EXHIBIT C

COMMONWEALTH OF KENTUCKY
BEFORE THE KENTUCKY STATE BOARD ON
ELECTRIC GENERATION AND TRANSMISSION SITING

In the Matter of:

ELECTRONIC APPLICATION OF WOOD DUCK SOLAR LLC FOR A CERTIFICATE OF OF CONSTRUCTION FOR AN APPROXIMATELY 100 MEGAWATT MERCHANT ELECTRIC SOLAR GENERATING FACILITY AND NONREGULATED ELECTRIC TRANSMISSION LINE IN BARREN COUNTY, KENTUCKY PURSUANT TO KRS 278.700 AND 807 KAR 5:110.	)))))))))	Case No. 2024-00337

<u>Certification of Compliance Pursuant to KRS 278.706(2)(d)</u>

Comes the Affiant, Emily Williams, solely in my capacity as chief executive officer of Geenex Solar LLC and hereby states as follows:

1. I am over the age of 18 and a resident of Indiana.

2. I am the Chief Executive Officer of Geenex Solar LLC, the parent company of Wood Duck Solar LLC.

3. I have conducted an inquiry into the facts contained in this Certification and have found them to be true to the best of my knowledge and belief.

4. I hereby certify that the proposed facility as planned and to be constructed in unincorporated Barren County, Kentucky, will be in compliance with any local noise control ordinances and planning and zoning ordinances.

5. There is no noise control ordinance applicable to unincorporated Barren County.

6. Per Section 503.1.5 of the Subdivision Regulations of Barren County, Kentucky, the project is designed to adhere to setbacks applicable to a ground-mounted Solar Energy System (SES).

Signed on this 14th day of May 2025.

Emily Williams
Emily Williams
Chief Executive Officer
Geenex Solar LLC

EXHIBIT D

COMMONWEALTH OF KENTUCKY
BEFORE THE KENTUCKY STATE BOARD ON
ELECTRIC GENERATION AND TRANSMISSION SITING

In the Matter of:

ELECTRONIC APPLICATION OF WOOD DUCK SOLAR LLC FOR A CERTIFICATE OF OF CONSTRUCTION FOR AN APPROXIMATELY 100 MEGAWATT MERCHANT ELECTRIC SOLAR GENERATING FACILITY AND NONREGULATED ELECTRIC TRANSMISSION LINE IN BARREN COUNTY, KENTUCKY PURSUANT TO KRS 278.700 AND 807 KAR 5:110.	)))))))))	Case No. 2024-00337

Proof of Service in Compliance with KRS 278.706(2)(h)

Comes the Affiant, Kelley Pope, and hereby states as follows:

1. I am over the age of 18 and a resident of Kentucky.

2. On May 19, 2025, I personally delivered physical versions of Wood Duck Solar LLC's Application for a Certificate of Construction for a merchant solar electric generating facility and nonregulated electric transmission line to the following individuals and locations:

Jamie Bewley Byrd, Barren County Judge-Executive
117 North Public Square
Glasgow, KY 42141

Kevin Myatt, Planning Director, City-County Planning Commission of Barren County
200 South Green Street, Suite 201
Glasgow, KY 42141

I affirm under penalty of perjury that the foregoing representations are true.

Date: May 19, 2025

Kelley Pope
Kelley Pope

COLLIN RAY JONES
MY COMM. EXPIRES 07/28/2027
NOTARY PUBLIC
ID # KYNP76595
STATE AT LARGE
KENTUCKY

Collin Jones
5/19/25

Minnie Bullock
05/19/25

EXHIBIT E

Generation Interconnection

Feasibility Study Report

for

Queue Project AG1-070

BON AYR 69 KV

37.5 MW Capacity / 45 MW Energy

January 2021

Table of Contents

1 Introduction

This Feasibility Study has been prepared in accordance with the PJM Open Access Transmission Tariff, 36.2, as well as the Feasibility Study Agreement between the Interconnection Customer (IC), and PJM Interconnection, LLC (PJM), Transmission Provider (TP). The Interconnected Transmission Owner (ITO) is EKPC.

2 Preface

The intent of the feasibility study is to determine a plan, with ballpark cost and construction time estimates, to connect the subject generation to the PJM network at a location specified by the Interconnection Customer. The Interconnection Customer may request the interconnection of generation as a capacity resource or as an energy-only resource. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: (1) Direct Connections, which are new facilities and/or facilities upgrades needed to connect the generator to the PJM network, and (2) Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system.

In some instances a generator interconnection may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection, may also contribute to the need for the same network reinforcement. Cost allocation rules for network upgrades can be found in PJM Manual 14A, Attachment B. The possibility of sharing the reinforcement costs with other projects may be identified in the feasibility study, but the actual allocation will be deferred until the impact study is performed.

The Interconnection Customer seeking to interconnect a wind or solar generation facility shall maintain meteorological data facilities as well as provide that meteorological data which is required per Schedule H to the Interconnection Service Agreement and Section 8 of Manual 14D.

The Feasibility Study estimates do not include the feasibility, cost, or time required to obtain property rights and permits for construction of the required facilities. The project developer is responsible for the right of way, real estate, and construction permit issues. For properties currently owned by Transmission Owners, the costs may be included in the study.

3 General

The Interconnection Customer (IC), has proposed a Solar generating facility located in Barren County, Kentucky. The installed facilities will have a total capability of 45 MW with 37.5 MW of this output being recognized by PJM as Capacity.

The proposed in-service date for this project is June 01, 2024. This study does not imply a TO commitment to this in-service date.

Queue Number	**AG1-070**
Project Name	BON AYR 69 KV
State	Kentucky
County	Barren
Transmission Owner	EKPC
MFO	45
MWE	45
MWC	37.5
Fuel	Solar
Basecase Study Year	2024

Any new service customers who can feasibly be commercially operable prior to June 1st of the basecase study year are required to request interim deliverability analysis.

4 Point of Interconnection

AG1-070 will interconnect with the EKPC transmission system along one of the following Points of Interconnection:

Primary POI: Bon Ayr 69 kV substation.

Secondary POI: Bon Ayr to Cave City 69 kV line.

5 Cost Summary

The AG1-070 project will be responsible for the following costs:

Description	Total Cost
Total Physical Interconnection Costs	$5,205,000
Total System Network Upgrade Costs	$1,060,000
Total Costs	**$6,265,000**

This cost excludes a Federal Income Tax Gross Up charges. This tax may or may not be charged based on whether this project meets the eligibility requirements of IRS Notice 2016-36, 2016-25 I.R.B. (6/20/2016). If at a future date it is determined that the Federal Income Tax Gross charge is required, the Transmission Owner shall be reimbursed by the Interconnection Customer for such taxes.

Cost allocations for any System Upgrades will be provided in the System Impact Study Report.

6 Transmission Owner Scope of Work

The total physical interconnection costs is given in the table below:

6.1 Attachment Facilities

The total preliminary cost estimate for the Attachment work is given in the table below. These costs do not include CIAC Tax Gross-up.

Description	Total Cost
Install necessary equipment (a 69 kV isolation switch structure and associated switch, plus interconnection metering, fiber-optic connection and telecommunications equipment, circuit breaker and associated switches, and relay panel) at the Bon Ayr switching station, to accept the IC generator lead line/bus (Estimated time to implement is 25 months)	$1,170,000
Total Attachment Facility Costs	**$1,170,000**

6.2 Direct Connection Cost Estimate

The total preliminary cost estimate for the Direct Connection work is given in the table below. These costs do not include CIAC Tax Gross-up.

Description	Total Cost
Install necessary infrastructure (69 kV structures, circuit breakers, control building, etc.) at the Bon Ayr distribution substation to facilitate connection of the IC solar generation project (Estimated time to implement is 25 months)	$2,455,000
Total Direct Connection Facility Costs	**$2,455,000**

6.3 Non-Direct Connection Cost Estimate

The total preliminary cost estimate for the Non-Direct Connection work is given in the table below. These costs do not include CIAC Tax Gross-up.

Description	Total Cost
Modify relays and/or settings at Fox Hollow substation for the existing line to the Bon Ayr switching station (Estimated time to implement is 9 months)	$85,000
Modify relays and/or settings at Barren County substation for the existing line to the Bon Ayr switching station (Estimated time to implement is 9 months)	$85,000
Install OPGW on the Bon Ayr-Beckton-West Glasgow-Parkway 69 kV line sections (8.3 miles) (Estimated time to implement is 24 months)	$1,410,000
Total Non-Direct Connection Facility Costs	**$1,580,000**

7 Interconnection Customer Requirements

It is understood that the Interconnection Customer (IC) is responsible for all costs associated with this interconnection. The costs above are reimbursable to the Transmission Owner. The cost of the IC's generating plant and the costs for the line connecting the generating plant to the Point of Interconnection are not included in this report; these are assumed to be the IC's responsibility.

The Generation Interconnection Agreement does not in or by itself establish a requirement for the Transmission Owner to provide power for consumption at the developer's facilities. A separate agreement may be reached with the local utility that provides service in the area to ensure that infrastructure is in place to meet this demand and proper metering equipment is installed. It is the responsibility of the developer to contact the local service provider to determine if a local service agreement is required.

1. An Interconnection Customer entering the New Services Queue on or after October 1, 2012 with a proposed new Customer Facility that has a Maximum Facility Output equal to or greater than 100 MW shall install and maintain, at its expense, phasor measurement units (PMUs). See Section 8.5.3 of Appendix 2 to the Interconnection Service Agreement as well as section 4.3 of PJM Manual 14D for additional information.

2. The Interconnection Customer may be required to install and/or pay for metering as necessary to properly track real time output of the facility as well as installing metering which shall be used for billing purposes. See Section 8 of Appendix 2 to the Interconnection Service Agreement as well as Section 4 of PJM Manual 14D for additional information.

8 Revenue Metering and SCADA Requirements

8.1 PJM Requirements

The Interconnection Customer will be required to install equipment necessary to provide Revenue Metering (KWH, KVARH) and real time data (KW, KVAR) for IC's generating Resource. See PJM Manuals M-01 and M-14D, and PJM Tariff Section 8 of Attachment O.

8.2 Meteorological Data Reporting Requirements

The solar generation facility shall provide the Transmission Provider with site-specific meteorological data including:

- Back Panel temperature (Fahrenheit) - (Required for plants with Maximum Facility Output of 3 MW or higher)
- Irradiance (Watts/meter2) - (Required for plants with Maximum Facility Output of 3 MW or higher)
- Ambient air temperature (Fahrenheit) - (Accepted, not required)
- Wind speed (meters/second) - (Accepted, not required)
- Wind direction (decimal degrees from true north) - (Accepted, not required)

8.3 Interconnected Transmission Owner Requirements

The IC will be required to comply with all Interconnected Transmission Owner's revenue metering requirements for generation interconnection customers located at the following link:

http://www.pjm.com/planning/design-engineering/to-tech-standards/

9 Summer Peak - Load Flow Analysis - Primary POI

The Queue Project AG1-070 was evaluated as a 45.0 MW (Capacity 37.5 MW) injection at the Bon Ayr 69 kV substation in the EKPC area. Project AG1-070 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AG1-070 was studied with a commercial probability of 53.0 %. Potential network impacts were as follows:

9.1 Generation Deliverability

(Single or N-1 contingencies for the Capacity portion only of the interconnection)

None

9.2 Multiple Facility Contingency

(Double Circuit Tower Line, Fault with a Stuck Breaker, and Bus Fault contingencies for the full energy output)

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
166663324	342319	2SUMM SHAD J	69.0	EKPC	342322	2SUMM SHADE	69.0	EKPC	1	EKPC_P2-2_SUMMSHADE 161 #2	bus	98.0	98.29	106.96	DC	8.49

9.3 Contribution to Previously Identified Overloads

(This project contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
165224099	342287	2SOMERSET KU	69.0	EKPC	324531	2FERGUSON SO	69.0	LGEE	1	EKPC_P7-1_COOP 161 DBL 2	tower	105.0	104.46	105.87	DC	3.29
165223848	342718	5COOPER 2	161.0	EKPC	324141	5ELIHU	161.0	LGEE	1	EKPC_P2-2_LAUREL CO 161	bus	277.0	106.46	108.15	DC	4.67
165224114	342718	5COOPER 2	161.0	EKPC	324141	5ELIHU	161.0	LGEE	1	EKPC_P7-1_LAURL 161 DBL	tower	277.0	106.73	108.41	DC	4.66
166663319	940830	AE2-071 TAP	69.0	EKPC	342319	2SUMM SHAD J	69.0	EKPC	1	EKPC_P2-2_SUMMSHADE 161 #2	bus	63.0	109.2	116.68	DC	4.72
166663292	960170	AF2-308 TAP	69.0	EKPC	341287	2CENT HARDIN	69.0	EKPC	1	EKPC_P2-2_BONNIE 138/69	bus	98.0	118.98	120.28	DC	2.81

9.4 Potential Congestion due to Local Energy Deliverability

PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The developer can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.

Note: Only the most severely overloaded conditions are listed below. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed which shall study all overload conditions associated with the overloaded element(s) identified.

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
169323556	342718	5COOPER2	161.0	EKPC	324141	5ELIHU	161.0	LGEE	1	EKPC_P2-1_5LAUREL CO 161.00 TO 5LAUREL DAM 161.00	operation	277.0	106.4	108.09	DC	4.68

9.5 System Reinforcements - Summer Peak Load Flow - Primary POI

ID	Idx	Facility	Upgrade Description	Cost
166663292	5	**AF2-308 TAP 69.0 kV - 2CENT HARDIN 69.0 kV Ckt 1**	**EKPC** **EKPC-r0087 (1910) : Increase the maximum operating temperature of the 556 MCM ACSR conductor in the AF2-308 Tap-Central Hardin 69 kV line section to 302 degrees F (4.15 miles)** **Project Type : FAC** **Cost : $280,000** **Time Estimate : 9.0 Months**	$280,000
166663324	1	**2SUMM SHAD J 69.0 kV - 2SUMM SHADE 69.0 kV Ckt 1**	**EKPC** **r0065 (1866) : Increase the maximum operating temperature of the 556 MCM ACSR conductor in the Summer Shade-Summer Shade Junction 69 kV line section to 302 degrees F (0.2 mile)** **Project Type : FAC** **Cost : $10,000** **Time Estimate : 6.0 Months**	$10,000
165224099	2	**2SOMERSET KU 69.0 kV - 2FERGUSON SO 69.0 kV Ckt 1**	**EKPC** **r0077 (1878) : LGEE violation (non PJM area). EKPC emergency rating is 152 MVA.** **Project Type : FAC** **Cost : $0** **Time Estimate : 0.0 Months** **LGEE** **NonPJMArea (1886) : The external (i.e. Non-PJM) Transmission Owner, LGEE, will not evaluate this violation until the impact study phase.** **Project Type : FAC** **Cost : $0** **Time Estimate : 0.0 Months**	$0
166663319	4	**AE2-071 TAP 69.0 kV - 2SUMM SHAD J 69.0 kV Ckt 1**	**EKPC** **EKPC-r0113a (1970) : Increase the maximum operating temperature of the 266 MCM ACSR conductor in the AE2-071 Tap-Summer Shade Junction 69 kV line section to 266 degrees F (1.7 miles)** **Project Type : FAC** **Cost : $110,000** **Time Estimate : 9.0 Months**	$110,000

ID	Idx	Facility	Upgrade Description	Cost
165224114,165223848	3	**5COOPER2 161.0 kV - 5ELIHU 161.0 kV Ckt 1**	**EKPC** **r0076 (1877) : Increase the maximum operating temperature of the 795 MCM ACSR conductor in the Cooper-Elihu 161 kV line section to 275 degrees F (6.7 miles)** **Project Type : FAC** **Cost : $660,000** **Time Estimate : 9.0 Months** **LGEE** **NonPJMArea (1886) : The external (i.e. Non-PJM) Transmission Owner, LGEE, will not evaluate this violation until the impact study phase.** **Project Type : FAC** **Cost : $0** **Time Estimate : 0.0 Months**	$660,000
			TOTAL COST	**$1,060,000**

9.6 Flow Gate Details - Primary POI

The following indices contain additional information about each facility presented in the body of the report. For each index, a description of the flowgate and its contingency was included for convenience. The intent of the indices is to provide more details on which projects/generators have contributions to the flowgate in question. All New Service Queue Requests, through the end of the Queue under study, that are contributors to a flowgate will be listed in the indices. Please note that there may be contributors that are subsequently queued after the queue under study that are not listed in the indices. Although this information is not used "as is" for cost allocation purposes, it can be used to gage the impact of other projects/generators. It should be noted the project/generator MW contributions presented in the body of the report are Full MW Impact contributions which are also noted in the indices column named "Full MW Impact", whereas the loading percentages reported in the body of the report, take into consideration the PJM Generator Deliverability Test rules such as commercial probability of each project as well as the ramping impact of "Adder" contributions. The MW Impact found and used in the analysis is shown in the indices column named "Gendeliv MW Impact".

9.6.1 Index 1

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
166663324	342319	2SUMM SHAD J	EKPC	342322	2SUMM SHADE	EKPC	1	EKPC_P2-2_SUMMSHADE 161 #2	bus	98.0	98.29	106.96	DC	8.49

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
342442	2W GLASGOW	0.0316	50/50	0.0316
940045	AE1-246 C	13.1406	50/50	13.1406
940046	AE1-246 E	6.3270	50/50	6.3270
940831	AE2-071 C	9.9061	50/50	9.9061
940832	AE2-071 E	6.6041	50/50	6.6041
945381	AF1-203 C	5.6606	50/50	5.6606
945382	AF1-203 E	3.7738	50/50	3.7738
960741	AF2-365 C O1	3.3753	50/50	3.3753
960742	AF2-365 E O1	2.2502	50/50	2.2502
962221	AG1-067 C O1	8.4392	50/50	8.4392
962222	AG1-067 E O1	4.4918	50/50	4.4918
962241	AG1-070 C O1	7.0729	50/50	7.0729
962242	AG1-070 E O1	1.4146	50/50	1.4146
962251	AG1-071 C O1	8.4875	50/50	8.4875
962252	AG1-071 E O1	1.8861	50/50	1.8861
966031	AG1-472 C	7.8926	50/50	7.8926
966032	AG1-472 E	5.2618	50/50	5.2618
WEC	WEC	0.0309	Confirmed LTF	0.0309
CPLE	CPLE	0.0403	Confirmed LTF	0.0403
CBM-W2	CBM-W2	2.2400	Confirmed LTF	2.2400
NY	NY	0.0022	Confirmed LTF	0.0022
TVA	TVA	0.5166	Confirmed LTF	0.5166
O-066	O-066	0.0202	Confirmed LTF	0.0202
SIGE	SIGE	0.0173	Confirmed LTF	0.0173
CBM-S2	CBM-S2	0.8770	Confirmed LTF	0.8770
CBM-S1	CBM-S1	0.1083	Confirmed LTF	0.1083
G-007	G-007	0.0031	Confirmed LTF	0.0031
MEC	MEC	0.2654	Confirmed LTF	0.2654
TRIMBLE	TRIMBLE	0.0061	Confirmed LTF	0.0061
LAGN	LAGN	0.5390	Confirmed LTF	0.5390
CBM-W1	CBM-W1	1.2618	Confirmed LTF	1.2618

9.6.2 Index 2

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
165224099	342287	2SOMERSET KU	EKPC	324531	2FERGUSON SO	LGEE	1	EKPC_P7-1_COOP 161 DBL 2	tower	105.0	104.46	105.87	DC	3.29

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
342900	1COOPER1 G	4.9218	50/50	4.9218
342903	1COOPER2 G	9.5458	50/50	9.5458
939131	AE1-143 C	5.4221	Adder	6.38
939132	AE1-143 E	2.6857	Adder	3.16
940045	AE1-246 C	5.4632	Adder	6.43
940046	AE1-246 E	2.6305	Adder	3.09
940831	AE2-071 C	1.6233	Adder	1.91
940832	AE2-071 E	1.0822	Adder	1.27
943701	AF1-038 C	8.3977	50/50	8.3977
943702	AF1-038 E	5.5985	50/50	5.5985
943821	AF1-050 C	2.5575	Adder	3.01
943822	AF1-050 E	1.7050	Adder	2.01
944151	AF1-083 C O1	2.5256	Adder	2.97
944152	AF1-083 E O1	1.6837	Adder	1.98
944511	AF1-116 C	6.0808	Adder	7.15
944512	AF1-116 E	4.0539	Adder	4.77
945381	AF1-203 C	0.9276	Adder	1.09
945382	AF1-203 E	0.6184	Adder	0.73
960741	AF2-365 C O1	1.5231	Adder	1.79
960742	AF2-365 E O1	1.0154	Adder	1.19
962221	AG1-067 C O1	0.9274	Adder	2.06
962222	AG1-067 E O1	0.4936	Adder	1.1
962241	AG1-070 C O1	1.2361	Adder	2.74
962242	AG1-070 E O1	0.2472	Adder	0.55
962251	AG1-071 C O1	1.4833	Adder	3.29
962252	AG1-071 E O1	0.3296	Adder	0.73
964781	AG1-341 C O1	2.2790	Adder	5.06
964782	AG1-341 E O1	1.5193	Adder	3.37
964891	AG1-353 C	2.3239	Adder	5.16
964892	AG1-353 E	1.5493	Adder	3.44
964901	AG1-354 C	3.2939	Adder	7.31
964902	AG1-354 E	2.1959	Adder	4.87
965401	AG1-405 C	10.6088	50/50	10.6088
965402	AG1-405 E	7.0726	50/50	7.0726
965411	AG1-406	6.8244	50/50	6.8244
966021	AG1-471 C O1	5.1635	50/50	5.1635
966022	AG1-471 E O1	3.4423	50/50	3.4423
966031	AG1-472 C	1.5310	Adder	3.4
966032	AG1-472 E	1.0207	Adder	2.27
966191	AG1-488 C O1	1.8353	Adder	4.07
966192	AG1-488 E O1	1.2236	Adder	2.72

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
WEC	WEC	0.0652	Confirmed LTF	0.0652
CPLE	CPLE	0.0628	Confirmed LTF	0.0628
LGE-0012019	LGE-0012019	5.0017	LTF	5.0017
CBM-W2	CBM-W2	5.1878	Confirmed LTF	5.1878
NY	NY	0.0426	Confirmed LTF	0.0426
TVA	TVA	1.3454	Confirmed LTF	1.3454
O-066	O-066	0.5048	Confirmed LTF	0.5048
SIGE	SIGE	0.0489	Confirmed LTF	0.0489
CBM-S2	CBM-S2	1.7957	Confirmed LTF	1.7957
CBM-S1	CBM-S1	0.2983	Confirmed LTF	0.2983
G-007	G-007	0.0788	Confirmed LTF	0.0788
MEC	MEC	0.5848	Confirmed LTF	0.5848
LAGN	LAGN	1.2705	Confirmed LTF	1.2705
CBM-W1	CBM-W1	2.5797	Confirmed LTF	2.5797

9.6.3 Index 3

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
165224114	342718	5COOPER2	EKPC	324141	5ELIHU	LGEE	1	EKPC_P7-1_LAURL 161 DBL	tower	277.0	106.73	108.41	DC	4.66

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
342442	2W GLASGOW	0.0165	50/50	0.0165
342900	1COOPER1 G	10.1486	50/50	10.1486
342903	1COOPER2 G	19.7433	50/50	19.7433
342945	1LAUREL 1G	6.1423	50/50	6.1423
939131	AE1-143 C	9.9773	50/50	9.9773
939132	AE1-143 E	4.9420	50/50	4.9420
940045	AE1-246 C	9.3685	50/50	9.3685
940046	AE1-246 E	4.5107	50/50	4.5107
940831	AE2-071 C	2.5509	50/50	2.5509
940832	AE2-071 E	1.7006	50/50	1.7006
942411	AE2-254 C O1	1.3451	Adder	1.58
942412	AE2-254 E O1	0.8967	Adder	1.05
943701	AF1-038 C	6.6586	50/50	6.6586
943702	AF1-038 E	4.4390	50/50	4.4390
943821	AF1-050 C	4.5025	50/50	4.5025
943822	AF1-050 E	3.0017	50/50	3.0017
944151	AF1-083 C O1	4.5583	50/50	4.5583
944152	AF1-083 E O1	3.0389	50/50	3.0389
944511	AF1-116 C	11.1895	50/50	11.1895
944512	AF1-116 E	7.4597	50/50	7.4597
945381	AF1-203 C	1.4576	50/50	1.4576
945382	AF1-203 E	0.9718	50/50	0.9718
960741	AF2-365 C O1	2.2040	Adder	2.59
960742	AF2-365 E O1	1.4693	Adder	1.73
962221	AG1-067 C O1	2.8138	50/50	2.8138
962222	AG1-067 E O1	1.4977	50/50	1.4977
962241	AG1-070 C O1	3.8850	50/50	3.8850
962242	AG1-070 E O1	0.7770	50/50	0.7770
962251	AG1-071 C O1	4.6620	50/50	4.6620
962252	AG1-071 E O1	1.0360	50/50	1.0360
964781	AG1-341 C O1	7.3763	50/50	7.3763
964782	AG1-341 E O1	4.9176	50/50	4.9176
964891	AG1-353 C	7.8586	50/50	7.8586
964892	AG1-353 E	5.2391	50/50	5.2391
964901	AG1-354 C	10.7820	50/50	10.7820
964902	AG1-354 E	7.1880	50/50	7.1880
965401	AG1-405 C	3.9234	50/50	3.9234
965402	AG1-405 E	2.6156	50/50	2.6156
965411	AG1-406	2.5238	50/50	2.5238
966021	AG1-471 C O1	7.2990	50/50	7.2990
966022	AG1-471 E O1	4.8660	50/50	4.8660

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
966031	AG1-472 C	4.8624	50/50	4.8624
966032	AG1-472 E	3.2416	50/50	3.2416
966191	AG1-488 C O1	6.3433	50/50	6.3433
966192	AG1-488 E O1	4.2288	50/50	4.2288
WEC	WEC	0.0787	Confirmed LTF	0.0787
CPLE	CPLE	0.0874	Confirmed LTF	0.0874
LGE-0012019	LGE-0012019	7.7561	LTF	7.7561
CBM-W2	CBM-W2	7.4368	Confirmed LTF	7.4368
NY	NY	0.0868	Confirmed LTF	0.0868
TVA	TVA	2.0090	Confirmed LTF	2.0090
O-066	O-066	1.0364	Confirmed LTF	1.0364
SIGE	SIGE	0.0700	Confirmed LTF	0.0700
CBM-S2	CBM-S2	2.6726	Confirmed LTF	2.6726
CBM-S1	CBM-S1	0.4378	Confirmed LTF	0.4378
G-007	G-007	0.1617	Confirmed LTF	0.1617
MEC	MEC	0.7945	Confirmed LTF	0.7945
LAGN	LAGN	1.8725	Confirmed LTF	1.8725
CBM-W1	CBM-W1	3.0283	Confirmed LTF	3.0283

9.6.4 Index 4

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
166663319	940830	AE2-071 TAP	EKPC	342319	2SUMM SHAD J	EKPC	1	EKPC_P2-2_SUMMSHADE 161 #2	bus	63.0	109.2	116.68	DC	4.72

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
342442	2W GLASGOW	0.0176	50/50	0.0176
940045	AE1-246 C	6.2055	Adder	7.3
940046	AE1-246 E	2.9878	Adder	3.52
940831	AE2-071 C	13.9033	50/50	13.9033
940832	AE2-071 E	9.2688	50/50	9.2688
945381	AF1-203 C	7.9447	50/50	7.9447
945382	AF1-203 E	5.2965	50/50	5.2965
960741	AF2-365 C O1	1.5940	Adder	1.88
960742	AF2-365 E O1	1.0627	Adder	1.25
962221	AG1-067 C O1	0.9445	Adder	2.1
962222	AG1-067 E O1	0.5027	Adder	1.12
962241	AG1-070 C O1	3.9296	50/50	3.9296
962242	AG1-070 E O1	0.7859	50/50	0.7859
962251	AG1-071 C O1	4.7156	50/50	4.7156
962252	AG1-071 E O1	1.0479	50/50	1.0479
966031	AG1-472 C	1.9756	Adder	4.39
966032	AG1-472 E	1.3170	Adder	2.92
WEC	WEC	0.0170	Confirmed LTF	0.0170
CPLE	CPLE	0.0218	Confirmed LTF	0.0218
CBM-W2	CBM-W2	1.2365	Confirmed LTF	1.2365
NY	NY	0.0017	Confirmed LTF	0.0017
TVA	TVA	0.2870	Confirmed LTF	0.2870
O-066	O-066	0.0135	Confirmed LTF	0.0135
SIGE	SIGE	0.0096	Confirmed LTF	0.0096
CBM-S2	CBM-S2	0.4802	Confirmed LTF	0.4802
CBM-S1	CBM-S1	0.0600	Confirmed LTF	0.0600
G-007	G-007	0.0021	Confirmed LTF	0.0021
MEC	MEC	0.1478	Confirmed LTF	0.1478
TRIMBLE	TRIMBLE	0.0039	Confirmed LTF	0.0039
LAGN	LAGN	0.2992	Confirmed LTF	0.2992
CBM-W1	CBM-W1	0.6870	Confirmed LTF	0.6870

9.6.5 Index 5

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
166663292	960170	AF2-308 TAP	EKPC	341287	2CENT HARDIN	EKPC	1	EKPC_P2-2_BONNIE 138/69	bus	98.0	118.98	120.28	DC	2.81

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
959691	AF2-260 C	37.3710	50/50	37.3710
959692	AF2-260 E	18.6855	50/50	18.6855
960171	AF2-308	18.5105	50/50	18.5105
960181	AF2-309 C	27.7658	50/50	27.7658
960182	AF2-309 E	18.5105	50/50	18.5105
960741	AF2-365 C O1	5.1435	50/50	5.1435
960742	AF2-365 E O1	3.4290	50/50	3.4290
961003	AF2-391 BAT	17.4480	50/50	17.4480
962241	AG1-070 C O1	1.0565	Adder	2.35
962242	AG1-070 E O1	0.2113	Adder	0.47
962251	AG1-071 C O1	1.2678	Adder	2.81
962252	AG1-071 E O1	0.2817	Adder	0.63
962473	AG1-096 BAT	0.7350	Merchant Transmission	0.7350
964571	AG1-320 C O1	21.9408	50/50	21.9408
964572	AG1-320 E O1	10.8903	50/50	10.8903
966031	AG1-472 C	1.8175	Adder	4.03
966032	AG1-472 E	1.2117	Adder	2.69
WEC	WEC	0.0101	Confirmed LTF	0.0101
CPLE	CPLE	0.0976	Confirmed LTF	0.0976
G-007A	G-007A	0.0288	Confirmed LTF	0.0288
VFT	VFT	0.0774	Confirmed LTF	0.0774
CBM-W2	CBM-W2	2.1862	Confirmed LTF	2.1862
TVA	TVA	0.6804	Confirmed LTF	0.6804
CBM-S2	CBM-S2	1.9732	Confirmed LTF	1.9732
CBM-S1	CBM-S1	0.1193	Confirmed LTF	0.1193
CBM-N	CBM-N	0.0132	Confirmed LTF	0.0132
MEC	MEC	0.2050	Confirmed LTF	0.2050
GIBSON	GIBSON	0.0628	Confirmed LTF	0.0628
BLUEG	BLUEG	0.9097	Confirmed LTF	0.9097
TRIMBLE	TRIMBLE	0.2560	Confirmed LTF	0.2560
LAGN	LAGN	0.6562	Confirmed LTF	0.6562
CBM-W1	CBM-W1	0.4627	Confirmed LTF	0.4627

9.7 Queue Dependencies – Primary POI

The Queue Projects below are listed in one or more indices for the overloads identified in your report. These projects contribute to the loading of the overloaded facilities identified in your report. The percent overload of a facility and cost allocation you may have towards a particular reinforcement could vary depending on the action of these earlier projects. The status of each project at the time of the analysis is presented in the table. This list may change as earlier projects withdraw or modify their requests.

