Industrial Solar Farms: An In-Depth Look

How Industrial Solar Farms Impact the Rural Tidewater Counties of the Middle Peninsula and Northern Neck

INTRODUCTION

This paper addresses the potential impact of industrial solar farms on the rural tidewater counties of the Middle Peninsula and the Northern Neck. As the pace of solar development rapidly quickens and decisions are made with increasing frequency, this paper aims to equip decision makers and the public alike with the information they need to take an informed stance on this issue, and make decisions which best benefit the future of the community.

This paper refers to the conversion and development of rural farm and forest lands into utility-scale solar power generation stations, known as “solar farms.” This paper **does not** address the personal use of solar panels erected or installed by a property owner to provide electricity for the owner’s home, farm, or business.

Based on the evidence presented here and other existing case studies, it is clear that solar farms are industrial activities which are unrelated to agriculture. Accordingly, if approved by a rural county’s board of supervisors, solar farms should be restricted to areas that are already appropriately zoned for industrial use. While the authors of this paper support solar power as an alternative energy source, we strongly oppose the destruction of productive farm and forest lands as a means of producing solar energy.

The popular term **“**Solar Farm” is a dangerously misleading concept, as solar farms pose a direct and very real threat to the agriculture, forestry, scenic beauty, unspoiled natural resources, and water systems that not only attract residents and visitors to the region, but provide the vast majority of jobs for residents and tax revenues for local governments. The following research supports this stance, and is presented in hopes of helping county policymakers and landowners make decisions regarding solar farms that preserve for future generations the scenic characteristics and quality of life benefits traditionally enjoyed by citizens of the tidewater counties of the Middle Peninsula and Northern Neck.

Issues to Consider When Evaluating a Proposal for a Solar Farm

Most citizens who live in the rural tidewater counties of the Middle Peninsula and the Northern Neck may have little direct knowledge of solar farms or the issues that should be evaluated by a local Board of Supervisors when a solar farm proposal is presented for approval. A brief discussion of the conversion process when agricultural land is turned into a commercial solar site and a basic understanding of how solar farms operate are necessary to provide the framework for an analysis of the issues.

1. UTILITY-SCALE SOLAR FARMS ARE NOT FARMS

They are industrial projects that convert large tracts of farmland and forests into rows of glass panels containing highly toxic materials.

The first point to understand is that a "solar farm" is an **industrial site** that has nothing to do with farming or forestry or the ancillary activities related to agriculture. To the contrary, a "solar farm" is an industrial activity where productive farm or forestry acreage is converted into an electric power generation station. The term "solar farm" is a complete misnomer. It has its origin in the fact that solar companies have found it cost efficient to lease farmland in rural counties on which to erect their solar generation panels because land cleared for farming is already exposed to direct sunlight. For all intents and purposes, a "solar farm" is an industrial enterprise that is wholly unrelated to and not supportive of any farm or forestry use. In fact, the construction of a solar power generation site on land previously dedicated to farming is actually destructive of the underlying farm acreage because the site is typically cleared of much of its top soil, compacted, and chemically treated to control plant growth.

In the site preparation stage, as noted above, trees and vegetation are cut, the land is leveled, and chemicals and herbicides are used to eliminate plant growth on the acreage where large numbers of solar panels will be clustered. An interconnected above-ground mounting system is then erected to hold rows of solar-powered photovoltaic (PV) panels in a concentrated

configuration that tracks the sun. Electricity generated by the solar panels is carried by electrical wires and cables to high-voltage transmission lines where it ultimately enters a central power grid that distributes electric power through a transmission and distribution system to consumers. The land disturbance is not confined to the footprint of the operating site, but also includes the associated construction of access roads, right of ways, and the upgrading or constructing of transmission lines.

The scope of the land disturbance activity and the size of the geographical area it directly impacts depends on the number of megawatts of electricity the solar farm is engineered to produce. Typical solar farms in rural Virginia may consist of 150 to 300 acres, but they can be significantly larger. For example, the Coronal Energy solar farm in Essex County operates on a lease covering 200 acres and is engineered to produce 20 megawatts of electricity (equal to 20 million watts per hour). A much larger solar site was recently approved by Charles City County for a 340-megawatt solar project on 1400 acres. The Charles City County solar project will be operated by the Sustainable Power Group (a/k/a sPower), a Utah-based entity. The same company (sPower) has also submitted an application to Spotsylvania County's board of supervisors to operate an even larger 500-megawatt solar farm which, if approved, would encompass approximately 6300 acres and would be the largest solar generating project in Virginia.

