

December 9, 2022



Solar Generation Siting Final Report – Golden Solar

KY State Board on Electric Generation
and Transmission Siting
Case #2020-00243

Customer:
Kentucky Public Service
Commission

Prepared for:
KY State Board on Electric Generation
and Transmission Siting



December 9, 2022

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Solar Generation siting Final Report – Golden Solar

Synopsis

This document is the Final Report prepared by Wells Engineering for Golden Solar Electric Solar Generating facility in Caldwell County, KY.

WEpsc Order: WE220830245

Public Service Commission PO:
PON2 123 2200001809

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Executive Summary Golden Solar Adequacy Final Report

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Information on Sound Dampening as requested by the Siting Board

REVISIONS

Revision	Date Issued	Issue Type	By	Description
0	12-09-22	Final Report	VC	Issue for Review & Record

ABOUT WELLS ENGINEERING

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1 General Statement

The present document is the Final report prepared for the Solar Generation siting project of Golden Solar LLC who is applying for a certificate of construction for an approximately 100 MW Merchant Electric Solar Generation Facility in Caldwell County, KY.

1.1 Scope

As part of the personal service contract for the ‘Generation Siting Board 2022’, between The Commonwealth of Kentucky Energy Environment Cabinet/Public Service commission and Wells Engineering, in the matter of the order issued for case number 2020-00243, Wells Engineering was appointed to review the Application documents and the Site assessment report submitted by the applicant as per the Kentucky Revised Statutes 278.706 & .708 and submit a Final report on the Solar Generation Siting for the application for a construction certificate by Golden Solar LLC in Caldwell County KY.

Wells Engineering performed the review of the Application documents and the Site Assessment report submitted by the applicant by assigning it to the Senior Engineers and Designers at Wells Engineering and by hiring experts as per different requirements of the siting project as seen by Wells Engineering.

Wells Engineering contracted the following expertise based on the requirements of the project,

- i) Clover lake Consulting Services for Environmental assessment.
- ii) Watters Unclaimed Property Consulting LLC for Economic impact.
- iii) Clark Toleman, MAI-SRA for the review on impact on property values.

1.2 Reference Document

The following documents are referenced for the creation of this document.

- i) Golden_Application_and_Index (SAR and Exhibits)
- ii) Golden_Application Exhibits A-B to I,
- iii) Kirkland Property Value Impact Analysis
- iv) Adequacy Report from Cloverlake consulting
- v) Adjacent Property Value Impact Report from E.Clark Toleman, MAI
- vi) Kentucky Revised Statutes¹, KRS 278-706, 708, 710
- vii) Responses provided by Golden Solar, LLC for First RFI
- viii) Responses provided by Golden Solar, LLC for Second RFI

¹ <https://apps.legislature.ky.gov/law/statutes/chapter.aspx?id=38583>

2 Solar Electric Power – ‘Know-how’

Earth receives energy from the sun in the form of heat and light. It is possible for the light energy received to be converted into electricity using a device called a solar cell or photovoltaic cell (PV Cell for short). A solar cell receives ‘Photons’ from sunlight which then produces Electric ‘Volts’ thus giving these devices the name ‘Photovoltaic’.

A simple solar cell is relatively small and can only produce a couple watts of electricity, which is not sufficient for large-scale utilization. To increase the power production, several cells are combined to form a ‘Solar Module’, which can produce a usable amount of electricity. A ‘Solar System’ is when several solar modules are arranged systematically for large-scale power production.

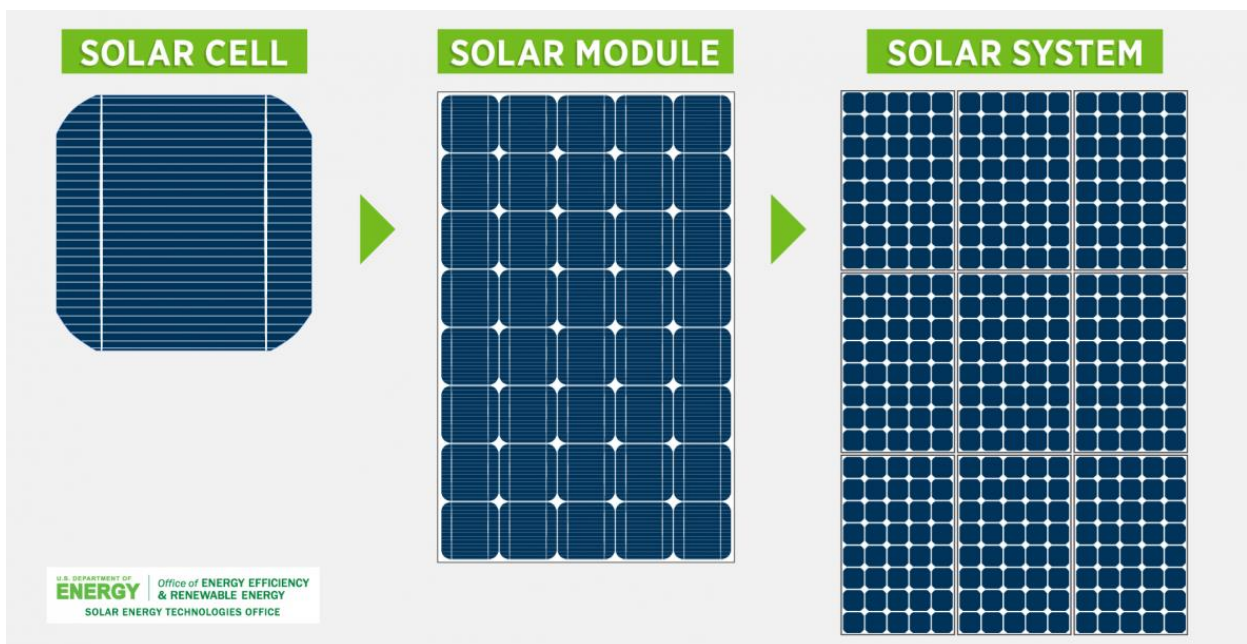


Figure (1)
Solar System²

For electricity generated by Solar systems to be utilized, it first must be connected to the regional electric grid. Once the solar system is connected to the electric grid it can then be distributed to consumers. This is achieved by constructing a solar power plant with the use of a solar panels, in which the quantity and arrangement of solar modules is determined from the electrical system

² Picture from the official website of ‘Office of Energy Efficiency & Renewable Energy’

design of the plant and is then connected to the regional electric grid for distribution to the consumer.

2.1 Solar Power Plant

A Solar Power plant is an electric power plant constructed for generating electric power using solar modules. A Solar Power Plant consists of a solar system and the other associated electrical and plant equipment for transmitting the energy generated.

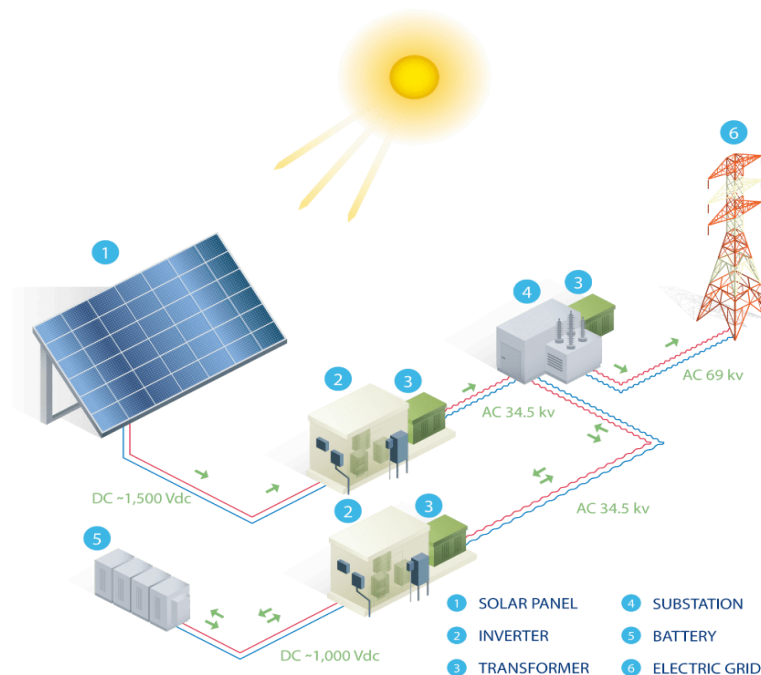


Figure (2)
A Solar Power Plant³

Some of the commonly seen equipment in a solar power plant are,

- i) Solar Modules
- ii) Inverters,
- iii) Batteries
- iv) Power transformer,
- v) High voltage Circuit breakers, Fuses and Other protection equipment
- vi) Utility Metering equipment
- vii) Electrical Conductors &
- viii) Steel & Concrete structures,

³ Image found from [industrial-on-grid-scheme.png \(1600×1546\) \(avenston.com\)](https://www.avenston.com)

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A Solar Power plant, constructed by a private entity, after making Power Purchase Agreements (PPA) with the local Electric Power grid to supply electric power, is known as a ‘Merchant Electric Solar Power Plant’.

2.2 Role of Solar Modules

As stated earlier a Solar Module which is ‘Photovoltaic’, uses ‘Photons’ that are absorbed from sunlight to then produce electric power. This electric power is unidirectional in nature and requires additional equipment such as Inverters and Transformers for Electric Power Utilization.

Besides the additional equipment, the Solar modules are manufactured with the ability to track the sun to increase their efficiency.



Picture (3)
Solar Modules Installed on Farmland⁴

2.3 Role of Inverters

The power produced by a solar system, because of its basic principle of operation, is unidirectional and is in the form of Direct Current or in short, DC. This form of DC Power is not

⁴ Refer to PV magazine [Molong Solar Farm no longer in development, successfully energised – pv magazine Australia \(pv-magazine-australia.com\)](http://pv-magazine-australia.com)

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suitable for utilization. The DC power should be converted to Alternating current, AC for utilization.

A 'Solar inverter' or a 'PV inverter' is a power electronic device which converts the DC Power generated by the Solar system, into AC Power. This AC Power is then transmitted to the electrical grid for power distribution.



Picture (4)
Industrial Solar Inverter⁵

2.4 Role of Batteries

As a Solar system can produce electric power only when the sunlight is available. It is because of this drawback a Solar power plant cannot produce electricity during night. In order to overcome this drawback Solar power plants are installed with batteries so that some portion of electricity produced by the solar modules during the day is stored in the batteries and retrieved during night.

The Solar Modules and the Batteries function on DC. A proper combination of Solar Modules and

⁵ Refer to PV magazine [SMA reaches 10 GW of installed Sunny Central inverters in North America – pv magazine USA \(pv-magazine-usa.com\)](https://www.pv-magazine.com)

Batteries can produce electricity all day long.



Picture (5)
GE Industrial Battery⁶

2.5 Role of Transformers and Other associated switchyard equipment

A Transformer is an electrical power equipment which is used either to step-up or to step-down the voltage of an electrical power source without changing the frequency of the voltage. A Transformer is an AC power equipment.

In a Solar Power plant, the power produced by the solar modules is converted into the useful form of AC by Inverters. The AC Power produced by inverters are at a relatively lower voltage compared to the voltage available at the electric power grid. A Transformer, which can step-up the voltage to match it with the grid, is used to overcome the difference in voltages and to establish an interconnection for the supply of power.

In a large Solar Power plant, every Inverter is installed with a Transformer locally to the inverter, to step-up the voltage to a medium level, other than the voltage available at the grid. This is done

⁶ Refer to PV magazine [GE to supply 100 MW/300 MWh battery for South Australia solar farm – pv magazine International \(pv-magazine.com\)](https://www.pv-magazine.com)

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to form a network of Transformers to collect the power coming from each Inverter.

This Electric network of transformers will have one high-capacity Main Transformer, which does the final step-up for the connection with the grid.