Queue Number	Project Name	Status
AE1-143	Marion County 161 kV	Engineering and Procurement
AE1-246	Barren County-Summer Shade 161 kV	Active
AE2-071	Patton Rd-Summer Shade 69 kV	Active
AE2-254	Garrard County-Tommy-Gooch 69 kV	Active
AF1-038	Sewellton Jct-Webbs Crossroads 69 kV	Active
AF1-050	Summer Shade - Green County 161 kV	Active
AF1-083	Green County-Saloma 161 kV	Active
AF1-116	Marion County 161 kV	Active
AF1-203	Patton Rd-Summer Shade 69 kV	Active
AF2-260	Stephensburg 69 kV	Active
AF2-308	Central Hardin-Stephensburg 69 kV	Active
AF2-309	Central Hardin-Stephensburg 69 kV	Active
AF2-365	Munfordville KU Tap-Horse Cave Jct. 69 kV	Active
AF2-391	Central Hardin 69 kV	Active
AG1-067	Temple Hill 69 kV	Active
AG1-070	Bon Ayr 69 kV	Active
AG1-071	Bon Ayr 69 kV	Active
AG1-096	Rineyville 69 kV	Active
AG1-320	Glendale-Stephensburg 69 kV	Active
AG1-341	Summer Shade 161 kV	Active
AG1-353	Greene County-Marion County 161 kV	Active
AG1-354	Summershade-Green County 161 kV	Active
AG1-405	Walnut Grove-Asahi 69 kV	Active
AG1-406	Walnut Grove-Asahi 69 kV	Active
AG1-471	Up Church-Wayne County 69 kV	Active
AG1-472	Seymour-Cave City 69 kV	Active
AG1-488	Marion IP 161 kV	Active

9.8 Contingency Descriptions - Primary POI

Contingency Name	Contingency Definition
EKPC_P2-2_LAUREL CO 161	CONTINGENCY 'EKPC_P2-2_LAUREL CO 161' /* LAUREL 161 BUS OPEN BUS 342754 /* 5LAUREL CO END
EKPC_P2-2_BONNIE 138/69	CONTINGENCY 'EKPC_P2-2_BONNIE 138/69' /* KU BONNIEVILLE 138/69 TIE OPEN BUS 324213 /* 4BONNIE END
EKPC_P7-1_COOP 161 DBL 2	CONTINGENCY 'EKPC_P7-1_COOP 161 DBL 2' /* COOPER - ELIHU 161 & COOPER - LAUREL DAM 161 OPEN BRANCH FROM BUS 324141 TO BUS 342718 CKT 1 /* 324141 5ELIHU 161.00 342718 5COOPER2 161.00 OPEN BRANCH FROM BUS 342718 TO BUS 342757 CKT 1 /* 342718 5COOPER2 161.00 342757 5LAUREL DAM 161.00 END
EKPC_P7-1_LAURL 161 DBL	CONTINGENCY 'EKPC_P7-1_LAURL 161 DBL' /* LAUREL CO - LAUREL DAM 161 & LAUREL CO - TYNER 161 OPEN BRANCH FROM BUS 342754 TO BUS 342757 CKT 1 /* 342754 5LAUREL CO 161.00 342757 5LAUREL DAM 161.00 OPEN BRANCH FROM BUS 342754 TO BUS 342781 CKT 1 /* 342754 5LAUREL CO 161.00 342781 5PITTSBURG 161.00 OPEN BRANCH FROM BUS 342781 TO BUS 342820 CKT 1 /* 342781 5PITTSBURG 161.00 342820 5TYNER 161.00 END
EKPC_P2-2_SUMMSHADE 161 #2	CONTINGENCY 'EKPC_P2-2_SUMMSHADE 161 #2' /* SUMMERSHADE 161 BUS OPEN BRANCH FROM BUS 964900 TO BUS 342814 CKT 1 /* 964900 AG1-354 TAP 161.00 342814 5SUMM SHADE 161.00 OPEN BRANCH FROM BUS 940040 TO BUS 342814 CKT 1 OPEN BUS 342814 END
EKPC_P2-1_5LAUREL CO 161.00 TO 5LAUREL DAM 161.00	CONTINGENCY 'EKPC_P2-1_5LAUREL CO 161.00 TO 5LAUREL DAM 161.00' OPEN BRANCH FROM BUS 342754 TO BUS 342757 CKT 1 /*5LAUREL CO 161.005LAUREL DAM 161.00 END

10 Short Circuit Analysis - Primary POI

The following Breakers are overdutied

None.

11 Summer Peak - Load Flow Analysis - Secondary POI

The Queue Project AG1-070 was evaluated as a 45.0 MW (Capacity 37.5 MW) injection tapping the Bon Ayr to Cave City 69 kV line in the EKPC area. Project AG1-070 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AG1-070 was studied with a commercial probability of 53.0 %. Potential network impacts were as follows:

11.1 Generation Deliverability

(Single or N-1 contingencies for the Capacity portion only of the interconnection)

None

11.2 Multiple Facility Contingency

(Double Circuit Tower Line, Fault with a Stuck Breaker, and Bus Fault contingencies for the full energy output)

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
166663324	342319	2SUMM SHAD J	69.0	EKPC	342322	2SUMM SHADE	69.0	EKPC	1	EKPC_P2-2_SUMMSHADE 161 #2	bus	98.0	98.36	106.92	DC	8.39
173786912	342319	2SUMM SHAD J	69.0	EKPC	342322	2SUMM SHADE	69.0	EKPC	1	EKPC_P2-3_SSHAD S11-1044	breaker	98.0	99.46	108.12	DC	8.49

11.3 Contribution to Previously Identified Overloads

(This project contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
165224099	342287	2SOMERSET KU	69.0	EKPC	324531	2FERGUSON SO	69.0	LGEE	1	EKPC_P7-1_COOP 161 DBL 2	tower	105.0	104.46	105.87	DC	3.28
165223848	342718	5COOPER 2	161.0	EKPC	324141	5ELIHU	161.0	LGEE	1	EKPC_P2-2_LAUREL CO 161	bus	277.0	106.46	108.15	DC	4.66
165224114	342718	5COOPER 2	161.0	EKPC	324141	5ELIHU	161.0	LGEE	1	EKPC_P7-1_LAURL 161 DBL	tower	277.0	106.73	108.41	DC	4.65
173970135	342718	5COOPER 2	161.0	EKPC	324141	5ELIHU	161.0	LGEE	1	EKPC_P4-5_LAURL S50-1024	breaker	277.0	106.73	108.41	DC	4.65
166663319	940830	AE2-071 TAP	69.0	EKPC	342319	2SUMM SHAD J	69.0	EKPC	1	EKPC_P2-2_SUMMSHADE 161 #2	bus	63.0	109.08	116.48	DC	4.66
173786915	940830	AE2-071 TAP	69.0	EKPC	342319	2SUMM SHAD J	69.0	EKPC	1	EKPC_P4-2_SSHAD S11-1004	breaker	63.0	109.08	116.48	DC	4.66
172210391	960170	AF2-308 TAP	69.0	EKPC	966220	AG1-491 TAP	69.0	EKPC	1	EKPC_P2-2_BONNIE 138/69	bus	98.0	118.98	120.32	DC	2.91

11.4 Potential Congestion due to Local Energy Deliverability

PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The developer can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.

Note: Only the most severely overloaded conditions are listed below. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed which shall study all overload conditions associated with the overloaded element(s) identified.

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
169323556	342718	5COOPER 2	161.0	EKPC	324141	5ELIHU	161.0	LGEE	1	EKPC_P2-1_5LAUREL CO 161.00 TO 5LAUREL DAM 161.00	operation	277.0	106.41	108.09	DC	4.67

11.5 Flow Gate Details - Secondary POI

The following indices contain additional information about each facility presented in the body of the report. For each index, a description of the flowgate and its contingency was included for convenience. The intent of the indices is to provide more details on which projects/generators have contributions to the flowgate in question. All New Service Queue Requests, through the end of the Queue under study, that are contributors to a flowgate will be listed in the indices. Please note that there may be contributors that are subsequently queued after the queue under study that are not listed in the indices. Although this information is not used "as is" for cost allocation purposes, it can be used to gage the impact of other projects/generators. It should be noted the project/generator MW contributions presented in the body of the report are Full MW Impact contributions which are also noted in the indices column named "Full MW Impact", whereas the loading percentages reported in the body of the report, take into consideration the PJM Generator Deliverability Test rules such as commercial probability of each project as well as the ramping impact of "Adder" contributions. The MW Impact found and used in the analysis is shown in the indices column named "Gendeliv MW Impact".

11.5.1 Index 1

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
173786912	342319	2SUMM SHAD J	EKPC	342322	2SUMM SHADE	EKPC	1	EKPC_P2-3_SSHAD S11-1044	breaker	98.0	99.46	108.12	DC	8.49

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
342442	2W GLASGOW	0.0320	50/50	0.0320
940045	AE1-246 C	13.3018	50/50	13.3018
940046	AE1-246 E	6.4046	50/50	6.4046
940831	AE2-071 C	9.9485	50/50	9.9485
940832	AE2-071 E	6.6324	50/50	6.6324
945381	AF1-203 C	5.6849	50/50	5.6849
945382	AF1-203 E	3.7899	50/50	3.7899
960741	AF2-365 C O1	3.4173	50/50	3.4173
960742	AF2-365 E O1	2.2782	50/50	2.2782
962221	AG1-067 C O2	8.5379	50/50	8.5379
962222	AG1-067 E O2	4.5444	50/50	4.5444
962241	AG1-070 C O2	7.0729	50/50	7.0729
962242	AG1-070 E O2	1.4146	50/50	1.4146
962251	AG1-071 C O2	8.4875	50/50	8.4875
962252	AG1-071 E O2	1.8861	50/50	1.8861
966031	AG1-472 C O2	6.7090	50/50	6.7090
966032	AG1-472 E O2	4.4726	50/50	4.4726
WEC	WEC	0.0309	Confirmed LTF	0.0309
CPLE	CPLE	0.0505	Confirmed LTF	0.0505
CBM-W2	CBM-W2	2.4192	Confirmed LTF	2.4192
NY	NY	0.0017	Confirmed LTF	0.0017
TVA	TVA	0.5838	Confirmed LTF	0.5838
O-066	O-066	0.0135	Confirmed LTF	0.0135
SIGE	SIGE	0.0154	Confirmed LTF	0.0154
CBM-S2	CBM-S2	1.0858	Confirmed LTF	1.0858
CBM-S1	CBM-S1	0.1197	Confirmed LTF	0.1197
G-007	G-007	0.0021	Confirmed LTF	0.0021
MEC	MEC	0.2797	Confirmed LTF	0.2797
BLUEG	BLUEG	0.1007	Confirmed LTF	0.1007
TRIMBLE	TRIMBLE	0.0367	Confirmed LTF	0.0367
LAGN	LAGN	0.6003	Confirmed LTF	0.6003
CBM-W1	CBM-W1	1.2618	Confirmed LTF	1.2618

11.5.2 Index 2

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
165224099	342287	2SOMERSET KU	EKPC	324531	2FERGUSON SO	LGEE	1	EKPC_P7-1_COOP 161 DBL 2	tower	105.0	104.46	105.87	DC	3.28

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
342900	1COOPER1 G	4.9218	50/50	4.9218
342903	1COOPER2 G	9.5458	50/50	9.5458
939131	AE1-143 C	5.4221	Adder	6.38
939132	AE1-143 E	2.6857	Adder	3.16
940045	AE1-246 C	5.4632	Adder	6.43
940046	AE1-246 E	2.6305	Adder	3.09
940831	AE2-071 C	1.6233	Adder	1.91
940832	AE2-071 E	1.0822	Adder	1.27
943701	AF1-038 C	8.3977	50/50	8.3977
943702	AF1-038 E	5.5985	50/50	5.5985
943821	AF1-050 C	2.5575	Adder	3.01
943822	AF1-050 E	1.7050	Adder	2.01
944151	AF1-083 C O1	2.5256	Adder	2.97
944152	AF1-083 E O1	1.6837	Adder	1.98
944511	AF1-116 C	6.0808	Adder	7.15
944512	AF1-116 E	4.0539	Adder	4.77
945381	AF1-203 C	0.9276	Adder	1.09
945382	AF1-203 E	0.6184	Adder	0.73
960741	AF2-365 C O1	1.5231	Adder	1.79
960742	AF2-365 E O1	1.0154	Adder	1.19
962221	AG1-067 C O2	0.9285	Adder	2.06
962222	AG1-067 E O2	0.4942	Adder	1.1
962241	AG1-070 C O2	1.2324	Adder	2.74
962242	AG1-070 E O2	0.2465	Adder	0.55
962251	AG1-071 C O2	1.4789	Adder	3.28
962252	AG1-071 E O2	0.3286	Adder	0.73
964781	AG1-341 C O2	2.6451	Adder	5.87
964782	AG1-341 E O2	1.7634	Adder	3.91
964891	AG1-353 C	2.3239	Adder	5.16
964892	AG1-353 E	1.5493	Adder	3.44
964901	AG1-354 C	3.2939	Adder	7.31
964902	AG1-354 E	2.1959	Adder	4.87
965401	AG1-405 C	10.6088	50/50	10.6088
965402	AG1-405 E	7.0726	50/50	7.0726
965411	AG1-406	6.8244	50/50	6.8244
966021	AG1-471 C O2	5.2283	50/50	5.2283
966022	AG1-471 E O2	3.4855	50/50	3.4855
966031	AG1-472 C O2	1.4123	Adder	3.13
966032	AG1-472 E O2	0.9415	Adder	2.09
966191	AG1-488 C O2	1.8800	Adder	4.17
966192	AG1-488 E O2	1.2533	Adder	2.78

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
WEC	WEC	0.0652	Confirmed LTF	0.0652
CPLE	CPLE	0.0628	Confirmed LTF	0.0628
LGE-0012019	LGE-0012019	5.0017	LTF	5.0017
CBM-W2	CBM-W2	5.1878	Confirmed LTF	5.1878
NY	NY	0.0426	Confirmed LTF	0.0426
TVA	TVA	1.3454	Confirmed LTF	1.3454
O-066	O-066	0.5048	Confirmed LTF	0.5048
SIGE	SIGE	0.0489	Confirmed LTF	0.0489
CBM-S2	CBM-S2	1.7957	Confirmed LTF	1.7957
CBM-S1	CBM-S1	0.2983	Confirmed LTF	0.2983
G-007	G-007	0.0788	Confirmed LTF	0.0788
MEC	MEC	0.5848	Confirmed LTF	0.5848
LAGN	LAGN	1.2705	Confirmed LTF	1.2705
CBM-W1	CBM-W1	2.5797	Confirmed LTF	2.5797

11.5.3 Index 3

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
173970135	342718	5COOPER2	EKPC	324141	5ELIHU	LGEE	1	EKPC_P4-5_LAURL S50-1024	breaker	277.0	106.73	108.41	DC	4.65

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
342442	2W GLASGOW	0.0165	50/50	0.0165
342900	1COOPER1 G	10.1486	50/50	10.1486
342903	1COOPER2 G	19.7433	50/50	19.7433
342945	1LAUREL 1G	6.1423	50/50	6.1423
939131	AE1-143 C	9.9773	50/50	9.9773
939132	AE1-143 E	4.9420	50/50	4.9420
940045	AE1-246 C	9.3685	50/50	9.3685
940046	AE1-246 E	4.5107	50/50	4.5107
940831	AE2-071 C	2.5509	50/50	2.5509
940832	AE2-071 E	1.7006	50/50	1.7006
942411	AE2-254 C O1	1.3451	Adder	1.58
942412	AE2-254 E O1	0.8967	Adder	1.05
943701	AF1-038 C	6.6586	50/50	6.6586
943702	AF1-038 E	4.4390	50/50	4.4390
943821	AF1-050 C	4.5025	50/50	4.5025
943822	AF1-050 E	3.0017	50/50	3.0017
944151	AF1-083 C O1	4.5583	50/50	4.5583
944152	AF1-083 E O1	3.0389	50/50	3.0389
944511	AF1-116 C	11.1895	50/50	11.1895
944512	AF1-116 E	7.4597	50/50	7.4597
945381	AF1-203 C	1.4576	50/50	1.4576
945382	AF1-203 E	0.9718	50/50	0.9718
960741	AF2-365 C O1	2.2040	Adder	2.59
960742	AF2-365 E O1	1.4693	Adder	1.73
962221	AG1-067 C O2	2.8165	50/50	2.8165
962222	AG1-067 E O2	1.4991	50/50	1.4991
962241	AG1-070 C O2	3.8768	50/50	3.8768
962242	AG1-070 E O2	0.7754	50/50	0.7754
962251	AG1-071 C O2	4.6521	50/50	4.6521
962252	AG1-071 E O2	1.0338	50/50	1.0338
964781	AG1-341 C O2	7.8139	50/50	7.8139
964782	AG1-341 E O2	5.2093	50/50	5.2093
964891	AG1-353 C	7.8586	50/50	7.8586
964892	AG1-353 E	5.2391	50/50	5.2391
964901	AG1-354 C	10.7820	50/50	10.7820
964902	AG1-354 E	7.1880	50/50	7.1880
965401	AG1-405 C	3.9234	50/50	3.9234
965402	AG1-405 E	2.6156	50/50	2.6156
965411	AG1-406	2.5238	50/50	2.5238
966021	AG1-471 C O2	7.4002	50/50	7.4002
966022	AG1-471 E O2	4.9334	50/50	4.9334

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
966031	AG1-472 C O2	2.0318	Adder	4.51
966032	AG1-472 E O2	1.3545	Adder	3.01
966191	AG1-488 C O2	6.5272	50/50	6.5272
966192	AG1-488 E O2	4.3515	50/50	4.3515
WEC	WEC	0.0787	Confirmed LTF	0.0787
CPLE	CPLE	0.0874	Confirmed LTF	0.0874
LGE-0012019	LGE-0012019	7.7561	LTF	7.7561
CBM-W2	CBM-W2	7.4368	Confirmed LTF	7.4368
NY	NY	0.0868	Confirmed LTF	0.0868
TVA	TVA	2.0090	Confirmed LTF	2.0090
O-066	O-066	1.0364	Confirmed LTF	1.0364
SIGE	SIGE	0.0700	Confirmed LTF	0.0700
CBM-S2	CBM-S2	2.6726	Confirmed LTF	2.6726
CBM-S1	CBM-S1	0.4378	Confirmed LTF	0.4378
G-007	G-007	0.1617	Confirmed LTF	0.1617
MEC	MEC	0.7945	Confirmed LTF	0.7945
LAGN	LAGN	1.8725	Confirmed LTF	1.8725
CBM-W1	CBM-W1	3.0283	Confirmed LTF	3.0283

11.5.4 Index 4

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
173786915	940830	AE2-071 TAP	EKPC	342319	2SUMM SHAD J	EKPC	1	EKPC_P4-2_SSHAD S11-1004	breaker	63.0	109.08	116.48	DC	4.66

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
342442	2W GLASGOW	0.0176	50/50	0.0176
940045	AE1-246 C	6.2055	Adder	7.3
940046	AE1-246 E	2.9878	Adder	3.52
940831	AE2-071 C	13.9033	50/50	13.9033
940832	AE2-071 E	9.2688	50/50	9.2688
945381	AF1-203 C	7.9447	50/50	7.9447
945382	AF1-203 E	5.2965	50/50	5.2965
960741	AF2-365 C O1	1.5940	Adder	1.88
960742	AF2-365 E O1	1.0627	Adder	1.25
962221	AG1-067 C O2	0.8973	Adder	1.99
962222	AG1-067 E O2	0.4776	Adder	1.06
962241	AG1-070 C O2	3.8824	50/50	3.8824
962242	AG1-070 E O2	0.7765	50/50	0.7765
962251	AG1-071 C O2	4.6588	50/50	4.6588
962252	AG1-071 E O2	1.0353	50/50	1.0353
966031	AG1-472 C O2	1.6588	Adder	3.68
966032	AG1-472 E O2	1.1059	Adder	2.45
WEC	WEC	0.0170	Confirmed LTF	0.0170
CPLE	CPLE	0.0218	Confirmed LTF	0.0218
CBM-W2	CBM-W2	1.2365	Confirmed LTF	1.2365
NY	NY	0.0017	Confirmed LTF	0.0017
TVA	TVA	0.2870	Confirmed LTF	0.2870
O-066	O-066	0.0135	Confirmed LTF	0.0135
SIGE	SIGE	0.0096	Confirmed LTF	0.0096
CBM-S2	CBM-S2	0.4802	Confirmed LTF	0.4802
CBM-S1	CBM-S1	0.0600	Confirmed LTF	0.0600
G-007	G-007	0.0021	Confirmed LTF	0.0021
MEC	MEC	0.1478	Confirmed LTF	0.1478
TRIMBLE	TRIMBLE	0.0039	Confirmed LTF	0.0039
LAGN	LAGN	0.2992	Confirmed LTF	0.2992
CBM-W1	CBM-W1	0.6870	Confirmed LTF	0.6870

11.5.5 Index 5

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
172210391	960170	AF2-308 TAP	EKPC	966220	AG1-491 TAP	EKPC	1	EKPC_P2-2_BONNIE 138/69	bus	98.0	118.98	120.32	DC	2.91

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
959691	AF2-260 C	37.3710	50/50	37.3710
959692	AF2-260 E	18.6855	50/50	18.6855
960171	AF2-308	18.5105	50/50	18.5105
960181	AF2-309 C	27.7658	50/50	27.7658
960182	AF2-309 E	18.5105	50/50	18.5105
960741	AF2-365 C O1	5.1435	50/50	5.1435
960742	AF2-365 E O1	3.4290	50/50	3.4290
961003	AF2-391 BAT	17.4480	50/50	17.4480
962241	AG1-070 C O2	1.0907	Adder	2.42
962242	AG1-070 E O2	0.2181	Adder	0.48
962251	AG1-071 C O2	1.3088	Adder	2.91
962252	AG1-071 E O2	0.2908	Adder	0.65
962473	AG1-096 BAT	0.7330	Merchant Transmission	0.7330
964571	AG1-320 C O2	17.7273	50/50	17.7273
964572	AG1-320 E O2	8.7989	50/50	8.7989
966031	AG1-472 C O2	6.1210	50/50	6.1210
966032	AG1-472 E O2	4.0806	50/50	4.0806
WEC	WEC	0.0101	Confirmed LTF	0.0101
CPLE	CPLE	0.0976	Confirmed LTF	0.0976
G-007A	G-007A	0.0288	Confirmed LTF	0.0288
VFT	VFT	0.0774	Confirmed LTF	0.0774
CBM-W2	CBM-W2	2.1862	Confirmed LTF	2.1862
TVA	TVA	0.6804	Confirmed LTF	0.6804
CBM-S2	CBM-S2	1.9732	Confirmed LTF	1.9732
CBM-S1	CBM-S1	0.1193	Confirmed LTF	0.1193
CBM-N	CBM-N	0.0132	Confirmed LTF	0.0132
MEC	MEC	0.2050	Confirmed LTF	0.2050
GIBSON	GIBSON	0.0628	Confirmed LTF	0.0628
BLUEG	BLUEG	0.9097	Confirmed LTF	0.9097
TRIMBLE	TRIMBLE	0.2560	Confirmed LTF	0.2560
LAGN	LAGN	0.6562	Confirmed LTF	0.6562
CBM-W1	CBM-W1	0.4627	Confirmed LTF	0.4627

11.6 Contingency Descriptions - Secondary POI

Contingency Name	Contingency Definition
EKPC_P2-1_5LAUREL CO 161.00 TO 5LAUREL DAM 161.00	CONTINGENCY 'EKPC_P2-1_5LAUREL CO 161.00 TO 5LAUREL DAM 161.00' / 563 OPEN BRANCH FROM BUS 342754 TO BUS 342757 CKT 1 / 342754 5LAUREL CO 161 342757 5LAUREL DAM 161 1 END
EKPC_P4-2_SSHAD S11-1004	CONTINGENCY 'EKPC_P4-2_SSHAD S11-1004' / 71 OPEN BRANCH FROM BUS 342814 TO BUS 940040 CKT 1 / 342814 5SUMM SHADE 161 940040 AE1-246 TAP 161 1 OPEN BRANCH FROM BUS 342814 TO BUS 361788 CKT 1 / 342814 5SUMM SHADE 161 361788 5SUM SHAD TP 161 1 OPEN BRANCH FROM BUS 342814 TO BUS 964900 CKT 1 / 342814 5SUMM SHADE 161 964900 AG1-354 TAP 161 1 OPEN BRANCH FROM BUS 342814 TO BUS 360334 CKT 1 / 342814 5SUMM SHADE 161 360334 5SUMMER SHAD 161 1 OPEN BRANCH FROM BUS 342814 TO BUS 342322 CKT 1 / 342814 5SUMM SHADE 161 342322 2SUMM SHADE 69.0 1 END
EKPC_P2-2_LAUREL CO 161	CONTINGENCY 'EKPC_P2-2_LAUREL CO 161' /* LAUREL 161 BUS OPEN BUS 342754 /* 5LAUREL CO END
EKPC_P2-2_BONNIE 138/69	CONTINGENCY 'EKPC_P2-2_BONNIE 138/69' /* KU BONNIEVILLE 138/69 TIE OPEN BUS 324213 /* 4BONNIE END
EKPC_P7-1_COOP 161 DBL 2	CONTINGENCY 'EKPC_P7-1_COOP 161 DBL 2' /* COOPER - ELIHU 161 & COOPER - LAUREL DAM 161 OPEN BRANCH FROM BUS 324141 TO BUS 342718 CKT 1 /* 324141 5ELIHU 161.00 342718 5COOPER2 161.00 OPEN BRANCH FROM BUS 342718 TO BUS 342757 CKT 1 /* 342718 5COOPER2 161.00 342757 5LAUREL DAM 161.00 END
EKPC_P7-1_LAURL 161 DBL	CONTINGENCY 'EKPC_P7-1_LAURL 161 DBL' /* LAUREL CO - LAUREL DAM 161 & LAUREL CO - TYNER 161 OPEN BRANCH FROM BUS 342754 TO BUS 342757 CKT 1 /* 342754 5LAUREL CO 161.00 342757 5LAUREL DAM 161.00 OPEN BRANCH FROM BUS 342754 TO BUS 342781 CKT 1 /* 342754 5LAUREL CO 161.00 342781 5PITTSBURG 161.00 OPEN BRANCH FROM BUS 342781 TO BUS 342820 CKT 1 /* 342781 5PITTSBURG 161.00 342820 5TYNER 161.00 END

Contingency Name	Contingency Definition
EKPC_P2-2_SUMMSHADE 161 #2	CONTINGENCY 'EKPC_P2-2_SUMMSHADE 161 #2' /* SUMMERSHADE 161 BUS OPEN BRANCH FROM BUS 964900 TO BUS 342814 CKT 1 /* 964900 AG1-354 TAP 161.00 342814 5SUMM SHADE 161.00 OPEN BRANCH FROM BUS 940040 TO BUS 342814 CKT 1 OPEN BUS 342814 END
EKPC_P2-3_SSHAD S11-1044	CONTINGENCY 'EKPC_P2-3_SSHAD S11-1044' / 89 OPEN BRANCH FROM BUS 342814 TO BUS 940040 CKT 1 / 342814 5SUMM SHADE 161 940040 AE1-246 TAP 161 1 OPEN BRANCH FROM BUS 342814 TO BUS 964900 CKT 1 / 342814 5SUMM SHADE 161 964900 AG1-354 TAP 161 1 OPEN BRANCH FROM BUS 326998 TO BUS 361788 CKT 1 / 326998 5BULLITT TAP 161 361788 5SUM SHAD TP 161 1 OPEN BRANCH FROM BUS 342814 TO BUS 361788 CKT 1 / 342814 5SUMM SHADE 161 361788 5SUM SHAD TP 161 1 OPEN BRANCH FROM BUS 360334 TO BUS 361788 CKT 1 / 360334 5SUMMER SHAD 161 361788 5SUM SHAD TP 161 1 OPEN BRANCH FROM BUS 342814 TO BUS 360334 CKT 1 / 342814 5SUMM SHADE 161 360334 5SUMMER SHAD 161 1 OPEN BRANCH FROM BUS 342814 TO BUS 342322 CKT 1 / 342814 5SUMM SHADE 161 342322 2SUMM SHADE 69.0 1 END
EKPC_P4-5_LAURL S50-1024	CONTINGENCY 'EKPC_P4-5_LAURL S50-1024' / 608 OPEN BRANCH FROM BUS 342754 TO BUS 342757 CKT 1 / 342754 5LAUREL CO 161 342757 5LAUREL DAM 161 1 OPEN BRANCH FROM BUS 342754 TO BUS 342781 CKT 1 / 342754 5LAUREL CO 161 342781 5PITTSBURG 161 1 OPEN BRANCH FROM BUS 342754 TO BUS 341740 CKT 1 / 342754 5LAUREL CO 161 341740 2LAUREL CO 69.0 1 OPEN BRANCH FROM BUS 342781 TO BUS 324688 CKT 1 / 342781 5PITTSBURG 161 324688 2PITTSBRG KU 69.0 1 OPEN BRANCH FROM BUS 342781 TO BUS 342820 CKT 1 / 342781 5PITTSBURG 161 342820 5TYNER 161 1 END

12 Affected Systems

12.1 TVA

TVA Impacts to be determined during later study phases (as applicable).