The vast majority of solar farms in rural Virginia are operated by LLCs (Limited Liability Companies) pursuant to leases signed by the property owners. As the surge in solar farms sweeps across rural Virginia, many farmers who own large tracts of productive farmland are being offered leases or option contracts which commit them to lease their land so that it can be converted to a solar power generation site. In Essex County, for example, Coronal Energy obtained a 5-year option to lease 274 acres from one property owner in the southern end of the County, and Hexagon Energy, LLC has obtained options to lease two tracts of 138 acres and 182 acres from other property owners near Center Cross. More recently, Innovative Solar Systems, LLC, a solar energy company in North Carolina, has sent mailings to farm owners in Essex's Occupacia District offering to lease tracts of "clear clean" farmland over 150 acres which are near "large power lines."

2. THE ECONOMIC IMPACT OF SOLAR FARMS ON A RURAL COUNTY MAY BE NEGATIVE: Farm employees lose jobs, work is lost in farm service occupations, few permanent jobs are created, the cost of county services go up, the increase in property taxes may be minimal, and revenue from tourism may be adversely affected.

Solar farms are touted by industry advocates as being good for a state's economy because they provide a clean source of renewable energy which attracts business and provides employment opportunities in rural areas where the solar plants are typically located. This is a contention which should not be readily accepted. In the rural counties of tidewater Virginia, a solar farm may actually have a negative effect on the local economy and damage the economic interests of local residents. **We should remember that farms and forests which are targeted by the solar companies are the primary economic engines of our rural communities.**

When a farm is converted to a solar power site, farm employees who are usually local residents of the county and who have directly farmed the land for many years are displaced. In addition, local residents in a variety of farm-related occupations who performed contract services to the site are impacted. For example, in a rural farming community, many of the jobs held by local residents are with off-site businesses which provide the farm supplies and services a working farm requires. These contract services pertain to crop production, irrigation, harvesting and sale of crops, transportation of produce, maintenance of farm machinery such as combines and tractors, crop insurance, insect control, and a variety of other services. None of these services are required by a solar farm.

The loss of farm related employment is not offset by employment opportunities at the solar site. In this respect, it is important to understand that a solar generating site differs materially from a local manufacturing plant or a retail sales facility which requires regular employment forces. While some local employees may be used as part of the construction crew that clear and level the site, their jobs are temporary and end when the site preparation work is completed. The solar panels and ground mounting systems which are manufactured elsewhere are then installed by specialized contractors, not by local employees. When the solar site begins to

generate power, there are few, if any, regular employees at the site, with the possible exception of a few maintenance employees.

The reality is that a PV solar farm typically provides little, if any, regular employment to local residents of a rural area. Moreover, the electrical energy the solar farm produces affords no particular benefit to the residents and local businesses in the rural county where the solar farm is located. None of the power generated by a PV solar farm is channeled to a local resident, local business or directly to any local consumer. It is sold to public utilities or electric power contractors who purchase it for sale to a central grid.

Solar industry representatives can be expected to argue that the county will experience an increase in property tax revenue if farmland is converted to a solar generation site. While it is true that real estate taxes applicable to the tract of land are likely to increase, so will the cost to the county for providing services to the site, which include utilities, fire, and other emergency services. One emergency incident at the solar site could cost the county more than any increase in the real estate tax revenue it experiences. Moreover, the county will receive no property tax revenue on the solar panels and mounting system or other equipment installed by the solar operator because they are exempt from local taxation pursuant to incentives granted by Virginia's General Assembly.

In assessing the economic impact of solar farms, a county should also consider whether their presence detracts from the characteristics of the county which attract new families and businesses to the area. Residents of the Middle Peninsula and the Northern Neck place a high value on the fact that they live in a scenic area, with abundant tidal waters, and largely unspoiled natural resources. They also take pride in the fact that this is an area acclaimed for its historical significance. This is the image promoted by the local governments of this tidewater region in their comprehensive plans and on their websites. It is an aesthetically pleasing image which is marketed to attract retirees and tourism to the area and to reaffirm the conservation goals and values of local government to existing residents.