Besides the Transformers, Solar Power plants are installed with some other electrical equipment like,

- i) Electric Switchgear
- ii) Electric Bus system
- iii) Electric Protection system &
- iv) Electric Energy measurement system

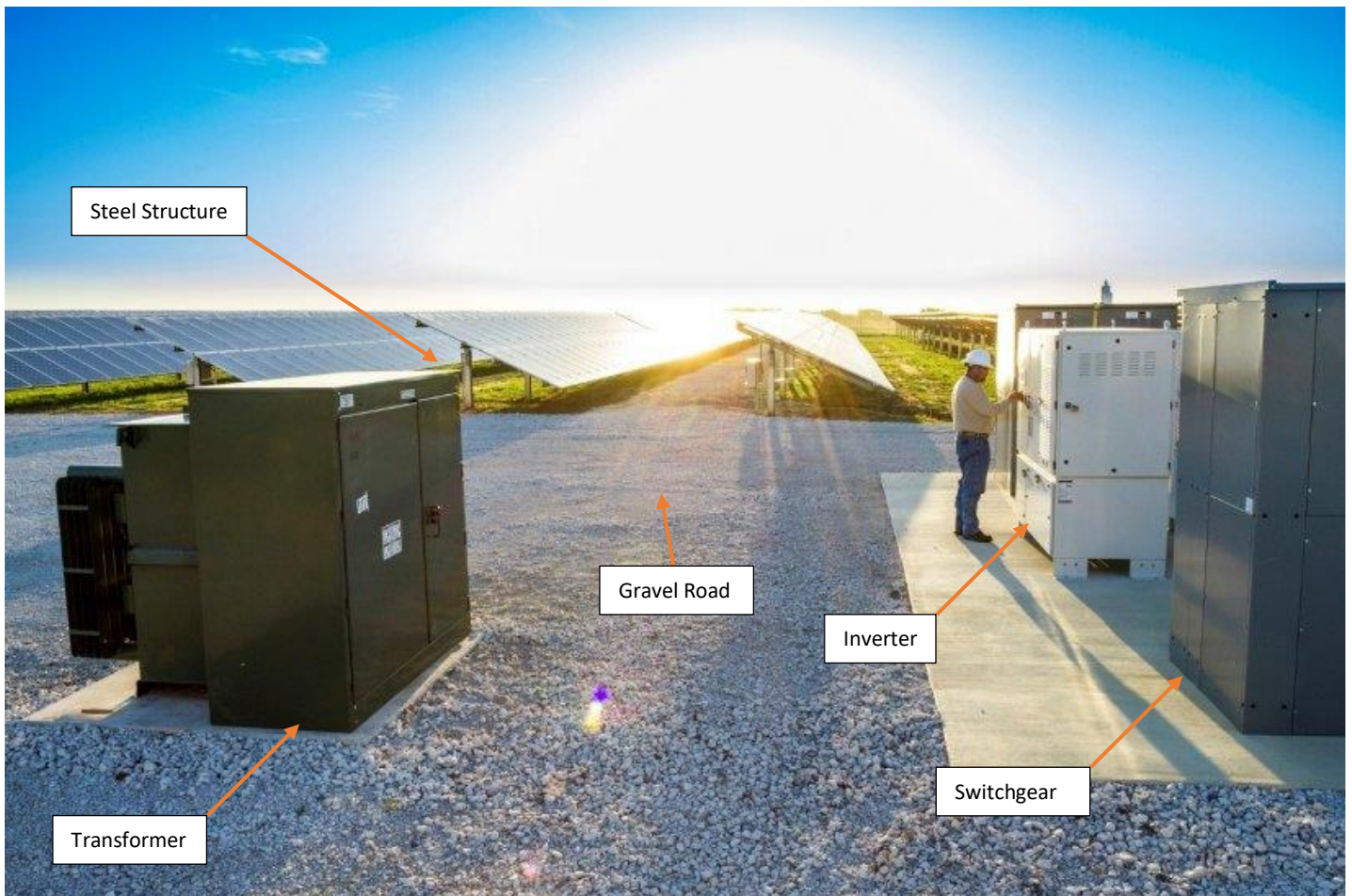


Picture (6) Substation Transformer⁷

⁷ Image found from the following website [Transformer substation THE TRENT - The Trent \(thetrentonline.com\)](http://thetrentonline.com)

2.6 Role of Steel & Concrete Structures, Roadways & Fencing

Steel & Concrete structures are necessary structures for the installation of solar modules and all other necessary electrical equipment. Roadways provide access to the modules for site personnel for work to be completed for maintenance and general site operation. Fencing is installed at solar facilities to determine the boundary of the facility, safety, as well as controlling who has access to the facility.



Picture (7)
Steel & Concrete Structures of a 2MW Solar farm⁸

⁸ Image found from the following website
<https://www.energy.gov/eere/solar/solar-integration-inverters-and-grid-services-basics>

2.7 General Effects of Solar Power Plants

2.7.1 Noise from the Equipment

In a Solar power plant, the Solar Inverters and the Power Transformers are the main sources of noise. The cooling fans mounted on the Inverters and the Transformers are responsible for the majority of the noise. However, the noise produced by this equipment are effective only in the vicinity of the equipment and decay with the distance. When this equipment is located appropriately in the plant the effect of noise can be minimized.

2.7.2 Increased Road Traffic, Noise and Fugitive dust

The Solar Powerplant is a plant with stationary equipment producing energy based on the photovoltaic effect. There will not be any transportation of raw material or the plant wastage for the Solar power plant. Hence, Solar power plants do not increase the Traffic, Noise and Fugitive dust during the operation. However, during construction there will be considerable traffic of construction vehicles transporting the equipment of the plant. Necessary mitigation measures must be taken to avoid traffic congestion, Noise and Fugitive dust during the construction of the Solar Power plant

2.7.3 Environmental and Wildlife

Solar energy systems/power plants do not produce air pollution or greenhouse gases. In fact, solar energy consumption can have a positive indirect effect on the environment and reduces the use of other energy sources that have larger effects on the environment. However, some toxic materials and chemicals are used to make the photovoltaic (PV) cells of the Solar modules.

There has been a relatively low number of studies that have been done on how solar facilities affect wildlife. However, the following methods can be adopted to minimize the impact of Solar power plants on wildlife⁹,

- i) Avoid areas of high native biodiversity and high-quality natural communities
- ii) Allow for wildlife connectivity, now and in the face of climate change
- iii) Preferentially use disturbed or degraded lands
- iv) Protect water quality and avoid erosion
- v) Restore native vegetation and grasslands

⁹ Making Solar Wildlife-Friendly

Creating solutions to maximize conservation benefit from solar production

<https://www.nature.org/en-us/about-us/where-we-work/united-states/north-carolina/stories-in-north-carolina/making-solar-wildlife-friendly/>

- vi) Provide wildlife habitat

2.7.4 Farming land

One of the biggest concerns with solar farms built on farmland is the effects they will have on the land once all the panels and associated equipment are removed from the site, as well the effect on local wildlife species and the ability for the land to be used with domesticated animals.

The land occupying a solar farm can be reverted to agricultural uses once the project has reached the end of its operational life. The life of a solar installation is roughly 20-25 years and can provide a recovery period, increasing the value of that land for agriculture in the future. Giving soil rest can also maintain soil quality and contribute to the biodiversity of agricultural land.¹⁰

Silicon-based photovoltaic cells (PV) are the type of PV cells commonly used. Most solar panels are manufactured with a glass front that protects the PV cell as well as either a aluminum or steel frame. Research shows that traces metals leaching from solar modules is unlikely to present a significant risk due to the sealed nature of the PV cells. Some manufacturers use cadmium telluride (CdTe). Cadmium compounds are toxic, but studies show that these compounds cannot be emitted from CdTe modules during normal operation or even during fires. Industrial incineration temperatures, which are higher than grassfires, are required to release the compounds from the modules.¹¹

During the Plant operation, Solar farms can be used to graze domestic animals such as sheep, which are commonly used to control vegetation at the facility as they do not climb on or damage the PV modules. It is not necessary to raise the PV modules in height to accommodate grazing as vegetation is accessible beneath the modules at the standard mounting heights. When sheep are used for grazing to control vegetation growth it can benefit local shepherds, the solar operators, and the land due to a reduction in mowing, herbicide, and other management needs. Cattle grazing is generally not compatible with PV facilities due to the risk of damage to the modules. Wild animals can graze under PV modules; however, security fences can be installed to increase the security of the facility as well as keeping out larger animals if they are deemed to be a damage risk to the modules. Fencing can be built to accommodate smaller animals such as foxes. The areas below the PV modules can be built to provide a habitat and forage to pollinators, birds, and other small species.¹²

¹⁰ Farmer's Guide to Going Solar <https://www.energy.gov/eere/solar/farmers-guide-going-solar>

¹¹ Farmer's Guide to Going Solar <https://www.energy.gov/eere/solar/farmers-guide-going-solar>

¹² Farmer's Guide to Going Solar <https://www.energy.gov/eere/solar/farmers-guide-going-solar>

3 Golden Solar – Application Review & Findings

The present document, as mentioned in the previous sections, is the final report created after reviewing the application documents submitted by the applicant, Golden Solar, LLC.

In this section, a detailed discussion is made on the Initial review, Site visit and the Final review from Wells Engineering.

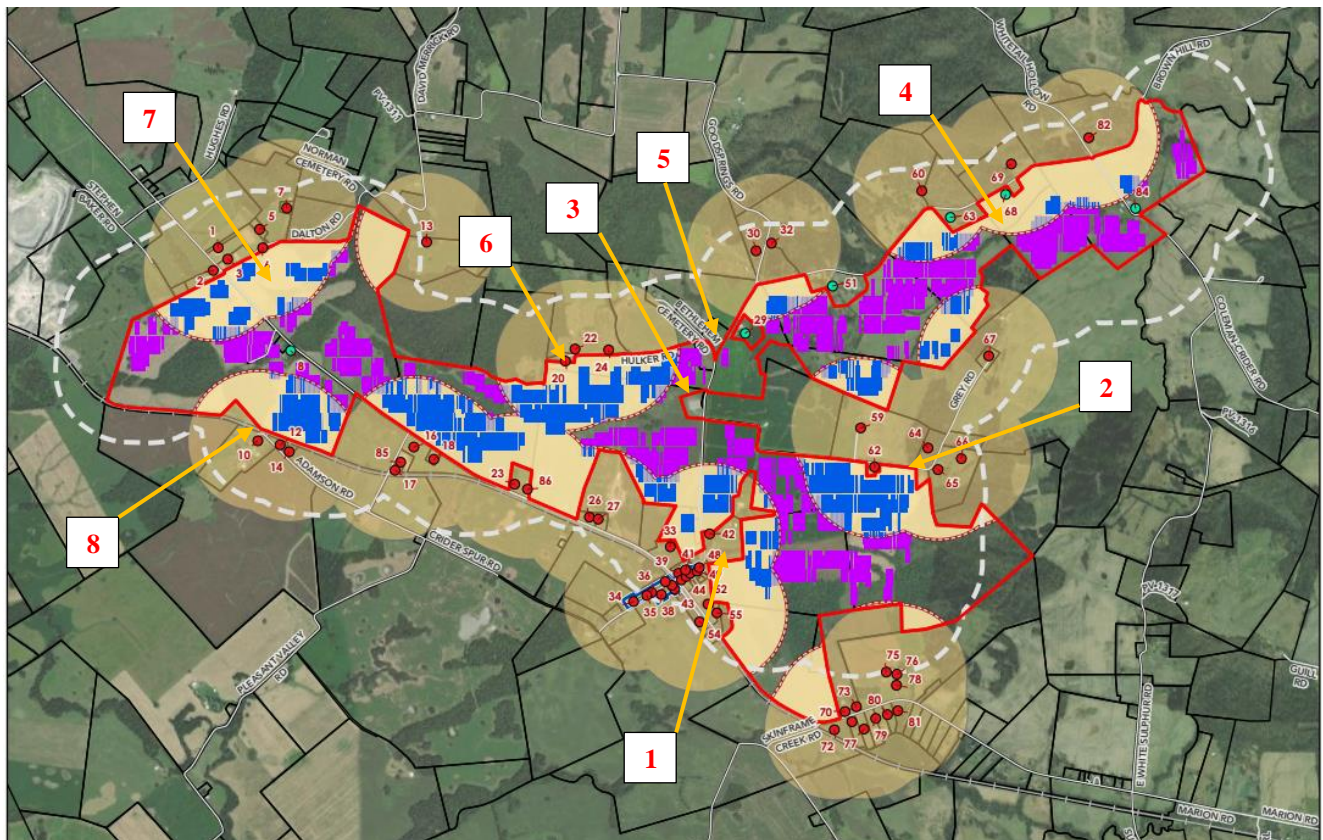
3.1 Initial Review

Wells Engineering and its Consultants working on the Siting Project review the applicant document for their adequacy, as part of the requirements of the state order for the applicant's Case No. 2020-00243. After the initial review of the application documents, a list of statements was submitted from First and Second Requests for Information

3.2 Site Visit

As part of the requirements of the state order, for the applicant's Case No. 2020-00243, Wells Engineering, made a visit to site as organized by the Siting board, on October 20th, 2022.

The locations visited are indicated on the picture below Reference Picture (8).



Picture (8) Golden Solar Site Visit Locations

Pictures from the site visit are shown in the following pages.



Picture (9) Location #1 (Looking North)



Picture (10) Location #1 (Looking South)



Picture (11) Location #2 (Looking South)



Picture (12) Location #3 Existing Substation on Goodsprings Rd



Picture (13) Location #3 Goodsprings Rd & Grey Rd



Picture (14) Location #4 Coleman Crider Rd



Picture (15) Location #4 Participating property on Coleman Crider Rd



Picture (16) Location #4 Participating property on Coleman Crider Rd



Picture (17) Location #5 Bethlehem Cemetery, Bethlehem Cemetery Rd



Picture (18) Location #5 Hulker Rd & Bethlehem Cemetery Rd



Picture (19) Location #6 Non-participating property on Hulker Rd



Picture (20) Location #7 Marion Rd



Picture (21) Location #8 Adamson Rd (Looking East)

3.3 Final Review

In this section a detailed discussion is made on the major aspects of the application documents submitted for their compliance as per the statutes KRS 278.706, 708 & 710

3.3.1 Review of Application documents

Accordant with KRS 278.706 the applicant, Golden Solar LLC, submitted the application documents and a Site Assessment Report addressing the compliances on different requirements of KRS 278.708.