12.2 Duke Energy Progress

Duke Energy Progress Impacts to be determined during later study phases (as applicable).

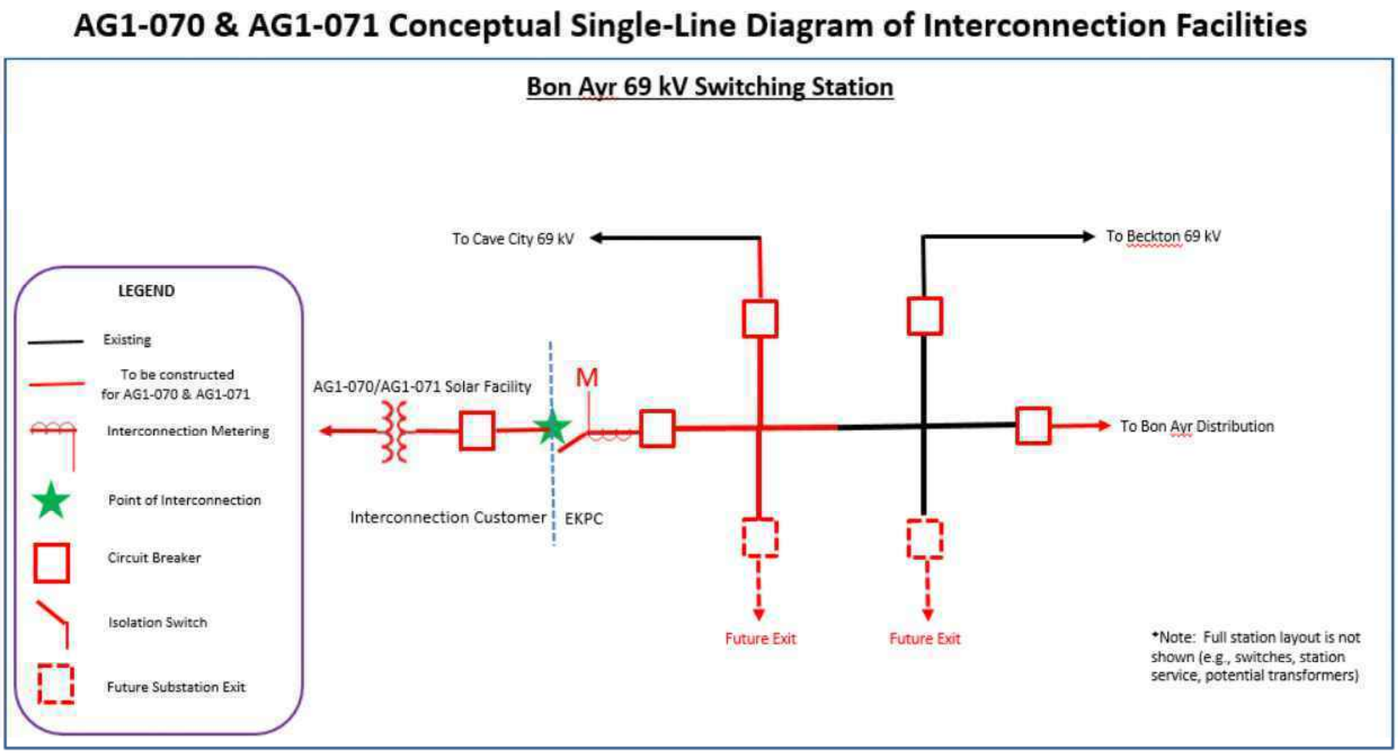
12.3 MISO

MISO Impacts to be determined during later study phases (as applicable).

12.4 LG&E

LG&E Impacts to be determined during later study phases (as applicable).

13 Attachment 1: One Line Diagram – Primary POI



Generation Interconnection

System Impact Study Report

for

Queue Project AG1-070

BON AYR 69 KV

32.7 MW Capacity / 45 MW Energy

August 2021

Table of Contents

1 Introduction

This System Impact Study has been prepared in accordance with the PJM Open Access Transmission Tariff, 205, as well as the System Impact Study Agreement between the Interconnection Customer (IC), and PJM Interconnection, LLC (PJM), Transmission Provider (TP). The Interconnected Transmission Owner (ITO) is EKPC.

2 Preface

The intent of the System Impact Study is to determine a plan, with approximate cost and construction time estimates, to connect the subject generation interconnection project to the PJM network at a location specified by the Interconnection Customer. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system. All facilities required for interconnection of a generation interconnection project must be designed to meet the technical specifications (on PJM web site) for the appropriate transmission owner.

In some instances an Interconnection Customer may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection or merchant transmission upgrade, may also contribute to the need for the same network reinforcement. The possibility of sharing the reinforcement costs with other projects may be identified in the Feasibility Study, but the actual allocation will be deferred until the System Impact Study is performed.

The System Impact Study estimates do not include the feasibility, cost, or time required to obtain property rights and permits for construction of the required facilities. The project developer is responsible for the right of way, real estate, and construction permit issues. For properties currently owned by Transmission Owners, the costs may be included in the study.

The Interconnection Customer seeking to interconnect a wind or solar generation facility shall maintain meteorological data facilities as well as provide that meteorological data which is required per Schedule H to the Interconnection Service Agreement and Section 8 of Manual 14D.

3 General

The Interconnection Customer (IC), has proposed a Solar; Storage generating facility located in Barren County, Kentucky. The installed facilities will have a total capability of 45 MW with 32.7 MW of this output being recognized by PJM as Capacity.

The proposed in-service date for this project is June 01, 2024. This study does not imply a TO commitment to this in-service date.

Queue Number	AG1-070
Project Name	BON AYR 69 KV
State	Kentucky
County	Barren
Transmission Owner	EKPC
MFO	45
MWE	45
MWC	32.7
Fuel	Solar; Storage
Basecase Study Year	2024

Any new service customers who can feasibly be commercially operable prior to June 1st of the basecase study year are required to request interim deliverability analysis.

4 Point of Interconnection

AG1-070 will interconnect with the EKPC on transmission system at the Bon Ayr 69 kV substation.

5 Cost Summary

The AG1-070 project will be responsible for the following costs:

Description	Total Cost
Total Physical Interconnection Costs	$5,205,000
Allocation towards System Network Upgrade Costs (PJM Identified - Summer Peak)*	$0
Allocation towards System Network Upgrade Costs (PJM Identified - Light Load)*	$0
Allocation towards System Network Upgrade Costs (TO Identified)*	$0
Total Costs	**$5,205,000**

*As your project progresses through the study process and other projects modify their request or withdraw, then your cost allocation could change.

The estimates provided in this report are preliminary in nature, as they were determined without the benefit of detailed engineering studies. Final estimates will require an on-site review and coordination to determine final construction requirements. In addition, Stability analysis will be completed during the Facilities Study stage. It is possible that a need for additional upgrades could be identified by these studies.

This cost excludes a Federal Income Tax Gross Up charges. This tax may or may not be charged based on whether this project meets the eligibility requirements of IRS Notice 88-129. If at a future date it is determined that the Federal Income Tax Gross charge is required, the Transmission Owner shall be reimbursed by the Interconnection Customer for such taxes.

Note 1: PJM Open Access Transmission Tariff (OATT) section 217.3A outline cost allocation rules. The rules are further clarified in PJM Manual 14A Attachment B. The allocation of costs for a network upgrade will start with the first Queue project to cause the need for the upgrade. Later queue projects will receive cost allocation contingent on their contribution to the violation and are allocated to the queues that have not closed less than 5 years following the execution of the first Interconnection Service Agreement which identifies the need for this upgrade.

Note 2: For customers with System Reinforcements listed: If your present cost allocation to a System Reinforcement indicates $0, then please be aware that as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, the cost responsibilities can change and a cost allocation may be assigned to your project. In addition, although your present cost allocation to a System Reinforcement is presently $0, your project may need this system reinforcement completed to be deliverable to the PJM system. If your project comes into service prior to completion of the system reinforcement, an interim deliverability study for your project will be required.

6 Transmission Owner Scope of Work

The total physical interconnection costs is given in the tables below:

6.1 Attachment Facilities

The total preliminary cost estimate for the Attachment work is given in the table below. These costs do not include CIAC Tax Gross-up.

Description	Total Cost
Install necessary equipment (a 69 kV isolation switch structure and associated switch, plus interconnection metering, fiber-optic connection and telecommunications equipment, circuit breaker and associated switches, and relay panel) at the Bon Ayr switching station, to accept the IC generator lead line/bus (Estimated time to implement is 25 months)	$1,170,000
Total Attachment Facility Costs	**$1,170,000**

6.2 Direct Connection Cost Estimate

The total preliminary cost estimate for the Direct Connection work is given in the table below. These costs do not include CIAC Tax Gross-up.

Description	Total Cost
Install necessary infrastructure (69 kV structures, circuit breakers, control building, etc.) at the Bon Ayr distribution substation to facilitate connection of the IC solar generation project (Estimated time to implement is 25 months)	$2,455,000
Total Direct Connection Facility Costs	**$2,455,000**

6.3 Non-Direct Connection Cost Estimate

The total preliminary cost estimate for the Non-Direct Connection work is given in the table below. These costs do not include CIAC Tax Gross-up.

Description	Total Cost
Modify relays and/or settings at Fox Hollow substation for the existing line to the Bon Ayr switching station (Estimated time to implement is 9 months)	$85,000
Modify relays and/or settings at Barren County substation for the existing line to the Bon Ayr switching station (Estimated time to implement is 9 months)	$85,000
Install OPGW on the Bon Ayr-Beckton-West Glasgow-Parkway 69 kV line sections (8.3 miles) (Estimated time to implement is 24 months)	$1,410,000
Total Non-Direct Connection Facility Costs	**$1,580,000**

7 Schedule

Based on the scope of work for the interconnection facilities, it is expected to take a minimum of 25 months after the signing of an Interconnection Construction Service Agreement (or "Interconnection Agreement" if non-FERC) and construction kickoff call to complete the installation of the physical connection work. This assumes that there will be no environmental issues with any of the new properties associated with this project, that there will be no delays in acquiring the necessary permits for implementing the defined interconnection work, and that all system outages will be allowed when requested.

The schedule for any required Network Impact Reinforcements will be more clearly identified in future study phases. The estimated time to complete each of the required reinforcements is identified in the "System Reinforcements" section of the report.

8 Interconnection Customer Requirements

It is understood that the Interconnection Customer (IC) is responsible for all costs associated with this interconnection. The costs above are reimbursable to the Transmission Owner. The cost of the IC's generating plant and the costs for the line connecting the generating plant to the Point of Interconnection are not included in this report; these are assumed to be the IC's responsibility.

The Generation Interconnection Agreement does not in or by itself establish a requirement for the Transmission Owner to provide power for consumption at the developer's facilities. A separate agreement may be reached with the local utility that provides service in the area to ensure that infrastructure is in place to meet this demand and proper metering equipment is installed. It is the responsibility of the developer to contact the local service provider to determine if a local service agreement is required.

1. An Interconnection Customer entering the New Services Queue on or after October 1, 2012 with a proposed new Customer Facility that has a Maximum Facility Output equal to or greater than 100 MW shall install and maintain, at its expense, phasor measurement units (PMUs). See Section 8.5.3 of Appendix 2 to the Interconnection Service Agreement as well as section 4.3 of PJM Manual 14D for additional information.

2. The Interconnection Customer may be required to install and/or pay for metering as necessary to properly track real time output of the facility as well as installing metering which shall be used for billing purposes. See Section 8 of Appendix 2 to the Interconnection Service Agreement as well as Section 4 of PJM Manual 14D for additional information.

9 Revenue Metering and SCADA Requirements

9.1 PJM Requirements

The Interconnection Customer will be required to install equipment necessary to provide Revenue Metering (KWH, KVARH) and real time data (KW, KVAR) for IC's generating Resource. See PJM Manuals M-01 and M-14D, and PJM Tariff Section 8 of Attachment O.

9.2 Meteorological Data Reporting Requirements

The solar generation facility shall provide the Transmission Provider with site-specific meteorological data including:

- Back Panel temperature (Fahrenheit) - (Required for plants with Maximum Facility Output of 3 MW or higher)
- Irradiance (Watts/meter2) - (Required for plants with Maximum Facility Output of 3 MW or higher)
- Ambient air temperature (Fahrenheit) - (Accepted, not required)
- Wind speed (meters/second) - (Accepted, not required)
- Wind direction (decimal degrees from true north) - (Accepted, not required)

9.3 Interconnected Transmission Owner Requirements

The IC will be required to comply with all Interconnected Transmission Owner's revenue metering requirements for generation interconnection customers located at the following link:

http://www.pjm.com/planning/design-engineering/to-tech-standards/

10 Summer Peak Analysis

The Queue Project AG1-070 was evaluated as a 45.0 MW (Capacity 32.70 MW) injection at the Bon Ayr 69 kV substation in the EKPC area. Project AG1-070 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AG1-070 was studied with a commercial probability of 100.0 %. Potential network impacts were as follows:

10.1 Generation Deliverability

(Single or N-1 contingencies for the Capacity portion only of the interconnection)

None

10.2 Multiple Facility Contingency

(Double Circuit Tower Line, Fault with a Stuck Breaker, and Bus Fault contingencies for the full energy output)

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
180487288	940830	AE2-071 TAP	69.0	EKPC	342319	2SUMM SHAD J	69.0	EKPC	1	EKPC_P4-5_SSHAD S11-1004	breaker	63.0	95.8	103.03	AC	4.77
180537121	940830	AE2-071 TAP	69.0	EKPC	342319	2SUMM SHAD J	69.0	EKPC	1	EKPC_P2-3_SSHAD S11-1039	breaker	63.0	95.05	102.19	AC	4.72
180537562	940830	AE2-071 TAP	69.0	EKPC	342319	2SUMM SHAD J	69.0	EKPC	1	EKPC_P4-5_SSHAD S11-1014	breaker	63.0	95.04	102.18	AC	4.72

10.3 Contribution to Previously Identified Overloads

(This project contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
165224099	342287	2SOMERSET KU	69.0	EKPC	324531	2FERGUSON SO	69.0	EKPC	1	EKPC_P7-1_COOP 161 DBL 2	tower	105.0	107.62	110.31	AC	3.29
165224114	342718	5COOPER 2	161.0	LGEE	324141	5ELIHU	161.0	EKPC	1	EKPC_P7-1_LAURL 161 DBL	tower	277.0	107.12	108.83	AC	4.66
173970135	342718	5COOPER 2	161.0	LGEE	324141	5ELIHU	161.0	EKPC	1	EKPC_P4-5_LAURL S50-1024	breaker	277.0	107.06	108.77	AC	4.66
166663319	940830	AE2-071 TAP	69.0	EKPC	342319	2SUMM SHAD J	69.0	EKPC	1	EKPC_P2-2_SUMMSHADE 161 #2	bus	63.0	109.65	116.78	AC	4.72
173786915	940830	AE2-071 TAP	69.0	EKPC	342319	2SUMM SHAD J	69.0	EKPC	1	EKPC_P4-2_SSHAD S11-1004	breaker	63.0	109.65	116.79	AC	4.72
180091270	940830	AE2-071 TAP	69.0	EKPC	342319	2SUMM SHAD J	69.0	EKPC	1	EKPC_P2-3_SSHAD S11-1044	breaker	63.0	110.57	117.8	AC	4.77
166663292	960170	AF2-308 TAP	69.0	EKPC	341287	2CENT HARDIN	69.0	EKPC	1	EKPC_P2-2_BONNIE 138/69	bus	98.0	119.78	122.26	AC	2.81

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
179713774	960170	AF2-308 TAP	69.0	EKPC	341287	2CENT HARDIN	69.0	EKPC	1	EKPC_P2-3_BONNVW8-828	breaker	98.0	119.79	122.27	AC	2.81

10.4 Steady-State Voltage Requirements

To be determined during the Facilities Study phase.

10.5 Potential Congestion due to Local Energy Deliverability

PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The developer can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.

Note: Only the most severely overloaded conditions are listed below. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed which shall study all overload conditions associated with the overloaded element(s) identified.

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
169323556	342718	5COOPER 2	161.0	LGEE	324141	5ELIHU	161.0	EKPC	1	EKPC_P2-1_5LAUREL CO 161.00 TO 5LAUREL DAM 161.00	operation	277.0	106.73	108.44	AC	4.68

10.6 System Reinforcements

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AG1-070	Upgrade Number
179713774,166663292	4	AF2-308 TAP 69.0 kV - 2CENT HARDIN 69.0 kV Ckt 1	EKPC ProjectId : n7036.1 (EKPC-r0087): Description : Increase the maximum operating temperature of the 556 MCM ACSR conductor in the AF2-308 Tap-Central Hardin 69 kV line section to 302 degrees F (4.15 miles). Type : FAC Total Cost : $1,730,000 Time Estimate : 9 Months Ratings : 103.0/129.0/135.0 This constraint is driven by a prior queue. Per PJM cost allocation rules, Queue Project AG1-070 presently does not receive cost allocation for this upgrade.	$1,730,000	$0	n7036.1
165224099	2	2SOMERSET KU 69.0 kV - 2FERGUSON SO 69.0 kV Ckt 1	EKPC EKPC emergency rating is 152 MVA. No upgrade is required. LGEE A LG&E affected system study will be required to determine if LG&E upgrades are required on this line. Preliminary upgrade, if determined to be required, is to replace terminal equipment at a cost estimate of $897,613.	$0	$0	N/A
180537121,180487288,180091270,173786915,166663319,180537562	1	AE2-071 TAP 69.0 kV - 2SUMM SHAD J 69.0 kV Ckt 1	EKPC ProjectId : n7788 (EKPC-r0113a): Description : Increase the maximum operating temperature of the 266 MCM ACSR conductor in the AE2-071 Tap-Summer Shade Junction 69 kV line section to 266 degrees F (1.7 miles). Type : FAC Total Cost : $115,000 Time Estimate : 9 Months Ratings : 66.0/76.0/78.0 This constraint is driven by a prior queue. Per PJM cost allocation rules, Queue Project AG1-070 presently does not receive cost allocation for this upgrade.	$115,000	$0	n7788

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AG1-070	Upgrade Number
173970135,165224114	3	**5COOPER2 161.0 kV - 5ELIHU 161.0 kV Ckt 1**	**EKPC** **ProjectId : n6238 (r0076):** **Description : Increase the maximum operating temperature of the 795 MCM ACSR conductor in the Cooper-Elihu 161 kV line section to 275 degrees F (6.7 miles).** **Type : FAC** **Total Cost : $680,000** **Time Estimate : 10 Months** **Ratings : 312.0/371.0/381.0** **This constraint is driven by a prior queue. Per PJM cost allocation rules, Queue Project AG1-070 presently does not receive cost allocation for this upgrade.** **LGEE** **LG&E SE rating is 277 MVA. A LG&E affected system study will be required to determine if LG&E upgrades are required on this line. Preliminary upgrade, if determined to be required, is to upgrade the line conductor at a cost estimate of $28,083. New LG&E expected SE rating to be 335 MVA.**	$680,000	$0	n6238
			TOTAL COST	**$2,525,000**	**$0**	

Note : For customers with System Reinforcements listed: If your present cost allocation to a System Reinforcement indicates $0, then please be aware that as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, the cost responsibilities can change and a cost allocation may be assigned to your project. In addition, although your present cost allocation to a System Reinforcement is presently $0, your project may need this system reinforcement completed to be deliverable to the PJM system. If your project comes into service prior to completion of the system reinforcement, an interim deliverability study for your project will be required.

10.7 Flow Gate Details

The following indices contain additional information about each facility presented in the body of the report. For each index, a description of the flowgate and its contingency was included for convenience. The intent of the indices is to provide more details on which projects/generators have contributions to the flowgate in question. All New Service Queue Requests, through the end of the Queue under study, that are contributors to a flowgate will be listed in the indices. Please note that there may be contributors that are subsequently queued after the queue under study that are not listed in the indices. Although this information is not used "as is" for cost allocation purposes, it can be used to gage the impact of other projects/generators. It should be noted the project/generator MW contributions presented in the body of the report are Full MW Impact contributions which are also noted in the indices column named "Full MW Impact", whereas the loading percentages reported in the body of the report, take into consideration the PJM Generator Deliverability Test rules such as commercial probability of each project as well as the ramping impact of "Adder" contributions. The MW Impact found and used in the analysis is shown in the indices column named "Gendeliv MW Impact".

10.7.1 Index 1

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
180091270	940830	AE2-071 TAP	EKPC	342319	2SUMM SHAD J	EKPC	1	EKPC_P2-3_SSHAD S11-1044	breaker	63.0	110.57	117.8	AC	4.77

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
342442	2W GLASGOW	0.02	80|50	0.02
940045	AE1-246 C	6.28	Adder	7.39
940046	AE1-246 E	3.02	Adder	3.55
940831	AE2-071 C	13.93	80|50	13.93
940832	AE2-071 E	9.28	80|50	9.28
945381	AF1-203 C	7.96	80|50	7.96
945382	AF1-203 E	5.31	80|50	5.31
960741	AF2-365 C O1	1.61	Adder	1.89
960742	AF2-365 E O1	1.08	Adder	1.27
962221	AG1-067 C O1	1.81	Adder	2.13
962222	AG1-067 E O1	0.96	Adder	1.13
962241	AG1-070 C O1	3.47	80|50	3.47
962242	AG1-070 E O1	1.3	80|50	1.3
962251	AG1-071 C O1	3.98	80|50	3.98
962252	AG1-071 E O1	1.86	80|50	1.86
966031	AG1-472 C	3.77	Adder	4.44
966032	AG1-472 E	2.52	Adder	2.96
LTFEXP_AA2-074	LTFEXP_AA2-074->LTFIMP_AA2-074	0.0185	Confirmed LTF	0.0185
LTFEXP_BlueG	LTFEXP_BlueG->LTFIMP_BlueG	0.0553	Confirmed LTF	0.0553
LTFEXP_CBM-S1	LTFEXP_CBM-S1->LTFIMP_CBM-S1	0.0666	LTF/CBM	0.0666
LTFEXP_CBM-S2	LTFEXP_CBM-S2->LTFIMP_CBM-S2	0.6067	LTF/CBM	0.6067
LTFEXP_CBM-W1	LTFEXP_CBM-W1->LTFIMP_CBM-W1	0.7019	LTF/CBM	0.7019
LTFEXP_CBM-W2	LTFEXP_CBM-W2->LTFIMP_CBM-W2	1.3433	LTF/CBM	1.3433
LTFEXP_CPLE	LTFEXP_CPLE->LTFIMP_CPLE	0.0283	Confirmed LTF	0.0283
LTFEXP_G-007	LTFEXP_G-007->LTFIMP_G-007	0.0009	LTF/CMTX NF	0.0009
LTFEXP_LAGN	LTFEXP_LAGN->LTFIMP_LAGN	0.3336	Confirmed LTF	0.3336
LTFEXP_MEC	LTFEXP_MEC->LTFIMP_MEC	0.1558	Confirmed LTF	0.1558
LTFEXP_NY	LTFEXP_NY->LTFIMP_NY	0.0009	Confirmed LTF	0.0009
LTFEXP_O-066	LTFEXP_O-066->LTFIMP_O-066	0.006	LTF/CMTX NF	0.006
LTFEXP_SIGE	LTFEXP_SIGE->LTFIMP_SIGE	0.0085	Confirmed LTF	0.0085

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
LTFEXP_TRIMBLE	LTFEXP_TRIMBLE->LTFIMP_TRIMBLE	0.0202	Confirmed LTF	0.0202
LTFEXP_TVA	LTFEXP_TVA->LTFIMP_TVA	0.3247	Confirmed LTF	0.3247
LTFEXP_WEC	LTFEXP_WEC->LTFIMP_WEC	0.0172	Confirmed LTF	0.0172

10.7.2 Index 2

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
165224099	342287	2SOMERSET KU	EKPC	324531	2FERGUSON SO	EKPC	1	EKPC_P7-1_COOP 161 DBL 2	tower	105.0	107.62	110.31	AC	3.29

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
342900	1COOPER1 G	5.12	80|50	5.12
342903	1COOPER2 G	9.93	80|50	9.93
939131	AE1-143 C	5.42	Adder	6.38
939132	AE1-143 E	2.69	Adder	3.16
940045	AE1-246 C	5.46	Adder	6.42
940046	AE1-246 E	2.63	Adder	3.09
940831	AE2-071 C	1.62	Adder	1.91
940832	AE2-071 E	1.08	Adder	1.27
943701	AF1-038 C	8.4	80|50	8.4
943702	AF1-038 E	5.6	80|50	5.6
943821	AF1-050 C	2.56	Adder	3.01
943822	AF1-050 E	1.71	Adder	2.01
944151	AF1-083 C O1	2.53	Adder	2.98
944152	AF1-083 E O1	1.68	Adder	1.98
944511	AF1-116 C	6.08	Adder	7.15
944512	AF1-116 E	4.05	Adder	4.76
945381	AF1-203 C	0.93	Adder	1.09
945382	AF1-203 E	0.62	Adder	0.73
960741	AF2-365 C O1	1.52	Adder	1.79
960742	AF2-365 E O1	1.02	Adder	1.2
962221	AG1-067 C O1	1.75	Adder	2.06
962222	AG1-067 E O1	0.93	Adder	1.09
962241	AG1-070 C O1	2.03	Adder	2.39
962242	AG1-070 E O1	0.77	Adder	0.91
962251	AG1-071 C O1	2.33	Adder	2.74
962252	AG1-071 E O1	1.09	Adder	1.28
964781	AG1-341 C O1	4.3	Adder	5.06
964782	AG1-341 E O1	2.87	Adder	3.38
964891	AG1-353 C	4.39	Adder	5.16
964892	AG1-353 E	2.92	Adder	3.44
964901	AG1-354 C	6.22	Adder	7.32
964902	AG1-354 E	4.14	Adder	4.87
965401	AG1-405 C	10.61	80|50	10.61
965402	AG1-405 E	7.07	80|50	7.07
965411	AG1-406	6.82	80|50	6.82
966021	AG1-471 C O1	5.16	80|50	5.16
966022	AG1-471 E O1	3.44	80|50	3.44
966031	AG1-472 C	2.89	Adder	3.4
966032	AG1-472 E	1.93	Adder	2.27
966191	AG1-488 C O1	3.46	Adder	4.07
966192	AG1-488 E O1	2.31	Adder	2.72