The conversion of scenic farmland to solar project sites with rows of glass panels is an image in sharp contrast with the website descriptions promoted by local governments. It is also an image that is inconsistent with the advice of economic consultants who have been engaged to assist

the local counties in promoting their tourism goals. Tourism is recognized as a critically important economic element for the Tidewater counties of the Northern Neck and Middle Peninsula. For example, data released for 2017 by the United States Travel Association showed that tourism revenue for the five counties of the Northern Neck reached $273,391,000, that tourism supported 2772 jobs, and accounted for tourism-related tax revenue of approximately $7,604,000. By any objective analysis, the proliferation of solar farms in this tidewater region is likely to have an adverse economic impact on tourism revenue.

3. SOLAR FARMS POSE SIGNIFICANT ENVIRONMENTAL RISKS:

Productive topsoil is destroyed, runoff and erosion of contaminated soil can occur, storms can damage solar panels containing highly toxic metals known to be carcinogens, clean-up of toxic waste product is difficult and very costly, and there is no certified regional means of solar panel toxic waste treatment, recycling, or decommissioning.

Advocates who support a solar farm proposal typically argue that because solar energy draws its power from the sun, it is friendly to the environment. They usually contrast solar power farms with traditional power stations that burn fossil fuels which pose greater harm to the environment by creating greenhouse gas emissions, particularly carbon dioxide (CO2), and impact both air and water quality. **The comparative harm to the environment caused by a solar power farm versus a carbon fueled power station is not the issue. The relevant environmental question that needs to be addressed when a solar farm is proposed is what is the impact on the local environment if land is converted from its existing farm or forestry use to a solar power generation station.** This is a question that requires a thorough environmental assessment because the potential for substantial environmental damage can be significant, long lasting, impact neighboring properties, and be very costly to remediate.

The requisite environmental assessment should encompass the footprint of the proposed site and the access roads, right of ways, and transmission lines necessary for its operation. The assessment should also evaluate the project's water requirements, its potential impact on the aquifer and on any water bodies in close proximity to the site. There may also be areas of special concern that require protection such as wetlands, or locations where endangered plants grow, or which serve as critical habitat for protected wildlife.

Because the area of the project site where the solar panels will be located will be denuded of trees and leveled, and the use of chemicals and herbicides will be applied to control plant growth, there is always the potential at a solar farm for storm water runoff and erosion. Ground that has been cleared of trees may not be able to absorb significant rainfall, resulting in runoff and erosion of contaminated soil. The environmental assessment should address this risk and require containment barriers and berms. In addition, all chemicals and herbicides used for grounds clearance and maintenance should be identified and records should be maintained and available for inspection to show the volume and frequency of their use, and the location where they are stored.

The environmental assessment should also require disclosure of all toxic metals contained in the solar panels, such as cadmium telluride, cadmium sulfides, lead, silicon tetrachloride, chromium, copper indium selenide, and other metals known to be carcinogens. Because the solar modules are clustered in the open, they are exposed to extreme weather, including high wind conditions which could potentially damage and dislodge the solar panels. In a worst-case situation, such as the tornado that devastated a 28-mile path from the Middle Peninsula to the Northern Neck on February 24, 2016, a solar plant in the path of such a storm would likely experience massive damage to its solar panels with glass and toxic materials strewn over a wide area far beyond the footprint of the solar site. The 2016 tornado that struck Essex and Richmond counties destroyed a large number of homes and deposited massive amounts of debris in the marshes, wetlands and tidal waters. It was fortunate that there was no solar farm in the path of the 2016 tornado.

Just two years later, in January, 2018, Essex County residents learned first-hand about the environmental risks posed by a solar farm when Coronal Energy's 200 acre solar station, located just off US Route 17 near Dunnsville, Virginia, experienced heavy rainfall for several

days. On that occasion, tons of muddy sediment eroded from the Coronal site and poured into a tributary of the Rappahannock River, and ultimately into the river itself, which is part of the Chesapeake Bay Watershed. During the permitting process for this solar site, Coronal representatives had promised Essex's planning commission that storm water runoff and erosion would not be a problem.

While solar industry representatives may be inclined to dismiss the concerns of local residents about the risk of environmental damage when severe storms hit a solar farm, there are ample real life incidents which demonstrate the validity of these concerns. For example, in April, 2015, a tornado struck a 550 megawatt solar farm known as the Desert Sunlight Solar Project located just six miles north of Desert Center, California. The tornado destroyed over 150,000 cadmium telluride solar panels. The damage was so great that broken glass modules containing toxic metals were strewn beyond the footprint of the site and had to be collected and moved to staging areas via trucks and trailers. Other instances of environmental damage at the same solar site include heavy runoff of storm water, erosion and flooding which impacted the habitat for certain species of protected wildlife. Additional examples of significant environmental damage at solar power sites due to severe weather conditions include a large solar farm in Humacao, Puerto Rico, which supplied nearly 40 percent of the Island's solar generated electricity. In 2017, strong winds from Hurricane Maria hit the Humacao site ripping a large number of the station's solar panels from their foundation and destroying the glass panels. And, in 2016, a 60 acre solar station near Little Falls, Minnesota, was extensively damaged by 90 mph winds which destroyed 25 rows of solar panels, leaving twisted racks, crushed solar panels, and damaged wiring.