As per KRS 278.708(3) the Site Assessment Report shall include the following

- (a) A description of the proposed facility that shall include a proposed site development plan that describes:
 - 1) Surrounding land uses for residential, commercial, agricultural, and recreational purposes.
 - 2) The legal boundaries of the proposed site.
 - 3) Proposed access control to the site.
 - 4) The location of facility buildings, transmission lines, and other structures.
 - 5) Location and use of accessways, internal roads, and railways.
 - 6) Existing or proposed utilities to service the facility.
 - 7) Compliance with applicable setback requirements as provided under KRS 278.704(2), (3), (4), or (5).
 - 8) Evaluation of the noise levels expected to be produced by the facility.
- (b) An evaluation of the compatibility of the facility with scenic surroundings.
- (c) The potential changes in property values and land use resulting from the siting, construction, and operation of the proposed facility for property owners adjacent to the facility.
- (d) Evaluation of anticipated peak and average noise levels associated with the facility's construction and operation at the property boundary.
- (e) The impact of the facility's operation on road and rail traffic to and within the facility, including anticipated levels of fugitive dust created by the traffic and any anticipated degradation of roads and lands in the vicinity of the facility.

As per KRS 278.710(1)(c) the 'Economic Impact of the facility' is studied for granting a Construction Certificate.

3.3.2 278.708(3)(a)(1) Surrounding Land Uses

Wells Engineering reviewed the Site Layout and maps submitted by the applicant and visited site on October 20th, 2022. The findings after the site visit are discussed below.

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Findings on the Site Layouts & maps

- 1) Underground communication lines should be identified at the time of construction.
- 2) Bethlehem Cemetery should be easily accessible

3.3.3 278.708(3)(a)(2) Legal Boundaries

The documentation on the legal description of the land was found to be adequate as part of the application. However, any discrepancy identified at any stage of the project shall be brought to the attention of the Public Service commission and resolved for legal compliance.

3.3.4 278.708(3)(a)(3) Proposed Access Control

As per the KRS requirements KRS 278.708 (3)(a)(3), the applicant has proposed the access control methods that are adopted for the site.

Finding on Proposed Access Control:

- 1) At the time of construction and operation of the plant, besides providing fencing (as proposed by the applicant), all necessary signage, caution boards and safety requirements as per OSHA shall be installed.

3.3.5 278.708(3)(a)(4) Location of Facility Buildings & Transmission Lines

After reviewing the Site Layout and other plans submitted by the applicant and after visiting the site, the following findings were made.

Findings on Location of Facility Buildings and Transmission lines.

- 1) Existing Electric services:
Any new power line should be clear of the existing electric service line, power pole and guy wire. Reference Pictures (9), (10), (12), (15), (16) & (20) .
- 2) The Substation will need oil containment for the Transformer to prevent any leakage of oil into nearby bodies of water.
- 3) The location has an Electrical Substation in the vicinity of the proposed substation area, which will make the interconnection into the power grid much easier. Reference Picture (12).
- 4) The Substation and the Operator building should be protected against entry of unauthorized personnel.

3.3.6 278.708(3)(a)(5) Location and Use of Accessways, Internal Road & Railways

As part of the site visit, major access points are visited, and the following findings were made.

Findings on Location and Use of Accessways, Internal Road & Road

- 1) The internal roads are proposed to be all-weather gravel.

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- 2) Rail roads are not applicable to the site. Rail transportation may be used at the time of construction.
- 3) Avoid using Oversize trailers for material transport and limit the overall weight as per the bridges and culverts of the Road. Install new culverts if necessary. Reference Picture (13) & (22).



Picture (22) Culvert on Grey Rd

3.3.7 278.708(3)(a)(6) Existing or Proposed Utilities to Service the Facility

After reviewing the plot plans submitted by the applicant, it was found that the drawings do not indicate the utilities to the Operation & Maintenance building of the plant, as the drawings are prepared as preliminary. The applicant has not indicated if water, internet, or phone connection will be provided to the site. As applicable, there should be necessary drawings created indicating all underground, overhead utilities required to site at the time of construction.

3.3.8 278.708(3)(a)(7) Compliance with Applicable setback requirements

The KRS required setback is 2000 feet. This setback is practical for turbine-based plants but not practical for a solar power plant. After reviewing the application documents, Layouts & Maps, it was found that the following setback distances are followed,

- 200' Panel Setback from Residence
- 450' Inverter Setback from Residence

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3.3.9 278.708(3)(a)(8); (b); (d) & (e) Evaluation of Noise levels, Scenic surroundings, Environmental impact & Fugitive Dust

Wells Engineering has appointed Thomas Chaney for the Environmental Assessment of site for Noise, Scenic surroundings, historic and archeological, Environmental & Fugitive dust. The summary of review is as below,

“Based on a review of The Golden Solar Project Site Assessment Report, by W. Thomas Chaney of Cloverlake Consulting, all of the report is in compliance with the intent of KRS 278.708.”

However, it was noticed that there are three areas where additional information/analysis may be needed.

These suggested measures are:

- Historic Resources-In particular a discussion of the impact of the project on historic buildings and cemeteries. The response to the first set of questions stated that an Archeologic Survey will be completed by the end of 2022. The Commission should hold the applicant accountable for this commitment.
- A plan to mitigate construction noise caused by pile driving including on-site barriers and construction schedules should be filed with the Siting Board 30 days prior to the beginning of construction. The application documents indicate this will be done.
- Addressing impacts on endangered species that might result from the project and a requirement to get Federal Permit(s) (Army Corps of Engineers, etc.).

Reference Attachment-B for complete report from Cloverlake Consulting.

3.3.10 278.708(3)(c) Property Values

Wells Engineering has appointed Clark Toleman for the assessment of the Application document for the impact on Property Values. The conclusion is described below.

Conclusion: “The evidence presented in this impact study including the paired sales is a strong indicator that proximity to a solar farm in this Caldwell County location will have a neutral impact on the adjoining property value when the set back and buffer screening is in place The proposed solar farm is a passive entity without the recognized nuisance characteristics if noise, traffic, odor, or other typical stigma considered to create a detrimental effect.”

Reference the Attachment-C for complete report from, E. Clark Toleman MAI, SRA.

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3.3.11 278.710(1)(c) Economic Impact Analysis

Economic Impact Analysis was performed by Mark Watters, as contracted by Wells Engineering, for the Site Assessment.

Summary: "Based upon the representations of the Applicant through its Economic Impact Analysis and Responses to the Siting Board's Requests for Information, there is a significant, short-term initial economic to both the Commonwealth of Kentucky and the Caldwell County region. During the longer operational (generation) phase, there are lesser-but-positive economic regional impacts."

Reference the Attachment-D for complete report from Mark M. Watters.

4 Recommendations & Mitigations Measures

After reviewing the application documents and performing the site visit, Wells Engineering provides the following Recommendations & Mitigation measures.

1. Create a Site Survey Map indicating the property boundaries. This will be a good reference for the current and future needs of the project.
2. Create an over-all plot plan indicating all water bodies, bridges, culverts, access roads, power lines, residential and public structures, etc.
3. For locating the Solar Modules and Other associated equipment of the plant maintain sufficient clearance from the existing power lines
4. Construct new bridges or culverts wherever necessary for equipment transportation.
5. Adhere to the setback distance at all locations as per guidelines from the local planning zone authority. If no ordinances are in place, apply for a deviation to the KRS 276.706(2)(e)
6. Setbacks for solar equipment from roads and property lines, with increased setbacks for certain equipment. Security fencing, and vegetative buffer shall not be subject to setback restrictions.
7. Leaving existing vegetation between solar equipment and neighboring residences in place, to the extent practicable, to help screen the Project and reduce the visual impact
8. Notices to neighbors regarding potential construction and operation noises, as well as limits on working hours during the construction period, as described in the Application.
9. Fugitive Dust and PM10(Coarse particles)
Coarse (bigger) particles, called PM10, can irritate your eyes, nose, and throat. Dust from roads, farms, dry riverbeds, construction sites, and mines are types of PM10. The applicant will submit in writing the specific plan to control fugitive dust and PM 10 during the construction process ten days prior to commencing construction.
10. Protection of Water Resources in the Project Area
Ten days prior to the commencement of construction, the Applicant will provide a detailed plan on how they will protect water resources in the project area. The site assessment documents in several locations say that certain mitigation measures regarding erosion and protection of water resources “may” be carried out. This needs to be clearly specified. The primary focus should be on preventing turbidity from being added to local streams because of erosion during construction.

4.1 Cumulative effect of the Total Solar generation on the Grid

Solar developments are rapidly increasing and while the impact to the surrounding environment might be minimal, the combined or cumulative effects of multiple developments may have a greater impact. Environmental concerns due to cumulative impacts, such as Glint, Glare and emission are expected to grow.

Solar Generation Siting Final Report

Golden Solar, LLC

KY State Board on Electric Generation and Transmission Siting

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The proposed project would create air emissions due to vehicle and dust emissions associated with development activities. Similar effects would be experienced during decommissioning, which would be carried out according to the project's restoration plan.

Generating electricity using solar rather than fossil fuels reduces greenhouse gas emissions and helps address climate change. While solar energy is preferable to fossil fuel generators from an emissions perspective, power output from solar energy sources depends on variable natural resources, which makes these plants more difficult to control and presents challenges for grid operators.

As the electricity from solar energy can be produced only during daytime, the Solar Power projects have the inherent risk of unavailability during nighttime. The utilities and the transmission planning authorities shall identify the risks associated with this and plan the intake of the energy from Solar plants effectively.

To accurately balance electricity supply and demand on the power grid, grid operators must understand how much solar energy is being generated at any given time, how much solar energy generation is expected, and how to respond to changing generation. This can be challenging for grid operators due to the intermittent nature of solar energy and the wide variety in the size and locations of solar energy across the power grid. As the proportion of solar energy capacity on the grid increases, these issues are becoming increasingly important to understand renewables connect to the grid, how these connections impact grid operations, and implications of a high penetration of renewables for the grid in the future.

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Golden Solar, LLC

KY State Board on Electric Generation and Transmission Siting

Case #2020-00243



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ATTACHMENT A



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Golden Solar-Adequacy of the Applicants Site Assessment Report

**Developed for Wells Engineering and the Kentucky Public Service Commission-
State Board on Electric Generation and Transmission Siting**

By Cloverlake Consulting, W. Thomas Chaney, President

November 28, 2022



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Cloverlake Consulting November 28, 2022

**On Behalf of Wells Engineering, Florence, Kentucky For the Golden
Solar Project Kentucky State Board on Electric Generation and
Transmission Siting, Kentucky Public Service Commission**

1. Description of the Proposed Site

Golden Solar, LLC (Golden Solar), a wholly owned subsidiary of National Grid Renewables Development, LLC, is proposing to construct the Golden Solar Facility (Project), which will be an up to 100-megawatt (MWac) alternating current photovoltaic electricity generation facility. Project facilities will include solar modules, inverters, tracking racking, fencing, access roads, a substation, a switchyard, an operations and maintenance (O&M) building and facilities, below-and/or above-ground electrical collection lines, up to eight weather stations (up to 15 feet tall), and temporary construction laydown yards. The Project will be located on approximately 1,870 combined acres in Caldwell County between the towns of Fredonia and Princeton. No street address has been established at this time for the Project; the coordinates for the location are 37.16879°N and 87.98105°W. For interconnection, Golden Solar, LLC will construct a substation to connect at the North Princeton Switching Station owned by Louisville Gas and Electric Company and Kentucky Utilities Company (LG&E/KU). The Project substation will be located within the Project boundary, and an overhead generator tie line of approximately 300 feet in length will connect it to the point of interconnection. The solar panels will be mounted on a racking system, which provides a foundation for the panels and supports them aboveground on pile-driven piers. This racking system has a minor footprint, and concrete foundations are unlikely to be required, resulting in low impact to the area beneath the panels. Final geotechnical studies will identify any possible deviations from standard pile driving conditions. Rainfall will run off the panels onto the ground surrounding the panels, which will be vegetated with herbaceous plants and provide infiltration into the groundwater. The electricity generation facility will be surrounded by a 6-foot-tall fence topped with barbed and/or smooth wire for security that meets National Electrical Code Article 110. Outside of the fence, trees and shrubs will be planted as screens in areas where the panels are adjacent to residences or other sensitive areas that could experience visual impacts from the panels and associated infrastructure and existing vegetation is an inadequate screen. Vegetative buffers will consist of

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deciduous and evergreen trees and shrubs, as described in Section 2.2.1 of the Application. A wetland delineation report was completed for the Project area (Attachment G to the Application). Additionally, a Phase I Environmental Site Assessment was conducted on the Project area at two different times, so there are two Phase I Environmental Site Assessment documents (Attachment H of the Application). A Karst Survey (Attachment I to the Application) was also conducted on the majority of the Project area. These reports have been incorporated into the site plan design. 1.2.2 Site Plan Details of Project Documents.

The following list provides site plan details pursuant to the requirements in KRS 278.708(3)(a):

1. Current land use was assessed within the proposed Project boundary. Approximately 75% percent of the land within the Project boundary is currently used for agriculture. A detailed breakdown of land cover was obtained using data from the National Land Cover Database by the applicant.

(Table 1). Attachment A, Figure 1 shows the land cover types within and surrounding the Project boundary.

