

# Solar Farms: Answers to Your Questions





*“Solar is a good neighbor. It is odorless, has a low profile and is virtually noiseless.”*



Pegasus Solar Project

## Does solar belong on “prime farmland” or other types of productive agricultural lands?

“Prime farmland” is a soil-type-based designation from the U.S. Department of Agriculture (USDA), which defines prime farmland as “land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses.”<sup>1</sup> A state may also designate non-prime farmland as “farmland of statewide importance”; according to the USDA, farmland of statewide importance is a designation that states may use for soils that do not meet the definition of “prime” but may “economically produce high yields of crops when treated and managed according to acceptable farming methods.”<sup>2</sup>

National Grid Renewables builds solar projects on all types of open, flat land, including prime farmland, farmland of statewide importance, and other non-prime soils. Solar can improve soil quality once a site is decommissioned. Solar sites planted with native vegetation (which is standard practice for National Grid Renewables) have less stormwater runoff than row crops. Further, the plants improve soil quality by allowing soil microorganisms and fauna to recover from compaction and pesticide use.<sup>3</sup>

Many states recognize the value of the coexistence of solar energy projects and farmland. For example, the State of Michigan allows commercial solar on land enrolled in the State’s farmland preservation program because solar can serve to preserve farmland from being developed for other, more permanent uses.<sup>4</sup> Solar and farming can even coexist on the same plot of land, an idea dubbed “agrivoltaics” that can increase agricultural production while also increasing the value of the solar generating system.<sup>5</sup>

## Is solar bad for soils?

National Grid Renewables is aware of some misconceptions about the negative impacts solar has on soil. Far from harming the soil, a revegetated site can improve runoff and soil quality compared to prior row cropping, as noted above.

Native vegetation only requires spot treatment with herbicides while establishing (which usually takes about three years), and from that point on only requires mowing for maintenance. “Fewer chemicals are applied to a solar farm site than . . . a traditional farming operation.”<sup>6</sup> Solar can even increase crop yields when utilized for agrivoltaics in water-limited areas, primarily by reducing aridity (or dryness).<sup>7</sup> Finally, solar projects can increase fauna biodiversity by “recreating pre-industrial soil conditions” and providing habitat.<sup>8</sup>

Our operating sites have had great success at revegetation with native plantings. Representative photos of some of our projects are included throughout this booklet.



Equuleus Solar Project

*“...a revegetated site can improve runoff and soil quality compared to prior row cropping...”*



<sup>1</sup>U.S. Department of Agriculture, *Prime and other Important Farmlands*, [https://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/nrcseprd1338623.html](https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcseprd1338623.html).

<sup>2</sup>*Id.*

<sup>3</sup>Davis, R., *Soil, crop, & storm water benefits of solar sites*, *Fresh Energy*, <https://fresh-energy.org/soil-crop-storm-water-benefits-of-solar-sites> (2016).

<sup>4</sup>Balaskovitz, A., *Whitmer policy allows commercial solar projects on farmland preservation property*, *MIBiz*, <https://mibiz.com/sections/food-agribusiness/whitmer-policy-allows-commercial-solar-projects-on-farmland-preservation-property> (2019).

<sup>5</sup>Hassanpour, A.E., Selker J.S., and Higgins, C.W., *Remarkable agrivoltaic influence on soil moisture, micrometeorology and water-use efficiency*, *PLoS ONE* 13(11): e0203256, <https://doi.org/10.1371/journal.pone.0203256> (2018).

<sup>6</sup>O’Hara, B., *Facts, not fiction, needed in solar energy debates*, *The Sampson Independent*, <https://www.clintonnc.com/news/agriculture/5887/facts-not-fiction-needed-in-solar-energy-debates> (2015).

<sup>7</sup>*Id.*

<sup>8</sup>Enkhardt, S., *Solar parks help biodiversity by recreating pre-industrial soil conditions*, *PV Magazine*, <https://www.pv-magazine.com/2019/11/21/solar-parks-help-biodiversity-by-recreating-pre-industrial-soil-conditions> (2019).

## Does solar cause a “heat island” effect?

Some studies have shown that solar projects can produce what is known as the “photovoltaic heat island effect” (or PVHI) caused by a change in the local energy balance.<sup>9</sup> However, the PVHI generally only occurs when solar panels are covering ground that is lighter in color than the panels are (such as light-colored sand in a desert). Solar projects with panels located on land that is comprised of dark soil and/or vegetation do not have the potential for PVHI.