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
LTFEXP_AA2-074	LTFEXP_AA2-074->LTFIMP_AA2-074	0.0411	Confirmed LTF	0.0411
LTFEXP_CBM-S1	LTFEXP_CBM-S1->LTFIMP_CBM-S1	0.2983	LTF/CBM	0.2983
LTFEXP_CBM-S2	LTFEXP_CBM-S2->LTFIMP_CBM-S2	1.7974	LTF/CBM	1.7974
LTFEXP_CBM-W1	LTFEXP_CBM-W1->LTFIMP_CBM-W1	2.5857	LTF/CBM	2.5857
LTFEXP_CBM-W2	LTFEXP_CBM-W2->LTFIMP_CBM-W2	5.1941	LTF/CBM	5.1941
LTFEXP_CPLE	LTFEXP_CPLE->LTFIMP_CPLE	0.063	Confirmed LTF	0.063
LTFEXP_G-007	LTFEXP_G-007->LTFIMP_G-007	0.0785	LTF/CMTX NF	0.0785
LTFEXP_LAGN	LTFEXP_LAGN->LTFIMP_LAGN	1.2718	Confirmed LTF	1.2718
LTFEXP_LGE-0012019	LTFEXP_LGE-0012019->LTFIMP_LGE-0012019	5.0016	Confirmed LTF	5.0016
LTFEXP_MEC	LTFEXP_MEC->LTFIMP_MEC	0.5859	Confirmed LTF	0.5859
LTFEXP_NY	LTFEXP_NY->LTFIMP_NY	0.0421	Confirmed LTF	0.0421
LTFEXP_O-066	LTFEXP_O-066->LTFIMP_O-066	0.5037	LTF/CMTX NF	0.5037
LTFEXP_SIGE	LTFEXP_SIGE->LTFIMP_SIGE	0.0411	Confirmed LTF	0.0411
LTFEXP_TVA	LTFEXP_TVA->LTFIMP_TVA	1.3459	Confirmed LTF	1.3459
LTFEXP_WEC	LTFEXP_WEC->LTFIMP_WEC	0.0653	Confirmed LTF	0.0653

10.7.3 Index 3

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
173970135	342718	5COOPER2	LGEE	324141	5ELIHU	EKPC	1	EKPC_P4-5_LAURL S50-1024	breaker	277.0	107.06	108.77	AC	4.66

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
342442	2W GLASGOW	0.02	80|50	0.02
342900	1COOPER1 G	10.56	80|50	10.56
342903	1COOPER2 G	20.54	80|50	20.54
342945	1LAUREL 1G	6.39	80|50	6.39
939131	AE1-143 C	9.98	80|50	9.98
939132	AE1-143 E	4.94	80|50	4.94
940045	AE1-246 C	9.37	80|50	9.37
940046	AE1-246 E	4.51	80|50	4.51
940831	AE2-071 C	2.55	80|50	2.55
940832	AE2-071 E	1.7	80|50	1.7
942411	AE2-254 C O1	1.35	Adder	1.59
942412	AE2-254 E O1	0.9	Adder	1.06
943701	AF1-038 C	6.66	80|50	6.66
943702	AF1-038 E	4.44	80|50	4.44
943821	AF1-050 C	4.5	80|50	4.5
943822	AF1-050 E	3.0	80|50	3.0
944151	AF1-083 C O1	4.56	80|50	4.56
944152	AF1-083 E O1	3.04	80|50	3.04
944511	AF1-116 C	11.19	80|50	11.19
944512	AF1-116 E	7.46	80|50	7.46
945381	AF1-203 C	1.46	80|50	1.46
945382	AF1-203 E	0.97	80|50	0.97
960741	AF2-365 C O1	2.2	Adder	2.59
960742	AF2-365 E O1	1.47	Adder	1.73
962221	AG1-067 C O1	2.81	80|50	2.81
962222	AG1-067 E O1	1.5	80|50	1.5
962241	AG1-070 C O1	3.39	80|50	3.39
962242	AG1-070 E O1	1.27	80|50	1.27
962251	AG1-071 C O1	3.89	80|50	3.89
962252	AG1-071 E O1	1.81	80|50	1.81
964781	AG1-341 C O1	7.38	80|50	7.38
964782	AG1-341 E O1	4.92	80|50	4.92
964891	AG1-353 C	7.86	80|50	7.86
964892	AG1-353 E	5.24	80|50	5.24
964901	AG1-354 C	10.78	80|50	10.78
964902	AG1-354 E	7.19	80|50	7.19
965401	AG1-405 C	3.92	80|50	3.92
965402	AG1-405 E	2.62	80|50	2.62
965411	AG1-406	2.52	80|50	2.52
966021	AG1-471 C O1	7.3	80|50	7.3
966022	AG1-471 E O1	4.87	80|50	4.87

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
966031	AG1-472 C	4.86	80|50	4.86
966032	AG1-472 E	3.24	80|50	3.24
966191	AG1-488 C O1	6.34	80|50	6.34
966192	AG1-488 E O1	4.23	80|50	4.23
LTFEXP_AA2-074	LTFEXP_AA2-074->LTFIMP_AA2-074	0.0571	Confirmed LTF	0.0571
LTFEXP_CBM-S1	LTFEXP_CBM-S1->LTFIMP_CBM-S1	0.4382	LTF/CBM	0.4382
LTFEXP_CBM-S2	LTFEXP_CBM-S2->LTFIMP_CBM-S2	2.6837	LTF/CBM	2.6837
LTFEXP_CBM-W1	LTFEXP_CBM-W1->LTFIMP_CBM-W1	3.0458	LTF/CBM	3.0458
LTFEXP_CBM-W2	LTFEXP_CBM-W2->LTFIMP_CBM-W2	7.4506	LTF/CBM	7.4506
LTFEXP_CPLE	LTFEXP_CPLE->LTFIMP_CPLE	0.0881	Confirmed LTF	0.0881
LTFEXP_G-007	LTFEXP_G-007->LTFIMP_G-007	0.1603	LTF/CMTX NF	0.1603
LTFEXP_LAGN	LTFEXP_LAGN->LTFIMP_LAGN	1.8739	Confirmed LTF	1.8739
LTFEXP_LGE-0012019	LTFEXP_LGE-0012019->LTFIMP_LGE-0012019	7.7562	Confirmed LTF	7.7562
LTFEXP_MEC	LTFEXP_MEC->LTFIMP_MEC	0.7955	Confirmed LTF	0.7955
LTFEXP_NY	LTFEXP_NY->LTFIMP_NY	0.0863	Confirmed LTF	0.0863
LTFEXP_O-066	LTFEXP_O-066->LTFIMP_O-066	1.0288	LTF/CMTX NF	1.0288
LTFEXP_SIGE	LTFEXP_SIGE->LTFIMP_SIGE	0.054	Confirmed LTF	0.054
LTFEXP_TVA	LTFEXP_TVA->LTFIMP_TVA	2.0101	Confirmed LTF	2.0101
LTFEXP_WEC	LTFEXP_WEC->LTFIMP_WEC	0.079	Confirmed LTF	0.079

10.7.4 Index 4

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
179713774	960170	AF2-308 TAP	EKPC	341287	2CENT HARDIN	EKPC	1	EKPC_P2-3_BONNV W8-828	breaker	98.0	119.79	122.27	AC	2.81

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
959691	AF2-260 C	37.37	80|50	37.37
959692	AF2-260 E	18.69	80|50	18.69
960171	AF2-308	18.51	80|50	18.51
960181	AF2-309 C	27.77	80|50	27.77
960182	AF2-309 E	18.51	80|50	18.51
960741	AF2-365 C O1	5.14	80|50	5.14
960742	AF2-365 E O1	3.43	80|50	3.43
961003	AF2-391 BAT	17.45	80|50	17.45
962241	AG1-070 C O1	1.74	Adder	2.05
962242	AG1-070 E O1	0.65	Adder	0.76
962251	AG1-071 C O1	1.99	Adder	2.34
962252	AG1-071 E O1	0.93	Adder	1.09
964571	AG1-320 C O1	21.94	80|50	21.94
964572	AG1-320 E O1	10.89	80|50	10.89
966031	AG1-472 C	3.43	Adder	4.04
966032	AG1-472 E	2.29	Adder	2.69
LTFEXP_AA2-074	LTFEXP_AA2-074->LTFIMP_AA2-074	0.0637	Confirmed LTF	0.0637
LTFEXP_BlueG	LTFEXP_BlueG->LTFIMP_BlueG	0.9097	Confirmed LTF	0.9097
LTFEXP_CBM-N	LTFEXP_CBM-N->LTFIMP_CBM-N	0.0133	LTF/CBM	0.0133
LTFEXP_CBM-S1	LTFEXP_CBM-S1->LTFIMP_CBM-S1	0.1192	LTF/CBM	0.1192
LTFEXP_CBM-S2	LTFEXP_CBM-S2->LTFIMP_CBM-S2	1.9709	LTF/CBM	1.9709
LTFEXP_CBM-W1	LTFEXP_CBM-W1->LTFIMP_CBM-W1	0.4597	LTF/CBM	0.4597
LTFEXP_CBM-W2	LTFEXP_CBM-W2->LTFIMP_CBM-W2	2.1816	LTF/CBM	2.1816
LTFEXP_CPLE	LTFEXP_CPLE->LTFIMP_CPLE	0.0977	Confirmed LTF	0.0977
LTFEXP_G-007A	LTFEXP_G-007A->LTFIMP_G-007A	0.0278	LTF/CMTX	0.0278
LTFEXP_GIBSON	LTFEXP_GIBSON->LTFIMP_GIBSON	0.0631	Confirmed LTF	0.0631
LTFEXP_LAGN	LTFEXP_LAGN->LTFIMP_LAGN	0.656	Confirmed LTF	0.656
LTFEXP_LGE-0012019	LTFEXP_LGE-0012019->LTFIMP_LGE-0012019	1.4366	Confirmed LTF	1.4366
LTFEXP_MEC	LTFEXP_MEC->LTFIMP_MEC	0.2049	Confirmed LTF	0.2049

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
LTFEXP_TRIMBLE	LTFEXP_TRIMBLE->LTFIMP_TRIMBLE	0.2563	Confirmed LTF	0.2563
LTFEXP_TVA	LTFEXP_TVA->LTFIMP_TVA	0.6804	Confirmed LTF	0.6804
LTFEXP_VFT	LTFEXP_VFT->LTFIMP_VFT	0.0737	Confirmed LTF	0.0737
LTFEXP_WEC	LTFEXP_WEC->LTFIMP_WEC	0.0101	Confirmed LTF	0.0101

10.8 Queue Dependencies

The Queue Projects below are listed in one or more indices for the overloads identified in your report. These projects contribute to the loading of the overloaded facilities identified in your report. The percent overload of a facility and cost allocation you may have towards a particular reinforcement could vary depending on the action of these earlier projects. The status of each project at the time of the analysis is presented in the table. This list may change as earlier projects withdraw or modify their requests.

Queue Number	Project Name	Status
AA2-074	CPLE-PJM	Confirmed
AE1-143	Marion County 161 kV	Engineering and Procurement
AE1-246	Barren County-Summer Shade 161 kV	Active
AE2-071	Patton Rd-Summer Shade 69 kV	Active
AE2-254	Garrard County-Tommy-Gooch 69 kV	Engineering and Procurement
AF1-038	Sewellton Jct-Webbs Crossroads 69 kV	Active
AF1-050	Summer Shade - Green County 161 kV	Active
AF1-083	Green County-Saloma 161 kV	Active
AF1-116	Marion County 161 kV	Active
AF1-203	Patton Rd-Summer Shade 69 kV	Active
AF2-260	Stephensburg-Central Hardin 69 kV	Active
AF2-308	Central Hardin-Stephensburg 69 kV	Active
AF2-309	Central Hardin-Stephensburg 69 kV	Active
AF2-365	Munfordville KU Tap-Horse Cave Jct. 69 kV	Active
AF2-391	Central Hardin 69 kV	Active
AG1-067	Temple Hill 69 kV	Active
AG1-070	Bon Ayr 69 kV	Active
AG1-071	Bon Ayr 69 kV	Active
AG1-320	Glendale-Stephensburg 69 kV	Active
AG1-341	Summer Shade 161 kV	Active
AG1-353	Greene County-Marion County 161 kV	Active
AG1-354	Summershade-Green County 161 kV	Active
AG1-405	Walnut Grove-Asahi 69 kV	Active
AG1-406	Walnut Grove-Asahi 69 kV	Active
AG1-471	Up Church-Wayne County 69 kV	Active
AG1-472	Seymour-Cave City 69 kV	Active
AG1-488	Marion IP 161 kV	Active

10.9 Contingency Descriptions

Contingency Name	Contingency Definition
EKPC_P4-5_SSHAD S11-1004	CONTINGENCY 'EKPC_P4-5_SSHAD S11-1004' /* SUMMERSHADE OPEN BRANCH FROM BUS 341059 TO BUS 342694 CKT 1 /* 341059 2BARREN CO 69.000 342694 5BARREN CO 161.00 /*OPEN BRANCH FROM BUS 342694 TO BUS 342814 CKT 1 /* 342694 5BARREN CO 161.00 342814 5SUMM SHADE 161.00 OPEN BRANCH FROM BUS 940040 TO BUS 342814 CKT 1 OPEN BRANCH FROM BUS 361788 TO BUS 342814 CKT 1 /* /*OPEN BRANCH FROM BUS 342811 TO BUS 342814 CKT 1 /* OPEN BRANCH FROM BUS 342733 TO BUS 342814 CKT 1 /* 342733 5GREEN CO 161.00 342814 5SUMM SHADE 161.00 OPEN BRANCH FROM BUS 964900 TO BUS 342814 CKT 1 /* 342733 AG1-354 TAP 161.00 342814 5SUMM SHADE 161.00 OPEN BUS 361788 OPEN BUS 342814 END
EKPC_P2-1_5LAUREL CO 161.00 TO 5LAUREL DAM 161.00	CONTINGENCY 'EKPC_P2-1_5LAUREL CO 161.00 TO 5LAUREL DAM 161.00' OPEN BRANCH FROM BUS 342754 TO BUS 342757 CKT 1 /*5LAUREL CO 161.005LAUREL DAM 161.00 END
EKPC_P4-2_SSHAD S11-1004	CONTINGENCY 'EKPC_P4-2_SSHAD S11-1004' /* SUMMERSHADE /*OPEN BRANCH FROM BUS 341059 TO BUS 342694 CKT 1 /* 341059 2BARREN CO 69.000 342694 5BARREN CO 161.00 /*OPEN BRANCH FROM BUS 342694 TO BUS 342814 CKT 1 /* 342694 5BARREN CO 161.00 342814 5SUMM SHADE 161.00 OPEN BRANCH FROM BUS 940040 TO BUS 342814 CKT 1 OPEN BRANCH FROM BUS 361788 TO BUS 342814 CKT 1 /* /*OPEN BRANCH FROM BUS 342811 TO BUS 342814 CKT 1 /* OPEN BRANCH FROM BUS 342733 TO BUS 342814 CKT 1 /* 342733 5GREEN CO 161.00 342814 5SUMM SHADE 161.00 OPEN BRANCH FROM BUS 964900 TO BUS 342814 CKT 1 /* 342733 AG1-354 TAP 161.00 342814 5SUMM SHADE 161.00 OPEN BUS 342814 END

Contingency Name	Contingency Definition
EKPC_P4-5_SSHAD S11-1014	CONTINGENCY 'EKPC_P4-5_SSHAD S11-1014' /* SUMMERSHADE /*OPEN BRANCH FROM BUS 341059 TO BUS 342694 CKT 1 /* 341059 2BARREN CO 69.000 342694 5BARREN CO 161.00 /*OPEN BRANCH FROM BUS 342694 TO BUS 342814 CKT 1 /* 342694 5BARREN CO 161.00 342814 5SUMM SHADE 161.00 OPEN BUS 940040 OPEN BRANCH FROM BUS 361788 TO BUS 342814 CKT 1 /* /*OPEN BRANCH FROM BUS 342811 TO BUS 342814 CKT 1 /* OPEN BRANCH FROM BUS 342733 TO BUS 342814 CKT 1 /* 342733 5GREEN CO 161.00 342814 5SUMM SHADE 161.00 OPEN BRANCH FROM BUS 964900 TO BUS 342814 CKT 1 /* 342733 AG1-354 TAP 161.00 342814 5SUMM SHADE 161.00 OPEN BUS 342814 END
EKPC_P2-3_SSHAD S11-1039	CONTINGENCY 'EKPC_P2-3_SSHAD S11-1039' /* SUMMERSHADE OPEN BUS 342814 /* 5SUMM SHADE OPEN BRANCH FROM BUS 341059 TO BUS 342694 CKT 1 /* 341059 2BARREN CO 69.000 342694 5BARREN CO 161.00 END
EKPC_P2-2_BONNIE 138/69	CONTINGENCY 'EKPC_P2-2_BONNIE 138/69' /* KU BONNIEVILLE 138/69 TIE OPEN BUS 324213 /* 4BONNIE END
EKPC_P7-1_COOP 161 DBL 2	CONTINGENCY 'EKPC_P7-1_COOP 161 DBL 2' /* COOPER - ELIHU 161 & COOPER - LAUREL DAM 161 OPEN BRANCH FROM BUS 324141 TO BUS 342718 CKT 1 /* 324141 5ELIHU 161.00 342718 5COOPER2 161.00 OPEN BRANCH FROM BUS 342718 TO BUS 342757 CKT 1 /* 342718 5COOPER2 161.00 342757 5LAUREL DAM 161.00 END
EKPC_P7-1_LAURL 161 DBL	CONTINGENCY 'EKPC_P7-1_LAURL 161 DBL' /* LAUREL CO - LAUREL DAM 161 & LAUREL CO - TYNER 161 OPEN BRANCH FROM BUS 342754 TO BUS 342757 CKT 1 /* 342754 5LAUREL CO 161.00 342757 5LAUREL DAM 161.00 OPEN BRANCH FROM BUS 342754 TO BUS 342781 CKT 1 /* 342754 5LAUREL CO 161.00 342781 5PITTSBURG 161.00 OPEN BRANCH FROM BUS 342781 TO BUS 342820 CKT 1 /* 342781 5PITTSBURG 161.00 342820 5TYNER 161.00 END
EKPC_P2-3_BONNV W8-828	CONTINGENCY 'EKPC_P2-3_BONNV W8-828' /* BONNIEVILLE OPEN BUS 324213 /* 4BONNIE END

Contingency Name	Contingency Definition
EKPC_P2-2_SUMMSHADE 161 #2	CONTINGENCY 'EKPC_P2-2_SUMMSHADE 161 #2' /* SUMMERSHADE 161 BUS /* OPEN BRANCH FROM BUS 342733 TO BUS 342814 CKT 1 /* 342733 5GREEN CO 161.00 342814 5SUMM SHADE 161.00 OPEN BRANCH FROM BUS 964900 TO BUS 342814 CKT 1 /* 964900 AG1-354 TAP 161.00 342814 5SUMM SHADE 161.00 /*OPEN BRANCH FROM BUS 342694 TO BUS 342814 CKT 1 /* 342694 5BARREN CO 161.00 342814 5SUMM SHADE 161.00 OPEN BRANCH FROM BUS 940040 TO BUS 342814 CKT 1 /*OPEN BUS 361788 /* 361788 5SUM SHAD TP161.00 OPEN BUS 342814 END
EKPC_P2-3_SSHAD S11-1044	CONTINGENCY 'EKPC_P2-3_SSHAD S11-1044' /* SUMMERSHADE /*OPEN BRANCH FROM BUS 341059 TO BUS 342694 CKT 1 /* 341059 2BARREN CO 69.000 342694 5BARREN CO 161.00 /*OPEN BRANCH FROM BUS 342694 TO BUS 342814 CKT 1 /* 342694 5BARREN CO 161.00 342814 5SUMM SHADE 161.00 OPEN BRANCH FROM BUS 940040 TO BUS 342814 CKT 1 /* OPEN BRANCH FROM BUS 342733 TO BUS 342814 CKT 1 /* 342733 5GREEN CO 161.00 342814 5SUMM SHADE 161.00 OPEN BRANCH FROM BUS 964900 TO BUS 342814 CKT 1 /* 342733 AG1-354 TAP 161.00 342814 5SUMM SHADE 161.00 /*OPEN BRANCH FROM BUS 361788 TO BUS 342814 CKT 1 /* 361788 5SUM SHAD TP161.00 342814 5SUMM SHADE 161.00 OPEN BUS 361788 OPEN BUS 342814 END
EKPC_P4-5_LAURL S50-1024	CONTINGENCY 'EKPC_P4-5_LAURL S50-1024' /* LAUREL CO OPEN BUS 342754 /* 5LAUREL CO DROPS BUS OPEN BRANCH FROM BUS 324688 TO BUS 342781 CKT 1 /* 324688 2PITTSKU 69.000 342781 5PITTSBURG 161.00 OPEN BRANCH FROM BUS 342781 TO BUS 342820 CKT 1 /* 342781 5PITTSBURG 161.00 342820 5TYNER 161.00 END

11 Light Load Analysis

The Queue Project AG1-070 was evaluated as a 37.5 MW injection at the Bon Ayr 69 kV substation in the EKPC area. Project AG1-070 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AG1-070 was studied with a commercial probability of 100.0 %. Potential network impacts were as follows:

11.1 Light Load Deliverability

(Single or N-1 contingencies for the Capacity portion only of the interconnection)

None.

11.2 Multiple Facility Contingency

(Double Circuit Tower Line, Fault with a Stuck Breaker, and Bus Fault contingencies for the full energy output)

None.

11.3 Contribution to Previously Identified Overloads

(This project contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

None.

11.4 Steady-State Voltage Requirements

To be determined during the Facilities Study phase.

11.5 Potential Congestion due to Local Energy Deliverability

PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The developer can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.

Note: Only the most severely overloaded conditions are listed below. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed which shall study all overload conditions associated with the overloaded element(s) identified.

None

11.6 System Reinforcements

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AG1-070	Upgrade Number
			TOTAL COST	**$0**		

Note : For customers with System Reinforcements listed: If your present cost allocation to a System Reinforcement indicates $0, then please be aware that as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, the cost responsibilities can change and a cost allocation may be assigned to your project. In addition, although your present cost allocation to a System Reinforcement is presently $0, your project may need this system reinforcement completed to be deliverable to the PJM system. If your project comes into service prior to completion of the system reinforcement, an interim deliverability study for your project will be required.

12 Short Circuit Analysis

The following Breakers are overdutied:

None.

13 Stability and Reactive Power

(Summary of the VAR requirements based upon the results of the dynamic studies)

To be determined in the Facilities Study Phase.

14 Affected Systems

14.1 TVA

None

14.2 Duke Energy Progress

None

14.3 MISO

MISO Impacts to be determined during later study phases (as applicable).

14.4 LG&E

LG&E Impacts to be determined during later study phases (as applicable).

15 Attachment 1: One Line Diagram

Generation Interconnection

Feasibility Study Report

for

Queue Project AG1-071

BON AYR 69 KV

45 MW Capacity / 55 MW Energy

January 2021

Table of Contents

1 Introduction

This Feasibility Study has been prepared in accordance with the PJM Open Access Transmission Tariff, 36.2, as well as the Feasibility Study Agreement between the Interconnection Customer (IC), and PJM Interconnection, LLC (PJM), Transmission Provider (TP). The Interconnected Transmission Owner (ITO) is EKPC.

2 Preface

The intent of the feasibility study is to determine a plan, with ballpark cost and construction time estimates, to connect the subject generation to the PJM network at a location specified by the Interconnection Customer. The Interconnection Customer may request the interconnection of generation as a capacity resource or as an energy-only resource. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: (1) Direct Connections, which are new facilities and/or facilities upgrades needed to connect the generator to the PJM network, and (2) Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system.

In some instances a generator interconnection may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection, may also contribute to the need for the same network reinforcement. Cost allocation rules for network upgrades can be found in PJM Manual 14A, Attachment B. The possibility of sharing the reinforcement costs with other projects may be identified in the feasibility study, but the actual allocation will be deferred until the impact study is performed.

The Interconnection Customer seeking to interconnect a wind or solar generation facility shall maintain meteorological data facilities as well as provide that meteorological data which is required per Schedule H to the Interconnection Service Agreement and Section 8 of Manual 14D.

The Feasibility Study estimates do not include the feasibility, cost, or time required to obtain property rights and permits for construction of the required facilities. The project developer is responsible for the right of way, real estate, and construction permit issues. For properties currently owned by Transmission Owners, the costs may be included in the study.

3 General

The Interconnection Customer (IC), has proposed a Solar generating facility located in Barren County, Kentucky. The installed facilities will have a total capability of 55 MW with 45 MW of this output being recognized by PJM as Capacity.

The proposed in-service date for this project is June 01, 2024. This study does not imply a TO commitment to this in-service date.

Queue Number	**AG1-071**
Project Name	BON AYR 69 KV
State	Kentucky
County	Barren
Transmission Owner	EKPC
MFO	55
MWE	55
MWC	45
Fuel	Solar
Basecase Study Year	2024

Any new service customers who can feasibly be commercially operable prior to June 1st of the basecase study year are required to request interim deliverability analysis.

4 Point of Interconnection

AG1-071 (uprate to AF1-070) will interconnect with the EKPC transmission system along one of the following Points of Interconnection. AG1-071 is an uprate to AF1-070.

Primary POI: Bon Ayr substation

Secondary POI: Bon Ayr - Cave City 69 kV line

5 Cost Summary

The AG1-071 project will be responsible for the following costs:

Description	Total Cost
Total Physical Interconnection Costs	$0
Total System Network Upgrade Costs	$3,190,000
Total Costs	**$3,190,000**

This cost excludes a Federal Income Tax Gross Up charges. This tax may or may not be charged based on whether this project meets the eligibility requirements of IRS Notice 2016-36, 2016-25 I.R.B. (6/20/2016). If at a future date it is determined that the Federal Income Tax Gross charge is required, the Transmission Owner shall be reimbursed by the Interconnection Customer for such taxes.

Cost allocations for any System Upgrades will be provided in the System Impact Study Report.

6 Transmission Owner Scope of Work

The total physical interconnection costs is given in the table below:

6.1 Attachment Facilities

The total preliminary cost estimate for the Attachment work is given in the table below. These costs do not include CIAC Tax Gross-up.

Description	**Total Cost**
None.	$0
Total Attachment Facility Costs	**$0**

6.2 Direct Connection Cost Estimate

The total preliminary cost estimate for the Direct Connection work is given in the table below. These costs do not include CIAC Tax Gross-up.

Description	**Total Cost**
None.	$0
Total Direct Connection Facility Costs	**$0**

6.3 Non-Direct Connection Cost Estimate

The total preliminary cost estimate for the Non-Direct Connection work is given in the table below. These costs do not include CIAC Tax Gross-up.

Description	**Total Cost**
None.	$0
Total Non-Direct Connection Facility Costs	**$0**

7 Interconnection Customer Requirements

It is understood that the Interconnection Customer (IC) is responsible for all costs associated with this interconnection. The costs above are reimbursable to the Transmission Owner. The cost of the IC's generating plant and the costs for the line connecting the generating plant to the Point of Interconnection are not included in this report; these are assumed to be the IC's responsibility.

The Generation Interconnection Agreement does not in or by itself establish a requirement for the Transmission Owner to provide power for consumption at the developer's facilities. A separate agreement may be reached with the local utility that provides service in the area to ensure that infrastructure is in place to meet this demand and proper metering equipment is installed. It is the responsibility of the developer to contact the local service provider to determine if a local service agreement is required.

1. An Interconnection Customer entering the New Services Queue on or after October 1, 2012 with a proposed new Customer Facility that has a Maximum Facility Output equal to or greater than 100 MW shall install and maintain, at its expense, phasor measurement units (PMUs). See Section 8.5.3 of Appendix 2 to the Interconnection Service Agreement as well as section 4.3 of PJM Manual 14D for additional information.

2. The Interconnection Customer may be required to install and/or pay for metering as necessary to properly track real time output of the facility as well as installing metering which shall be used for billing purposes. See Section 8 of Appendix 2 to the Interconnection Service Agreement as well as Section 4 of PJM Manual 14D for additional information.

8 Revenue Metering and SCADA Requirements

8.1 PJM Requirements

The Interconnection Customer will be required to install equipment necessary to provide Revenue Metering (KWH, KVARH) and real time data (KW, KVAR) for IC's generating Resource. See PJM Manuals M-01 and M-14D, and PJM Tariff Section 8 of Attachment O.