Table 1 Land Cover within the Study Area -Source: NLCD 2016

Land Cover Category	Type	Acreage	Portion of Project Area
Agriculture	Cultivated Crops	1,013.1	58%
	Pasture/Hay	286.3	16%
	Developed Open Space	73.8	4%
	Forested		
	Deciduous Forest	356.1	20%
	Evergreen Forest	16.8	1%
	Mixed Forest	1.4	Less than 1%
	Grassland-Herbaceous	12.8	Less than 1%
	Wetland-Open Water	1.0	Less than 1%

Note: Land cover data are based on Geographic Information System data which may not match the total Project area and creates small variations in area calculations as a result.

2. The legal boundaries of the proposed site are shown in Exhibit I in the application, Application Figures.

3. The proposed facility access control is displayed in Exhibit J, Sheet C.700 of the application. A locked gate will secure the access points during operation.

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4. The locations of solar panels, the Project substation, and other structures are presented in Exhibit J, Sheets C.200-201. A description of the Project structures is included in Exhibit B and in Exhibit J, Sheet C.700 of the application.

5. The proposed locations of access ways and internal roads are presented in Exhibit J, Sheets 200-201. Approximately 39,072 feet (7.4 miles) of graveled access roads will be installed in 48 segments of 400 to 500 feet in length. The Project may use railways for construction deliveries, but the use of specific railways is to be determined.

6. For interconnection, Golden Solar, LLC will construct a Project substation to connect to the North Princeton Switching Station owned by LG&E/KU. The Project substation will be located within the Project area and will have an approximately 300-foot-long generator tie line to the point of interconnect.

7. Caldwell County does not have zoning or setback requirements that Golden Solar is required to follow. Project facilities and structures meet the KRS 278.704(2) 2000-foot setback requirement for schools, hospitals, and nursing home facilities. Golden Solar will request a setback deviation from any residential neighborhood within 2000 feet.

8. The report in Attachment B of the Application and Section 4 details anticipated sound emissions from the facility during construction and operation.

Evaluation of the Adequacy of this section of the Site Assessment: This part of the application meets the requirements of the application process.

2.1 Requirement KRS 278.708(3)(b): Evaluate the facility's compatibility with scenic surroundings.

2.2 Compliance

2.2.1 Facility Compatibility: Screening Sections of the proposed Project boundary will be adjacent to roadways and other properties. Golden Solar will provide screening to mitigate potential visual impacts to the landowners' property. If a vegetation buffer is not already present between the Project boundary and adjacent residential structures, one will be planted. The types of vegetation used in screening will vary due to differences in topography, soils, sun exposure, and other factors. It is important to recognize which plants are appropriate not only for a region but also for a specific site or area. This landscape plan proposes to utilize native landscape material that will be adapted to the climate of this region. The primary intent is to provide visual relief in order to break up the lines of the infrastructure and enhance the overall aesthetics of the Project. Existing landscaping and vegetation along roadways, property lines,

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and fence rows should be maintained where possible. It is important to note that the plans will not provide 100 percent screening or visual obstruction of the Project. The primary intent is to provide visual relief in order to break up the lines of the infrastructure and enhance the overall aesthetics of the Project. To increase screening effectiveness, Golden Solar will use evergreen species such as American Holly, Eastern Red Cedar, Virginia Pine, or other appropriate native or non-invasive species. Deciduous trees and shrubs will also be used in conjunction with the evergreen species. Examples of typical planting concept plans are included below in Insets 1 and 2 in the Application. The majority of the plantings will be Type 1, which is a mix of evergreen and deciduous species. A Type 2 planting, which is primarily evergreen trees, will be planted near the residential neighborhood on Goodsprings Road to provide a denser buffer for this group of residences. An estimated 32 buffers are planned, each ranging from 100 feet to 2,350 feet in length (total length of proposed screening is 21,832 feet). The majority of buffers will be planted along the Project perimeter, with a smaller proportion within the Project area. The site plan in Exhibit J shows where these buffer additions are planned (Sheet C.200-201). The trees and shrubs will be planted at a height of 3 and 2 feet and are anticipated to reach a height of 15-30 feet and 8-18 feet at maturity, respectively. Vegetation screening details are included in Exhibit J, Sheet L.100. The screening plan is preliminary and is subject to change. The plan will be finalized prior to construction based on actual field conditions, including the consideration of residential home line-of-sight observations. See inset 1 and 2 in the Application.

Evaluation of the Adequacy of this section of the Site Assessment: This part of the application meets the requirements of the application process.

2.2.2 Facility Compatibility: Glare and Decommissioning Additionally, a Glare Report (Attachment C) was prepared for the Project and found no impact to sensitive receptors from glare associated with facility infrastructure. Golden Solar will place security lighting at main entrances that are downlit; this lighting will be manually controlled, and motion activated. In addition, lights at each inverter will be switch controlled for repair purposes. Given that adjacent property values are not anticipated to be impacted by the siting of the solar facility (Attachment D), implementation of vegetative screening buffers, and compliance with all regulatory requirements, the Project is compatible with the scenic surroundings. At the end of the Project's life, Golden Solar will decommission the solar facility and return the land to its previous condition. Golden Solar has prepared a decommissioning methodology (Attachment E) that describes how the facility will be properly decommissioned.

2.2.3 Public Communication

The Project website (available at <https://nationalgridrenewables.com/Golden/>) provided the public with details on how to attend the public information meeting, a map showing the Project area, aerial imagery, parcel numbers for all participating properties in Golden Solar, the opportunity to submit

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questions and comments regarding the Project, a summary of frequently asked questions and responses, and instructions on how to request more information. During the public information meeting (PIM) discussed in Exhibit C, if neighbors or participating landowners asked questions about scenic impact, the applicant described the proposed screening plan. Contact information was provided at the PIM for follow up from participants

Evaluation of the Adequacy of this section of the Site Assessment: This part of the application meets the requirements of the application process.

3.1 Requirement KRS 278.708(3)(c): Analysis of the potential changes generated by the proposed facility siting, construction, and operation that would affect property values and land use for adjacent property owners

3.2 Compliance A Property Value Impact Report (Attachment D) prepared by a certified real estate appraiser discussed impacts to potential property values for landowners adjacent to the proposed facility. The report found that “properties surrounding other solar farms operating in compliance with regulatory standards will not be adversely affected in either short- or long-term periods.” The research notes that “considering all of the preceding, the data indicates that solar facilities do not have a negative impact on adjacent property values

Evaluation of the Adequacy of this section of the Site Assessment: This part of the application meets the requirements of the application process.

4.1 Requirement KRS 278.708(3)(d): Evaluation of anticipated peak and average levels of noise at the property boundary generated by the facility's construction and operation.

4.2 Compliance

Sound levels generated by facility construction and operations are discussed in the attached Sound Emission Assessment (Attachment B). In summary, sound generated during construction is expected to only occur during daylight hours and will be generated by heavy equipment, passenger cars and trucks, and tool use during assembly of the Project. Sound generated during Project operation will include sound from the motors on the solar panel tracking system, if used, and from the inverters. The brief and intermittent sound from the tracking system motors will be quiet and only barely perceptible from within the solar panel arrays themselves. Based on the preliminary design, the sound produced by the solar panel inverters during daytime operation will fall below even the nighttime EPA guideline of 45 A-weighted Decibel. At final design, Golden Solar commits to a maximum daytime sound level of 55 A-weighted Decibel and nighttime maximum of 45 A-weighted Decibel. The Sound Emissions Assessment concluded that “any adverse noise impact from the Project during operation is highly unlikely, if

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[Project] sound emissions are audible at all.” The amount of sound generated during construction will vary depending on the type of activities occurring on a given day. Grading equipment, bobcats, and other construction equipment typically emit sound levels of approximately 73 dBA at 200 feet (FHWA 2009). Sounds associated with these types of equipment will primarily occur during the initial site set up – grading and access road construction, which is expected to last approximately 10 weeks. It is anticipated that pile driving for rack support foundations will create the loudest sound (72 dBA at 200 feet, FHWA 2009). Installation of each rack support foundation takes between 30 seconds to 2 minutes, depending on soil conditions; the duration of the activity is anticipated to be 12 weeks across the entire Project. Finally, installation of the solar panels on the tracking racks will emit sound levels similar to general construction (72 dBA at 200 feet). Typically, a forklift is used to place individual panels on the tracking rack system. The sounds from all construction activities will dissipate with distance and will be audible at varying levels, depending on the locations of the equipment and receptors. Note that construction activities will be sequenced; site preparation may occur at a portion of the site while pile driving occurs at a different location. These sound impacts will be temporary and limited to daytime hours (dBA) inside of the proposed Project fencing in most cases.

Issues were raised in the first set of questions to the applicant regarding noise. These were adequately answered by the applicant in their response.

Evaluation of the Adequacy of this section of the Site Assessment: This part of the application meets the requirements of the application process.

5.1 Requirement

KRS 278.708 (3)(e); The anticipated impact on road and rail traffic by the facility's operation, including fugitive dust generated by the traffic and degradation of roads and lands within the vicinity of the facility.

5.2 Compliance

A report discussing the Project's anticipated impact on road and rail traffic levels, fugitive dust from traffic, and degradation of roads caused by Project-affiliated traffic is included in Attachment F of the Application. Railways may be used during construction for equipment deliveries but not during facility operations. The results of the report presented in Attachment F are summarized below.

During construction, the traffic volume will temporarily increase from the delivery of construction materials and personnel traveling to and from the Project. Appropriate signage and traffic directing will occur as necessary to increase driver safety and reduce risk of collisions for approaching traffic. Golden Solar will coordinate with the road authority to mitigate for any unanticipated damage to roadways. For

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facility O&M activities, a small maintenance crew will regularly drive through the area in pick-up trucks, but this activity will not impact traffic function.

Activities that disturb land during the construction of the Project may temporarily add airborne materials. To reduce the contribution of airborne materials, application of water and covering of spoils may occur. The use of water for dust control is authorized under the Kentucky Pollutant Discharge Elimination System as a non-stormwater discharge activity that is required for the Project.

The Fredonia Valley railroad track extends in a southeasterly direction along the northern Project border (<https://transportation.ky.gov/MultimodalFreight/Pages/Railroads.aspx>). Construction traffic will use the existing public roadway system to access the Project facilities. Railways may be used for deliveries during construction by vendors, such as those providing the main power transformers.

Evaluation of the Adequacy of this section of the Site Assessment: This part of the application meets the requirements of the application process.

6.1 Requirement

KRS 278.708(4): The site assessment report shall also suggest any mitigating measures to be implemented by the applicant to minimize or avoid adverse effects identified in the site assessment report; and KRS 278.708(6); The applicant shall be given the opportunity to present evidence to the board regarding any mitigation measures. As a condition of approval for an application to obtain a construction certificate, the board may require the implementation of any mitigation measures that the board deems appropriate.

6.2 Compliance Golden Solar will undertake a series of mitigation measures to avoid or minimize potential Project impacts, as outlined below in Table 2.

Table 2 Project Mitigation Measures Mitigation Measures

1. Golden Solar shall place panels no closer to residences than 200 feet and central inverters no closer to residences than 450 feet. Golden Solar shall place the substation no closer to residences than 1,000 feet.
2. Golden Solar shall leave existing vegetation between solar arrays and nearby roadways in place to the extent feasible.
3. Golden Solar shall implement a planting of evergreen and deciduous trees and shrubs as a visual buffer to mitigate visual viewshed concerns from adjacent residences where there is not adequate vegetation. To the extent an affected property owner indicates such buffer is not necessary, Golden Solar will obtain that property owner's written consent and submit such consent in writing to the Siting Board.

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4. Golden Solar shall cultivate at least two acres of native, pollinator-friendly species onsite.
5. Golden Solar shall place appropriate signage to warn potential trespassers. Golden Solar shall ensure site entrances and boundaries have adequate signage, particularly in areas visible to the public.
6. Golden Solar or its contractor shall control access to the site during construction and operation.
7. A fence surrounding the solar arrays shall be installed prior to operation. During construction, the property will be enclosed to the extent possible. The substation and switchyard shall have their own separate security fence installed in accordance with NESC standards.
8. Prior to construction, Golden Solar shall provide a finalized Emergency Response Plan to the local fire district, first responders, and any county emergency management agency. Golden Solar will provide site-specific training for local emergency responders at their request. Access for fire and emergency units will be set up after consultations with local authorities.
9. Prior to commencing construction, Golden Solar shall develop a traffic management plan for operation and construction to minimize the impacts of any traffic and keep roadways safe during construction
10. Golden Solar shall use appropriate signage and traffic signaling as needed to aid construction traffic and prevent severe traffic issues.
11. Golden Solar's construction activity, process, and deliveries shall be limited to 8 am to 6 pm Monday through Saturday. In the case of inclement weather, Sundays may be used as make-up days.
12. Golden Solar shall limit pile driving within 1,000 feet of a residence to 9 am-5 pm Monday-Friday
13. Golden Solar's non-noise creating on-site construction activities shall be limited to 6 am to 10 pm, Monday through Sunday. These would include field visits, arrival, departure, planning meetings, mowing, surveying, etc.
14. Golden Solar shall inform and obtain permits from State and local road authorities before bringing oversized or overweight loads onto state or country roads in the vicinity.
15. Golden Solar shall fix or fully compensate the appropriate transportation authorities for damage or degradation to roads or bridges that it causes or to which it materially contributes in compliance with any agreements or permits.

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16. Golden Solar shall properly maintain construction equipment and follow best management practices related to fugitive dust throughout the construction process, including use of water trucks. Dust impacts shall be kept at a minimal level. The Siting Board requires Golden Solar's compliance with 401 KAR 63:010.