St. John's Solar Project

## Do solar projects cause glare?

According to the National Renewable Energy Laboratory:

*Residents and community officials often cite glare or blinding from solar facilities as a primary concern. While concentrating solar technologies do use mirrors which can cause glare, most solar farms use PV modules to generate electricity. PV modules use non-reflective glass and are designed to absorb rather than reflect the light that hits the panels in order to convert solar energy into electricity. PV modules are generally less reflective than windows and are installed at numerous airports.*<sup>10</sup>

One particular glare study on a project outside of Las Vegas concluded that “the potential or hazardous glare from flat-plate PV systems is similar to that of smooth water and not expected to be a hazard to air navigation.”<sup>11</sup>

## Do solar projects impact birds?

Concentrated solar power, which does not involve photovoltaics, can be harmful to birds. But large-scale photovoltaic projects generally do not negatively impact birds outside of desert areas.<sup>12</sup> Because of its low direct risk to birds, as well as its direct and indirect benefits to birds via reductions in carbon pollution, the National Audubon Society (among other wildlife organizations) advocates for increases in installed solar photovoltaic capacity.<sup>13</sup>



<sup>9</sup>See, for example, Barron-Gafford, G., Minor, R., Allen, N. et al., *The Photovoltaic Heat Island Effect: Larger solar power plants increase local temperatures*, Sci Rep 6, 35070 (2016).

<sup>10</sup>Day, M., *Top five large-scale solar myths*, National Renewable Energy Laboratory, <https://www.nrel.gov/state-local-tribal/blog/posts/top-five-large-scale-solar-myths.html> (2016).

<sup>11</sup>Riley, E. & Olson, C., *A study of the hazardous glare potential to aviators from utility-scale flat-plate photovoltaic systems*, International Scholarly Research Notices, Volume 2011, Article ID 651857, <https://doi.org/10.5402/2011/651857> (2011).

<sup>12</sup>There have been some documented bird mortalities at desert solar PV projects, potentially because they mistake the panels for water. Smithson-Stanley, L. & Bergstrom, L., *Why solar power is good for birds*, National Audubon Society, <https://www.audubon.org/news/why-solar-power-good-birds> (2017).

<sup>13</sup>*It's time to go solar*, <https://www.audubon.org/conservation/climate/solar>.

## Do solar projects impact property values?

Numerous studies have demonstrated that properties adjacent to solar projects do not see negative property-value impacts, nor does having a solar project as a neighbor negatively impact the ability to sell agricultural or residential properties.<sup>14</sup> A paired-sales study of the sale of properties adjacent to nine solar farms in Minnesota, Illinois, and Indiana, for example, found “little to no measurable and consistent difference in value” between sales of properties adjacent to solar farms and control properties. This finding led the authors to conclude that “properties surrounding other solar farms operating in compliance with all regulatory standards will similarly not be adversely affected, in either the short or long term periods.”<sup>15</sup>



<sup>14</sup>Solar Energy Industries Association, *Correcting the myth that solar harms property value*, <https://www.seia.org/research-resources/solar-and-property-value> (2019).

<sup>15</sup>McGarr, P.L. & Lines, A.R., *Adjacent property values solar impact study: A study of nine existing solar farms*, CohnReznick, <https://www.mcleancountyil.gov/DocumentCenter/View/13192/Patricia-L-McGarr-Property-Value-Impact-Study?bidId=> (2018).

## Could a landowner and/or municipality get stuck with the cost of decommissioning a solar project?

Other industries, despite being more intrusive and permanent, are not subject to the same decommissioning standards as solar (and other renewable forms of energy), making solar a comparatively low-risk form of development.

National Grid Renewables creates a decommissioning plan for each and every one of its solar projects. The financial surety requirement varies based on the rules of each host jurisdiction. National Grid Renewables’ standard solar lease also obligates the project to remove all solar facilities at the end of the project’s life/lease term.



*Solar projects can increase fauna biodiversity by “recreating pre-industrial soil conditions” and providing habitat.*

Brooten Solar Project



<sup>16</sup>Day, M., Top five large-scale solar myths, National Renewable Energy Laboratory, <https://www.nrel.gov/state-local-tribal/blog/posts/top-five-large-scale-solar-myths.html> (2016).

<sup>17</sup>Guldberg, P., *Study of acoustic and EMF levels from solar photovoltaic projects*, Tech Environmental, Inc., <http://files.masscec.com/research/StudyAcousticEMFLevelsSolarPhotovoltaicProjects.pdf> (2012).

