufacturers created new PFAS types, which were so-called GenX PFAS. They differed slightly in their chemical composition, but were marketed as equally as effective as PFOA and other original PFAS types. On October 25, 2021, the EPA released its human health toxicity study findings with respect to GenX chemicals (note that the EPA has also released human health toxicity findings with respect to other types of PFAS, including PFOA, PFOS, and PFBS, all of which conclude that those PFAS types are toxic to human health in various ways).⁷ The EPA's GenX PFAS toxicity assessment concludes that GenX have several potential health effects, including on the liver, kidneys, the immune system, development of offspring, and an association with **liver and pancreatic cancer**, with the liver being especially susceptible to oral exposure from GenX chemicals.

Taking this into consideration, the EPA established what it calls chronic and subchronic reference doses (RfDs) for GenX chemicals. The EPA defines these terms as follows: "a reference dose is an estimate of the amount of a chemical a person can ingest daily over a lifetime (chronic RfD) or less (subchronic RfD) that is unlikely to lead to adverse health effects in humans." The RfDs that the EPA established for GenX were as follows:

Subchronic RfD (mg/kg/day)	Chronic RfD (mg/kg/day)
0.00003	0.000003

To put these numbers into context, they are lower than any of the other three PFAS toxicity assessment RfDs released to date, with the GenX numbers coming in at 100 times less than the RfD for PFBS. The EPA points out in its toxicity assessment that it is currently re-assessing the PFOA and PFOS RfDs, suggesting that new RfDs for either or both may in fact be less than the GenX RfD.

Contrary to the statements made during the Town's Board meeting by NYSERDA, there is well-established and unrefuted science that clearly shows that certain types of PFAS are toxic to human health. Why are we not insisting on disclosures from the solar panel and components manufacturers as to what types of PFAS their products contain? We absolutely need to know this information and only then can we determine the toxicity information available about those chemical types. To simply state that we do not know if PFAS (a class of over 9,000 chemicals)

⁶ <http://www.c8sciencepanel.org/>

⁷ https://www.epa.gov/system/files/documents/2021-10/genx-chemicals-toxicity-assessment_tech-edited_oct-21-508.pdf

are toxic to human health is simply not supported by science, and we certainly can determine if any PFAS used on solar panels in the Town are toxic to human health **if only** we first have the necessary information – that being, what types of PFAS are in or on the panels.

PFAS Erosion From Solar Panels

NYSERDA's representative noted that "the solar industry hasn't been studied yet" with respect to PFAS runoff from the panels, making that comment seemingly to suggest that there are no studies that should alarm the Town specific to PFAS. He is correct – the solar industry is just beginning to study PFAS erosion concerns. The cumulative surface area of photovoltaic panels in utility scaled solar projects is significant. The absence of evidence at this time should not result in the Town simply approving the project hoping that no such studies will eventually be done or that PFAS contamination from solar panels comes to light. The neighbors, whose only source of drinking water is from wells drilled on properties adjacent to the Project site, want the Board to consider the long term purity of the ground water and aquifer. The fact that Duanesburg's water table is so high that properties must elevate their septic systems may mean that the risk of contamination of the aquifer is greater than normal. NYSERDA's representative responded to one of the Town's questions regarding panel degradation by agreeing that the anti-glare component of the panels "can degrade over time."

My prior letters to the Board show that there are existing patents for solar anti-glare materials that contain PFAS. All of this should lead the Town to have concerns over the possibility of PFAS runoff from the solar panels, which would then naturally find their way into the soil and water. This is one of the primary reasons why I have repeatedly asked the Town to require the Applicant to conduct pre- and post-construction soil and water testing, as well as annual testing of the soil and water. If no studies currently exist, why not take the prudent preventative step of placing the burden on the Applicant to conduct this simple testing? Capital Region Environmental Lab performs water testing including tests for PFAS. I had a professional collect samples from my well in October and I am waiting on the results. There is no burden to the Town whatsoever by requiring these due diligence steps.

Finally, NYSERDA's representative references a "study" from New Hampshire, which he represented shows that there were no PFAS found at three solar sites in that state. This is an inaccurate representation of the "study." The state's own presentation on the issue⁸ shows that what the state actually said was that PFAS are used in some solar panels and no PFAS have been detected **near** three solar panel sites in the state. The size of the solar projects and the number of panels is not provided. Oak Hill Solar may have more than 43,400 panels for the anticipated 40 year lifetime of the Project. Due to the degradation of panels they may be economical to replaced

⁸ https://portal.ct.gov/-/media/Departments-and-Agencies/DPH/dph/environmental_health/private_wells/2018-Downloads/7-050218-Kernen-PFAS-CT.pdf

the panels every 15 years.⁹ The state did NOT test the actual solar panel sites referenced. Further, the state indicated that it had not “...specifically studied run-off near solar panel installations.” In other words, the “study” that NYSERDA’s representative referenced as support for his position that evidence seems to suggest that there are no PFAS runoff concerns relating to solar panels is completely unfounded. The New Hampshire study is in fact not applicable to the point, since it never tested for runoff and did not even test the solar project sites themselves.