Hurricanes, tornados, and thunderstorms, of course, do not follow a predictable pattern and make no distinction between the types of structures that lie in their path. As solar farms increase in number, so will the number of weather related incidents in which solar panels are significantly damaged or destroyed. Each major incident will require costly clean-up activities and may have significant environmental consequences for years to come.

Experts differ on the extent to which solar panels that are damaged or broken in a severe storm create a significant risk of exposure to the toxic metals they contain, or the extent to which cadmium and other toxic materials may leach into the groundwater. The solar waste problem, of

course, is not just confined to panels that are damaged by storms or other events. It encompasses solar panels which are taken out of service and replaced by new panels that are technologically improved to produce greater conductivity. This is a growing toxic waste problem of immense proportion.

In the United States, there is no requirement for damaged or replaced solar panels to be recycled by the manufacturer or sent to a hazardous waste disposal center. In fact, there is no federal requirement to even classify them as hazardous waste. As a consequence, the panels are often sent to landfills where they may be crushed and exposed to the weather along with non-toxic waste. Researchers at the Electric Power Research Institute have warned against the practice of disposing of solar panels in "regular landfills" out of concern that "toxic materials may leach into the soil." To date, these warning have been largely ignored by solar corporations and solar panel manufacturers, and by state and federal regulatory authorities.

Many articles have been written which describe the disposal of solar panels as a growing national and international issue. The current trend for the increased use of solar power as an alternative form of clean energy, aided by state and federal financial incentives, ignores this problem. Unless it is addressed as a national priority, the problem will become particularly acute when industrial solar farms are decommissioned.

The problem of solar waste disposal is not just a United States issue. Japan's Environment Ministry has issued a warning that by the year 2040, Japan is likely to have 800,000 tons of solar panel waste, with no current plan for safely disposing of it. China, which has more solar plants than any other country, has an even greater solar waste disposal problem. Only Europe requires solar power manufacturers to collect and safely dispose of the solar power panels they produce.

In the United States, the manufacturers of solar panels are not charged with the cost of recycling or safe disposal of solar panel waste product. This is also an expense which may not be built into the business model of the corporate entities who operate solar farms, the vast majority of whom are special purpose entities incorporated as LLCs who may lack the financial reserves to absorb the cost of hazardous waste disposal. This is a problem that cannot be indefinitely ignored or postponed. If solar panel manufacturers and

solar farm entities do not absorb the expense, it may ultimately fall into the lap of the owner of the property and the county where the solar farm is located.

4. THE IMPACT ON LOCAL RESIDENTS LIVING NEAR THE SOLAR PROJECT: The conversion of agricultural property to an industrial site can adversely affect the property values, health and safety, and quality of life of local residents.

As noted in the previous sections of this article, when a commercial solar project is approved in a rural farming community, the impact on the county and its local residents can be far reaching with lasting consequences. The citizens who experience the most immediate impact are the families who live in closest proximity to the proposed solar plant. Many of these families may have purchased property and built or bought homes in the area in reliance on the fact that the land proposed for a commercial solar generation site was zoned for agricultural use. Zoning plays a big part in a family's decision to move to a new area. This may be particularly true of retirees who chose the area for its quality of life benefits and scenic characteristics.

There can be no doubt that residential property values may be diminished by any industrial activity that poses an environmental or health risk or by other characteristics that diminish the quality of life of nearby residents. This is an understandable concern of the residents of any community and it is one of the primary points of concern which the residents of Fawn Lake, a waterfront retirement community in Spotsylvania County, Virginia, have recently expressed in opposition to the massive 500-megawatt solar power generation site proposed by the Utah-based Sustainable Power Group (sPower). The group of local citizens in opposition to the project number in the hundreds and call themselves the Concerned Citizens of Spotsylvania. sPower is actually a consortium of limited liability solar entities. The project would include three tracts of forest land encompassing over eight squares miles of Spotsylvania County in an area zoned for "agricultural use". The sPower project calls for the installation of 1.8 million solar panels on a 6300-acre forest site in close proximity to Fawn Lake.