17. Golden Solar shall notify residents and businesses within 1,500 feet of the Project boundary about the construction plan, noise potential, and mitigation plans at least 30 days prior to construction commencement.

18. Golden Solar shall respond to any noise-related complaints from residents adjacent to the Project boundary and work with those residents to reduce noise-related concerns through careful scheduling or other means to the extent feasible.

19. Golden Solar shall implement ridesharing between construction workers when feasible, use appropriate traffic controls or allow flexible working hours outside of peak hours to minimize any potential delays during AM and PM peak hours.

20. To the extent Golden Solar retires and decommissions the solar facility without any subsequent plans to repower the facility, Golden Solar shall decommission the entire site and restore the land consistent with lease agreements after the Project has served its useful life. With respect to those assets or equipment that cannot be salvaged, Golden Solar or its successors shall recycle or dispose of those assets or equipment in an environmentally appropriate and compliant manner.

21. Golden Solar shall submit a formal decommissioning plan and cost estimate to Caldwell County and the Siting Board prior to operation. Golden Solar shall provide the County a financial surety equal to the amount necessary to effectuate the formal decommissioning plan, minus salvage value. The financial surety amount shall be reviewed every five years at Golden Solar's expense to determine and update the cost of decommissioning.

22. Golden Solar will submit a final site layout plan to the Siting Board upon completion of the final site design. Changes from the preliminary site layout will be clearly indicated on the final layout graphic. Those changes could include, but are not limited to, the location of solar panels, inverters, transformers, substations, operation and maintenance building, transmission line route, or other Project facilities and infrastructure.

23. Golden Solar will submit to the Siting Board for review any change in the Project boundaries from those referenced in the final order in this proceeding.

24. The Siting Board and the Caldwell County Fiscal Court shall be notified in writing of any (a) abandonment of the Project or (b) acquisition or transfer of ownership, control, or the right to control

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the Project (whether by sale of assets, transfer of stock, or otherwise). The notice shall update the environmental compliance history provided in Caldwell Solar's application pursuant to KRS 278.706(2)(i).

25. Golden Solar shall comply with all applicable conditions relating to solar interconnection with utilities. Golden Solar shall also accept responsibility for appropriate costs which may result from its interconnecting with the electricity transmission grid, consistent with the obligations imposed by KRS 278.212.

26. Golden Solar shall implement a Complaint Resolution Program to address any complaints from surrounding landowners. Golden Solar shall also submit annually a status report associated with its Complaint Resolution Program, providing, among other things, the individual complaints, how Golden Solar addressed those complaints, and the ultimate resolution of those complaints.

Evaluation of the Adequacy of this section of the Site Assessment: This part of the application meets the requirements of the application process.

6.2.1 Stormwater Discharges Associated with Construction Activity

Because the Project will disturb one or more acres of land, it must therefore comply with the National Pollutant Discharge Elimination System requirements of the Clean Water Act (CWA). Golden Solar will implement all mitigation measures required in the Kentucky Department of Environmental Protection Stormwater Construction General Permit that will be obtained from the Kentucky Energy & Environment Cabinet, Department for Environmental Protection, Division of Water (KDOW). In addition, Golden Solar will obtain a Kentucky Pollution Discharge Elimination System (KPDES) (KPDES No: KYR100000) General Permit for Stormwater Discharges Associated with Construction Activity.

6.2.2 Wetlands and Waters of the United States A wetland delineation was conducted for the Project April 8 - 10, 2020 and May 27, 2021, and the corresponding wetland and waterbody report has been attached in Attachment G of the application. An application for an Approved Jurisdictional Determination will be submitted to the United States Army Corps of Engineers (USACE), Louisville District. The Approved Jurisdictional Determination will contain the USACE determination on which aquatic features within the Project boundary are designated by the CWA as under federal jurisdiction. A USACE Section 404 CWA permit will be required if the Project will impact jurisdictional wetlands or Waters of the United States (WOUS). The USACE authorizes Nationwide Permits (NWP) for specific activities within jurisdictional waters, and each NWP has a corresponding Water Quality Certification (WQC) status from KDOW. The extent of impacts to jurisdictional wetlands or WOUS will determine whether an NWP or Individual 404/401 Permits are required. An NWP and the corresponding 401 General Certification will be authorized if the Project is determined to have minimal impacts to federal and state waters. If the Project qualifies for coverage under the NWP and the corresponding General WQC, the KDOW can authorize the facility by letter at the request of the applicant, with no further

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documentation required. If the activity does not qualify, Golden Solar will apply for a CWP Section 404 Individual Permit (IP) from the USACE and an IP to Construct Across or Along a Stream and/or WQC from the KDOW. Development in, along, or across a stream requires a floodplain permit. One graveled access road is proposed within the boundaries of a floodplain. Golden Solar will obtain a General Permit for Floodplain Development from KDOW and Caldwell County prior to construction.

Evaluation of the Adequacy of this section of the Site Assessment: This part of the application meets the requirements of the application process.

Evaluation of the Adequacy of this section of the Site Assessment: This part of the application meets the requirements of the application process.

7. Other Environmental Factors Addressed By the Applicant

The applicant has adequately addressed Wetlands, However the reviewer was concerned that no mention of endangered plant an animal species has been addressed. The applicant however, in its response to the first set of questions did respond adequately to the concern. If this has been done in other documents for the project, a summary of those analyses should have been placed in the Site Assessment Report.

The Applicant has filed an assessment of the Cumulative Environmental Impact of the project with the Kentucky Energy and Environment Cabinet. This assessment can be found in Applicants Exhibit G. This assessment meets the requirements of this regulatory process.

8.0 Summary of the Adequacy of the Applicant's Site Assessment Report

Based on a review of The Golden Solar Site Assessment Report, by W. Thomas Chaney of Cloverlake Consulting Services, all of the sections of the report are in compliance with the intent of KRS 278.708.

Based on Cloverlake's analysis there are three areas where additional information/analysis may be needed.

These suggested measures are:

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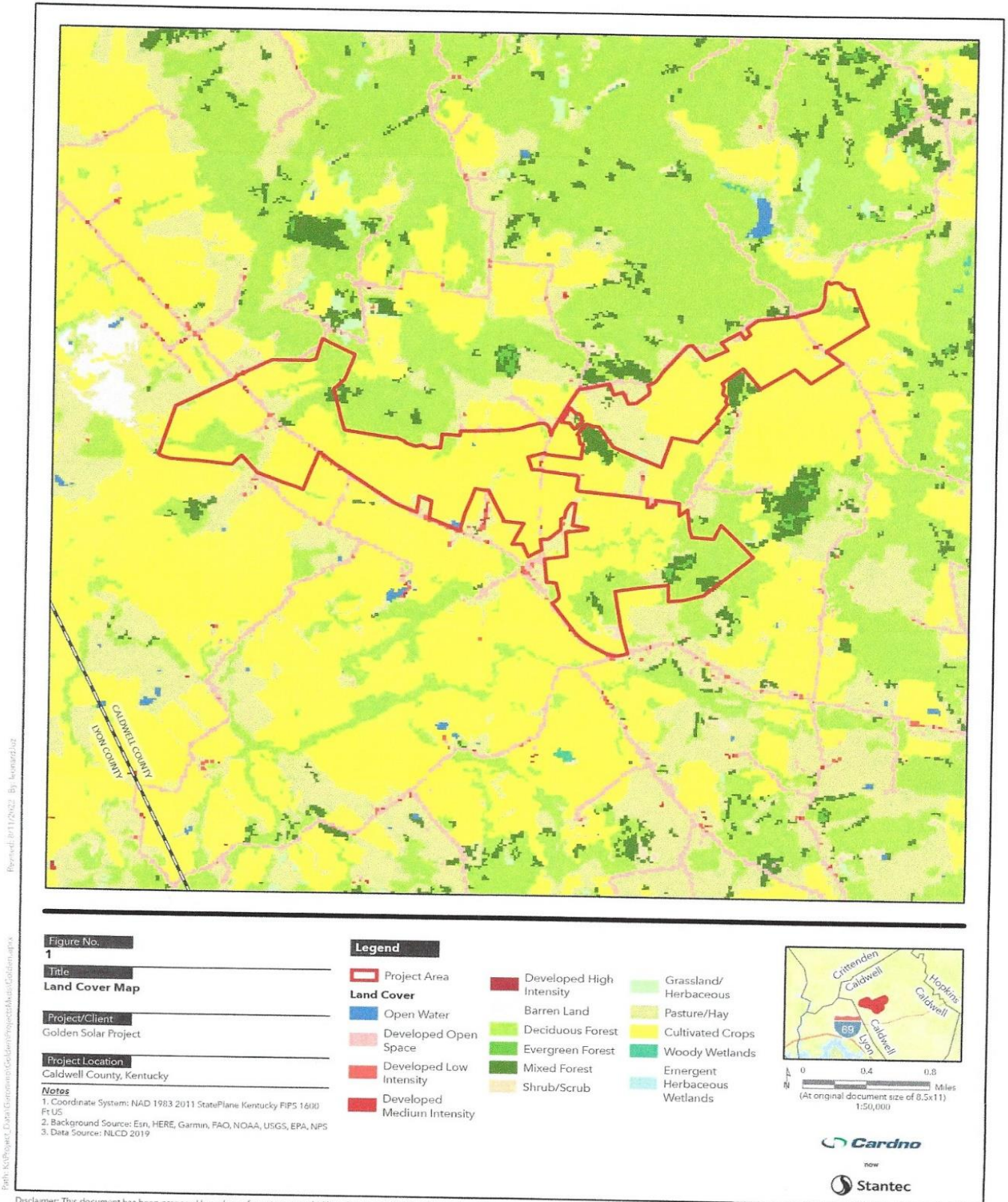
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- Historic Resources-In particular a discussion of the impact of the project on historic buildings and cemeteries. The response to the first set of questions stated that an Archeologic Survey will be completed by the end of 2022. The Commission should hold the applicant accountable for this commitment.
- A plan to mitigate construction noise caused by pile driving including on-site barriers and construction schedules should be filed with the Siting Board 30 days prior to the beginning of construction. The application documents indicate this will be done.
- Addressing impacts on endangered species that might result from the project and a requirement to get Federal Permit(s) (Army Corps of Engineers, etc.).

APPENDIX A-Site and Vicinity

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Disclaimer: This document has been prepared based on information provided by others as cited in the Notes section. Stantec has not verified the accuracy and/or completeness of this information and shall not be responsible for any errors or omissions which may be incorporated herein as a result. Stantec assumes no responsibility for data supplied in electronic format, and the recipient accepts full responsibility for verifying the accuracy and completeness of the data.

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REFERENCES

All the data for this adequacy report were taken from documents filed by Golden Solar and responses by the Kentucky PSC and its consultants and a search of the Kentucky Energy and Environment Cabinet web site.

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Gallery of Photographs Taken during the Site visit on October 2, 2022

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State Board on Electric Generation and Transmission Siting-Case No. 2020-00243**



Golden Solar-Adequacy of the Applicants the Site Assessment Report

**Developed for Wells Engineering and the Kentucky Public Service Commission-
State Board on Electric Generation and Transmission Siting-Case No. 2020-00243**



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State Board on Electric Generation and Transmission Siting-Case No. 2020-00243



Page 73

W. THOMAS (TOM) CHANEY

PRESIDENT CLOVERLAKE CONSULTING

YEARS OF EXPERIENCE

49

EDUCATION

- MBA, Finance and Management Rowland School of Business Point Park University, 2011
- M.A., Environmental Planning, Eastern Kentucky University, 1973
- B.A., Physical Geography and Geology, Eastern Kentucky University, 1972

AREAS OF EXPERTISE

- Strategic training and mentoring of employees
- Management and direction of multidiscipline natural resource management consulting teams
- Environmental Assessment of Energy Facilities
- Harvard Leadership Development Training
- Advanced Project Management Training

CERTIFICATIONS

- Certified Mediator, 2004
- Certified Kepner-Tregoe Rational Process Program Leader, 2003
- Harvard Leadership Development
- Advanced Project Management

HONORS

- Cinergy "Above and Beyond Award" for Diversity, CG&E/Cinergy, Duke Energy
- Diversity Champion and "Wolf" Award recipient for top individual performance, CG&E/Cinergy, Duke Energy

Golden Solar-Adequacy of the Applicants the Site Assessment Report

Developed for Wells Engineering and the Kentucky Public Service Commission- State Board on Electric Generation and Transmission Siting-Case No. 2020-00243

EXPERIENCE SUMMARY

Mr. Chaney is the President of Cloverlake Consulting Services and directs the work of expert natural resource management teams of engineers and scientists. He has a distinguished background in utility management, organizational development and consultant service to utility companies for environmental and planning work. He has done career management service for large utilities including Cinergy, Cincinnati Gas & Electric and Duke, and has consulting experience with Power Engineers, BHE Environmental, GAI Consultants, Booz-Allen Hamilton, Woolpert Consultants, and Dames and Moore.

Mr. Chaney's current practice involves Siting and Environmental Planning for major utility facilities in several states in the Midwest. He has developed testimony and testified in front of state siting agencies.