EPA’s PFAS Strategic Roadmap 2021-2024

On October 19, 2021, the EPA released it’s PFAS Strategic Roadmap for 2021-2024.¹⁰ The document is highly significant in that it clearly lays out the EPA’s 30+ steps that it intends to take with respect to PFAS in a short three-year time period. At the forefront of the actions the EPA will take are setting enforceable limits for PFAS in drinking water, designating some PFAS as “hazardous substances” under CERCLA, and aggressively pursuing cleanup of PFAS polluted land. As I detailed in my October 19, 2021 letter, the drinking water regulations and CERCLA designations are enormously important to tracts of land that may have PFAS pollution issues, and thereby may be polluting drinking water. I will not reiterate here the significant costs that could stem from being subject to enforcement actions for these types of PFAS remediation, but I provide this information for the Town because my original letter did not have firm deadlines for the EPA’s targeted actions. Now we do, as the EPA intends to take some of these actions as soon as one year from now. As I pointed out in my prior letter, once these regulations take effect, polluted tracts of land in New York could find themselves subject to enforcement action from now only the New York Department of Environmental Conservation, but the federal EPA, as well.

PFAS Lessons From Endicott, NY

In 2019, a Korean lithium-ion battery recycling company, SungEel MCC, applied to the state of New York for permitting to bring a battery recycling facility to Endicott, NY. Applications were filed with the Department of Environmental Conservation (“DEC”) and the DEC granted the company’s permit for the project in March 2020.¹¹ However, shortly after the permit was granted, concerns were raised to the DEC about the potential PFAS content in some lithium-ion batteries, and the community was concerned that the recycling process might release PFAS into the air and the surrounding community. The DEC temporarily revoked SungEel’s permit so that

⁹ <https://hbr.org/2021/06/the-dark-side-of-solar-power>

¹⁰ https://www.epa.gov/system/files/documents/2021-10/pfas-roadmap_final-508.pdf

¹¹ <https://wbng.com/2020/05/21/sungeel-endicott-mayor-respond-to-dec-letter-on-endicott-battery-recycling-facility/>

assurances could be obtained with respect to the PFAS content of the batteries that would be recycled at the facility. SungEel agreed to cooperate with the DEC by, among other things, getting information from the battery manufacturers as to whether the items had PFAS. They also agreed to do testing at their facility if the company was allowed to operate to determine whether any PFAS residue was resulting from the recycling processes that SungEel conducted. By June of 2020, due to evidence that confirmed that some lithium-ion batteries do indeed contain PFAS, the DEC indicated that it was conducting its own formal investigation of the issue.¹² The DEC also requested SungEel to monitor its facilities in Korea that recycle lithium ion batteries to determine if PFAS emissions were a result of the operations.

By January of 2021, SungEel had still not responded to the DEC's requests for proof from the battery manufacturers that the batteries were PFAS free, had not provided any data from their Korean facility as to PFAS emissions, and had provided no details whatsoever regarding PFAS concerns over its operations.¹³ Instead, the tenor of SungEel's statements changed to suggestions that they would simply abandon the project entirely. By March of 2021, this is precisely what happened, as the company chose to abandon its plans for Endicott entirely having never provided any information about the PFAS issues raised by the town and DEC.¹⁴

There are significant lessons that we can learn from Endicott's example of persisting for assurances before the project even began that there were no PFAS issues to worry about, or that the PFAS air emissions would be adequately controlled. In fact, the town and the DEC acted by temporarily revoking SungEel's permit without even first receiving proof that the batteries that would be recycled at the facility do contain PFAS. Instead, they acted proactively based on reliable information that some of the batteries might have PFAS, similar to the evidence I and Saving Greene have presented to this Board with respect to solar panels. Additionally, the Board should consider PFAS contamination from the thousands upon thousands of lithium ion batteries Amp wants to add to the Oak Hill Solar Project. While SungEel agreed to cooperate and be forthcoming with information regarding PFAS, it never did. If the citizens of Endicott had not banded together and demanded assurances from the entity in the best position to provide information and disclose PFAS information (the applicant, SungEel), the community would have been faced with a battery recycling facility operating and potentially polluting the surrounding community with PFAS.