8.2 Meteorological Data Reporting Requirements

The solar generation facility shall provide the Transmission Provider with site-specific meteorological data including:

- Back Panel temperature (Fahrenheit) - (Required for plants with Maximum Facility Output of 3 MW or higher)
- Irradiance (Watts/meter2) - (Required for plants with Maximum Facility Output of 3 MW or higher)
- Ambient air temperature (Fahrenheit) - (Accepted, not required)
- Wind speed (meters/second) - (Accepted, not required)
- Wind direction (decimal degrees from true north) - (Accepted, not required)

8.3 Interconnected Transmission Owner Requirements

The IC will be required to comply with all Interconnected Transmission Owner's revenue metering requirements for generation interconnection customers located at the following link:

http://www.pjm.com/planning/design-engineering/to-tech-standards/

9 Summer Peak - Load Flow Analysis - Primary POI

The Queue Project AG1-071 was evaluated as a 55.0 MW (Capacity 45.0 MW) injection at the Bon Ayr 69 kV substation in the EKPC area. Project AG1-071 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AG1-071 was studied with a commercial probability of 53.0 %. Potential network impacts were as follows:

9.1 Generation Deliverability

(Single or N-1 contingencies for the Capacity portion only of the interconnection)

None

9.2 Multiple Facility Contingency

(Double Circuit Tower Line, Fault with a Stuck Breaker, and Bus Fault contingencies for the full energy output)

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
166663765	341059	2BARREN CO	69.0	EKPC	341651	2HORSECAVE J	69.0	EKPC	1	EKPC_P2-2_SUMMSHADE 161 #2	bus	90.0	95.72	109.01	DC	11.96

9.3 Contribution to Previously Identified Overloads

(This project contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
165224633	342287	2SOMERSET KU	69.0	EKPC	324531	2FERGUSON SO	69.0	LGEE	1	EKPC_P7-1_COOP 161 DBL 2	tower	105.0	105.87	107.61	DC	4.02
166663779	342319	2SUMMSHAD J	69.0	EKPC	342322	2SUMMSHADE	69.0	EKPC	1	EKPC_P2-2_SUMMSHADE 161 #2	bus	98.0	106.96	117.54	DC	10.37
165224382	342718	5COOPER 2	161.0	EKPC	324141	5ELIHU	161.0	LGEE	1	EKPC_P2-2_LAUREL CO 161	bus	277.0	108.15	110.21	DC	5.71
165224648	342718	5COOPER 2	161.0	EKPC	324141	5ELIHU	161.0	LGEE	1	EKPC_P7-1_LAURL 161 DBL	tower	277.0	108.41	110.47	DC	5.7
166663774	940830	AE2-071 TAP	69.0	EKPC	342319	2SUMMSHAD J	69.0	EKPC	1	EKPC_P2-2_SUMMSHADE 161 #2	bus	63.0	116.68	125.83	DC	5.76
166663747	960170	AF2-308 TAP	69.0	EKPC	341287	2CENTHARDIN	69.0	EKPC	1	EKPC_P2-2_BONNIE 138/69	bus	98.0	120.28	121.86	DC	3.44

9.4 Potential Congestion due to Local Energy Deliverability

PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The developer can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.

Note: Only the most severely overloaded conditions are listed below. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed which shall study all overload conditions associated with the overloaded element(s) identified.

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
169324043	341059	2BARREN CO	69.0	EKPC	341651	2HORSECAVE J	69.0	EKPC	1	EKPC_P2-1_5SUMMSHADE 161.00 TO AE1-246 TAP 161.00	operation	90.0	88.05	100.55	DC	11.25
169323971	342718	5COOPER2	161.0	EKPC	324141	5ELIHU	161.0	LGEE	1	EKPC_P2-1_5LAUREL CO 161.00 TO 5LAUREL DAM 161.00	operation	277.0	108.09	110.16	DC	5.72
169549997	940830	AE2-071 TAP	69.0	EKPC	342319	2SUMMSHAD J	69.0	EKPC	1	EXT_360334 5SUMMER SHAD 161 360607 5S GLASGOW 161 1	operation	63.0	97.99	110.95	DC	8.17
169549998	940830	AE2-071 TAP	69.0	EKPC	342319	2SUMMSHAD J	69.0	EKPC	1	Base Case	operation	57.0	99.12	110.75	DC	6.63

9.5 System Reinforcements - Summer Peak Load Flow - Primary POI

ID	Idx	Facility	Upgrade Description	Cost
165224633	2	**2SOMERSET KU 69.0 kV - 2FERGUSON SO 69.0 kV Ckt 1**	**EKPC** **r0077 (1878) :** LGEE violation (non PJM area). EKPC emergency rating is 152 MVA. **Project Type :** FAC **Cost :** $0 **Time Estimate :** 0.0 Months **LGEE** **NonPJMArea (1886) :** The external (i.e. Non-PJM) Transmission Owner, LGEE, will not evaluate this violation until the impact study phase. **Project Type :** FAC **Cost :** $0 **Time Estimate :** 0.0 Months	$0
166663747	6	**AF2-308 TAP 69.0 kV - 2CENT HARDIN 69.0 kV Ckt 1**	**EKPC** **EKPC-r0087 (1910) :** Increase the maximum operating temperature of the 556 MCM ACSR conductor in the AF2-308 Tap-Central Hardin 69 kV line section to 302 degrees F (4.15 miles) **Project Type :** FAC **Cost :** $280,000 **Time Estimate :** 9.0 Months	$280,000
166663765	1	**2BARREN CO 69.0 kV - 2HORSECAVE J 69.0 kV Ckt 1**	**EKPC** **n6197.1 (1887) :** Uprate CT associated with Barren Co-Horsecave Jct 69kV line section to minimum 166 MVA Summer LTE **Project Type :** FAC **Cost :** $0 **Time Estimate :** 6.0 Months	$0
166663774	5	**AE2-071 TAP 69.0 kV - 2SUMM SHAD J 69.0 kV Ckt 1**	**EKPC** **r0071 (1872) :** Rebuild the AE2-071-Summer Shade 69 kV line section using 795 MCM ACSR conductor at 212 degrees F (1.7 miles) **Project Type :** FAC **Cost :** $2,110,000 **Time Estimate :** 16.0 Months	$2,110,000

ID	Idx	Facility	Upgrade Description	Cost
166663779	3	**2SUMM SHAD J 69.0 kV - 2SUMM SHADE 69.0 kV Ckt 1**	**EKPC** **r0065 (1866) : Increase the maximum operating temperature of the 556 MCM ACSR conductor in the Summer Shade-Summer Shade Junction 69 kV line section to 302 degrees F (0.2 mile)** **Project Type : FAC** **Cost : $10,000** **Time Estimate : 6.0 Months** **r0066 (1867) : Change the current transformer setting at Summer Shade associated with circuit breaker S11-634 from 600A to 800A.** **Project Type : FAC** **Cost : $10,000** **Time Estimate : 6.0 Months** **r0067 (1868) : Replace the 500 MCM copper bus and jumpers at the Summer Shade substation using 750 MCM copper or equivalent** **Project Type : FAC** **Cost : $120,000** **Time Estimate : 6.0 Months**	$140,000
165224648,165224382	4	**5COOPER2 161.0 kV - 5ELIHU 161.0 kV Ckt 1**	**EKPC** **r0076 (1877) : Increase the maximum operating temperature of the 795 MCM ACSR conductor in the Cooper-Elihu 161 kV line section to 275 degrees F (6.7 miles)** **Project Type : FAC** **Cost : $660,000** **Time Estimate : 9.0 Months** **LGEE** **NonPJMArea (1886) : The external (i.e. Non-PJM) Transmission Owner, LGEE, will not evaluate this violation until the impact study phase.** **Project Type : FAC** **Cost : $0** **Time Estimate : 0.0 Months**	$660,000
			TOTAL COST	**$3,190,000**

9.6 Flow Gate Details - Primary POI

The following indices contain additional information about each facility presented in the body of the report. For each index, a description of the flowgate and its contingency was included for convenience. The intent of the indices is to provide more details on which projects/generators have contributions to the flowgate in question. All New Service Queue Requests, through the end of the Queue under study, that are contributors to a flowgate will be listed in the indices. Please note that there may be contributors that are subsequently queued after the queue under study that are not listed in the indices. Although this information is not used "as is" for cost allocation purposes, it can be used to gage the impact of other projects/generators. It should be noted the project/generator MW contributions presented in the body of the report are Full MW Impact contributions which are also noted in the indices column named "Full MW Impact", whereas the loading percentages reported in the body of the report, take into consideration the PJM Generator Deliverability Test rules such as commercial probability of each project as well as the ramping impact of "Adder" contributions. The MW Impact found and used in the analysis is shown in the indices column named "Gendeliv MW Impact".

9.6.1 Index 1

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
166663765	341059	2BARREN CO	EKPC	341651	2HORSECAVE J	EKPC	1	EKPC_P2-2_SUMMSHADE 161 #2	bus	90.0	95.72	109.01	DC	11.96

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
342442	2W GLASGOW	0.0272	50/50	0.0272
940045	AE1-246 C	25.7823	50/50	25.7823
940046	AE1-246 E	12.4137	50/50	12.4137
940831	AE2-071 C	1.7425	Adder	2.05
940832	AE2-071 E	1.1617	Adder	1.37
945381	AF1-203 C	0.9957	Adder	1.17
945382	AF1-203 E	0.6638	Adder	0.78
962221	AG1-067 C O1	3.0457	50/50	3.0457
962222	AG1-067 E O1	1.6211	50/50	1.6211
962241	AG1-070 C O1	8.1548	50/50	8.1548
962242	AG1-070 E O1	1.6310	50/50	1.6310
962251	AG1-071 C O1	9.7857	50/50	9.7857
962252	AG1-071 E O1	2.1746	50/50	2.1746
966031	AG1-472 C	14.8747	50/50	14.8747
966032	AG1-472 E	9.9165	50/50	9.9165
CPLE	CPLE	0.0887	Confirmed LTF	0.0887
G-007A	G-007A	0.0360	Confirmed LTF	0.0360
VFT	VFT	0.0968	Confirmed LTF	0.0968
CBM-W2	CBM-W2	1.2275	Confirmed LTF	1.2275
TVA	TVA	0.5460	Confirmed LTF	0.5460
CBM-S2	CBM-S2	1.7748	Confirmed LTF	1.7748
CBM-S1	CBM-S1	0.1037	Confirmed LTF	0.1037
CBM-N	CBM-N	0.0180	Confirmed LTF	0.0180
MEC	MEC	0.0969	Confirmed LTF	0.0969
GIBSON	GIBSON	0.1190	Confirmed LTF	0.1190
BLUEG	BLUEG	0.3906	Confirmed LTF	0.3906
TRIMBLE	TRIMBLE	0.1174	Confirmed LTF	0.1174
LAGN	LAGN	0.4935	Confirmed LTF	0.4935

9.6.2 Index 2

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
165224633	342287	2SOMERSET KU	EKPC	324531	2FERGUSON SO	LGEE	1	EKPC_P7-1_COOP 161 DBL 2	tower	105.0	105.87	107.61	DC	4.02

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
342900	1COOPER1 G	4.9218	50/50	4.9218
342903	1COOPER2 G	9.5458	50/50	9.5458
939131	AE1-143 C	5.4221	Adder	6.38
939132	AE1-143 E	2.6857	Adder	3.16
940045	AE1-246 C	5.4632	Adder	6.43
940046	AE1-246 E	2.6305	Adder	3.09
940831	AE2-071 C	1.6233	Adder	1.91
940832	AE2-071 E	1.0822	Adder	1.27
943701	AF1-038 C	8.3977	50/50	8.3977
943702	AF1-038 E	5.5985	50/50	5.5985
943821	AF1-050 C	2.5575	Adder	3.01
943822	AF1-050 E	1.7050	Adder	2.01
944151	AF1-083 C O1	2.5256	Adder	2.97
944152	AF1-083 E O1	1.6837	Adder	1.98
944511	AF1-116 C	6.0808	Adder	7.15
944512	AF1-116 E	4.0539	Adder	4.77
945381	AF1-203 C	0.9276	Adder	1.09
945382	AF1-203 E	0.6184	Adder	0.73
960741	AF2-365 C O1	1.5231	Adder	1.79
960742	AF2-365 E O1	1.0154	Adder	1.19
962221	AG1-067 C O1	0.9274	Adder	2.06
962222	AG1-067 E O1	0.4936	Adder	1.1
962241	AG1-070 C O1	1.2361	Adder	2.74
962242	AG1-070 E O1	0.2472	Adder	0.55
962251	AG1-071 C O1	1.4833	Adder	3.29
962252	AG1-071 E O1	0.3296	Adder	0.73
964781	AG1-341 C O1	2.2790	Adder	5.06
964782	AG1-341 E O1	1.5193	Adder	3.37
964891	AG1-353 C	2.3239	Adder	5.16
964892	AG1-353 E	1.5493	Adder	3.44
964901	AG1-354 C	3.2939	Adder	7.31
964902	AG1-354 E	2.1959	Adder	4.87
965401	AG1-405 C	10.6088	50/50	10.6088
965402	AG1-405 E	7.0726	50/50	7.0726
965411	AG1-406	6.8244	50/50	6.8244
966021	AG1-471 C O1	5.1635	50/50	5.1635
966022	AG1-471 E O1	3.4423	50/50	3.4423
966031	AG1-472 C	1.5310	Adder	3.4
966032	AG1-472 E	1.0207	Adder	2.27
966191	AG1-488 C O1	1.8353	Adder	4.07
966192	AG1-488 E O1	1.2236	Adder	2.72

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
WEC	WEC	0.0652	Confirmed LTF	0.0652
CPLE	CPLE	0.0628	Confirmed LTF	0.0628
LGE-0012019	LGE-0012019	5.0017	LTF	5.0017
CBM-W2	CBM-W2	5.1878	Confirmed LTF	5.1878
NY	NY	0.0426	Confirmed LTF	0.0426
TVA	TVA	1.3454	Confirmed LTF	1.3454
O-066	O-066	0.5048	Confirmed LTF	0.5048
SIGE	SIGE	0.0489	Confirmed LTF	0.0489
CBM-S2	CBM-S2	1.7957	Confirmed LTF	1.7957
CBM-S1	CBM-S1	0.2983	Confirmed LTF	0.2983
G-007	G-007	0.0788	Confirmed LTF	0.0788
MEC	MEC	0.5848	Confirmed LTF	0.5848
LAGN	LAGN	1.2705	Confirmed LTF	1.2705
CBM-W1	CBM-W1	2.5797	Confirmed LTF	2.5797

9.6.3 Index 3

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
166663779	342319	2SUMM SHAD J	EKPC	342322	2SUMM SHADE	EKPC	1	EKPC_P2-2_SUMMSHADE 161 #2	bus	98.0	106.96	117.54	DC	10.37

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
342442	2W GLASGOW	0.0316	50/50	0.0316
940045	AE1-246 C	13.1406	50/50	13.1406
940046	AE1-246 E	6.3270	50/50	6.3270
940831	AE2-071 C	9.9061	50/50	9.9061
940832	AE2-071 E	6.6041	50/50	6.6041
945381	AF1-203 C	5.6606	50/50	5.6606
945382	AF1-203 E	3.7738	50/50	3.7738
960741	AF2-365 C O1	3.3753	50/50	3.3753
960742	AF2-365 E O1	2.2502	50/50	2.2502
962221	AG1-067 C O1	8.4392	50/50	8.4392
962222	AG1-067 E O1	4.4918	50/50	4.4918
962241	AG1-070 C O1	7.0729	50/50	7.0729
962242	AG1-070 E O1	1.4146	50/50	1.4146
962251	AG1-071 C O1	8.4875	50/50	8.4875
962252	AG1-071 E O1	1.8861	50/50	1.8861
966031	AG1-472 C	7.8926	50/50	7.8926
966032	AG1-472 E	5.2618	50/50	5.2618
WEC	WEC	0.0309	Confirmed LTF	0.0309
CPLE	CPLE	0.0403	Confirmed LTF	0.0403
CBM-W2	CBM-W2	2.2400	Confirmed LTF	2.2400
NY	NY	0.0022	Confirmed LTF	0.0022
TVA	TVA	0.5166	Confirmed LTF	0.5166
O-066	O-066	0.0202	Confirmed LTF	0.0202
SIGE	SIGE	0.0173	Confirmed LTF	0.0173
CBM-S2	CBM-S2	0.8770	Confirmed LTF	0.8770
CBM-S1	CBM-S1	0.1083	Confirmed LTF	0.1083
G-007	G-007	0.0031	Confirmed LTF	0.0031
MEC	MEC	0.2654	Confirmed LTF	0.2654
TRIMBLE	TRIMBLE	0.0061	Confirmed LTF	0.0061
LAGN	LAGN	0.5390	Confirmed LTF	0.5390
CBM-W1	CBM-W1	1.2618	Confirmed LTF	1.2618

9.6.4 Index 4

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
165224648	342718	5COOPER2	EKPC	324141	5ELIHU	LGEE	1	EKPC_P7-1_LAURL 161 DBL	tower	277.0	108.41	110.47	DC	5.7

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
342442	2W GLASGOW	0.0165	50/50	0.0165
342900	1COOPER1 G	10.1486	50/50	10.1486
342903	1COOPER2 G	19.7433	50/50	19.7433
342945	1LAUREL 1G	6.1423	50/50	6.1423
939131	AE1-143 C	9.9773	50/50	9.9773
939132	AE1-143 E	4.9420	50/50	4.9420
940045	AE1-246 C	9.3685	50/50	9.3685
940046	AE1-246 E	4.5107	50/50	4.5107
940831	AE2-071 C	2.5509	50/50	2.5509
940832	AE2-071 E	1.7006	50/50	1.7006
942411	AE2-254 C O1	1.3451	Adder	1.58
942412	AE2-254 E O1	0.8967	Adder	1.05
943701	AF1-038 C	6.6586	50/50	6.6586
943702	AF1-038 E	4.4390	50/50	4.4390
943821	AF1-050 C	4.5025	50/50	4.5025
943822	AF1-050 E	3.0017	50/50	3.0017
944151	AF1-083 C O1	4.5583	50/50	4.5583
944152	AF1-083 E O1	3.0389	50/50	3.0389
944511	AF1-116 C	11.1895	50/50	11.1895
944512	AF1-116 E	7.4597	50/50	7.4597
945381	AF1-203 C	1.4576	50/50	1.4576
945382	AF1-203 E	0.9718	50/50	0.9718
960741	AF2-365 C O1	2.2040	Adder	2.59
960742	AF2-365 E O1	1.4693	Adder	1.73
962221	AG1-067 C O1	2.8138	50/50	2.8138
962222	AG1-067 E O1	1.4977	50/50	1.4977
962241	AG1-070 C O1	3.8850	50/50	3.8850
962242	AG1-070 E O1	0.7770	50/50	0.7770
962251	AG1-071 C O1	4.6620	50/50	4.6620
962252	AG1-071 E O1	1.0360	50/50	1.0360
964781	AG1-341 C O1	7.3763	50/50	7.3763
964782	AG1-341 E O1	4.9176	50/50	4.9176
964891	AG1-353 C	7.8586	50/50	7.8586
964892	AG1-353 E	5.2391	50/50	5.2391
964901	AG1-354 C	10.7820	50/50	10.7820
964902	AG1-354 E	7.1880	50/50	7.1880
965401	AG1-405 C	3.9234	50/50	3.9234
965402	AG1-405 E	2.6156	50/50	2.6156
965411	AG1-406	2.5238	50/50	2.5238
966021	AG1-471 C O1	7.2990	50/50	7.2990
966022	AG1-471 E O1	4.8660	50/50	4.8660

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
966031	AG1-472 C	4.8624	50/50	4.8624
966032	AG1-472 E	3.2416	50/50	3.2416
966191	AG1-488 C O1	6.3433	50/50	6.3433
966192	AG1-488 E O1	4.2288	50/50	4.2288
WEC	WEC	0.0787	Confirmed LTF	0.0787
CPLE	CPLE	0.0874	Confirmed LTF	0.0874
LGE-0012019	LGE-0012019	7.7561	LTF	7.7561
CBM-W2	CBM-W2	7.4368	Confirmed LTF	7.4368
NY	NY	0.0868	Confirmed LTF	0.0868
TVA	TVA	2.0090	Confirmed LTF	2.0090
O-066	O-066	1.0364	Confirmed LTF	1.0364
SIGE	SIGE	0.0700	Confirmed LTF	0.0700
CBM-S2	CBM-S2	2.6726	Confirmed LTF	2.6726
CBM-S1	CBM-S1	0.4378	Confirmed LTF	0.4378
G-007	G-007	0.1617	Confirmed LTF	0.1617
MEC	MEC	0.7945	Confirmed LTF	0.7945
LAGN	LAGN	1.8725	Confirmed LTF	1.8725
CBM-W1	CBM-W1	3.0283	Confirmed LTF	3.0283

9.6.5 Index 5

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
166663774	940830	AE2-071 TAP	EKPC	342319	2SUMM SHAD J	EKPC	1	EKPC_P2-2_SUMMSHADE 161 #2	bus	63.0	116.68	125.83	DC	5.76

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
342442	2W GLASGOW	0.0176	50/50	0.0176
940045	AE1-246 C	6.2055	Adder	7.3
940046	AE1-246 E	2.9878	Adder	3.52
940831	AE2-071 C	13.9033	50/50	13.9033
940832	AE2-071 E	9.2688	50/50	9.2688
945381	AF1-203 C	7.9447	50/50	7.9447
945382	AF1-203 E	5.2965	50/50	5.2965
960741	AF2-365 C O1	1.5940	Adder	1.88
960742	AF2-365 E O1	1.0627	Adder	1.25
962221	AG1-067 C O1	0.9445	Adder	2.1
962222	AG1-067 E O1	0.5027	Adder	1.12
962241	AG1-070 C O1	3.9296	50/50	3.9296
962242	AG1-070 E O1	0.7859	50/50	0.7859
962251	AG1-071 C O1	4.7156	50/50	4.7156
962252	AG1-071 E O1	1.0479	50/50	1.0479
966031	AG1-472 C	1.9756	Adder	4.39
966032	AG1-472 E	1.3170	Adder	2.92
WEC	WEC	0.0170	Confirmed LTF	0.0170
CPLE	CPLE	0.0218	Confirmed LTF	0.0218
CBM-W2	CBM-W2	1.2365	Confirmed LTF	1.2365
NY	NY	0.0017	Confirmed LTF	0.0017
TVA	TVA	0.2870	Confirmed LTF	0.2870
O-066	O-066	0.0135	Confirmed LTF	0.0135
SIGE	SIGE	0.0096	Confirmed LTF	0.0096
CBM-S2	CBM-S2	0.4802	Confirmed LTF	0.4802
CBM-S1	CBM-S1	0.0600	Confirmed LTF	0.0600
G-007	G-007	0.0021	Confirmed LTF	0.0021
MEC	MEC	0.1478	Confirmed LTF	0.1478
TRIMBLE	TRIMBLE	0.0039	Confirmed LTF	0.0039
LAGN	LAGN	0.2992	Confirmed LTF	0.2992
CBM-W1	CBM-W1	0.6870	Confirmed LTF	0.6870

9.6.6 Index 6

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
166663747	960170	AF2-308 TAP	EKPC	341287	2CENT HARDIN	EKPC	1	EKPC_P2-2_BONNIE 138/69	bus	98.0	120.28	121.86	DC	3.44

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
959691	AF2-260 C	37.3710	50/50	37.3710
959692	AF2-260 E	18.6855	50/50	18.6855
960171	AF2-308	18.5105	50/50	18.5105
960181	AF2-309 C	27.7658	50/50	27.7658
960182	AF2-309 E	18.5105	50/50	18.5105
960741	AF2-365 C O1	5.1435	50/50	5.1435
960742	AF2-365 E O1	3.4290	50/50	3.4290
961003	AF2-391 BAT	17.4480	50/50	17.4480
962241	AG1-070 C O1	1.0565	Adder	2.35
962242	AG1-070 E O1	0.2113	Adder	0.47
962251	AG1-071 C O1	1.2678	Adder	2.81
962252	AG1-071 E O1	0.2817	Adder	0.63
962473	AG1-096 BAT	0.7350	Merchant Transmission	0.7350
964571	AG1-320 C O1	21.9408	50/50	21.9408
964572	AG1-320 E O1	10.8903	50/50	10.8903
966031	AG1-472 C	1.8175	Adder	4.03
966032	AG1-472 E	1.2117	Adder	2.69
WEC	WEC	0.0101	Confirmed LTF	0.0101
CPLE	CPLE	0.0976	Confirmed LTF	0.0976
G-007A	G-007A	0.0288	Confirmed LTF	0.0288
VFT	VFT	0.0774	Confirmed LTF	0.0774
CBM-W2	CBM-W2	2.1862	Confirmed LTF	2.1862
TVA	TVA	0.6804	Confirmed LTF	0.6804
CBM-S2	CBM-S2	1.9732	Confirmed LTF	1.9732
CBM-S1	CBM-S1	0.1193	Confirmed LTF	0.1193
CBM-N	CBM-N	0.0132	Confirmed LTF	0.0132
MEC	MEC	0.2050	Confirmed LTF	0.2050
GIBSON	GIBSON	0.0628	Confirmed LTF	0.0628
BLUEG	BLUEG	0.9097	Confirmed LTF	0.9097
TRIMBLE	TRIMBLE	0.2560	Confirmed LTF	0.2560
LAGN	LAGN	0.6562	Confirmed LTF	0.6562
CBM-W1	CBM-W1	0.4627	Confirmed LTF	0.4627

9.7 Queue Dependencies – Primary POI

The Queue Projects below are listed in one or more indices for the overloads identified in your report. These projects contribute to the loading of the overloaded facilities identified in your report. The percent overload of a facility and cost allocation you may have towards a particular reinforcement could vary depending on the action of these earlier projects. The status of each project at the time of the analysis is presented in the table. This list may change as earlier projects withdraw or modify their requests.

Queue Number	Project Name	Status
AE1-143	Marion County 161 kV	Engineering and Procurement
AE1-246	Barren County-Summer Shade 161 kV	Active
AE2-071	Patton Rd-Summer Shade 69 kV	Active
AE2-254	Garrard County-Tommy-Gooch 69 kV	Active
AF1-038	Sewellton Jct-Webbs Crossroads 69 kV	Active
AF1-050	Summer Shade - Green County 161 kV	Active
AF1-083	Green County-Saloma 161 kV	Active
AF1-116	Marion County 161 kV	Active
AF1-203	Patton Rd-Summer Shade 69 kV	Active
AF2-260	Stephensburg 69 kV	Active
AF2-308	Central Hardin-Stephensburg 69 kV	Active
AF2-309	Central Hardin-Stephensburg 69 kV	Active
AF2-365	Munfordville KU Tap-Horse Cave Jct. 69 kV	Active
AF2-391	Central Hardin 69 kV	Active
AG1-067	Temple Hill 69 kV	Active
AG1-070	Bon Ayr 69 kV	Active
AG1-071	Bon Ayr 69 kV	Active
AG1-096	Rineyville 69 kV	Active
AG1-320	Glendale-Stephensburg 69 kV	Active
AG1-341	Summer Shade 161 kV	Active
AG1-353	Greene County-Marion County 161 kV	Active
AG1-354	Summershade-Green County 161 kV	Active
AG1-405	Walnut Grove-Asahi 69 kV	Active
AG1-406	Walnut Grove-Asahi 69 kV	Active
AG1-471	Up Church-Wayne County 69 kV	Active
AG1-472	Seymour-Cave City 69 kV	Active
AG1-488	Marion IP 161 kV	Active

9.8 Contingency Descriptions - Primary POI

Contingency Name	Contingency Definition
EXT_360334 5SUMMER SHAD 161 360607 5S GLASGOW 161 1	CONTINGENCY 'EXT_360334 5SUMMER SHAD 161 360607 5S GLASGOW 161 1' OPEN BRANCH FROM BUS 360334 TO BUS 360607 CKT 1 END
EKPC_P2-2_LAUREL CO 161	CONTINGENCY 'EKPC_P2-2_LAUREL CO 161' /* LAUREL 161 BUS OPEN BUS 342754 /* 5LAUREL CO END
EKPC_P2-2_BONNIE 138/69	CONTINGENCY 'EKPC_P2-2_BONNIE 138/69' /* KU BONNIEVILLE 138/69 TIE OPEN BUS 324213 /* 4BONNIE END
EKPC_P7-1_COOP 161 DBL 2	CONTINGENCY 'EKPC_P7-1_COOP 161 DBL 2' /* COOPER - ELIHU 161 & COOPER - LAUREL DAM 161 OPEN BRANCH FROM BUS 324141 TO BUS 342718 CKT 1 /* 324141 5ELIHU 161.00 342718 5COOPER2 161.00 OPEN BRANCH FROM BUS 342718 TO BUS 342757 CKT 1 /* 342718 5COOPER2 161.00 342757 5LAUREL DAM 161.00 END
Base Case	
EKPC_P7-1_LAURL 161 DBL	CONTINGENCY 'EKPC_P7-1_LAURL 161 DBL' /* LAUREL CO - LAUREL DAM 161 & LAUREL CO - TYNER 161 OPEN BRANCH FROM BUS 342754 TO BUS 342757 CKT 1 /* 342754 5LAUREL CO 161.00 342757 5LAUREL DAM 161.00 OPEN BRANCH FROM BUS 342754 TO BUS 342781 CKT 1 /* 342754 5LAUREL CO 161.00 342781 5PITTSBURG 161.00 OPEN BRANCH FROM BUS 342781 TO BUS 342820 CKT 1 /* 342781 5PITTSBURG 161.00 342820 5TYNER 161.00 END
EKPC_P2-2_SUMMSHADE 161 #2	CONTINGENCY 'EKPC_P2-2_SUMMSHADE 161 #2' /* SUMMERSHADE 161 BUS OPEN BRANCH FROM BUS 964900 TO BUS 342814 CKT 1 /* 964900 AG1-354 TAP 161.00 342814 5SUMM SHADE 161.00 OPEN BRANCH FROM BUS 940040 TO BUS 342814 CKT 1 OPEN BUS 342814 END
EKPC_P2-1_5LAUREL CO 161.00 TO 5LAUREL DAM 161.00	CONTINGENCY 'EKPC_P2-1_5LAUREL CO 161.00 TO 5LAUREL DAM 161.00' OPEN BRANCH FROM BUS 342754 TO BUS 342757 CKT 1 /*5LAUREL CO 161.005LAUREL DAM 161.00 END

Contingency Name	Contingency Definition
EKPC_P2-1_5SUMM SHADE 161.00 TO AE1-246 TAP 161.00	CONTINGENCY 'EKPC_P2-1_5SUMM SHADE 161.00 TO AE1-246 TAP 161.00' OPEN BRANCH FROM BUS 342814 TO BUS 940040 CKT 1 /*5SUMM SHADE 161.00AE1-246 TAP 161.00 END

10 Short Circuit Analysis - Primary POI

The following Breakers are overdutied

None.