## Are solar projects noisy?

According to the National Renewable Energy Laboratory:

*The noisiest components in a solar farm are the inverters, which generate a low buzzing sound as they convert electricity from the direct current (DC) generated by PV modules to alternating current (AC) used by the electric grid. Tracking equipment allowing PV modules to face the sun over the course of the day can also generate a low level of noise. However, the noise generated by solar farms is generally not audible above ambient noise outside of the facility fence.<sup>16</sup>*

The location of central inverters in the middle of a solar project for electrical efficiency means that they are generally located away from property boundaries. Additionally, inverters only make noise while the solar panels are generating, so they do not produce noise at night.

A study done on three utility-scale solar sites (1 MW to 3.5 MW) found that daytime inverter sound approached background sound levels at 150 feet from the inverter pad in flat rural areas. At 150 feet, the highest sound level observed at all three projects was 47.5 dBA (Leq), which sounds about the same as being in the next room from a modern dishwasher when it is running. Even at 30 feet from the inverters, the sound levels observed were comparable to that of a conversation.<sup>17</sup>

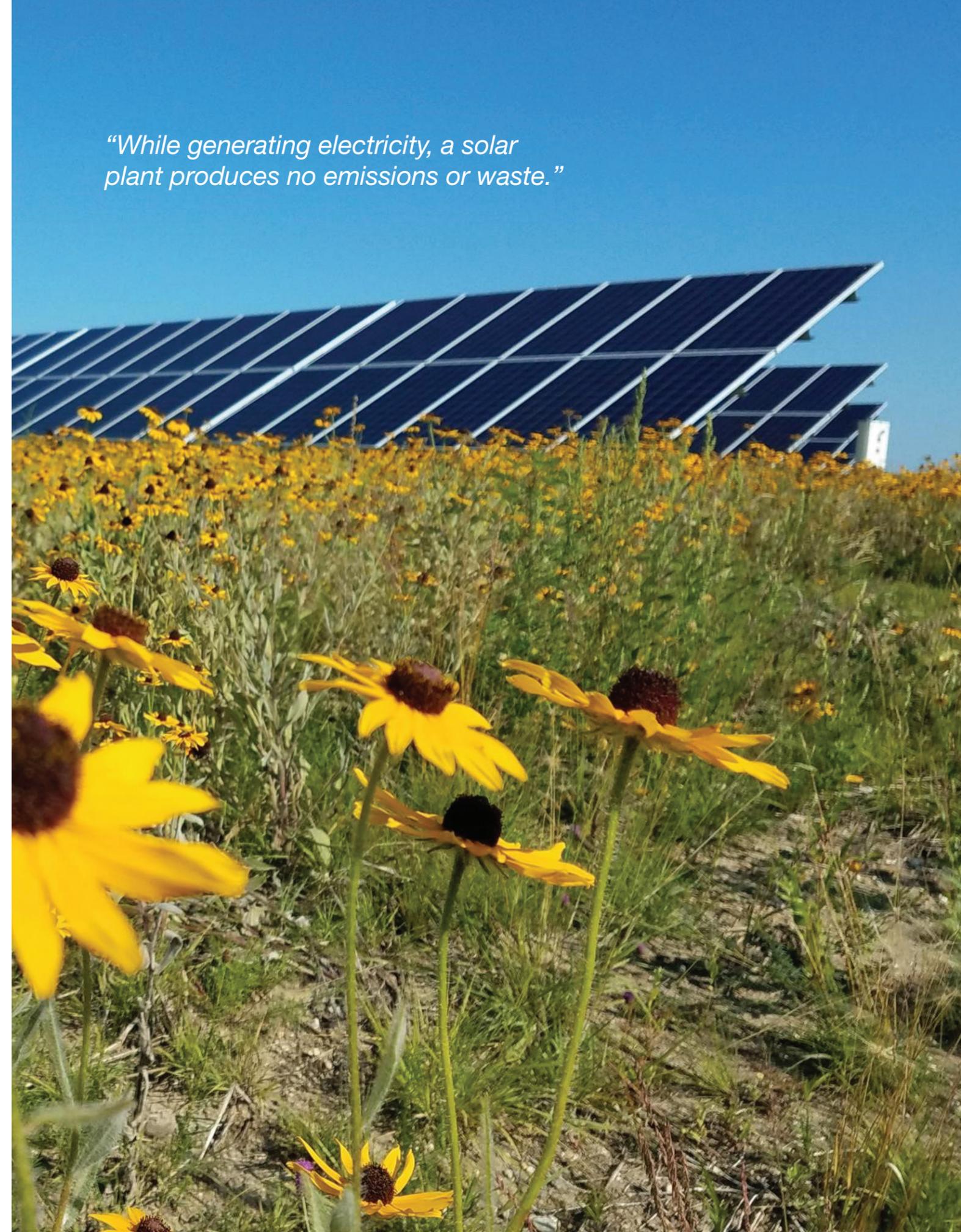
## Do solar panels emit toxic chemicals?