He also specializes in strategically training and mentoring employees and has grown a prominent Cincinnati multi-discipline environmental engineering and consulting practice. He also provided strategic training and mentoring services for CG&E, Cinergy, and Duke Energy for 25 years and currently provides these services to Master Provisions, a Northern Kentucky food charity... Mr. Chaney developed and presented the Business Case for Diversity to Cinergy executives in 1995, and was responsible for environmental training and education, and high-performance team training and coaching.

He is a certified mediator and holds a license as a Program Leader for Kepner-Tregoe rational process.

Kentucky Public Service Commission-Siting Board Ohio Power Siting Board SITING AND CERTIFICATION

Another specialty is the management of the Ohio Power Siting Board siting/certification process. He is also proficient at managing the Kentucky PSC Siting Board Process. He was involved in the original development of the rules for these processes with the PUCO and the OPSB and served as the implementing Principal contact for CG&E, Cinergy, and Duke from 1984 to 2006. He has been involved in consulting practices since then that specialize in these siting processes including GAI Consultants, BHE consultants, Power Engineers and ERM.

The following projects are a few examples of this work:

- Kentucky Public Service Commission Siting Board

In his position as President of Cloverlake Consulting Services, he has completed the analysis of the adequacy of two solar projects in Kentucky; Madison Solar and Horseshoe Bend Solar. He is currently actively involved in two additional solar projects; McCracken County Solar and Meade County Solar.

- AEP Siting and Permitting Projects, Ohio, Kentucky, Indiana, Virginia and West Virginia

In his position with Power Engineers, he supervised over twenty siting and permitting projects in the above states.

Golden Solar-Adequacy of the Applicants the Site Assessment Report

Developed for Wells Engineering and the Kentucky Public Service Commission- State Board on Electric Generation and Transmission Siting-Case No. 2020-00243

- NIPSCO Permitting In Indiana

Mr. Chaney, likewise, was involved in several Transmission Line permitting projects in Indiana for NIPSCO.

- GAI Consultants, Constance-Zimmer Natural Gas Transmission Line, Ohio

Project Manager responsible for the siting, routing and certification of this transmission line. The project required numerous environmental permits and a Certificate of Environmental Compatibility and Public need from the Ohio Power Siting Board (OPSB).

- Dominion East Ohio Gas, Akron-Canton Gas Transmission Line, Ohio

Project manager responsible for siting, certification (OPSB) and permitting.

- Management Consulting, Large Aviation and Environmental Projects

As a management consultant for a private management consulting firm, Mr. Chaney was responsible for numerous large aviation and environmental projects, including the Chicago, O'Hare International Airport Delta Concourse project, the Miami International Airport Runway Environmental Impact Statement (EIS) Concourse project, the Miami International Airport Runway Environmental Impact Statement (EIS) project, and the Greater Pittsburgh International Airport Midfield Terminal Studies project that required noise and land use compatibility studies.

- Regional Planning manager

As a planning manager for the Northern Kentucky Area Development District, Mr. Chaney covered all aspects of regional planning for eight counties in northern Kentucky. He supervised professional and clerical staff dealing with issues on the environment, housing, land use and recreation in compliance with the Older Americans Act (Title III) and the Social Security Act (Titles XIX and XX).

- Senior Environmental Planning Consultant

Mr. Chaney's experience as a Senior Environmental Planner with a private consulting firm required management of numerous land use planning and environmental assessment projects. His duties included accountability to the client.

- Duke Energy, Edwardsport IGCC Start-Up natural Gas Line, Indiana

Project Manager for the routing and permitting of a gas transmission line used to start-up the Edwardsport Indiana IGCC. This project is a clean coal endeavor that utilizes Illinois Basin high sulfur coal.

- Dominion East Ohio Gas Company, Solid Waste natural Gas Siting Study and Application, Ohio

Project Manager for the OPSB application for this complex project, which was rerouted due to the construction of a large municipal landfill.

- GAI Consultants, Rockies Express Line, Ohio

Project Manager for cultural resources projects associated with this gas transmission line.

Golden Solar-Adequacy of the Applicants the Site Assessment Report

**Developed for Wells Engineering and the Kentucky Public Service Commission-
State Board on Electric Generation and Transmission Siting-Case No. 2020-00243**

- **CG&E, Gas Storage Site, Kentucky**

Project Manager responsible for the environmental permitting of this large gas storage site, formerly a depleted gas and oil production field.

- **CG&E/Cinergy/Duke Energy Natural Gas Licensing Projects, Multiple States**

Reviewed and led the licensing and environmental permitting for all natural gas transmission line projects.

- **CG&E Cinergy, Numerous Power Plant, Transmission Line and Gas Line Siting and permitting Projects**

In his capacity as Licensing Division Director, Mr. Chaney was involved in more than 100 Transmission Line, Gas Line and Power Plant projects during his tenure with CG&E/Cinergy/Duke.



ATTACHMENT B



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Review Appraisal

Of:

CohnReznick

Adjacent Property Value Impact Report

Proposed Golden Solar Project

Caldwell County, Kentucky

Dated August 9, 2022

Date of Appraisal

November 20, 2022

Prepared for:

Mr. Scott H. Campbell, Senior Project Manager

Wells Engineering, PSC

6900 Houston Road, Suite 38

Florence, Kentucky

Prepared by:

E. Clark Toleman, MAI, SRA

333 West Vine Street, Suite 300

Lexington, Kentucky 40507

E. Clark Toleman, MAI, SRPA



Real Estate Appraisal Services

VINE CENTER 333 W. VINE ST., SUITE 300 • LEXINGTON, KENTUCKY 40507
TEL. (859) 253-0314 • FAX (859) 253-0653

November 28, 2022

Mr. Scott H. Campbell
Senior Project Manager
Wells Engineering, PSC
6900 Houston Road, Suite 38
Florence, Kentucky 41042

**Re: *Review Appraisal Report
CohnReznick-Impact Study dated August 9, 2022
Proposed Golden Solar Project, Caldwell County Kentucky***

Dear Mr. Campbell

Following your request, I have carried out an investigation and review of the CohnReznick Adjacent Property Value Impact Study that estimates the impact in terms of property value to the surrounding properties to the proposed Golden Solar Project. The CohenReznick report is part of the application Case No. 2020-00243 for the 1870 combined acre 100 MW solar project to The Kentucky State Board on Electric Generation and Transmission Siting. I have reviewed the CohenReznick report as well as the data within in application, and made a physical inspection of the subject parcels that make up the project and surrounding area. There are 17 parcels in the project, and 69 properties that have been identified as adjoining the project tracts.

Considering my analysis of the CohenReznick Impact Study my conclusion is that the report is credible and representative of the market conditions that would exist should the Golden Solar Project be constructed.

The following is a summary of my technical review of the CohenReznick report and comments on the specific data and analysis contained in the report prepared in compliance with Standard 3 of the Uniform Standards of Professional Practice.

Respectfully submitted,

A handwritten signature in blue ink, appearing to be "E. Clark Toleman".

E. Clark Toleman, MAI, SRA

Project Name: Golden Solar Project-PSC No. 2020-00243
Property Location: Caldwell County, Kentucky
Date of Impact Study: August 09, 2022
Property Type: Agricultural and Homesites
Land Area: 1870 Combined acres, 100 MW
Report Option: Narrative Primary and Addenda Report
Intended Use of Review: Internal Use
Highest and Best Use:

Purpose of this Review

The purpose of this review is to determine if the appraisal report is essentially in compliance with: KRS 278.708 and The Uniform Standards of Professional Appraisal Practice (USPAP) as promulgated by the Appraisal Standards Board of The Appraisal Foundation.

Scope of the Review

This review was limited to an analysis of the appraisal report in order to form an opinion as to:

- The completeness of the report;
- The adequacy and relevance of the data presented;
- The reasonableness of any adjustments made by the appraiser to the data;
- The appropriateness of appraisal methods and techniques used; and
- The adequacy and reasonableness of the analysis, opinions and conclusions contained in the appraisal report.

Reviewer: E. Clark Toleman MAI, SRA

Date of Review: November 20, 2022

3. Purpose of the Impact Study

The Impact Study is in two parts the primary study is a review of academic and peer authored property value impact studies, research and analysis of existing solar facilities, and market participant and Assessor interviews. The addenda is a site specific analysis of the properties adjacent to the proposed 100 MW Golden Solar Project. The purpose of this impact study under review is to estimate any related change in terms of market value to the adjoining properties due to the proposed solar project in Caldwell County Kentucky as of August 9, 2022.

Market Value is defined as:

The most probable price which a property should bring in a competitive and open market under all conditions requisite to a fair sale, the buyer and seller, each acting prudently, knowledgeably and assuming the price is not affected by undue stimulus, Implicit in this definition is the consummation of a sale as of a specified date and the passing of title from seller to buyer under conditions whereby: (1) buyer and seller are typically motivated; (2) both parties are will informed or well advised, and each acting in what he considers his own best interest; (3) a reasonable time is allowed for exposure to open markets; (4) payment is made in terms of cash in U,S, dollars or in terms of financial arrangements comparable thereto; and (5) the price represents the normal consideration for the property sold unaffected by special or creative financing or sales concessions granted by anyone associated with the sale.

Market Value is therefore the actual real dollar value of the subject property would bring at an appraisal date under “normal” conditions with the seller and buyer acting reasonably. The contemporary concept emphasizes cash value. This is necessary in the investigation of “market” sales to equate any non-typical financing terms to conditions that are typical at an appraisal date.

Intended Use of the Appraisal

This review appraisal is prepared for Wells Engineering on behalf of the Kentucky State Board on Electric Generation and Transmission Siting Board Case No. 2020-00243.

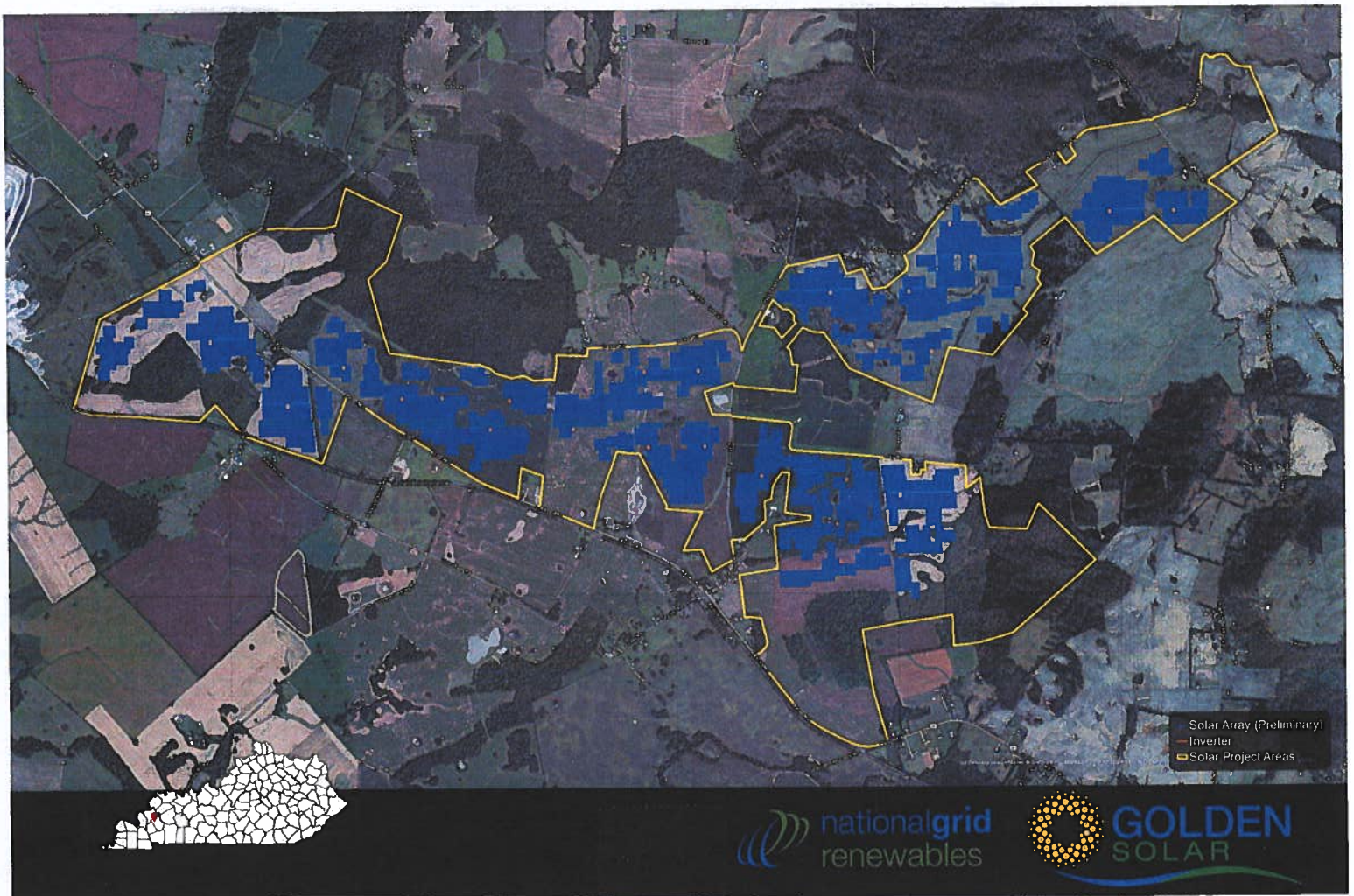
Date of Appraisal Review

This Review Appraisal is made as of November 20, 2022 with all economic, statistical and market data correlated to this date. The last inspection of the property was made on this date and all physical characteristics are described relative to this date unless otherwise sated within this report.