The sPower proposal, which at this time is under review by Spotsylvania's Board of Supervisors, has created a fire-storm of opposition from Fawn Lake residents and other citizens of Spotsylvania. The opposition group has contended that the proposed solar power site could create significant health and environmental risks to area residents, that it would drive down property values, and that in an environmental emergency the clean-up costs of toxic materials could be massive and would ultimately have to borne in large measure by the county and its tax payers. The Fawn Lake opponents also contend that the sPower solar project is likely to adversely affect home sales because it would discourage people from wanting to buy homes in the area, and that it is so massive in size (nearly half the size of Manhattan) that it would forever change the historic character of the County. The proposed site is located just a few miles away from the historic Civil War battlefield area where the Battle of the Wilderness, the Battle of Chancellorsville and the Battle of Spotsylvania Court House took place.

The opposition group has also disputed sPower's economic forecasts, pointing out that lower property values and declining home sales would cause the county to lose tax revenue, that solar power sites pose the risk of electrical fires caused by arc flashes and power surges which could require county services by fire and rescue squads, and that sPower's forecast of jobs was grossly inflated because the site clearance workers would be temporary employees and less than 35 permanent jobs would be created. In addition, the citizens group cited studies showing that solar power generation sites are costly to tax payers because they are artificially propped up by federal subsidies and state tax credits which far exceed what other power producers receive. The Concerned Citizens group also cited studies showing that the electric rates paid by consumers would actually increase, not be reduced, by solar power because it is intermittent, rather than continuous. Public regulated utilities are required to purchase solar power, but in order to maintain the continuous power flow the grid requires, this necessitates expensive additions to the power generating capacity of traditional energy companies, including new transmission lines. These costs are passed along to the consumer in increased electric rates.

An additional point of contention in the sPower proposal is the projected "decommissioning" cost to restore the project at some point in the future to its original condition. If restoration is even possible, the cost would be enormous. Spotsylvania has projected the cost to be $36,000,000, whereas sPower has projected about $11,000,000. The sPower projection assumes credits for the value of recycled materials.

As previously noted, recycling of solar panels is not currently required by law in the United States. A current analysis of decommissioning costs is highly speculative. If outdated or damaged solar panels are classified as hazardous waste as they should be, the decommissioning cost would skyrocket. In the meantime, the environmental problem of how to deal with the toxic materials in solar panels is growing. County governments should insist that the solar entities who propose to erect the solar panels and operate utility scale solar farms are financially secure and that they provide secured bonds to cover the anticipated cost of cleaning up solar waste at any time during the solar farms operation as well as the cost of decommissioning.

In recent years, there has been a huge surge in the number of solar farms structured as LLCs that have commenced operation in East Coast states, including Maryland, Virginia, and North Carolina. At the same, there are news reports of solar LLCs that have declared bankruptcy and have gone out of business. When this occurs, employees may be laid off and the solar assets of the bankrupt company sold to satisfy or partially satisfy creditors. In that circumstance, the solar farm may be shuttered, leaving the owner of the land and the county with solar power waste product and unresolved environmental issues, and the owner with land that he or she may never be able to put back into productive acreage.

For anyone concerned about tracking corporate accountability and liability, the corporate structure of sPower warrants further comment. It illustrates the difficulty of assessing financial responsibility when there are multiple limited liability corporations working on the same project. According to filings with Virginia's State Corporation Commission, sPower is actually the sPower Development Company, LLC, which is a wholly owned direct subsidiary of FTP Power, LLC, which is 50 percent owned by AES Lumos Holdings, LLC, and 50 percent owned by PIP5 Lumos, LLC. sPower has its own special purpose subsidiary LLCs, which include Pleinmont Solar 1,LLC, Pleinmont Solar 2,LLC, Highlander Solar Energy Station 1,LLC, and Richmond Spider Solar, LLC. Each of these subsidiary LLCs of sPower are allocated different amounts of megawatt generation in four separate phases of the project. None of these companies involved in the project are regulated utilities.

5. RISKS TO WILDLIFE AND DESTRUCTION OF CRITICAL WILDLIFE HABITAT:

Rural farms and forests in the tidal counties of the Chesapeake Bay Region provide vital habitat essential for the survival of countless numbers of migratory and non-migratory wildlife species. These critical habitat areas are being threatened by solar business entities who view farms and forests as assets to exploit for private gain.