11 Summer Peak - Load Flow Analysis - Secondary POI

The Queue Project AG1-071 was evaluated as a 55.0 MW (Capacity 45.0 MW) injection tapping the Bon Ayr to Cave City 69 kV line in the EKPC area. Project AG1-071 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AG1-071 was studied with a commercial probability of 53.0 %. Potential network impacts were as follows:

11.1 Generation Deliverability

(Single or N-1 contingencies for the Capacity portion only of the interconnection)

None

11.2 Multiple Facility Contingency

(Double Circuit Tower Line, Fault with a Stuck Breaker, and Bus Fault contingencies for the full energy output)

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
166663765	341059	2BARREN CO	69.0	EKPC	341651	2HORSECAVE J	69.0	EKPC	1	EKPC_P2-2_SUMMSHADE 161 #2	bus	90.0	96.14	109.96	DC	12.44
173787331	341059	2BARREN CO	69.0	EKPC	341651	2HORSECAVE J	69.0	EKPC	1	EKPC_P2-3_SSHAD S11-1044	breaker	90.0	98.53	112.52	DC	12.59

11.3 Contribution to Previously Identified Overloads

(This project contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
165224633	342287	2SOMERSET KU	69.0	EKPC	324531	2FERGUSON SO	69.0	LGEE	1	EKPC_P7-1_COOP 161 DBL 2	tower	105.0	105.87	107.6	DC	4.01
166663779	342319	2SUMMSHAD J	69.0	EKPC	342322	2SUMMSHADE	69.0	EKPC	1	EKPC_P2-2_SUMMSHADE 161 #2	bus	98.0	106.92	117.38	DC	10.25
173787265	342319	2SUMMSHAD J	69.0	EKPC	342322	2SUMMSHADE	69.0	EKPC	1	EKPC_P2-3_SSHAD S11-1044	breaker	98.0	108.12	118.71	DC	10.37
165224382	342718	5COOPER 2	161.0	EKPC	324141	5ELIHU	161.0	LGEE	1	EKPC_P2-2_LAUREL CO 161	bus	277.0	108.15	110.2	DC	5.7
165224648	342718	5COOPER 2	161.0	EKPC	324141	5ELIHU	161.0	LGEE	1	EKPC_P7-1_LAURL 161 DBL	tower	277.0	108.41	110.46	DC	5.69
173970506	342718	5COOPER 2	161.0	EKPC	324141	5ELIHU	161.0	LGEE	1	EKPC_P4-5_LAURL S50-1024	breaker	277.0	108.41	110.46	DC	5.69
166663774	940830	AE2-071 TAP	69.0	EKPC	342319	2SUMMSHAD J	69.0	EKPC	1	EKPC_P2-2_SUMMSHADE 161 #2	bus	63.0	116.48	125.52	DC	5.69
173787268	940830	AE2-071 TAP	69.0	EKPC	342319	2SUMMSHAD J	69.0	EKPC	1	EKPC_P4-2_SSHAD S11-1004	breaker	63.0	116.48	125.52	DC	5.69
172210837	960170	AF2-308 TAP	69.0	EKPC	966220	AG1-491 TAP	69.0	EKPC	1	EKPC_P2-2_BONNIE 138/69	bus	98.0	120.32	121.95	DC	3.55

11.4 Potential Congestion due to Local Energy Deliverability

PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The developer can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.

Note: Only the most severely overloaded conditions are listed below. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed which shall study all overload conditions associated with the overloaded element(s) identified.

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
169324043	341059	2BARREN CO	69.0	EKPC	341651	2HORSECAVE J	69.0	EKPC	1	EKPC_P2-1_5SUMM SHADE 161.00 TO AE1-246 TAP 161.00	operation	90.0	88.49	101.53	DC	11.74
174788521	342319	2SUMM SHAD J	69.0	EKPC	342322	2SUMM SHADE	69.0	EKPC	1	EKPC_P2-1_5SUMM SHADE 161.00 TO AE1-246 TAP 161.00	operation	98.0	96.35	111.71	DC	15.06
169323971	342718	5COOPER 2	161.0	EKPC	324141	5ELIHU	161.0	LGEE	1	EKPC_P2-1_5LAUREL CO 161.00 TO 5LAUREL DAM 161.00	operation	277.0	108.09	110.15	DC	5.7
169549997	940830	AE2-071 TAP	69.0	EKPC	342319	2SUMM SHAD J	69.0	EKPC	1	EXT_360334 5SUMMER SHAD 161 360607 5S GLASGOW 161 1	operation	63.0	97.43	109.97	DC	7.9
169549998	940830	AE2-071 TAP	69.0	EKPC	342319	2SUMM SHAD J	69.0	EKPC	1	Base Case	operation	57.0	98.61	109.89	DC	6.43

11.5 Flow Gate Details - Secondary POI

The following indices contain additional information about each facility presented in the body of the report. For each index, a description of the flowgate and its contingency was included for convenience. The intent of the indices is to provide more details on which projects/generators have contributions to the flowgate in question. All New Service Queue Requests, through the end of the Queue under study, that are contributors to a flowgate will be listed in the indices. Please note that there may be contributors that are subsequently queued after the queue under study that are not listed in the indices. Although this information is not used "as is" for cost allocation purposes, it can be used to gage the impact of other projects/generators. It should be noted the project/generator MW contributions presented in the body of the report are Full MW Impact contributions which are also noted in the indices column named "Full MW Impact", whereas the loading percentages reported in the body of the report, take into consideration the PJM Generator Deliverability Test rules such as commercial probability of each project as well as the ramping impact of "Adder" contributions. The MW Impact found and used in the analysis is shown in the indices column named "Gendeliv MW Impact".

11.5.1 Index 1

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
173787331	341059	2BARREN CO	EKPC	341651	2HORSECAVE J	EKPC	1	EKPC_P2-3_SSHAD S11-1044	breaker	90.0	98.53	112.52	DC	12.59

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
342442	2W GLASGOW	0.0277	50/50	0.0277
940045	AE1-246 C	25.9783	50/50	25.9783
940046	AE1-246 E	12.5081	50/50	12.5081
940831	AE2-071 C	2.1015	50/50	2.1015
940832	AE2-071 E	1.4010	50/50	1.4010
945381	AF1-203 C	1.2008	50/50	1.2008
945382	AF1-203 E	0.8006	50/50	0.8006
962221	AG1-067 C O2	3.1057	50/50	3.1057
962222	AG1-067 E O2	1.6530	50/50	1.6530
962241	AG1-070 C O2	8.5838	50/50	8.5838
962242	AG1-070 E O2	1.7168	50/50	1.7168
962251	AG1-071 C O2	10.3005	50/50	10.3005
962252	AG1-071 E O2	2.2890	50/50	2.2890
964781	AG1-341 C O2	2.7405	Adder	6.08
964782	AG1-341 E O2	1.8270	Adder	4.06
CPLE	CPLE	0.1024	Confirmed LTF	0.1024
G-007A	G-007A	0.0408	Confirmed LTF	0.0408
VFT	VFT	0.1096	Confirmed LTF	0.1096
CBM-W2	CBM-W2	1.4426	Confirmed LTF	1.4426
TVA	TVA	0.6272	Confirmed LTF	0.6272
CBM-S2	CBM-S2	2.0358	Confirmed LTF	2.0358
CBM-S1	CBM-S1	0.1174	Confirmed LTF	0.1174
CBM-N	CBM-N	0.0204	Confirmed LTF	0.0204
MEC	MEC	0.1144	Confirmed LTF	0.1144
GIBSON	GIBSON	0.1299	Confirmed LTF	0.1299
BLUEG	BLUEG	0.5243	Confirmed LTF	0.5243
TRIMBLE	TRIMBLE	0.1542	Confirmed LTF	0.1542
LAGN	LAGN	0.5688	Confirmed LTF	0.5688
CBM-W1	CBM-W1	0.0140	Confirmed LTF	0.0140

11.5.2 Index 2

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
165224633	342287	2SOMERSET KU	EKPC	324531	2FERGUSON SO	LGEE	1	EKPC_P7-1_COOP 161 DBL 2	tower	105.0	105.87	107.6	DC	4.01

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
342900	1COOPER1 G	4.9218	50/50	4.9218
342903	1COOPER2 G	9.5458	50/50	9.5458
939131	AE1-143 C	5.4221	Adder	6.38
939132	AE1-143 E	2.6857	Adder	3.16
940045	AE1-246 C	5.4632	Adder	6.43
940046	AE1-246 E	2.6305	Adder	3.09
940831	AE2-071 C	1.6233	Adder	1.91
940832	AE2-071 E	1.0822	Adder	1.27
943701	AF1-038 C	8.3977	50/50	8.3977
943702	AF1-038 E	5.5985	50/50	5.5985
943821	AF1-050 C	2.5575	Adder	3.01
943822	AF1-050 E	1.7050	Adder	2.01
944151	AF1-083 C O1	2.5256	Adder	2.97
944152	AF1-083 E O1	1.6837	Adder	1.98
944511	AF1-116 C	6.0808	Adder	7.15
944512	AF1-116 E	4.0539	Adder	4.77
945381	AF1-203 C	0.9276	Adder	1.09
945382	AF1-203 E	0.6184	Adder	0.73
960741	AF2-365 C O1	1.5231	Adder	1.79
960742	AF2-365 E O1	1.0154	Adder	1.19
962221	AG1-067 C O2	0.9285	Adder	2.06
962222	AG1-067 E O2	0.4942	Adder	1.1
962241	AG1-070 C O2	1.2324	Adder	2.74
962242	AG1-070 E O2	0.2465	Adder	0.55
962251	AG1-071 C O2	1.4789	Adder	3.28
962252	AG1-071 E O2	0.3286	Adder	0.73
964781	AG1-341 C O2	2.6451	Adder	5.87
964782	AG1-341 E O2	1.7634	Adder	3.91
964891	AG1-353 C	2.3239	Adder	5.16
964892	AG1-353 E	1.5493	Adder	3.44
964901	AG1-354 C	3.2939	Adder	7.31
964902	AG1-354 E	2.1959	Adder	4.87
965401	AG1-405 C	10.6088	50/50	10.6088
965402	AG1-405 E	7.0726	50/50	7.0726
965411	AG1-406	6.8244	50/50	6.8244
966021	AG1-471 C O2	5.2283	50/50	5.2283
966022	AG1-471 E O2	3.4855	50/50	3.4855
966031	AG1-472 C O2	1.4123	Adder	3.13
966032	AG1-472 E O2	0.9415	Adder	2.09
966191	AG1-488 C O2	1.8800	Adder	4.17
966192	AG1-488 E O2	1.2533	Adder	2.78

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
WEC	WEC	0.0652	Confirmed LTF	0.0652
CPLE	CPLE	0.0628	Confirmed LTF	0.0628
LGE-0012019	LGE-0012019	5.0017	LTF	5.0017
CBM-W2	CBM-W2	5.1878	Confirmed LTF	5.1878
NY	NY	0.0426	Confirmed LTF	0.0426
TVA	TVA	1.3454	Confirmed LTF	1.3454
O-066	O-066	0.5048	Confirmed LTF	0.5048
SIGE	SIGE	0.0489	Confirmed LTF	0.0489
CBM-S2	CBM-S2	1.7957	Confirmed LTF	1.7957
CBM-S1	CBM-S1	0.2983	Confirmed LTF	0.2983
G-007	G-007	0.0788	Confirmed LTF	0.0788
MEC	MEC	0.5848	Confirmed LTF	0.5848
LAGN	LAGN	1.2705	Confirmed LTF	1.2705
CBM-W1	CBM-W1	2.5797	Confirmed LTF	2.5797

11.5.3 Index 3

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
173787265	342319	2SUMM SHAD J	EKPC	342322	2SUMM SHADE	EKPC	1	EKPC_P2-3_SSHAD S11-1044	breaker	98.0	108.12	118.71	DC	10.37

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
342442	2W GLASGOW	0.0320	50/50	0.0320
940045	AE1-246 C	13.3018	50/50	13.3018
940046	AE1-246 E	6.4046	50/50	6.4046
940831	AE2-071 C	9.9485	50/50	9.9485
940832	AE2-071 E	6.6324	50/50	6.6324
945381	AF1-203 C	5.6849	50/50	5.6849
945382	AF1-203 E	3.7899	50/50	3.7899
960741	AF2-365 C O1	3.4173	50/50	3.4173
960742	AF2-365 E O1	2.2782	50/50	2.2782
962221	AG1-067 C O2	8.5379	50/50	8.5379
962222	AG1-067 E O2	4.5444	50/50	4.5444
962241	AG1-070 C O2	7.0729	50/50	7.0729
962242	AG1-070 E O2	1.4146	50/50	1.4146
962251	AG1-071 C O2	8.4875	50/50	8.4875
962252	AG1-071 E O2	1.8861	50/50	1.8861
966031	AG1-472 C O2	6.7090	50/50	6.7090
966032	AG1-472 E O2	4.4726	50/50	4.4726
WEC	WEC	0.0309	Confirmed LTF	0.0309
CPLE	CPLE	0.0505	Confirmed LTF	0.0505
CBM-W2	CBM-W2	2.4192	Confirmed LTF	2.4192
NY	NY	0.0017	Confirmed LTF	0.0017
TVA	TVA	0.5838	Confirmed LTF	0.5838
O-066	O-066	0.0135	Confirmed LTF	0.0135
SIGE	SIGE	0.0154	Confirmed LTF	0.0154
CBM-S2	CBM-S2	1.0858	Confirmed LTF	1.0858
CBM-S1	CBM-S1	0.1197	Confirmed LTF	0.1197
G-007	G-007	0.0021	Confirmed LTF	0.0021
MEC	MEC	0.2797	Confirmed LTF	0.2797
BLUEG	BLUEG	0.1007	Confirmed LTF	0.1007
TRIMBLE	TRIMBLE	0.0367	Confirmed LTF	0.0367
LAGN	LAGN	0.6003	Confirmed LTF	0.6003
CBM-W1	CBM-W1	1.2618	Confirmed LTF	1.2618

11.5.4 Index 4

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
173970506	342718	5COOPER2	EKPC	324141	5ELIHU	LGEE	1	EKPC_P4-5_LAURL S50-1024	breaker	277.0	108.41	110.46	DC	5.69

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
342442	2W GLASGOW	0.0165	50/50	0.0165
342900	1COOPER1 G	10.1486	50/50	10.1486
342903	1COOPER2 G	19.7433	50/50	19.7433
342945	1LAUREL 1G	6.1423	50/50	6.1423
939131	AE1-143 C	9.9773	50/50	9.9773
939132	AE1-143 E	4.9420	50/50	4.9420
940045	AE1-246 C	9.3685	50/50	9.3685
940046	AE1-246 E	4.5107	50/50	4.5107
940831	AE2-071 C	2.5509	50/50	2.5509
940832	AE2-071 E	1.7006	50/50	1.7006
942411	AE2-254 C O1	1.3451	Adder	1.58
942412	AE2-254 E O1	0.8967	Adder	1.05
943701	AF1-038 C	6.6586	50/50	6.6586
943702	AF1-038 E	4.4390	50/50	4.4390
943821	AF1-050 C	4.5025	50/50	4.5025
943822	AF1-050 E	3.0017	50/50	3.0017
944151	AF1-083 C O1	4.5583	50/50	4.5583
944152	AF1-083 E O1	3.0389	50/50	3.0389
944511	AF1-116 C	11.1895	50/50	11.1895
944512	AF1-116 E	7.4597	50/50	7.4597
945381	AF1-203 C	1.4576	50/50	1.4576
945382	AF1-203 E	0.9718	50/50	0.9718
960741	AF2-365 C O1	2.2040	Adder	2.59
960742	AF2-365 E O1	1.4693	Adder	1.73
962221	AG1-067 C O2	2.8165	50/50	2.8165
962222	AG1-067 E O2	1.4991	50/50	1.4991
962241	AG1-070 C O2	3.8768	50/50	3.8768
962242	AG1-070 E O2	0.7754	50/50	0.7754
962251	AG1-071 C O2	4.6521	50/50	4.6521
962252	AG1-071 E O2	1.0338	50/50	1.0338
964781	AG1-341 C O2	7.8139	50/50	7.8139
964782	AG1-341 E O2	5.2093	50/50	5.2093
964891	AG1-353 C	7.8586	50/50	7.8586
964892	AG1-353 E	5.2391	50/50	5.2391
964901	AG1-354 C	10.7820	50/50	10.7820
964902	AG1-354 E	7.1880	50/50	7.1880
965401	AG1-405 C	3.9234	50/50	3.9234
965402	AG1-405 E	2.6156	50/50	2.6156
965411	AG1-406	2.5238	50/50	2.5238
966021	AG1-471 C O2	7.4002	50/50	7.4002
966022	AG1-471 E O2	4.9334	50/50	4.9334

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
966031	AG1-472 C O2	2.0318	Adder	4.51
966032	AG1-472 E O2	1.3545	Adder	3.01
966191	AG1-488 C O2	6.5272	50/50	6.5272
966192	AG1-488 E O2	4.3515	50/50	4.3515
WEC	WEC	0.0787	Confirmed LTF	0.0787
CPLE	CPLE	0.0874	Confirmed LTF	0.0874
LGE-0012019	LGE-0012019	7.7561	LTF	7.7561
CBM-W2	CBM-W2	7.4368	Confirmed LTF	7.4368
NY	NY	0.0868	Confirmed LTF	0.0868
TVA	TVA	2.0090	Confirmed LTF	2.0090
O-066	O-066	1.0364	Confirmed LTF	1.0364
SIGE	SIGE	0.0700	Confirmed LTF	0.0700
CBM-S2	CBM-S2	2.6726	Confirmed LTF	2.6726
CBM-S1	CBM-S1	0.4378	Confirmed LTF	0.4378
G-007	G-007	0.1617	Confirmed LTF	0.1617
MEC	MEC	0.7945	Confirmed LTF	0.7945
LAGN	LAGN	1.8725	Confirmed LTF	1.8725
CBM-W1	CBM-W1	3.0283	Confirmed LTF	3.0283

11.5.5 Index 5

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
173787268	940830	AE2-071 TAP	EKPC	342319	2SUMM SHAD J	EKPC	1	EKPC_P4-2_SSHAD S11-1004	breaker	63.0	116.48	125.52	DC	5.69

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
342442	2W GLASGOW	0.0176	50/50	0.0176
940045	AE1-246 C	6.2055	Adder	7.3
940046	AE1-246 E	2.9878	Adder	3.52
940831	AE2-071 C	13.9033	50/50	13.9033
940832	AE2-071 E	9.2688	50/50	9.2688
945381	AF1-203 C	7.9447	50/50	7.9447
945382	AF1-203 E	5.2965	50/50	5.2965
960741	AF2-365 C O1	1.5940	Adder	1.88
960742	AF2-365 E O1	1.0627	Adder	1.25
962221	AG1-067 C O2	0.8973	Adder	1.99
962222	AG1-067 E O2	0.4776	Adder	1.06
962241	AG1-070 C O2	3.8824	50/50	3.8824
962242	AG1-070 E O2	0.7765	50/50	0.7765
962251	AG1-071 C O2	4.6588	50/50	4.6588
962252	AG1-071 E O2	1.0353	50/50	1.0353
966031	AG1-472 C O2	1.6588	Adder	3.68
966032	AG1-472 E O2	1.1059	Adder	2.45
WEC	WEC	0.0170	Confirmed LTF	0.0170
CPLE	CPLE	0.0218	Confirmed LTF	0.0218
CBM-W2	CBM-W2	1.2365	Confirmed LTF	1.2365
NY	NY	0.0017	Confirmed LTF	0.0017
TVA	TVA	0.2870	Confirmed LTF	0.2870
O-066	O-066	0.0135	Confirmed LTF	0.0135
SIGE	SIGE	0.0096	Confirmed LTF	0.0096
CBM-S2	CBM-S2	0.4802	Confirmed LTF	0.4802
CBM-S1	CBM-S1	0.0600	Confirmed LTF	0.0600
G-007	G-007	0.0021	Confirmed LTF	0.0021
MEC	MEC	0.1478	Confirmed LTF	0.1478
TRIMBLE	TRIMBLE	0.0039	Confirmed LTF	0.0039
LAGN	LAGN	0.2992	Confirmed LTF	0.2992
CBM-W1	CBM-W1	0.6870	Confirmed LTF	0.6870

11.5.6 Index 6

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
172210837	960170	AF2-308 TAP	EKPC	966220	AG1-491 TAP	EKPC	1	EKPC_P2-2_BONNIE 138/69	bus	98.0	120.32	121.95	DC	3.55

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
959691	AF2-260 C	37.3710	50/50	37.3710
959692	AF2-260 E	18.6855	50/50	18.6855
960171	AF2-308	18.5105	50/50	18.5105
960181	AF2-309 C	27.7658	50/50	27.7658
960182	AF2-309 E	18.5105	50/50	18.5105
960741	AF2-365 C O1	5.1435	50/50	5.1435
960742	AF2-365 E O1	3.4290	50/50	3.4290
961003	AF2-391 BAT	17.4480	50/50	17.4480
962241	AG1-070 C O2	1.0907	Adder	2.42
962242	AG1-070 E O2	0.2181	Adder	0.48
962251	AG1-071 C O2	1.3088	Adder	2.91
962252	AG1-071 E O2	0.2908	Adder	0.65
962473	AG1-096 BAT	0.7330	Merchant Transmission	0.7330
964571	AG1-320 C O2	17.7273	50/50	17.7273
964572	AG1-320 E O2	8.7989	50/50	8.7989
966031	AG1-472 C O2	6.1210	50/50	6.1210
966032	AG1-472 E O2	4.0806	50/50	4.0806
WEC	WEC	0.0101	Confirmed LTF	0.0101
CPLE	CPLE	0.0976	Confirmed LTF	0.0976
G-007A	G-007A	0.0288	Confirmed LTF	0.0288
VFT	VFT	0.0774	Confirmed LTF	0.0774
CBM-W2	CBM-W2	2.1862	Confirmed LTF	2.1862
TVA	TVA	0.6804	Confirmed LTF	0.6804
CBM-S2	CBM-S2	1.9732	Confirmed LTF	1.9732
CBM-S1	CBM-S1	0.1193	Confirmed LTF	0.1193
CBM-N	CBM-N	0.0132	Confirmed LTF	0.0132
MEC	MEC	0.2050	Confirmed LTF	0.2050
GIBSON	GIBSON	0.0628	Confirmed LTF	0.0628
BLUEG	BLUEG	0.9097	Confirmed LTF	0.9097
TRIMBLE	TRIMBLE	0.2560	Confirmed LTF	0.2560
LAGN	LAGN	0.6562	Confirmed LTF	0.6562
CBM-W1	CBM-W1	0.4627	Confirmed LTF	0.4627

11.6 Contingency Descriptions - Secondary POI

Contingency Name	Contingency Definition
EKPC_P2-1_5LAUREL CO 161.00 TO 5LAUREL DAM 161.00	CONTINGENCY 'EKPC_P2-1_5LAUREL CO 161.00 TO 5LAUREL DAM 161.00' / 563 OPEN BRANCH FROM BUS 342754 TO BUS 342757 CKT 1 / 342754 5LAUREL CO 161 342757 5LAUREL DAM 161 1 END
EKPC_P4-2_SSHAD S11-1004	CONTINGENCY 'EKPC_P4-2_SSHAD S11-1004' / 71 OPEN BRANCH FROM BUS 342814 TO BUS 940040 CKT 1 / 342814 5SUMM SHADE 161 940040 AE1-246 TAP 161 1 OPEN BRANCH FROM BUS 342814 TO BUS 361788 CKT 1 / 342814 5SUMM SHADE 161 361788 5SUM SHAD TP 161 1 OPEN BRANCH FROM BUS 342814 TO BUS 964900 CKT 1 / 342814 5SUMM SHADE 161 964900 AG1-354 TAP 161 1 OPEN BRANCH FROM BUS 342814 TO BUS 360334 CKT 1 / 342814 5SUMM SHADE 161 360334 5SUMMER SHAD 161 1 OPEN BRANCH FROM BUS 342814 TO BUS 342322 CKT 1 / 342814 5SUMM SHADE 161 342322 2SUMM SHADE 69.0 1 END
EXT_360334 5SUMMER SHAD 161 360607 5S GLASGOW 161 1	CONTINGENCY 'EXT_360334 5SUMMER SHAD 161 360607 5S GLASGOW 161 1' / 155 OPEN BRANCH FROM BUS 360334 TO BUS 360607 CKT 1 / 360334 5SUMMER SHAD 161 360607 5S GLASGOW 161 1 END
EKPC_P2-2_LAUREL CO 161	CONTINGENCY 'EKPC_P2-2_LAUREL CO 161' /* LAUREL 161 BUS OPEN BUS 342754 /* 5LAUREL CO END
EKPC_P2-2_BONNIE 138/69	CONTINGENCY 'EKPC_P2-2_BONNIE 138/69' /* KU BONNIEVILLE 138/69 TIE OPEN BUS 324213 /* 4BONNIE END
EKPC_P7-1_COOP 161 DBL 2	CONTINGENCY 'EKPC_P7-1_COOP 161 DBL 2' /* COOPER - ELIHU 161 & COOPER - LAUREL DAM 161 OPEN BRANCH FROM BUS 324141 TO BUS 342718 CKT 1 /* 324141 5ELIHU 161.00 342718 5COOPER2 161.00 OPEN BRANCH FROM BUS 342718 TO BUS 342757 CKT 1 /* 342718 5COOPER2 161.00 342757 5LAUREL DAM 161.00 END
Base Case	

Contingency Name	Contingency Definition
EKPC_P7-1_LAURL 161 DBL	CONTINGENCY 'EKPC_P7-1_LAURL 161 DBL' /* LAUREL CO - LAUREL DAM 161 & LAUREL CO - TYNER 161 OPEN BRANCH FROM BUS 342754 TO BUS 342757 CKT 1 /* 342754 5LAUREL CO 161.00 342757 5LAUREL DAM 161.00 OPEN BRANCH FROM BUS 342754 TO BUS 342781 CKT 1 /* 342754 5LAUREL CO 161.00 342781 5PITTSBURG 161.00 OPEN BRANCH FROM BUS 342781 TO BUS 342820 CKT 1 /* 342781 5PITTSBURG 161.00 342820 5TYNER 161.00 END
EKPC_P2-2_SUMMSHADE 161 #2	CONTINGENCY 'EKPC_P2-2_SUMMSHADE 161 #2' /* SUMMERSHADE 161 BUS OPEN BRANCH FROM BUS 964900 TO BUS 342814 CKT 1 /* 964900 AG1-354 TAP 161.00 342814 5SUMM SHADE 161.00 OPEN BRANCH FROM BUS 940040 TO BUS 342814 CKT 1 OPEN BUS 342814 END
EKPC_P2-3_SSHAD S11-1044	CONTINGENCY 'EKPC_P2-3_SSHAD S11-1044' / 89 OPEN BRANCH FROM BUS 342814 TO BUS 940040 CKT 1 / 342814 5SUMM SHADE 161 940040 AE1-246 TAP 161 1 OPEN BRANCH FROM BUS 342814 TO BUS 964900 CKT 1 / 342814 5SUMM SHADE 161 964900 AG1-354 TAP 161 1 OPEN BRANCH FROM BUS 326998 TO BUS 361788 CKT 1 / 326998 5BULLITT TAP 161 361788 5SUM SHAD TP 161 1 OPEN BRANCH FROM BUS 342814 TO BUS 361788 CKT 1 / 342814 5SUMM SHADE 161 361788 5SUM SHAD TP 161 1 OPEN BRANCH FROM BUS 360334 TO BUS 361788 CKT 1 / 360334 5SUMMER SHAD 161 361788 5SUM SHAD TP 161 1 OPEN BRANCH FROM BUS 342814 TO BUS 360334 CKT 1 / 342814 5SUMM SHADE 161 360334 5SUMMER SHAD 161 1 OPEN BRANCH FROM BUS 342814 TO BUS 342322 CKT 1 / 342814 5SUMM SHADE 161 342322 2SUMM SHADE 69.0 1 END
EKPC_P4-5_LAURL S50-1024	CONTINGENCY 'EKPC_P4-5_LAURL S50-1024' / 608 OPEN BRANCH FROM BUS 342754 TO BUS 342757 CKT 1 / 342754 5LAUREL CO 161 342757 5LAUREL DAM 161 1 OPEN BRANCH FROM BUS 342754 TO BUS 342781 CKT 1 / 342754 5LAUREL CO 161 342781 5PITTSBURG 161 1 OPEN BRANCH FROM BUS 342754 TO BUS 341740 CKT 1 / 342754 5LAUREL CO 161 341740 2LAUREL CO 69.0 1 OPEN BRANCH FROM BUS 342781 TO BUS 324688 CKT 1 / 342781 5PITTSBURG 161 324688 2PITTSBRG KU 69.0 1 OPEN BRANCH FROM BUS 342781 TO BUS 342820 CKT 1 / 342781 5PITTSBURG 161 342820 5TYNER 161 1 END
EKPC_P2-1_5SUMM SHADE 161.00 TO AE1-246 TAP 161.00	CONTINGENCY 'EKPC_P2-1_5SUMM SHADE 161.00 TO AE1-246 TAP 161.00' / 68 OPEN BRANCH FROM BUS 342814 TO BUS 940040 CKT 1 / 342814 5SUMM SHADE 161 940040 AE1-246 TAP 161 1 END

12 Affected Systems

12.1 TVA

TVA Impacts to be determined during later study phases (as applicable).