I reiterate that the Town must make the same types of demands of the Applicant as Endicott did of SungEel - (1) require the Applicant to provide written verification from the manufacturers of

¹² <https://www.pressconnects.com/story/news/local/2020/06/01/indicott-battery-recycler-getting-fresh-look/5309681002/>

¹³ <https://www.binghamtonhomepage.com/news/update-on-endicott-battery-recycling-project/>

¹⁴ <https://spectrumlocalnews.com/nys/binghamton/business/2021/03/22/company-abandons-plan-for-battery-recycling-plant-in-endicott>

the solar panels that none of the panels or components contain PFAS; (2) require the Applicant to conduct pre- and post-construction soil and water testing to ensure that no PFAS contamination occurred during construction; and (3) require the Applicant to do an annual test of soil and water for the lifetime of the project to ensure that PFAS runoff issues are either of no concern or, if detected, can be addressed immediately. These steps burden the Town in no way. The only burden to the Applicant is an added trivial cost in comparison to the millions of dollars they stand to gain from the completion of the project. Requiring them to invest a few thousand dollars as an assurance to the Town is the prudent thing to do in order to protect the Town's future.

Thank you for your time and consideration.

Respectfully,
Lynne Bruning
Susan Liss Biggs

Cc: Roger Tidball, Supervisor Town of Duanesburg
Bill Wenzel, Town Board Member

PO Box 160
Quaker Street, NY 12141

Dr. Mary T. Bassett, Director
New York State Department of Health
Corning Tower, Empire State Plaza,
Albany, NY 12237

Transmitted via email: dohweb@health.ny.gov

December 2, 2021

RE: Solar panels, anti-reflective coating, PFAS and the Precautionary Principle

Dear Dr. Bassett,

There has been little to no discussion of how utility-scale solar, wind and battery energy storage facilities may negatively impact rural communities, soils and ground waters where renewable energy resources are being constructed on thousands upon thousands of acres of farmland.

This letter draws attention to

- coatings used on commercial-grade solar panels
- the possibility of PFAS in and on solar panels, wiring and batteries
- citizen's requests for use of the precautionary principle to protect soil and groundwater.

The enclosed letters submitted to NYSERDA, the Article 10 Siting Board, the NYS Committee on Environmental Conservation and to the Town of Duanesburg outline this issue.

Developers are responsible to their investors. Not the town. Not the neighbors. And not the environment. New Yorkers need forward-thinking regulations to address exponential increases in renewable energy equipment and its potential to contaminate soil, ground water and drinking water on a massive scale both during operation and after decommissioning.

A 7.5-MWdc solar facility may use 22,000 photovoltaic panels and 3,000 linear feet of wire on 35 acres. Panels used at such facilities are coated with anti-reflective and anti-soil coatings, which increase profits by serving to improve productivity and decrease maintenance costs. These hydrophobic coatings help dirt slough off and trap sunbeams in the panel. They may be similar to the coatings applied at car washes where there are increasing reports of PFAS contamination. Some reports show that solar panel coatings may degrade as soon as two weeks. Dupont and 3M manufacture coatings that may be re-applied to solar panels in the field.

Hundreds of thousands of feet of buried wire connect panels to inverters, transformers and other components. Industry reports show that plastic coatings on wires may contain PFAS. Lithium-ion batteries for energy storage are documented to contain PFAS. Clearly there are valid concerns

about PFAS contamination from solar energy equipment. At decommissioning, contaminated wires that are left in the ground may continue to leach PFAS into the soil and groundwater. Batteries used for storage are seldom recycled and may require disposal every 10 to 15 years. Placing PSAS-contaminated debris in rural landfills further increases risks to communities.

Protecting our soil, groundwater and drinking water from contamination should be our foremost concern. Rural New Yorkers rely on drilled wells as their only source of drinking water. Federal and state regulations increasingly restrict the use of PFAS. Contamination lawsuits are being settled for tens of millions of dollars. The Town of Avon recently adopted a solar law prohibiting solar panels that use PFAS.

PFAS contamination is expensive and difficult or impossible to clean up. Small rural towns lack the resources to settle lawsuits over contaminated soils and drinking water.

I request that the Department of Health consider the human and environmental costs of PFAS contamination to our forest, meadow and agricultural lands and implement the following precautionary measures.

Developers must be required to:

1. Provide documentation that their products do not contain PFAS. If they cannot document that panels are PFAS-free, they must agree to accept liability for potential contamination.
2. Test the site soil and water before and after construction, then provide annual site testing and monitoring of wells and soil on adjoining properties.
3. In the event PFAS contamination occurs, decommission and remove components immediately. Any materials used on the contaminated site must be cross-referenced at once against other sites where those products are used and immediate testing undertaken.

I request that the State maintain for public use a database of PFAS free-solar panels, equipment, and coatings so municipalities and their residents can easily protect their soil and waters.

These precautionary measures would cost nothing to the state, towns or their residents. They would simply protect our soil and water as New York State moves toward its net zero goals.

Thank you for your time and consideration.

Respectfully,
Susan Biggs
Lynne Bruning

Enc: September 23, 2021 Saving Greene to the Siting Board
October 19, 2021 Bruning to Duanesburg Planning Board
November 8, 2021 Bruning to Duanesburg Planning Board
November 9, 2021 Water Test Results 13388 Duanesburg Road, Delanson NY 12053



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Insurance			\$0.00
Up to \$50.00 included			
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