As solar farms spread across the Chesapeake Bay region, there is growing concern about their impact on wildlife, both migratory and domestic, and on the destruction of critical natural resource habitat that is necessary for the survival of many wildlife species. The legislative initiatives that support solar as a climate friendly renewable energy source never contemplated the threat it would pose to ecologically important farmland and forests, or to critical wildlife habitat areas. We are now seeing more instances where solar companies are proposing the destruction of vast amounts of forestland and environmentally important farmland.

The problem lies in the fact that utility-scale PV solar farms are relatively inefficient in that they require up to 10 acres of land per megawatt. Moreover, the land they require is almost always productive farmland or forestland that already serves an important economic and social purpose while also contributing positively to the environment. Trees and plants, which solar farms destroy, absorb carbon dioxide (CO2) during plant growth. The carbon they capture during photosynthesis in the process known as carbon sequestration would otherwise rise and trap heat in the atmosphere. In this way, plants and trees are key players in our efforts to combat global warming.

From an environmental and ecological point of view, it makes no sense to destroy and replace farmland and forestland with rows of solar panels containing toxic metals. Farms and forests not only absorb carbon, they also absorb water which helps to avoid erosion and runoff, and they provide critical habitat for countless numbers of wildlife species, plants, and insects. It

would be hard to develop a list of wildlife species that can survive in the operating footprint of a solar farm.

Many articles have been written that document the mortality of wildlife, including protected and endangered species, caused by solar energy generating plants. The destruction of habitat is the primary cause, but at some solar plants the death of wildlife has been directly due to the intense heat generated from the solar panels. In California, where large "concentrating solar" plants (CSP) use "power towers" consisting of mirrors to concentrate energy from the sun to drive turbines, the solar energy production process creates high-temperature solar beams that are so hot they ignite insects, birds, and bats that fly through them. One CSP solar plant where this has occurred is the Ivanpah solar plant in the Mojave Desert, a 392-megawatt plant located on 3500 acres. **US Fish and Wildlife Service has referred to this type of large scale solar project as "mega-traps" for wildlife.**

The Ivanpah solar plant is one of three California CSP plants that were investigated by USFWS Office of Law Enforcement in 2013 for large numbers of bird deaths. Many of the birds had been fatally singed, while others died when they collided with the ground or structures at the sites. Investigators concluded that the "Lake Effect" of the reflective solar panels causes birds, bats and their insect prey to confuse the solar facility for a lake or pond. If they descend too fast, they crash and die. USFWS performed a mortality analysis covering the first two years of the Ivanpah plant's operation. The number of birds killed in the solar station's first full year of operation was 5128, and in the second year it was 5181. Of the birds whose deaths could be attributed to a definitive cause, 46 percent died of "singeing" and 54 percent to "collisions."

The "concentrating solar" technology in which solar energy is collected and converted to thermal energy is one of the alternative energy developments supported by the Department of Energy. It has been used at large solar projects in California, Nevada, and Arizona. If integrated into the electrical power generation capacity at a utility's traditional carbon fueled plant, it may have the potential to help reduce carbon fuel emissions. Research for this article did not reveal the existence of any "concentrating solar" plant in operation on the East Coast, except for a hybrid solar/natural gas plant operated by Florida Power & Light Company in Indiantown, Florida. As of this date, the "concentrating solar" technology has not been utilized and may not be currently feasible at utility scale solar farms on the East Coast. The "Lake Effect" issue, however, is a

subject of significant concern at East Coast utility scale projects, particularly those covering large acreage tracts in tidal regions where the rows of glass panels are more likely to cause migratory birds to believe they constitute rivers or lakes.

The reduction of carbon emissions through renewable energy initiatives, which includes the greater use of solar power, has long been a goal of environmental groups who have consistently urged federal and state authorities to protect our environment and to conserve critical natural resources and wildlife habitat areas. **The production of solar power, as one means of helping to reduce our reliance on fossil fuels, was never intended to be a license for the solar industry to destroy productive farmland, forests, and unspoiled natural resources which are the cornerstones of most rural communities. We should not be surprised that solar business entities which are usually non-resident corporations view our open space lands and forests as assets to be exploited, not assets to be preserved.**

In the Chesapeake Bay region, a vast network of tidal rivers, farms, and forests span the landscape and create a coordinated ecosystem that is important to the survival of thousands of species of migratory and non-migratory wildlife, including many which are designated by federal and state agencies to be endangered, protected, or species of concern. One significant forested property in this network is the Nanjemoy Peninsula in Charles County, Maryland.