12.2 Duke Energy Progress

Duke Energy Progress Impacts to be determined during later study phases (as applicable).

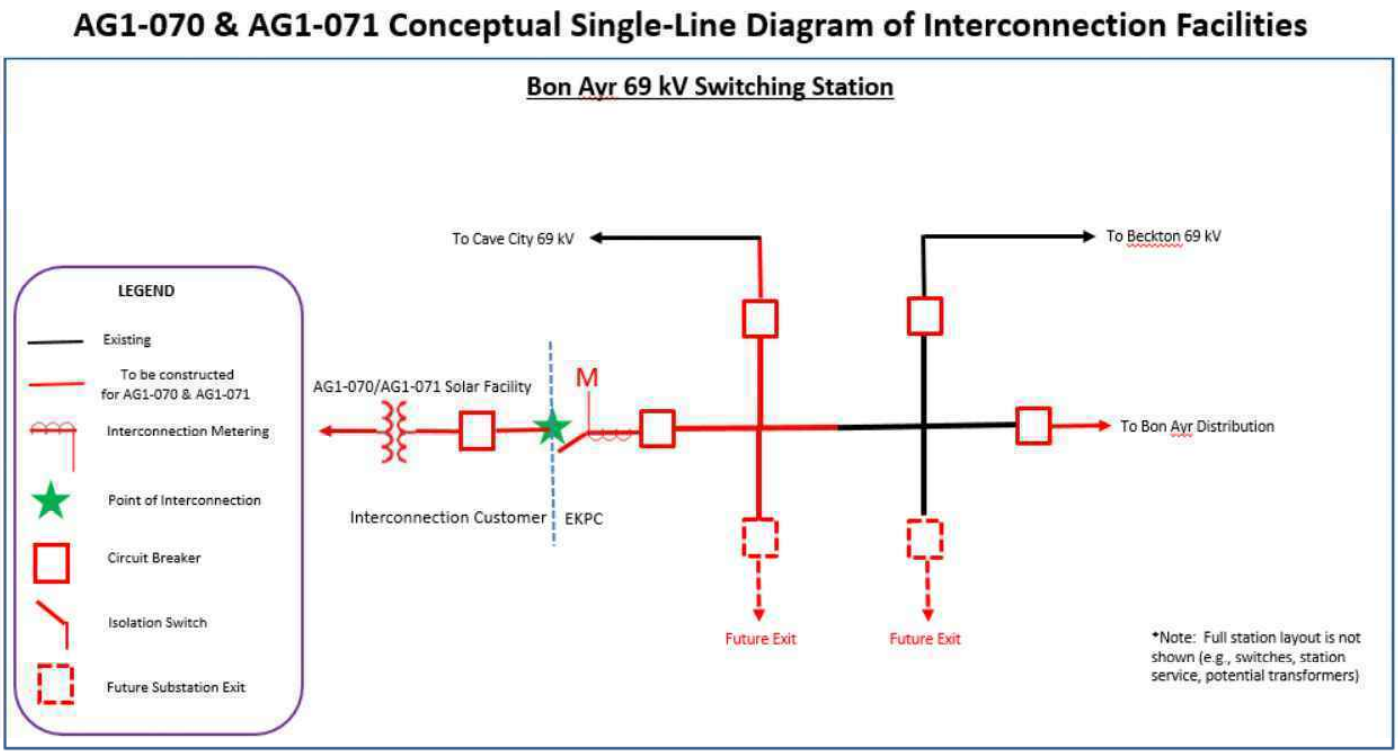
12.3 MISO

MISO Impacts to be determined during later study phases (as applicable).

12.4 LG&E

LG&E Impacts to be determined during later study phases (as applicable).

13 Attachment 1: One Line Diagram – Primary POI



Generation Interconnection

System Impact Study Report

for

Queue Project AG1-071

BON AYR 69 KV

37.5 MW Capacity / 55 MW Energy

August 2021

Table of Contents

1 Introduction

This System Impact Study has been prepared in accordance with the PJM Open Access Transmission Tariff, 205, as well as the System Impact Study Agreement between the Interconnection Customer (IC), and PJM Interconnection, LLC (PJM), Transmission Provider (TP). The Interconnected Transmission Owner (ITO) is EKPC.

2 Preface

The intent of the System Impact Study is to determine a plan, with approximate cost and construction time estimates, to connect the subject generation interconnection project to the PJM network at a location specified by the Interconnection Customer. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system. All facilities required for interconnection of a generation interconnection project must be designed to meet the technical specifications (on PJM web site) for the appropriate transmission owner.

In some instances an Interconnection Customer may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection or merchant transmission upgrade, may also contribute to the need for the same network reinforcement. The possibility of sharing the reinforcement costs with other projects may be identified in the Feasibility Study, but the actual allocation will be deferred until the System Impact Study is performed.

The System Impact Study estimates do not include the feasibility, cost, or time required to obtain property rights and permits for construction of the required facilities. The project developer is responsible for the right of way, real estate, and construction permit issues. For properties currently owned by Transmission Owners, the costs may be included in the study.

The Interconnection Customer seeking to interconnect a wind or solar generation facility shall maintain meteorological data facilities as well as provide that meteorological data which is required per Schedule H to the Interconnection Service Agreement and Section 8 of Manual 14D.

3 General

The Interconnection Customer (IC), has proposed a Solar; Storage generating facility located in Barren County, Kentucky. The installed facilities will have a total capability of 55 MW with 37.5 MW of this output being recognized by PJM as Capacity.

The proposed in-service date for this project is June 01, 2024. This study does not imply a TO commitment to this in-service date.

Queue Number	**AG1-071**
Project Name	BON AYR 69 KV
State	Kentucky
County	Barren
Transmission Owner	EKPC
MFO	55
MWE	55
MWC	37.5
Fuel	Solar; Storage
Basecase Study Year	2024

Any new service customers who can feasibly be commercially operable prior to June 1st of the basecase study year are required to request interim deliverability analysis.

4 Point of Interconnection

AG1-071 will interconnect with the EKPC on transmission system at the Bon Ayr 69 kV substation.

5 Cost Summary

The AG1-071 project will be responsible for the following costs:

Description	Total Cost
Total Physical Interconnection Costs	$0
Allocation towards System Network Upgrade Costs (PJM Identified - Summer Peak)*	$15,000
Allocation towards System Network Upgrade Costs (PJM Identified - Light Load)*	$0
Allocation towards System Network Upgrade Costs (TO Identified)*	$0
Total Costs	**$15,000**

*As your project progresses through the study process and other projects modify their request or withdraw, then your cost allocation could change.

The estimates provided in this report are preliminary in nature, as they were determined without the benefit of detailed engineering studies. Final estimates will require an on-site review and coordination to determine final construction requirements. In addition, Stability analysis will be completed during the Facilities Study stage. It is possible that a need for additional upgrades could be identified by these studies.

This cost excludes a Federal Income Tax Gross Up charges. This tax may or may not be charged based on whether this project meets the eligibility requirements of IRS Notice 88-129. If at a future date it is determined that the Federal Income Tax Gross charge is required, the Transmission Owner shall be reimbursed by the Interconnection Customer for such taxes.

Note 1: PJM Open Access Transmission Tariff (OATT) section 217.3A outline cost allocation rules. The rules are further clarified in PJM Manual 14A Attachment B. The allocation of costs for a network upgrade will start with the first Queue project to cause the need for the upgrade. Later queue projects will receive cost allocation contingent on their contribution to the violation and are allocated to the queues that have not closed less than 5 years following the execution of the first Interconnection Service Agreement which identifies the need for this upgrade.

Note 2: For customers with System Reinforcements listed: If your present cost allocation to a System Reinforcement indicates $0, then please be aware that as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, the cost responsibilities can change and a cost allocation may be assigned to your project. In addition, although your present cost allocation to a System Reinforcement is presently $0, your project may need this system reinforcement completed to be deliverable to the PJM system. If your project comes into service prior to completion of the system reinforcement, an interim deliverability study for your project will be required.

6 Transmission Owner Scope of Work

The total physical interconnection costs is given in the tables below:

6.1 Attachment Facilities

The total preliminary cost estimate for the Attachment work is given in the table below. These costs do not include CIAC Tax Gross-up.

Description	Total Cost
None	$0
Total Attachment Facility Costs	**$0**

6.2 Direct Connection Cost Estimate

The total preliminary cost estimate for the Direct Connection work is given in the table below. These costs do not include CIAC Tax Gross-up.

Description	Total Cost
None	$0
Total Direct Connection Facility Costs	**$0**

6.3 Non-Direct Connection Cost Estimate

The total preliminary cost estimate for the Non-Direct Connection work is given in the table below. These costs do not include CIAC Tax Gross-up.

Description	Total Cost
	$0
Total Non-Direct Connection Facility Costs	**$0**

7 Schedule

Based on the scope of work for the interconnection facilities, it is expected to take a minimum of 12 to 18 months after the signing of an Interconnection Construction Service Agreement (or "Interconnection Agreement" if non-FERC) and construction kickoff call to complete the installation of the physical connection work. This assumes that there will be no environmental issues with any of the new properties associated with this project, that there will be no delays in acquiring the necessary permits for implementing the defined interconnection work, and that all system outages will be allowed when requested.

The schedule for any required Network Impact Reinforcements will be more clearly identified in future study phases. The estimated time to complete each of the required reinforcements is identified in the "System Reinforcements" section of the report.

8 Interconnection Customer Requirements

It is understood that the Interconnection Customer (IC) is responsible for all costs associated with this interconnection. The costs above are reimbursable to the Transmission Owner. The cost of the IC's generating plant and the costs for the line connecting the generating plant to the Point of Interconnection are not included in this report; these are assumed to be the IC's responsibility.

The Generation Interconnection Agreement does not in or by itself establish a requirement for the Transmission Owner to provide power for consumption at the developer's facilities. A separate agreement may be reached with the local utility that provides service in the area to ensure that infrastructure is in place to meet this demand and proper metering equipment is installed. It is the responsibility of the developer to contact the local service provider to determine if a local service agreement is required.

1. An Interconnection Customer entering the New Services Queue on or after October 1, 2012 with a proposed new Customer Facility that has a Maximum Facility Output equal to or greater than 100 MW shall install and maintain, at its expense, phasor measurement units (PMUs). See Section 8.5.3 of Appendix 2 to the Interconnection Service Agreement as well as section 4.3 of PJM Manual 14D for additional information.

2. The Interconnection Customer may be required to install and/or pay for metering as necessary to properly track real time output of the facility as well as installing metering which shall be used for billing purposes. See Section 8 of Appendix 2 to the Interconnection Service Agreement as well as Section 4 of PJM Manual 14D for additional information.

9 Revenue Metering and SCADA Requirements

9.1 PJM Requirements

The Interconnection Customer will be required to install equipment necessary to provide Revenue Metering (KWH, KVARH) and real time data (KW, KVAR) for IC's generating Resource. See PJM Manuals M-01 and M-14D, and PJM Tariff Section 8 of Attachment O.

9.2 Meteorological Data Reporting Requirements

The solar generation facility shall provide the Transmission Provider with site-specific meteorological data including:

- Back Panel temperature (Fahrenheit) - (Required for plants with Maximum Facility Output of 3 MW or higher)
- Irradiance (Watts/meter2) - (Required for plants with Maximum Facility Output of 3 MW or higher)
- Ambient air temperature (Fahrenheit) - (Accepted, not required)
- Wind speed (meters/second) - (Accepted, not required)
- Wind direction (decimal degrees from true north) - (Accepted, not required)

9.3 Interconnected Transmission Owner Requirements

The IC will be required to comply with all Interconnected Transmission Owner's revenue metering requirements for generation interconnection customers located at the following link:

http://www.pjm.com/planning/design-engineering/to-tech-standards/

10 Summer Peak Analysis

The Queue Project AG1-071 was evaluated as a 55.0 MW (Capacity 37.50 MW) injection at the Bon Ayr 69 kV substation in the EKPC area. Project AG1-071 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AG1-071 was studied with a commercial probability of 100.0 %. Potential network impacts were as follows:

10.1 Generation Deliverability

(Single or N-1 contingencies for the Capacity portion only of the interconnection)

None

10.2 Multiple Facility Contingency

(Double Circuit Tower Line, Fault with a Stuck Breaker, and Bus Fault contingencies for the full energy output)

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
166663765	341059	2BARREN CO	69.0	EKPC	341651	2HORSECAVE J	69.0	EKPC	1	EKPC_P2-2_SUMMSHADE 161 #2	bus	90.0	94.99	107.27	AC	11.96
173787331	341059	2BARREN CO	69.0	EKPC	341651	2HORSECAVE J	69.0	EKPC	1	EKPC_P2-3_SSHAD S11-1044	breaker	90.0	96.99	109.55	AC	12.11
180160949	341059	2BARREN CO	69.0	EKPC	341651	2HORSECAVE J	69.0	EKPC	1	EKPC_P4-2_SSHAD S11-1004	breaker	90.0	94.99	107.27	AC	11.96
173787265	342319	2SUMMSHAD J	69.0	EKPC	342322	2SUMMSHADE	69.0	EKPC	1	EKPC_P2-3_SSHAD S11-1044	breaker	98.0	99.99	109.23	AC	10.5
180769529	342322	2SUMMSHADE	69.0	EKPC	341431	2EDM-JBGAL J	69.0	EKPC	1	EKPC_P2-3_SSHAD S11-1044	breaker	46.0	99.12	106.47	AC	4.11
180857729	342322	2SUMMSHADE	69.0	EKPC	341431	2EDM-JBGAL J	69.0	EKPC	1	EKPC_P4-2_SSHAD S11-1004	breaker	46.0	97.27	104.52	AC	4.01

10.3 Contribution to Previously Identified Overloads

(This project contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
165224633	342287	2SOMERSET KU	69.0	EKPC	324531	2FERGUSON SO	69.0	LGEE	1	EKPC_P7-1_COOP 161 DBL 2	tower	105.0	110.31	113.6	AC	4.02
165224648	342718	5COOPER 2	161.0	LGEE	324141	5ELIHU	161.0	EKPC	1	EKPC_P7-1_LAURL 161 DBL	tower	277.0	108.83	110.91	AC	5.7
173970506	342718	5COOPER 2	161.0	LGEE	324141	5ELIHU	161.0	EKPC	1	EKPC_P4-5_LAURL S50-1024	breaker	277.0	108.77	110.85	AC	5.7
166663774	940830	AE2-071 TAP	69.0	EKPC	342319	2SUMMSHAD J	69.0	EKPC	1	EKPC_P2-2_SUMMSHADE 161 #2	bus	63.0	116.78	125.5	AC	5.76

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
173787268	940830	AE2-071 TAP	69.0	EKPC	342319	2SUMM SHAD J	69.0	EKPC	1	EKPC_P4-2_SSHAD S11-1004	breaker	63.0	116.79	125.51	AC	5.76
180091271	940830	AE2-071 TAP	69.0	EKPC	342319	2SUMM SHAD J	69.0	EKPC	1	EKPC_P2-3_SSHAD S11-1044	breaker	63.0	117.8	126.63	AC	5.83
180487289	940830	AE2-071 TAP	69.0	EKPC	342319	2SUMM SHAD J	69.0	EKPC	1	EKPC_P4-5_SSHAD S11-1004	breaker	63.0	103.03	111.87	AC	5.83
180537122	940830	AE2-071 TAP	69.0	EKPC	342319	2SUMM SHAD J	69.0	EKPC	1	EKPC_P2-3_SSHAD S11-1039	breaker	63.0	102.19	110.92	AC	5.76
180537563	940830	AE2-071 TAP	69.0	EKPC	342319	2SUMM SHAD J	69.0	EKPC	1	EKPC_P4-5_SSHAD S11-1014	breaker	63.0	102.18	110.91	AC	5.76
166663747	960170	AF2-308 TAP	69.0	EKPC	341287	2CENT HARDIN	69.0	EKPC	1	EKPC_P2-2_BONNIE 138/69	bus	98.0	122.26	125.29	AC	3.44
179713775	960170	AF2-308 TAP	69.0	EKPC	341287	2CENT HARDIN	69.0	EKPC	1	EKPC_P2-3_BONNV W8-828	breaker	98.0	122.27	125.3	AC	3.44

10.4 Steady-State Voltage Requirements

To be determined during the Facilities Study phase.

10.5 Potential Congestion due to Local Energy Deliverability

PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The developer can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.

Note: Only the most severely overloaded conditions are listed below. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed which shall study all overload conditions associated with the overloaded element(s) identified.

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
169324043	341059	2BARREN CO	69.0	EKPC	341651	2HORSECAVE J	69.0	EKPC	1	EKPC_P2-1_5SUMM SHADE 161.00 TO AE1-246 TAP 161.00	operation	90.0	88.57	100.23	AC	11.25
174788521	342319	2SUMM SHAD J	69.0	EKPC	342322	2SUMM SHADE	69.0	EKPC	1	EKPC_P2-1_5SUMM SHADE 161.00 TO AE1-246 TAP 161.00	operation	98.0	88.79	102.49	AC	15.23

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
169323971	342718	5COOPER 2	161.0	LGEE	324141	5ELIHU	161.0	EKPC	1	EKPC_P2-1_5LAUREL CO 161.00 TO 5LAUREL DAM 161.00	operation	277.0	108.44	110.52	AC	5.72
169324086	342757	5LAUREL DAM	161.0	EKPC	342754	5LAUREL CO	161.0	EKPC	1	EXT_B-69-25	operation	200.0	99.95	101.27	AC	3.05
169549997	940830	AE2-071 TAP	69.0	EKPC	342319	2SUMM SHAD J	69.0	EKPC	1	EXT_360334 5SUMMER SHAD 161 360607 5S GLASGOW 161 1	operation	63.0	94.86	107.44	AC	8.17
169549998	940830	AE2-071 TAP	69.0	EKPC	342319	2SUMM SHAD J	69.0	EKPC	1	Base Case	operation	57.0	95.83	106.76	AC	6.63

10.6 System Reinforcements

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AG1-071	Upgrade Number
165224633	4	2SOMERSET KU 69.0 kV - 2FERGUSON SO 69.0 kV Ckt 1	EKPC EKPC emergency rating is 152 MVA. No upgrade is required. LGEE A LG&E affected system study will be required to determine if LG&E upgrades are required on this line. Preliminary upgrade, if determined to be required, is to replace terminal equipment at a cost estimate of $897,613.	$0	$0	N/A
179713775,166663747	7	AF2-308 TAP 69.0 kV - 2CENT HARDIN 69.0 kV Ckt 1	EKPC ProjectId : n7036.1 (EKPC-r0087): Description : Increase the maximum operating temperature of the 556 MCM ACSR conductor in the AF2-308 Tap-Central Hardin 69 kV line section to 302 degrees F (4.15 miles). Type : FAC Total Cost : $1,730,000 Time Estimate : 9 Months Ratings : 103.0/129.0/135.0 This constraint is driven by a prior queue. Per PJM cost allocation rules, Queue Project AG1-071 presently does not receive cost allocation for this upgrade.	$1,730,000	$0	n7036.1
180857729,180769529	3	2SUMM SHADE 69.0 kV - 2EDM-JBGAL J 69.0 kV Ckt 1	EKPC ProjectId : n7789 (r0004): Description : Increase MOT of Summershade-Edm. JB Galloway Jct. 69kV line section 266 MCM conductor to 212F (~7.9 miles). Type : FAC Total Cost : $1,260,000 Time Estimate : 12 Months Ratings : 57.0/63.0/66.0 This constraint is driven by a prior queue. Per PJM cost allocation rules, Queue Project AG1-071 presently does not receive cost allocation for this upgrade.	$1,260,000	$0	n7789
180160949,166663765,173787331	1	2BARREN CO 69.0 kV - 2HORSECAVE J 69.0 kV Ckt 1	EKPC ProjectId : n6197.1 : Description : Uprate CT associated with Barren Co-Horsecave Jct 69kV line section to minimum 166 MVA Summer LTE. Type : FAC Total Cost : $5,000 Time Estimate : 6 Months Ratings : 90.0/115.0/133.0 This project is the driver for the overload.	$5,000	$5,000	n6197.1

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AG1-071	Upgrade Number
180537122,180487289,173787268,180091271,166663774,180537563	6	AE2-071 TAP 69.0 kV - 2SUMM SHAD J 69.0 kV Ckt 1	**EKPC** **ProjectId : n7788 (EKPC-r0113a):** **Description : Increase the maximum operating temperature of the 266 MCM ACSR conductor in the AE2-071 Tap-Summer Shade Junction 69 kV line section to 266 degrees F (1.7 miles).** **Type : FAC** **Total Cost : $115,000** **Time Estimate : 9 Months** **Ratings : 66.0/76.0/78.0** **ProjectId : n7788.1 (r0071):** **Description : Rebuild the AE2-071-Summer Shade 69 kV line section using 795 MCM ACSR conductor at 212 degrees F (1.7 miles).** **Type : FAC** **Total Cost : $2,175,000** **Time Estimate : 16 Months** **Ratings : 114.0/127.0/127.0** **This constraint is driven by a prior queue. Per PJM cost allocation rules, Queue Project AG1-071 presently does not receive cost allocation for these upgrades.**	$115,000	$0	n7788 n7788.1
173787265	2	2SUMM SHAD J 69.0 kV - 2SUMM SHADE 69.0 kV Ckt 1	**EKPC** **ProjectId : n7792 (r0065):** **Description : Increase the maximum operating temperature of the 556 MCM ACSR conductor in the Summer Shade-Summer Shade Junction 69 kV line section to 302 degrees F (0.2 mile).** **Type : FAC** **Total Cost : $10,000** **Time Estimate : 6 Months** **Ratings : 90.0/108.0/109.0** **This project is the driver for the overload.**	$10,000	$10,000	n7792
165224648,173970506	5	5COOPER2 161.0 kV - 5ELIHU 161.0 kV Ckt 1	**EKPC** **ProjectId : n6238 (r0076):** **Description : Increase the maximum operating temperature of the 795 MCM ACSR conductor in the Cooper-Elihu 161 kV line section to 275 degrees F (6.7 miles).** **Type : FAC** **Total Cost : $680,000** **Time Estimate : 10 Months** **Ratings : 312.0/371.0/381.0** **This constraint is driven by a prior queue. Per PJM cost allocation rules, Queue Project AG1-071 presently does not receive cost allocation for this upgrade.** **LGEE** **LG&E SE rating is 277 MVA. A LG&E affected system study will be required to determine if LG&E upgrades are required on this line. Preliminary upgrade, if determined to be required, is to upgrade the line conductor at a cost estimate of $28,083. New LG&E expected SE rating to be 335 MVA.**	$680,000	$0	n6238

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AG1-071	Upgrade Number
			TOTAL COST	**$3,800,000**	**$15,000**	

Note : For customers with System Reinforcements listed: If your present cost allocation to a System Reinforcement indicates $0, then please be aware that as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, the cost responsibilities can change and a cost allocation may be assigned to your project. In addition, although your present cost allocation to a System Reinforcement is presently $0, your project may need this system reinforcement completed to be deliverable to the PJM system. If your project comes into service prior to completion of the system reinforcement, an interim deliverability study for your project will be required.

10.7 Flow Gate Details

The following indices contain additional information about each facility presented in the body of the report. For each index, a description of the flowgate and its contingency was included for convenience. The intent of the indices is to provide more details on which projects/generators have contributions to the flowgate in question. All New Service Queue Requests, through the end of the Queue under study, that are contributors to a flowgate will be listed in the indices. Please note that there may be contributors that are subsequently queued after the queue under study that are not listed in the indices. Although this information is not used "as is" for cost allocation purposes, it can be used to gage the impact of other projects/generators. It should be noted the project/generator MW contributions presented in the body of the report are Full MW Impact contributions which are also noted in the indices column named "Full MW Impact", whereas the loading percentages reported in the body of the report, take into consideration the PJM Generator Deliverability Test rules such as commercial probability of each project as well as the ramping impact of "Adder" contributions. The MW Impact found and used in the analysis is shown in the indices column named "Gendeliv MW Impact".