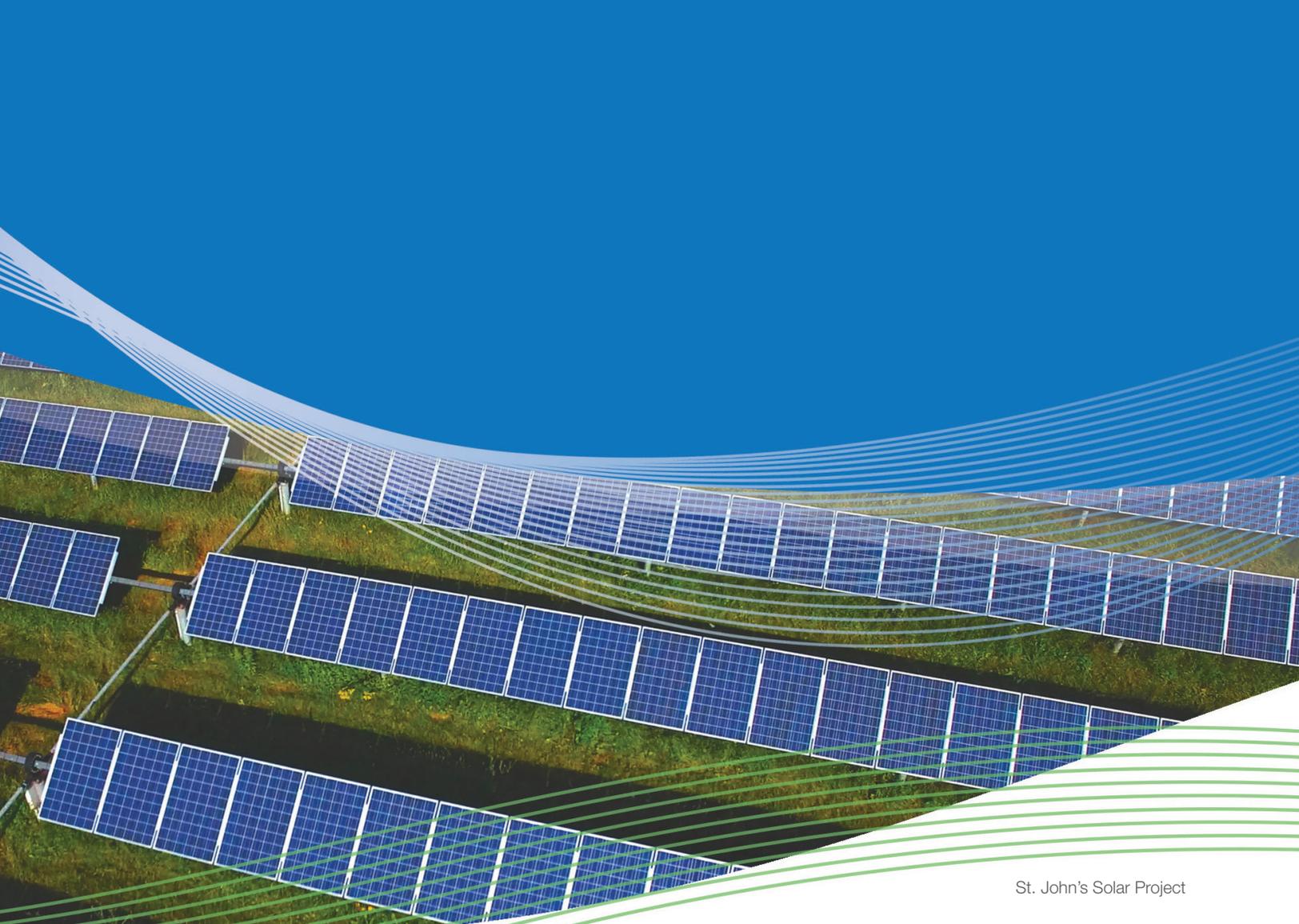
According to the GW Solar Institute at George Washington University:

*The most commonly utilized solar technologies use inert materials found at every building site including silicon (glass), aluminum (frame) and copper (wiring).*

While generating electricity, a solar plant produces no emissions or waste. Emissions from a coal plant cause harmful air and carbon pollution, while nuclear power creates waste product that remain extremely toxic to humans for millions of year. Though they are safe enough to dispose of in a landfill, recycling is the most environmentally safe and friendly way to decommission panels, as 'recycling the modules at the end of their useful life completely resolves any environmental concerns.'"

*"While generating electricity, a solar plant produces no emissions or waste."*





St. John's Solar Project



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