A recent article published in March, 2019, in the Chesapeake Bay Journal describes proposed solar farm sites on a heavily forested section of the Nanjemoy Peninsula, which conservation groups contend would destroy critical wildlife habitat and threaten the survival of numerous bird species. This dispute centers around a plan by a Miami based solar energy company to clear 400 acres of trees from two sites on the Nanjemoy Peninsula. Charles County's land use plan, which was adopted in 2016, calls for conservation of farmland and large contiguous forests, and specifically identifies the Nanjemoy Peninsula, which borders the Potomac River, as a "priority preservation area." The Audubon Society has designated it an "Important Bird Area" because it provides habitat and nesting for a "highly diverse assemblage" of birds that require large connected forests to breed. The Nanjemoy Peninsula has also been designated a "targeted ecological area" by the Maryland Department of Natural Resources which is a designation that guides government land acquisition for parks and nature preserves. Community activists and

conservation groups have urged the Maryland Department of Environment to deny the necessary permits for the project. At this time, no decision on the proposal has been made.

Summary

As the spread of solar farms continues, it is clear that some of the most scenic, historic, and ecologically important areas of the Chesapeake Bay region are being targeted by solar entities as potential sites for solar farms. There is no question that this includes farms and forests in the Middle Peninsula and Northern Neck, which often adjoin wetlands, marshes and tidal waters, and which provide critically important habitat for migratory and non-migratory wildlife.

County governments should be fully cognizant of the risks which solar farms pose to the counties of our tidewater region, the taxpayers, and even to the individual property owners who lease property to the solar energy entities. As explained in this paper, the economic and environmental risks are substantial and may impact local residents who own properties well beyond the footprint of the solar sites. The location and size of a proposed solar generation site are factors which contribute to the scope of the environmental risk and to wildlife habitat destruction.

Local residents must understand that a solar farm is an industrial business that has nothing to do with farming or forestry. The solar farm corporation that leases the farmland is almost always a **Limited Liability** Company, often thinly capitalized under a business model propped up by energy tax credits and legislative incentives. There is no guarantee that it will stay in business for the term of the lease, or if it goes out of business that it will have the financial resources to pay the waste clean-up and decommissioning costs. There are many solar farm LLCs who have declared bankruptcy in recent years.

The only thing certain is that productive farmland will be lost when converted to a solar generating site and that the land may never be suitable for farming again. When farmland is stripped of its

topsoil, regularly treated with herbicides to control plant growth, compacted, and shielded from rain and sunlight by solar panels, the soil beneath the panels can become “dead dirt” that has been so depleted of organic matter that it is unsuited for crop production. **Because solar farms are industrial properties that are by design destructive of farmland, they should not be approved as a “conditional” or “permitted” use in an area designated by the county as an “Agricultural District.”** Nor should they be approved in any environmentally sensitive area where they would pose a threat to wildlife. If approved at all, solar farms should be sited in an industrial district where other industrial activities are authorized.

We must recognize that cropland and forests play major roles in combating global warming because they absorb carbon dioxide during plant growth. They are essential components of a clean environment, and they provide much of the critical habitat necessary for the survival of countless species of animals and birds. Farms and forests are not only ecologically important to our tidewater region, they are also the primary economic engines. A 2017 report on the economic impact of farms and forests in Virginia commissioned by the Virginia Secretary of Agriculture and Forestry, which was prepared by the Weldon Cooper Center for Public Service, stated that agriculture and forestry together have an economic impact of over $91 billion, that they provide more than 442,000 jobs, and that every job in agriculture and forestry supports another 1.7 jobs in our state’s economy. The Weldon Cooper report also addresses the economic impact of agriculture and forestry on tourism and the environmental and societal benefits they provide. The report notes that Virginia agritourism and forest recreation account for millions of visitors and billions of dollars of tourism-related spending. They also provide “substantial environmental and other societal benefits” because they “improve air and water quality, mitigate flood vulnerability, provide wildlife habitat, and aid biodiversity” while also providing “scenic amenities that contribute to the quality of life.”

We should understand that solar energy is only one of the alternative clean energy sources that are being produced or developed in various parts of the world to address global warming. Grasslands, crops, and wood pellets from timber harvesting are some of the other sources of energy currently being used in Europe, which unlike solar panels do not create a waste product of toxic metals. As alternative energy sources to fossil fuels are developed, farmland and forestland are likely to be renewable sources of crops and trees which can be used as fuel for the production of clean energy.