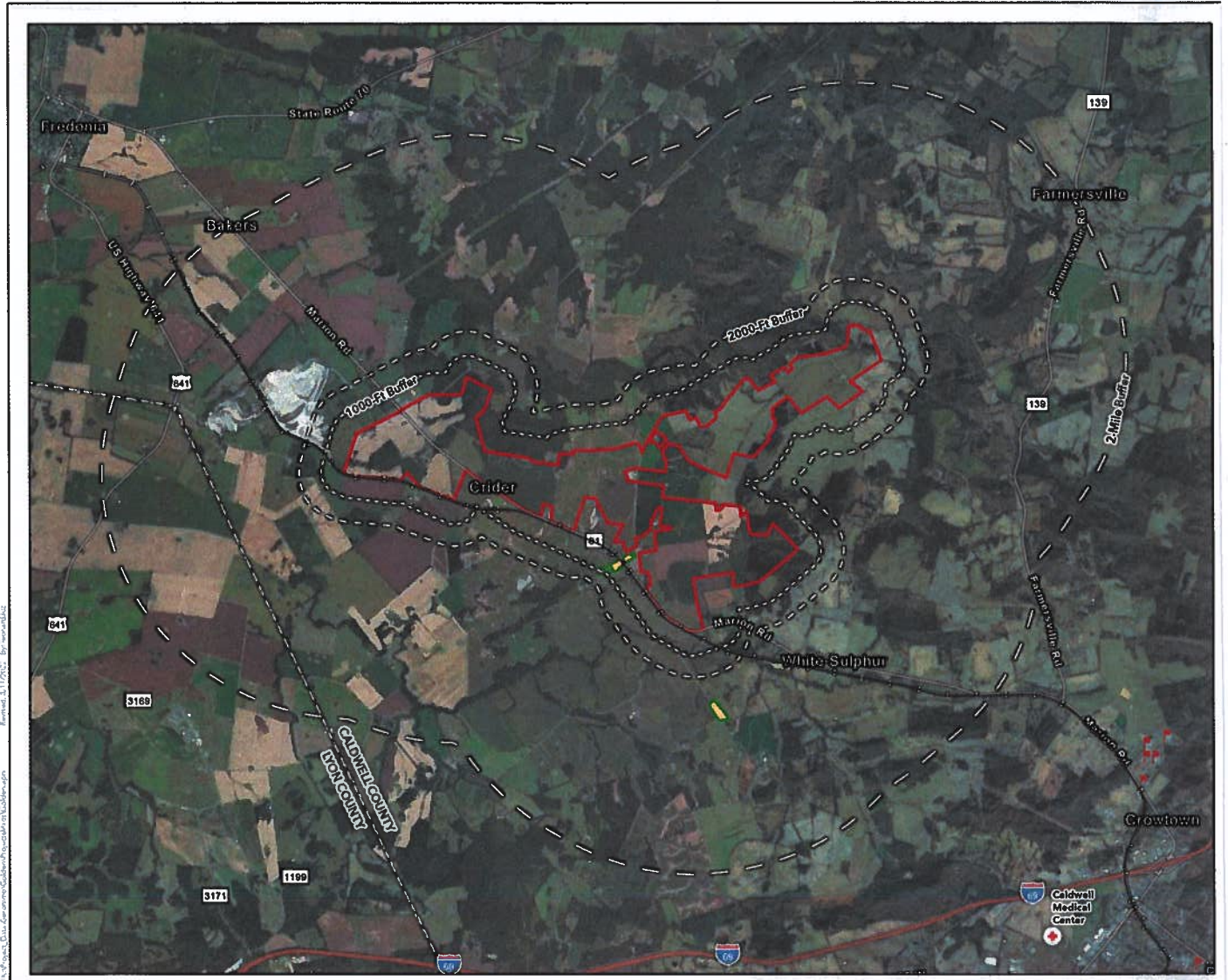
Proposed Project Area

The subject properties are situated approximately 5 miles north-west of Princeton with a total area of 1,870 acres in 17 parcels. The project parent parcels are on KY Route 91 (Marion Road) and bounded by Dalton Road on the north and Skinframe Creek Road on the south side. The identified adjoining sixty-nine properties are listed including twenty-nine tracts under ten acres with the balance being general farms ranging from 27 to 570 acres. The general area is rural in nature being developed as homesites and general farms. The 2021 Caldwell County population is estimated to be 12,977 with a slight decline of 1.83% by 2026. The project proposes that minimum distance of residence to a solar panel will be 300 feet, 500 feet to a central inverter and 1,000 feet to a substation and residence in the residential neighborhood.

Map Of Subject Property



Map Of Adjoining Property



Disclaimer: This document has been prepared based on information provided by others as cited in the Notes section. Stantec has not verified the accuracy and/or completeness of the information and shall not be responsible for any errors or omissions which may be incorporated herein as a result. Stantec assumes no responsibility for data supplied by others.

Figure No. 1

Surrounding Communities Map

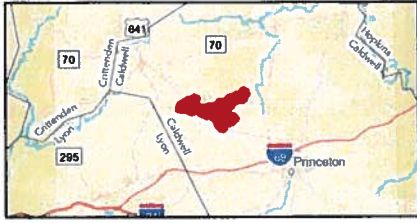
Client/Project

Golden Solar Project

Project Location

Caldwell County, Kentucky

- Project Area
- + Hospitals
- * Schools
- + Railway
- Residential Communities
- 1000-Ft Buffer
- 2000-Ft Buffer
- 2-Mi Buffer
- County Boundary



Notes
 1. NAD 1983 2011 StatePlane Kentucky FIPS 1403 FUS
 2. Basemap Sources: Earthstar Geographics, Esri, HERE, Garmin, SafeGraph, GeoTechnology, Inc. METI, NASA, USGS, EPA, NPS, USDA, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS



Methodology to Indicate Effect on Adjoining Properties

The CohenReznick Impact Study utilizes the Paired Sales Analysis as the basis for an indication of change in value experienced to adjoining properties from solar farm projects in several states. This is a quantitative analysis of paired-sales to identify the effect of any one characteristic in a given market on market price. This analysis is used to estimate what adjustment is indicated for an individual characteristic such as a garage, swimming pool or any number of characteristics that need adjustment for the subject property. This is a standard analysis technique in appraisal practice and is most indicative when there is a large sample size.

The CohenReznick Impact Study applied the paired sales analysis to adjoining properties around solar farms in seven states including Indiana, Georgia, Florida, North Carolina, Virginia, Michigan, and Minnesota. The result has been broken down into sub-groups with the Kentucky analysis indicating a range of change in value from -1% to +3% with three of these solar farms on the utility companies land and one is in an industrial park, and all are smaller scale than the proposed subject project.

The next survey is done in the surrounding states including 10 solar farms with a 44 property paired sale analysis indicating a range of effect on value from -4.99% to +20.02% with an average overall change of +2.13%, which would indicate a neutral overall effect on the value of adjoining properties to solar farms.

Conclusion of Solar Farm Impact

The evidence presented in this Impact study including the paired sales is a strong indicator that proximity to a solar farm in this Caldwell County location will have a neutral impact on the adjoining property value when the set back and buffer screening is in place. The proposed solar farm is a passive entity without the recognized nuisance characteristics of noise, traffic, odor, or other typical stigma considered to create a detrimental effect. A review of published research material on this subject is included in this Impact Study which also indicates the neutral effect on the adjoining property to solar farms projects of similar size and neighborhood characteristics as the proposed Golden Solar project.

Review Appraiser's Limiting Conditions and Certification

- This review memorandum is based on data and information contained in the appraisal report under review as well as additional information from other sources that may be applicable and have been identified.
 - It is assumed that the data and information contained in the appraisal under review are factual and accurate.
 - The reviewer reserves the right to consider any additional information that may subsequently become available and may revise any opinions and conclusions if such data and information dictate the need for change.
 - Unless otherwise stated, all of the assumptions and limiting conditions contained in the appraisal report under review are also conditions of this report.
 - This appraisal review is specifically not an appraisal. Any opinions expressed by the reviewer are limited by the scope of the analysis identified in this review report.
 - If the yield capitalization methodology (discounted cash flow analysis) was completed by the appraiser using a market-accepted, preformatted lease-by-lease software program: To the extent possible, the inputs have been scanned for reasonableness, however, neither the reliability or accuracy of the inputs nor the expertise or competency of the person working with the software can be verified by the reviewer. Further, no property specific, corroborating diskette has been submitted with this assignment.
 - The review appraiser is not required to give testimony or appear in court, or at public hearings or at any special meeting or hearing with reference to the property appraised or the appraisal report, unless arrangements have been made prior to preparation of this report.
-
- All data provided in the appraisal reviewed is assumed to be accurate and complete and that there has been no omission of data that would affect the reviewer's conclusions.

I certify that, to the best of my knowledge and belief:

- the facts and data reported by the reviewer and used in the review process are true and correct.
- the analyses, opinion and conclusions in this review report are limited only by the assumptions and limiting conditions stated in this review report and are my personal, impartial and unbiased professional analysis, opinions and conclusions.
- I have no present or prospective interest in the property that is the subject of this report and no personal interest with respect to the parties involved.
- I have no bias with respect to the property that is the subject of this report or to the parties involved with this assignment.
- my engagement in this assignment was not contingent upon developing or reporting predetermined results.
- my compensation is not contingent on an action or event resulting from the analyses, opinions or conclusions in this review or from its use.
- my analyses, opinions and conclusions were developed and this review report was prepared in conformity with the Uniform standards of Professional Appraisal Practice

(USPAP) and all federal, state and banking regulations in force and applicable as of the date of this report.

- I have made a personal inspection of the work and subject property under review.
- no one provided significant appraisal, appraisal review or appraisal consulting assistance to the person signing this certification, and I have not provided any prior appraisal service on this property.
- As of the date of this report, E. Clark Toleman, MAI, SRA has completed the continuing education requirements of the Appraisal Institute.
- The use of this report is subject to the requirements of the Appraisal Institute relating to review by its duly authorized representatives.



E. Clark Toleman, MAI, SRA
Kentucky Certified General Appraiser

QUALIFICATIONS OF THE APPRAISER

E. Clark Toleman MAI, SRA

PROFESSIONAL MEMBERSHIPS:

MAI Member of the Appraisal Institute

SRPA MAI No. 7572

SRA General Certification – Kentucky Real Estate Appraisers Board No. 109

Real Estate Broker – State of Kentucky

Member of Lexington Board of Realtors

Member of Kentucky Association of Realtors

Member of National Association of Realtors

EDUCATION: West Australia Institute of Technology, Perth, Australia – Business Studies Major in Real Estate Valuation

Completed all course requirements for the Australian Institute of Valuers, the American Institute of Real Estate Appraisers and Society of Real Estate Appraisers. Appraisal seminars related to Conservation Easements, partial interests and Federal guidelines for Federal Land Acquisition.

Participate in continuing education through seminars and courses by the Appraisal Institute.

EXPERIENCE:

Full time career in all phases of Real Estate. Employed in Property Management, Office of Development, Leasing and Valuation. Real Estate Appraiser in Lexington, Kentucky since 1974. Owner and Manager of Investment Property. Self- employed and owner of E. Clark Toleman Real Estate Appraisal Services.

APPRAISAL CLIENTS:

Financial Institutions:

Bank of Lexington, First Security National Bank, Bank One, Citizens Fidelity Bank in Lexington, First National Bank of Louisville, Fifth Third Bank of Campbell County, PNC Bank, Franklin Bank, MCNB Bank, First Capital Bank, Community Trust Bank, First Southern National Bank. Recent non-bank lender clients include: Realty Investment

Company, Memphis, Tennessee; New York Life, Atlanta, Georgia, Cincinnati Insurance Co.

GOVERNMENT INSTITUTIONS:

Lexington Fayette Urban County Government, Corps of Engineers, Department of Justice, General Services Administration, U.S. Postal Service, Census Bureau, Resolution Trust Corporation, FDIC, FSLIC, Commonwealth of Kentucky, Transportation Cabinet, Bluegrass Airport Board, LexTran Board, State of Kentucky Kentucky Office of the Courts, LFUCG Division of Water Quality, University of Kentucky, Kentucky State University, Kentucky Community and Technical College System, Eastern Kentucky University, Division of Real Property State of Kentucky, Louisville Regional Airport Board, Lexington KY Airport Board.

APPRAISED FOR:

Major horse farms, full range of commercial properties, multi-family residential, condemnation cases for both Plaintiff and Defendant, IRS, utility companies, four flood control lane projects, Urban Renewal, major industrial properties and highway right of way. Appraisals conducted on conservation easements for individuals the State of Kentucky for the PACE program and the Lexington Fayette Urban County Government for the Purchase of Development Rights, on Farm Properties, Marathon Oil Co. for R/W easements, CSX Railroad, Norfolk Southern Railway, Cincinnati Insurance, Safe Co Insurance, LexTran, and Southern States.