Conclusion

Each year, the tidewater counties of the Middle Peninsula and the Northern Neck lose more farmland and forest land to development activities and urban sprawl. Utility scale solar farms are the latest threat to the preservation of farms and forests in our region. They typically require up to 10 acres of land to produce a single megawatt, and are targeting large tracts (1000 acres or more) of our most productive farmland and forestland. **We must recognize the serious nature of the industrial solar farm threat and strongly urge that our local planning commissions and boards of supervisors reject proposals for solar farms in zoning districts that are intended to preserve farmland and forestland.** It makes no sense to sacrifice productive farmland and forestland, which provide employment opportunities and societal benefits to local residents, for a solar generating plant that provides so little direct value to our region.

Research and Paper prepared by

The Essex County Conservation Alliance

www.essexcca.com

Sources

The Economic Impact of Virginia's Agriculture and Forest Industries, Weldon Cooper Center for Public Service, University of Virginia, May, 2017

Virginia Department of Agriculture and Consumer Services, Office of Farmland Preservation Annual Report, December 1, 2018

Farmland Preservation, www.vdacs.virginia.gov/conservation-and-preservation.shtml

American Farmland Trust: "Farms Under Threat: The State of America's Farmland", May, 2018

Virginia Agriculture Facts & Figures, www.vdacs.virginia.gov/markets-and-finance-agriculture-facts-and-figures.shtml

Solar DAO, 8/26/2017, How to Build PV Solar Plants, https://medium.com/@solar.dao
Solar DAO, 8/28/2017, How Energy Travels: What Happens With PV Solar Power, https://medium.com/@solar.dao

Coronal Energy: Green Solar Farm is Turning an Essex Watershed Brown, https://wtvr.com.2018/02/08/

DEQ Issues Coronal Essex Solar Center Violation, Rappahannock Times, 03/07/2018
Protect Spotsylvania! Summary of Concerns by Concerned Citizens,
https://sites.google.com/view/concernedcitizensspotsylvania/summary-of-concerns

Massive East Coast Solar Project Generates Fury From Neighbors, www.foxnews/politics

Virginia Residents Protest Proposed Solar Farm in Spotsylvania https://m.Washingtontimes.com/news/2018/12/10

CoastalAgroBusiness: Solar Farming: Not a Good Use of Agricultural Land
http:// coastalagro.com

If Solar Panels Are So Clean, Why Do They Produce So Much Toxic Waste?www.forbes.com/sites/michaelshellenberger.2018/05/23/

Tornado Impact to Solar Project, www.basinandrangewatch.org/DesertSunlight.html

Tornado Damages National Guard Camp's New Solar Energy Project, www.twincities.com/2016/09/08

Will Solar Power be at Fault for the Next Environmental Crisis? www.instituteforenergyresearch.org

Are We Headed for a Solar Waste Crisis? www.environmentalprogress.org/2017/6/21/

It's Time to Plan for Solar Panel Recycling in the United States, www.solarpowerworldonline.com

The Verge: More Solar Panels Mean More Waste and There's No Easy Solution, www.theverge.com

Solar Power Waste: A Disposal Problem, https://wattsupwiththat.com/2018/12/23/

AICIe, The Global Home of Chemical Engineers: Solar Energy's Secret – Hazardous Waste: The Case for a National Recycling Framework, www.wise-intern.org/journal/2018

ChemServiceNews: Learn Which Chemicals Make Solar Power Possible, 02/04/2015, www.chemservice.com/news/2015/02/

Solar Is Booming But Solar Parks Could Have Unintended Climate Consequences, www.theguardian.com

Black & Veatch: Impact of Solar Energy on Wildlife is an Emerging Environmental Issue, www.bv.com/impact-solar-energy-wildlife/

Sharp Rise in Estimated Bird Deaths at Calif. "Power Tower", eenews.net

If Renewables Are So Great for the Environment, Why Do They Keep Destroying it? www.forbes.com/sites/michaelshellenberger/2018/05/17/

Environmental Effects of Solar Farms, www.ledwatcher.com/environmental-effects-solar-farms/

Solar Facility Planned for Southern MD Forest Comes Under Fire: Important Wildlife Habitat at Risk on Nanjemoy Peninsula, Chesapeake Bay Journal article, 03/07/2019