QUALIFIED AS EXPERT IN REAL ESTATE VALUES:

Federal Court of Kentucky- Eastern and Western Division. Testified in Local Tax Appeal Cases, Circuit Court of Clark, Pike, Montgomery, Bourbon, Woodford, Jessamine, Bell, Johnson, Jefferson, Anderson, Franklin, Boone, Campbell, Scott, Lawrence, Clay, Whitley, Pulaski, Kenton, and Martin County, Kentucky, and the United States Bankruptcy Court.



ATTACHMENT C



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**Review and Evaluation of the
Application of Golden Solar, LLC for an Approximately
100 Megawatt Merchant Electric Solar Generating
Facility in Caldwell County, Kentucky
Siting Board Case No. 2020-00243**

Economic Impact Analyses

Prepared for

**Wells Engineering PSC
6900 Houston Road, Suite 38
Florence, Kentucky 41042**

By

**Mark M. Watters
Watters Unclaimed Property Consulting LLC
2519 Ashton Court
Cincinnati, Ohio 45244**

**Before the Kentucky State Board on Electric Generation and
Transmission Siting
Case No. 2021-00243**

Executive Summary

Based upon the representations of the Applicant through its Economic Impact Analysis and Responses to the Siting Board's Requests for Information, there is a significant, short-term initial economic to both the Commonwealth of Kentucky and the Caldwell County region. During the longer operational (generation) phase, there are lesser-but-positive economic regional impacts. The Applicant's *Golden Solar Facility Impact Analysis* ("Economic Report") was prepared by Stantec.

Project Factual Summary

Golden Solar, LLC is requesting authorization to construct and operate a 100-megawatt merchant electric solar generating facility and nonregulated electric transmission line in Caldwell County, Commonwealth of Kentucky, on 1,870+/- acres between the towns of Fredonia and Princeton, both in Kentucky. The Project specifications involve both electric production and transmission tying into the existing electrical grid through one or more transmission lines that are part of the Project. The project site is within 75 yards (and across a railroad right-of-way) of the Caldwell Solar, LLC Project (Case No. 2020-00244), a 200-megawatt merchant electric solar generating facility. Both Golden Solar and Caldwell Solar are owned by National Grid Renewables Development, LLC.

Golden Solar LLC is a limited liability company with its principal offices at 8400 Normandale Lake Boulevard, suite 1200, Bloomington, MN 55437.

The Construction Phase estimated total spending is projected to be \$150 M and the total economic impact is estimated to be \$23.56 million (excluding tax revenues). The Operational (Generation) Phase annual economic impact is estimated to be \$804,800 (excluding tax revenues), or, for the 25-year projected Phase, \$20.12 M (est.)

Review Criteria and Methodology

This review encompasses the entirety of Golden Solar LLC's Application, including its Exhibits, especially "Attachment F", *Golden Solar Facility Impact Analysis* ("Economic Report"), prepared by Stantec (formerly Cardno), using JEDI, and the Responses to the Siting Board Staff's First and Second Requests for Information. JEDI is a streamlined model of IMPLAN. It is managed by industry experts hired by the National Renewable Energy Laboratory (NREL) and utilizes IMPLAN data.

Methodology. The Economic Report and its analyses of both Construction and Operational Phases of the Project were reviewed to consider:

- Specific aspects of the Project - specific tasks and activities; their chronology and timelines; and the geographic aspects of the Project and their effects;
- The quantification and/or estimation of the above-listed criteria for impact upon state, regional and local areas within the Commonwealth;
- Other civil, social and subjective (non-monetary) economic effects within the community, region, and state; and
- Potential impacts, either positive or negative, to current use or other industries and businesses
- Electrical output compared to current agrarian production.

Basis for Analysis. KRS 278.706 states that any person seeking to obtain a construction certificate to construct a merchant generating facility must file:

KRS 278.706

* * * *

(2) A completed application [including] the following:

(j) An analysis of the propose facility's economic impact on the affected region and the state.

Criteria for analysis. This review and evaluation of Applicant Blue Moon Energy LLC's proposed Solar Energy Project ("Project") is based upon projected short-term Construction- and long-term Operational Phases, as described by the Applicant and detailed by responses to questions posed to that Applicant. The Applicant's Economic Impact Report and their Responses are analyzed for each Phase, using the following criteria:

Direct impacts. Wages paid to employed workers for construction and maintenance Phases.

Indirect Impacts. Purchases of goods, materials and services necessary for the construction and maintenance of the Project facilities.

Induced Impacts. Expenditures for goods and services by workers spending portions of their Project-related wages at local and regional third-party businesses.

Note Indirect- and Induced Impacts were combined in the Economic Report.

Kentucky Income and Franchise Taxes.

Local Occupational Taxes.

Kentucky Commonwealth and Local Property Taxes.

- Real estate taxes
- Tangible Personal Property Taxes
- Fees in lieu of property taxes (IRB and PILOT)

Kentucky Commonwealth Sales Taxes.

Other Benefits. This includes other contributions to the Commonwealth and the Region.

Electrical and other Outputs. This criterion is a measure of the value of goods and services produced. Stated differently, “output” is the value of production by the industry or producer in a calendar year or, in the present case, for the period of production.¹

By definition, each criterion is reviewed in the context of *net* economic impact: the very terminology demands that in each instance there is an existing “baseline” from which positive or negative economic results may arise.

The analyses were conducted on a statewide and regional basis; no local (county) separation of economic impact was separate.

Applied Review and Analysis

Review Summary

Overall it appears that the proposed Project will likely have positive economic impacts on the regional and commonwealth economy. For most criteria there is positive impact. Discussion of each criterion follows. All sums are in current dollars:

Direct, Indirect and Induces Impacts

Direct, Indirect and Induced impacts. The applicant has outlined the basis for concluding the Project is projected to produce direct impacts during the Construction Phase of \$23,562,400 (Commonwealth) and \$304,600 (regional, including Caldwell County). The Construction Phase projects 150 full-time job equivalents, some of whom would be labor temporarily re-locating to the Commonwealth. The in-state jobs are projected to be 177.4 statewide (79.2 direct and 98.2

¹ See, e.g., *Output Data*, <https://support.implan.com/hc/en-us/articles/115009505807-Output-Data#:~:text=In%20IMPLAN%2C%20Output%20is%20the%20value%20of%20production,margin%20only%3B%20it%20does%20not%20represent%20revenues%20%28sales%29>.

indirect jobs) and 2.29 regional jobs (1.02 direct and 1.27 indirect). Current agrarian local current impact was not reviewed, so the above are gross numbers. Direct impact during the Operational Phase is annually projected as 0.1 job of modest income (\$3,600 – all direct), with indirect or induced income of \$6,800, with no agrarian income analyzed for netting. The Applicant's solar project is likely to have a significant short-term impact on the regional and Commonwealth economy during the Construction Phase and a modest impact during Operational Phase.

These numbers appear to be in line with similar projects.

Output

The generation of electricity by the Project (Output), is measured by positive cash flow, for the generation and sales of produced electricity. For the reasons below, the projected numbers should probably be ignored and the electrical output, considered unknown.

The economic output for current (agrarian) usage has yet to be determined. At this time, the Applicant has not obtained a power purchase agreement but fully intends to actively market its power output.²

Tax Impacts

Kentucky taxes for Economic Impact studies are grouped as business taxes, employment taxes, sales and use taxes, and property taxes for the purposes of this review. The Economic Report asserts taxes of all types for the life of the Project to be \$3.3 M for both Commonwealth and local taxes of all types. This projection is exclusively for property taxes.

Business taxes include Commonwealth income, franchise and like taxes.³

The Applicant taxpayer is a limited liability company (LLC). LLC's are not directly taxed for income purposes by the Commonwealth, but their ownership may be. LLC members may be taxed as single-member LLC (sole proprietorship which files federal and/or state income taxes); as a partnership whose partners file taxes (liable for self-employment taxes and income taxes); as C corporations, taxed as such; or S Corporations who pay corporate income taxes. In addition, LLC's file an Annual Report with the Secretary of State with a \$15 fee.

The Applicant has made no projection of Commonwealth business taxes with supporting information, data or calculations.

Employment taxes would include primarily local occupational taxes. These are sometimes grouped with business taxes as they are local income-based taxes but paid by the employer from withholding of the employees' wages. These taxes have been projected as \$251,000

² See *Response to Siting Board Staff's First Request for Information*, Request 6.

³ *Ibid.*, Request 18.

during the Construction Phase and \$13,000 annual for the Operational Phase (\$325,000 over the 25-year Phase)⁴. The projected current income derived from these properties has not been projected, so the Applicant's projection is gross, not net. These numbers are state taxes; local taxes are not included. Caldwell County has a 1% income tax not included above.

Sales and use taxes are taxes paid for purchasing goods and services within the Commonwealth, or with the complementary use tax, for property and services not taxable or undertaxed at the point of origin for which the commonwealth imposes their own tax. The applicant projects these taxes together will be under \$10,000 during the Construction Phase and under \$5,000 annually during the Operational Phase.⁵

Property taxes include both real estate and personal property taxes.

Real estate taxes, currently based upon farm usage, will not change during the short Construction Phase. The applicant has not provided information as to what these taxes are. During the Operational Phase, the Applicant is projecting annual real estate taxes of \$132,000 per year, or a 30-year projection of \$3.3 M, gross.⁶

Personal property taxes have not been projected. However, the Applicant intends to pursue an Industrial Revenue Bond (IBU) agreement and Payments in Lieu of Taxes (PILOT) agreement that will reduce projected taxes. As both have yet-to-be negotiated, they have not been projected.

Other benefits. The Applicant is committed to making charitable donations to local organizations exceeding \$400,000 during the life of the project.

A related legal entity has a similar project which is not contiguous, but is within 75 years of the current project. Presumably these two projects will have complementary synergies on each other, and together further enhance the economic impacts for state and local purposes.

Conclusions and Recommendations

The construction and operation of the Golder Solar, LLC solar project facility in Caldwell County, Kentucky will provide significant positive economic benefits to the region and Commonwealth.

The Project will provide significant positive economic effects to the region and Commonwealth during the short Construction Phase. Measurable employment, payroll and associated occupational taxes, together with indirect and induced impacts will realize both payroll and occupational tax increases.

⁴ See *Response to Siting Board Staff's First Request for Information*, Request 18.

⁵ Ibid.

⁶ Ibid., Request 21.

During the Operational Phase, the economic impact is expected to be smaller for the region and Commonwealth. A modest payroll will provide employment for a few individuals with modest state income and local occupancy taxes in the Commonwealth and Caldwell County. With IRD and PILOT agreements in place, over the 25-year life of the Operational Phase, the Applicant has not projected personal property taxes or their IRB/PILOT payments. However, real estate taxes are estimated to be \$3.3 M, gross.

Electric Generation and Transmission Siting Studies and Analyses – Economic Impact - Solar – Before the Kentucky Board on Electric Generation and Transmission Siting

In Re: Bluebird Solar LLC, Case No. 2021-00141, Application for Certificate to Construct an Approximately 90 Megawatt Merchant Electric Solar Generating Facility in Harrison County, Kentucky (September 2022)

In Re: Blue Moon Energy LLC, Case No. 2021-00414, Application for Certificate to Construct an Approximately 70 Megawatt Merchant Electric Solar Generating Facility and Nonregulated Electric Transmission Line in Harrison County, Kentucky (May 2022)

In Re: Sebree Solar, LLC, Case No 2021-00072, Application for Certificate to Construct an Approximately 60 Megawatt Merchant Solar Electric Generating Facility in Meade County, Kentucky (circa November 2021)

In Re: McCracken County Solar LLC, Case No 2020-00392, Application for Certificate to Construct an Approximately 60 Megawatt Merchant Solar Electric Generating Facility in Meade County, Kentucky (circa September 2020)

In Re: Meade County Solar LLC, Case No 2020-00390, Application for Certificate to Construct an Approximately 40 Megawatt Merchant Solar Electric Generating Facility in Meade County, Kentucky (circa September 2020)

As a subcontractor to the primary contractor for such study, reviewed the Applicant project reports of direct, indirect and induced economic impacts on the state and community; state corporate income, personal income, and occupational taxes; real and person property taxes; sales and use taxes; and net output value of goods and services produced.

Tax Studies – Real & Personal Property, Sales and Use, and Local Taxation Including Available Incentives, Deductions and Exemptions

Planning, Design and Analysis of Electrical Power System Upgrades – Tennessee

Performed construction contract review for the purposes of making a proposal for electronic system upgrades, to determine application of major taxes – Income, property sales and use taxes, rates, exemptions, exceptions, and available incentives applicable to Michigan.

Tax Studies – Kentucky Occupational Taxes

Research to identify local occupational taxes for proposed job sites

Prior to initiation and execution of contractor work projects, researched local occupation taxes for applicability, rates, registration and returns.

Tax Studies – Sales and Use Taxation

Planning, Design and Analysis of Electrical Power System Upgrades - Michigan

Performed construction contract review for the purposes of making a proposal for electronic system upgrades, to determine application of sales and use – and state tax exemptions deductions and incentives available.

Taxes Corporate Registration to Do Business and Pay Taxes and Fees

Registration of a Business and For Taxation - Pennsylvania

Made applications with the Pennsylvania Secretary of State for state registration and with the state Department of Revenue for all state and local applicable taxes.

Registration and Management of State Personal and Gross Receipts Taxes

Registration for Taxation – New Mexico

Determine applicable taxes and means of registration for payment of New Mexico personal and gross receipts taxes.