10.7.1 Index 1

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
173787331	341059	2BARREN CO	EKPC	341651	2HORSECAVE J	EKPC	1	EKPC_P2-3_SSHAD S11-1044	breaker	90.0	96.99	109.55	AC	12.11

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
342442	2W GLASGOW	0.03	80|50	0.03
940045	AE1-246 C	25.98	80|50	25.98
940046	AE1-246 E	12.51	80|50	12.51
940831	AE2-071 C	2.1	80|50	2.1
940832	AE2-071 E	1.4	80|50	1.4
945381	AF1-203 C	1.2	80|50	1.2
945382	AF1-203 E	0.8	80|50	0.8
962221	AG1-067 C O1	3.11	80|50	3.11
962222	AG1-067 E O1	1.66	80|50	1.66
962241	AG1-070 C O1	7.2	80|50	7.2
962242	AG1-070 E O1	2.71	80|50	2.71
962251	AG1-071 C O1	8.26	80|50	8.26
962252	AG1-071 E O1	3.85	80|50	3.85
966031	AG1-472 C	14.99	80|50	14.99
966032	AG1-472 E	9.99	80|50	9.99
LTFEXP_AA2-074	LTFEXP_AA2-074->LTFIMP_AA2-074	0.067	Confirmed LTF	0.067
LTFEXP_BlueG	LTFEXP_BlueG->LTFIMP_BlueG	0.5238	Confirmed LTF	0.5238
LTFEXP_CBM-N	LTFEXP_CBM-N->LTFIMP_CBM-N	0.0204	LTF/CBM	0.0204
LTFEXP_CBM-S1	LTFEXP_CBM-S1->LTFIMP_CBM-S1	0.1177	LTF/CBM	0.1177
LTFEXP_CBM-S2	LTFEXP_CBM-S2->LTFIMP_CBM-S2	2.041	LTF/CBM	2.041
LTFEXP_CBM-W1	LTFEXP_CBM-W1->LTFIMP_CBM-W1	0.0152	LTF/CBM	0.0152
LTFEXP_CBM-W2	LTFEXP_CBM-W2->LTFIMP_CBM-W2	1.446	LTF/CBM	1.446
LTFEXP_CPLE	LTFEXP_CPLE->LTFIMP_CPLE	0.1024	Confirmed LTF	0.1024
LTFEXP_G-007A	LTFEXP_G-007A->LTFIMP_G-007A	0.0419	LTF/CMTX	0.0419
LTFEXP_GIBSON	LTFEXP_GIBSON->LTFIMP_GIBSON	0.1299	Confirmed LTF	0.1299
LTFEXP_LAGN	LTFEXP_LAGN->LTFIMP_LAGN	0.5691	Confirmed LTF	0.5691
LTFEXP_MEC	LTFEXP_MEC->LTFIMP_MEC	0.1139	Confirmed LTF	0.1139
LTFEXP_TRIMBLE	LTFEXP_TRIMBLE->LTFIMP_TRIMBLE	0.1544	Confirmed LTF	0.1544
LTFEXP_TVA	LTFEXP_TVA->LTFIMP_TVA	0.6275	Confirmed LTF	0.6275

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
LTFEXP_VFT	LTFEXP_VFT->LTFIMP_VFT	0.1118	Confirmed LTF	0.1118

10.7.2 Index 2

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
173787265	342319	2SUMM SHAD J	EKPC	342322	2SUMM SHADE	EKPC	1	EKPC_P2-3_SSHAD S11-1044	breaker	98.0	99.99	109.23	AC	10.5

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
342442	2W GLASGOW	0.03	80|50	0.03
940045	AE1-246 C	13.3	80|50	13.3
940046	AE1-246 E	6.4	80|50	6.4
940831	AE2-071 C	9.95	80|50	9.95
940832	AE2-071 E	6.63	80|50	6.63
945381	AF1-203 C	5.68	80|50	5.68
945382	AF1-203 E	3.79	80|50	3.79
960741	AF2-365 C O1	3.42	80|50	3.42
960742	AF2-365 E O1	2.28	80|50	2.28
962221	AG1-067 C O1	8.5	80|50	8.5
962222	AG1-067 E O1	4.52	80|50	4.52
962241	AG1-070 C O1	6.24	80|50	6.24
962242	AG1-070 E O1	2.35	80|50	2.35
962251	AG1-071 C O1	7.16	80|50	7.16
962252	AG1-071 E O1	3.34	80|50	3.34
966031	AG1-472 C	7.99	80|50	7.99
966032	AG1-472 E	5.33	80|50	5.33
LTFEXP_AA2-074	LTFEXP_AA2-074->LTFIMP_AA2-074	0.0333	Confirmed LTF	0.0333
LTFEXP_BlueG	LTFEXP_BlueG->LTFIMP_BlueG	0.0995	Confirmed LTF	0.0995
LTFEXP_CBM-S1	LTFEXP_CBM-S1->LTFIMP_CBM-S1	0.1199	LTF/CBM	0.1199
LTFEXP_CBM-S2	LTFEXP_CBM-S2->LTFIMP_CBM-S2	1.0921	LTF/CBM	1.0921
LTFEXP_CBM-W1	LTFEXP_CBM-W1->LTFIMP_CBM-W1	1.2633	LTF/CBM	1.2633
LTFEXP_CBM-W2	LTFEXP_CBM-W2->LTFIMP_CBM-W2	2.4178	LTF/CBM	2.4178
LTFEXP_CPLE	LTFEXP_CPLE->LTFIMP_CPLE	0.0509	Confirmed LTF	0.0509
LTFEXP_G-007	LTFEXP_G-007->LTFIMP_G-007	0.0016	LTF/CMTX NF	0.0016
LTFEXP_LAGN	LTFEXP_LAGN->LTFIMP_LAGN	0.6005	Confirmed LTF	0.6005
LTFEXP_MEC	LTFEXP_MEC->LTFIMP_MEC	0.2803	Confirmed LTF	0.2803
LTFEXP_NY	LTFEXP_NY->LTFIMP_NY	0.0017	Confirmed LTF	0.0017
LTFEXP_O-066	LTFEXP_O-066->LTFIMP_O-066	0.0107	LTF/CMTX NF	0.0107
LTFEXP_SIGE	LTFEXP_SIGE->LTFIMP_SIGE	0.0153	Confirmed LTF	0.0153

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
LTFEXP_TRIMBLE	LTFEXP_TRIMBLE->LTFIMP_TRIMBLE	0.0364	Confirmed LTF	0.0364
LTFEXP_TVA	LTFEXP_TVA->LTFIMP_TVA	0.5843	Confirmed LTF	0.5843
LTFEXP_WEC	LTFEXP_WEC->LTFIMP_WEC	0.031	Confirmed LTF	0.031

10.7.3 Index 3

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
180769529	342322	2SUMM SHADE	EKPC	341431	2EDM-JBGAL J	EKPC	1	EKPC_P2-3_SSHAD S11-1044	breaker	46.0	99.12	106.47	AC	4.11

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
939131	AE1-143 C	-2.96	Adder	-3.48
940045	AE1-246 C	4.28	Adder	5.04
940046	AE1-246 E	2.06	Adder	2.42
940831	AE2-071 C	3.83	80|50	3.83
940832	AE2-071 E	2.55	80|50	2.55
945381	AF1-203 C	2.19	80|50	2.19
945382	AF1-203 E	1.46	80|50	1.46
962221	AG1-067 C O1	3.31	80|50	3.31
962222	AG1-067 E O1	1.76	80|50	1.76
962241	AG1-070 C O1	2.08	Adder	2.45
962242	AG1-070 E O1	0.78	Adder	0.92
962251	AG1-071 C O1	2.38	Adder	2.8
962252	AG1-071 E O1	1.11	Adder	1.31
966031	AG1-472 C	2.58	Adder	3.04
966032	AG1-472 E	1.72	Adder	2.02
LTFEXP_AA2-074	LTFEXP_AA2-074->LTFIMP_AA2-074	0.0482	Confirmed LTF	0.0482
LTFEXP_BlueG	LTFEXP_BlueG->LTFIMP_BlueG	0.3254	Confirmed LTF	0.3254
LTFEXP_CBM-N	LTFEXP_CBM-N->LTFIMP_CBM-N	0.011	LTF/CBM	0.011
LTFEXP_CBM-S1	LTFEXP_CBM-S1->LTFIMP_CBM-S1	0.093	LTF/CBM	0.093
LTFEXP_CBM-S2	LTFEXP_CBM-S2->LTFIMP_CBM-S2	1.4899	LTF/CBM	1.4899
LTFEXP_CBM-W1	LTFEXP_CBM-W1->LTFIMP_CBM-W1	0.3657	LTF/CBM	0.3657
LTFEXP_CBM-W2	LTFEXP_CBM-W2->LTFIMP_CBM-W2	1.5075	LTF/CBM	1.5075
LTFEXP_CPLE	LTFEXP_CPLE->LTFIMP_CPLE	0.0737	Confirmed LTF	0.0737
LTFEXP_G-007A	LTFEXP_G-007A->LTFIMP_G-007A	0.0227	LTF/CMTX	0.0227
LTFEXP_GIBSON	LTFEXP_GIBSON->LTFIMP_GIBSON	0.0342	Confirmed LTF	0.0342
LTFEXP_LAGN	LTFEXP_LAGN->LTFIMP_LAGN	0.4676	Confirmed LTF	0.4676
LTFEXP_MEC	LTFEXP_MEC->LTFIMP_MEC	0.1411	Confirmed LTF	0.1411
LTFEXP_TRIMBLE	LTFEXP_TRIMBLE->LTFIMP_TRIMBLE	0.0998	Confirmed LTF	0.0998
LTFEXP_TVA	LTFEXP_TVA->LTFIMP_TVA	0.4959	Confirmed LTF	0.4959

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
LTFEXP_VFT	LTFEXP_VFT->LTFIMP_VFT	0.0605	Confirmed LTF	0.0605
LTFEXP_WEC	LTFEXP_WEC->LTFIMP_WEC	0.0083	Confirmed LTF	0.0083

10.7.4 Index 4

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
165224633	342287	2SOMERSET KU	EKPC	324531	2FERGUSON SO	EKPC	1	EKPC_P7-1_COOP 161 DBL 2	tower	105.0	110.31	113.6	AC	4.02

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
342900	1COOPER1 G	5.12	80|50	5.12
342903	1COOPER2 G	9.93	80|50	9.93
939131	AE1-143 C	5.42	Adder	6.38
939132	AE1-143 E	2.69	Adder	3.16
940045	AE1-246 C	5.46	Adder	6.42
940046	AE1-246 E	2.63	Adder	3.09
940831	AE2-071 C	1.62	Adder	1.91
940832	AE2-071 E	1.08	Adder	1.27
943701	AF1-038 C	8.4	80|50	8.4
943702	AF1-038 E	5.6	80|50	5.6
943821	AF1-050 C	2.56	Adder	3.01
943822	AF1-050 E	1.71	Adder	2.01
944151	AF1-083 C O1	2.53	Adder	2.98
944152	AF1-083 E O1	1.68	Adder	1.98
944511	AF1-116 C	6.08	Adder	7.15
944512	AF1-116 E	4.05	Adder	4.76
945381	AF1-203 C	0.93	Adder	1.09
945382	AF1-203 E	0.62	Adder	0.73
960741	AF2-365 C O1	1.52	Adder	1.79
960742	AF2-365 E O1	1.02	Adder	1.2
962221	AG1-067 C O1	1.75	Adder	2.06
962222	AG1-067 E O1	0.93	Adder	1.09
962241	AG1-070 C O1	2.03	Adder	2.39
962242	AG1-070 E O1	0.77	Adder	0.91
962251	AG1-071 C O1	2.33	Adder	2.74
962252	AG1-071 E O1	1.09	Adder	1.28
964781	AG1-341 C O1	4.3	Adder	5.06
964782	AG1-341 E O1	2.87	Adder	3.38
964891	AG1-353 C	4.39	Adder	5.16
964892	AG1-353 E	2.92	Adder	3.44
964901	AG1-354 C	6.22	Adder	7.32
964902	AG1-354 E	4.14	Adder	4.87
965401	AG1-405 C	10.61	80|50	10.61
965402	AG1-405 E	7.07	80|50	7.07
965411	AG1-406	6.82	80|50	6.82
966021	AG1-471 C O1	5.16	80|50	5.16
966022	AG1-471 E O1	3.44	80|50	3.44
966031	AG1-472 C	2.89	Adder	3.4
966032	AG1-472 E	1.93	Adder	2.27
966191	AG1-488 C O1	3.46	Adder	4.07
966192	AG1-488 E O1	2.31	Adder	2.72

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
LTFEXP_AA2-074	LTFEXP_AA2-074->LTFIMP_AA2-074	0.0411	Confirmed LTF	0.0411
LTFEXP_CBM-S1	LTFEXP_CBM-S1->LTFIMP_CBM-S1	0.2983	LTF/CBM	0.2983
LTFEXP_CBM-S2	LTFEXP_CBM-S2->LTFIMP_CBM-S2	1.7974	LTF/CBM	1.7974
LTFEXP_CBM-W1	LTFEXP_CBM-W1->LTFIMP_CBM-W1	2.5857	LTF/CBM	2.5857
LTFEXP_CBM-W2	LTFEXP_CBM-W2->LTFIMP_CBM-W2	5.1941	LTF/CBM	5.1941
LTFEXP_CPLE	LTFEXP_CPLE->LTFIMP_CPLE	0.063	Confirmed LTF	0.063
LTFEXP_G-007	LTFEXP_G-007->LTFIMP_G-007	0.0785	LTF/CMTX NF	0.0785
LTFEXP_LAGN	LTFEXP_LAGN->LTFIMP_LAGN	1.2718	Confirmed LTF	1.2718
LTFEXP_LGE-0012019	LTFEXP_LGE-0012019->LTFIMP_LGE-0012019	5.0016	Confirmed LTF	5.0016
LTFEXP_MEC	LTFEXP_MEC->LTFIMP_MEC	0.5859	Confirmed LTF	0.5859
LTFEXP_NY	LTFEXP_NY->LTFIMP_NY	0.0421	Confirmed LTF	0.0421
LTFEXP_O-066	LTFEXP_O-066->LTFIMP_O-066	0.5037	LTF/CMTX NF	0.5037
LTFEXP_SIGE	LTFEXP_SIGE->LTFIMP_SIGE	0.0411	Confirmed LTF	0.0411
LTFEXP_TVA	LTFEXP_TVA->LTFIMP_TVA	1.3459	Confirmed LTF	1.3459
LTFEXP_WEC	LTFEXP_WEC->LTFIMP_WEC	0.0653	Confirmed LTF	0.0653

10.7.5 Index 5

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
173970506	342718	5COOPER2	LGEE	324141	5ELIHU	EKPC	1	EKPC_P4-5_LAURL S50-1024	breaker	277.0	108.77	110.85	AC	5.7

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
342442	2W GLASGOW	0.02	80|50	0.02
342900	1COOPER1 G	10.56	80|50	10.56
342903	1COOPER2 G	20.54	80|50	20.54
342945	1LAUREL 1G	6.39	80|50	6.39
939131	AE1-143 C	9.98	80|50	9.98
939132	AE1-143 E	4.94	80|50	4.94
940045	AE1-246 C	9.37	80|50	9.37
940046	AE1-246 E	4.51	80|50	4.51
940831	AE2-071 C	2.55	80|50	2.55
940832	AE2-071 E	1.7	80|50	1.7
942411	AE2-254 C O1	1.35	Adder	1.59
942412	AE2-254 E O1	0.9	Adder	1.06
943701	AF1-038 C	6.66	80|50	6.66
943702	AF1-038 E	4.44	80|50	4.44
943821	AF1-050 C	4.5	80|50	4.5
943822	AF1-050 E	3.0	80|50	3.0
944151	AF1-083 C O1	4.56	80|50	4.56
944152	AF1-083 E O1	3.04	80|50	3.04
944511	AF1-116 C	11.19	80|50	11.19
944512	AF1-116 E	7.46	80|50	7.46
945381	AF1-203 C	1.46	80|50	1.46
945382	AF1-203 E	0.97	80|50	0.97
960741	AF2-365 C O1	2.2	Adder	2.59
960742	AF2-365 E O1	1.47	Adder	1.73
962221	AG1-067 C O1	2.81	80|50	2.81
962222	AG1-067 E O1	1.5	80|50	1.5
962241	AG1-070 C O1	3.39	80|50	3.39
962242	AG1-070 E O1	1.27	80|50	1.27
962251	AG1-071 C O1	3.89	80|50	3.89
962252	AG1-071 E O1	1.81	80|50	1.81
964781	AG1-341 C O1	7.38	80|50	7.38
964782	AG1-341 E O1	4.92	80|50	4.92
964891	AG1-353 C	7.86	80|50	7.86
964892	AG1-353 E	5.24	80|50	5.24
964901	AG1-354 C	10.78	80|50	10.78
964902	AG1-354 E	7.19	80|50	7.19
965401	AG1-405 C	3.92	80|50	3.92
965402	AG1-405 E	2.62	80|50	2.62
965411	AG1-406	2.52	80|50	2.52
966021	AG1-471 C O1	7.3	80|50	7.3
966022	AG1-471 E O1	4.87	80|50	4.87

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
966031	AG1-472 C	4.86	80|50	4.86
966032	AG1-472 E	3.24	80|50	3.24
966191	AG1-488 C O1	6.34	80|50	6.34
966192	AG1-488 E O1	4.23	80|50	4.23
LTFEXP_AA2-074	LTFEXP_AA2-074->LTFIMP_AA2-074	0.0571	Confirmed LTF	0.0571
LTFEXP_CBM-S1	LTFEXP_CBM-S1->LTFIMP_CBM-S1	0.4382	LTF/CBM	0.4382
LTFEXP_CBM-S2	LTFEXP_CBM-S2->LTFIMP_CBM-S2	2.6837	LTF/CBM	2.6837
LTFEXP_CBM-W1	LTFEXP_CBM-W1->LTFIMP_CBM-W1	3.0458	LTF/CBM	3.0458
LTFEXP_CBM-W2	LTFEXP_CBM-W2->LTFIMP_CBM-W2	7.4506	LTF/CBM	7.4506
LTFEXP_CPLE	LTFEXP_CPLE->LTFIMP_CPLE	0.0881	Confirmed LTF	0.0881
LTFEXP_G-007	LTFEXP_G-007->LTFIMP_G-007	0.1603	LTF/CMTX NF	0.1603
LTFEXP_LAGN	LTFEXP_LAGN->LTFIMP_LAGN	1.8739	Confirmed LTF	1.8739
LTFEXP_LGE-0012019	LTFEXP_LGE-0012019->LTFIMP_LGE-0012019	7.7562	Confirmed LTF	7.7562
LTFEXP_MEC	LTFEXP_MEC->LTFIMP_MEC	0.7955	Confirmed LTF	0.7955
LTFEXP_NY	LTFEXP_NY->LTFIMP_NY	0.0863	Confirmed LTF	0.0863
LTFEXP_O-066	LTFEXP_O-066->LTFIMP_O-066	1.0288	LTF/CMTX NF	1.0288
LTFEXP_SIGE	LTFEXP_SIGE->LTFIMP_SIGE	0.054	Confirmed LTF	0.054
LTFEXP_TVA	LTFEXP_TVA->LTFIMP_TVA	2.0101	Confirmed LTF	2.0101
LTFEXP_WEC	LTFEXP_WEC->LTFIMP_WEC	0.079	Confirmed LTF	0.079

10.7.6 Index 6

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
180091271	940830	AE2-071 TAP	EKPC	342319	2SUMM SHAD J	EKPC	1	EKPC_P2-3_SSHAD S11-1044	breaker	63.0	117.8	126.63	AC	5.83

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
342442	2W GLASGOW	0.02	80|50	0.02
940045	AE1-246 C	6.28	Adder	7.39
940046	AE1-246 E	3.02	Adder	3.55
940831	AE2-071 C	13.93	80|50	13.93
940832	AE2-071 E	9.28	80|50	9.28
945381	AF1-203 C	7.96	80|50	7.96
945382	AF1-203 E	5.31	80|50	5.31
960741	AF2-365 C O1	1.61	Adder	1.89
960742	AF2-365 E O1	1.08	Adder	1.27
962221	AG1-067 C O1	1.81	Adder	2.13
962222	AG1-067 E O1	0.96	Adder	1.13
962241	AG1-070 C O1	3.47	80|50	3.47
962242	AG1-070 E O1	1.3	80|50	1.3
962251	AG1-071 C O1	3.98	80|50	3.98
962252	AG1-071 E O1	1.86	80|50	1.86
966031	AG1-472 C	3.77	Adder	4.44
966032	AG1-472 E	2.52	Adder	2.96
LTFEXP_AA2-074	LTFEXP_AA2-074->LTFIMP_AA2-074	0.0185	Confirmed LTF	0.0185
LTFEXP_BlueG	LTFEXP_BlueG->LTFIMP_BlueG	0.0553	Confirmed LTF	0.0553
LTFEXP_CBM-S1	LTFEXP_CBM-S1->LTFIMP_CBM-S1	0.0666	LTF/CBM	0.0666
LTFEXP_CBM-S2	LTFEXP_CBM-S2->LTFIMP_CBM-S2	0.6067	LTF/CBM	0.6067
LTFEXP_CBM-W1	LTFEXP_CBM-W1->LTFIMP_CBM-W1	0.7019	LTF/CBM	0.7019
LTFEXP_CBM-W2	LTFEXP_CBM-W2->LTFIMP_CBM-W2	1.3433	LTF/CBM	1.3433
LTFEXP_CPLE	LTFEXP_CPLE->LTFIMP_CPLE	0.0283	Confirmed LTF	0.0283
LTFEXP_G-007	LTFEXP_G-007->LTFIMP_G-007	0.0009	LTF/CMTX NF	0.0009
LTFEXP_LAGN	LTFEXP_LAGN->LTFIMP_LAGN	0.3336	Confirmed LTF	0.3336
LTFEXP_MEC	LTFEXP_MEC->LTFIMP_MEC	0.1558	Confirmed LTF	0.1558
LTFEXP_NY	LTFEXP_NY->LTFIMP_NY	0.0009	Confirmed LTF	0.0009
LTFEXP_O-066	LTFEXP_O-066->LTFIMP_O-066	0.006	LTF/CMTX NF	0.006
LTFEXP_SIGE	LTFEXP_SIGE->LTFIMP_SIGE	0.0085	Confirmed LTF	0.0085

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
LTFEXP_TRIMBLE	LTFEXP_TRIMBLE->LTFIMP_TRIMBLE	0.0202	Confirmed LTF	0.0202
LTFEXP_TVA	LTFEXP_TVA->LTFIMP_TVA	0.3247	Confirmed LTF	0.3247
LTFEXP_WEC	LTFEXP_WEC->LTFIMP_WEC	0.0172	Confirmed LTF	0.0172

10.7.7 Index 7

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
179713775	960170	AF2-308 TAP	EKPC	341287	2CENT HARDIN	EKPC	1	EKPC_P2-3_BONNV W8-828	breaker	98.0	122.27	125.3	AC	3.44

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
959691	AF2-260 C	37.37	80|50	37.37
959692	AF2-260 E	18.69	80|50	18.69
960171	AF2-308	18.51	80|50	18.51
960181	AF2-309 C	27.77	80|50	27.77
960182	AF2-309 E	18.51	80|50	18.51
960741	AF2-365 C O1	5.14	80|50	5.14
960742	AF2-365 E O1	3.43	80|50	3.43
961003	AF2-391 BAT	17.45	80|50	17.45
962241	AG1-070 C O1	1.74	Adder	2.05
962242	AG1-070 E O1	0.65	Adder	0.76
962251	AG1-071 C O1	1.99	Adder	2.34
962252	AG1-071 E O1	0.93	Adder	1.09
964571	AG1-320 C O1	21.94	80|50	21.94
964572	AG1-320 E O1	10.89	80|50	10.89
966031	AG1-472 C	3.43	Adder	4.04
966032	AG1-472 E	2.29	Adder	2.69
LTFEXP_AA2-074	LTFEXP_AA2-074->LTFIMP_AA2-074	0.0637	Confirmed LTF	0.0637
LTFEXP_BlueG	LTFEXP_BlueG->LTFIMP_BlueG	0.9097	Confirmed LTF	0.9097
LTFEXP_CBM-N	LTFEXP_CBM-N->LTFIMP_CBM-N	0.0133	LTF/CBM	0.0133
LTFEXP_CBM-S1	LTFEXP_CBM-S1->LTFIMP_CBM-S1	0.1192	LTF/CBM	0.1192
LTFEXP_CBM-S2	LTFEXP_CBM-S2->LTFIMP_CBM-S2	1.9709	LTF/CBM	1.9709
LTFEXP_CBM-W1	LTFEXP_CBM-W1->LTFIMP_CBM-W1	0.4597	LTF/CBM	0.4597
LTFEXP_CBM-W2	LTFEXP_CBM-W2->LTFIMP_CBM-W2	2.1816	LTF/CBM	2.1816
LTFEXP_CPLE	LTFEXP_CPLE->LTFIMP_CPLE	0.0977	Confirmed LTF	0.0977
LTFEXP_G-007A	LTFEXP_G-007A->LTFIMP_G-007A	0.0278	LTF/CMTX	0.0278
LTFEXP_GIBSON	LTFEXP_GIBSON->LTFIMP_GIBSON	0.0631	Confirmed LTF	0.0631
LTFEXP_LAGN	LTFEXP_LAGN->LTFIMP_LAGN	0.656	Confirmed LTF	0.656
LTFEXP_LGE-0012019	LTFEXP_LGE-0012019->LTFIMP_LGE-0012019	1.4366	Confirmed LTF	1.4366
LTFEXP_MEC	LTFEXP_MEC->LTFIMP_MEC	0.2049	Confirmed LTF	0.2049

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
LTFEXP_TRIMBLE	LTFEXP_TRIMBLE->LTFIMP_TRIMBLE	0.2563	Confirmed LTF	0.2563
LTFEXP_TVA	LTFEXP_TVA->LTFIMP_TVA	0.6804	Confirmed LTF	0.6804
LTFEXP_VFT	LTFEXP_VFT->LTFIMP_VFT	0.0737	Confirmed LTF	0.0737
LTFEXP_WEC	LTFEXP_WEC->LTFIMP_WEC	0.0101	Confirmed LTF	0.0101

10.8 Queue Dependencies

The Queue Projects below are listed in one or more indices for the overloads identified in your report. These projects contribute to the loading of the overloaded facilities identified in your report. The percent overload of a facility and cost allocation you may have towards a particular reinforcement could vary depending on the action of these earlier projects. The status of each project at the time of the analysis is presented in the table. This list may change as earlier projects withdraw or modify their requests.

Queue Number	Project Name	Status
AA2-074	CPLE-PJM	Confirmed
AE1-143	Marion County 161 kV	Engineering and Procurement
AE1-246	Barren County-Summer Shade 161 kV	Active
AE2-071	Patton Rd-Summer Shade 69 kV	Active
AE2-254	Garrard County-Tommy-Gooch 69 kV	Engineering and Procurement
AF1-038	Sewellton Jct-Webbs Crossroads 69 kV	Active
AF1-050	Summer Shade - Green County 161 kV	Active
AF1-083	Green County-Saloma 161 kV	Active
AF1-116	Marion County 161 kV	Active
AF1-203	Patton Rd-Summer Shade 69 kV	Active
AF2-260	Stephensburg-Central Hardin 69 kV	Active
AF2-308	Central Hardin-Stephensburg 69 kV	Active
AF2-309	Central Hardin-Stephensburg 69 kV	Active
AF2-365	Munfordville KU Tap-Horse Cave Jct. 69 kV	Active
AF2-391	Central Hardin 69 kV	Active
AG1-067	Temple Hill 69 kV	Active
AG1-070	Bon Ayr 69 kV	Active
AG1-071	Bon Ayr 69 kV	Active
AG1-320	Glendale-Stephensburg 69 kV	Active
AG1-341	Summer Shade 161 kV	Active
AG1-353	Greene County-Marion County 161 kV	Active
AG1-354	Summershade-Green County 161 kV	Active
AG1-405	Walnut Grove-Asahi 69 kV	Active
AG1-406	Walnut Grove-Asahi 69 kV	Active
AG1-471	Up Church-Wayne County 69 kV	Active
AG1-472	Seymour-Cave City 69 kV	Active
AG1-488	Marion IP 161 kV	Active

10.9 Contingency Descriptions

Contingency Name	Contingency Definition
EKPC_P4-5_SSHAD S11-1004	CONTINGENCY 'EKPC_P4-5_SSHAD S11-1004' /* SUMMERSHADE OPEN BRANCH FROM BUS 341059 TO BUS 342694 CKT 1 /* 341059 2BARREN CO 69.000 342694 5BARREN CO 161.00 /*OPEN BRANCH FROM BUS 342694 TO BUS 342814 CKT 1 /* 342694 5BARREN CO 161.00 342814 5SUMM SHADE 161.00 OPEN BRANCH FROM BUS 940040 TO BUS 342814 CKT 1 OPEN BRANCH FROM BUS 361788 TO BUS 342814 CKT 1 /* /*OPEN BRANCH FROM BUS 342811 TO BUS 342814 CKT 1 /* OPEN BRANCH FROM BUS 342733 TO BUS 342814 CKT 1 /* 342733 5GREEN CO 161.00 342814 5SUMM SHADE 161.00 OPEN BRANCH FROM BUS 964900 TO BUS 342814 CKT 1 /* 342733 AG1-354 TAP 161.00 342814 5SUMM SHADE 161.00 OPEN BUS 361788 OPEN BUS 342814 END
EKPC_P2-1_5LAUREL CO 161.00 TO 5LAUREL DAM 161.00	CONTINGENCY 'EKPC_P2-1_5LAUREL CO 161.00 TO 5LAUREL DAM 161.00' OPEN BRANCH FROM BUS 342754 TO BUS 342757 CKT 1 /*5LAUREL CO 161.005LAUREL DAM 161.00 END
EKPC_P4-2_SSHAD S11-1004	CONTINGENCY 'EKPC_P4-2_SSHAD S11-1004' /* SUMMERSHADE /*OPEN BRANCH FROM BUS 341059 TO BUS 342694 CKT 1 /* 341059 2BARREN CO 69.000 342694 5BARREN CO 161.00 /*OPEN BRANCH FROM BUS 342694 TO BUS 342814 CKT 1 /* 342694 5BARREN CO 161.00 342814 5SUMM SHADE 161.00 OPEN BRANCH FROM BUS 940040 TO BUS 342814 CKT 1 OPEN BRANCH FROM BUS 361788 TO BUS 342814 CKT 1 /* /*OPEN BRANCH FROM BUS 342811 TO BUS 342814 CKT 1 /* OPEN BRANCH FROM BUS 342733 TO BUS 342814 CKT 1 /* 342733 5GREEN CO 161.00 342814 5SUMM SHADE 161.00 OPEN BRANCH FROM BUS 964900 TO BUS 342814 CKT 1 /* 342733 AG1-354 TAP 161.00 342814 5SUMM SHADE 161.00 OPEN BUS 342814 END
EXT_360334 5SUMMER SHAD 161 360607 5S GLASGOW 161 1	CONTINGENCY 'EXT_360334 5SUMMER SHAD 161 360607 5S GLASGOW 161 1' OPEN BRANCH FROM BUS 360334 TO BUS 360607 CKT 1 END

Contingency Name	Contingency Definition
EKPC_P4-5_SSHAD S11-1014	CONTINGENCY 'EKPC_P4-5_SSHAD S11-1014' /* SUMMERSHADE /*OPEN BRANCH FROM BUS 341059 TO BUS 342694 CKT 1 /* 341059 2BARREN CO 69.000 342694 5BARREN CO 161.00 /*OPEN BRANCH FROM BUS 342694 TO BUS 342814 CKT 1 /* 342694 5BARREN CO 161.00 342814 5SUMM SHADE 161.00 OPEN BUS 940040 OPEN BRANCH FROM BUS 361788 TO BUS 342814 CKT 1 /* /*OPEN BRANCH FROM BUS 342811 TO BUS 342814 CKT 1 /* OPEN BRANCH FROM BUS 342733 TO BUS 342814 CKT 1 /* 342733 5GREEN CO 161.00 342814 5SUMM SHADE 161.00 OPEN BRANCH FROM BUS 964900 TO BUS 342814 CKT 1 /* 342733 AG1-354 TAP 161.00 342814 5SUMM SHADE 161.00 OPEN BUS 342814 END
EKPC_P2-3_SSHAD S11-1039	CONTINGENCY 'EKPC_P2-3_SSHAD S11-1039' /* SUMMERSHADE OPEN BUS 342814 /* 5SUMM SHADE OPEN BRANCH FROM BUS 341059 TO BUS 342694 CKT 1 /* 341059 2BARREN CO 69.000 342694 5BARREN CO 161.00 END
EXT_B-69-25	CONTINGENCY 'EXT_B-69-25' / 2360 OPEN BRANCH FROM BUS 324130 TO BUS 324141 CKT 1 / 324130 5ALCALDE 161 324141 5ELIHU 161 1 OPEN BRANCH FROM BUS 324141 TO BUS 342718 CKT 1 / 324141 5ELIHU 161 342718 5COOPER2 161 1 OPEN BRANCH FROM BUS 324141 TO BUS 324514 CKT 1 / 324141 5ELIHU 161 324514 2ELIHU 69.0 1 OPEN BRANCH FROM BUS 324141 TO BUS 324514 CKT 2 / 324141 5ELIHU 161 324514 2ELIHU 69.0 2 END
EKPC_P2-2_BONNIE 138/69	CONTINGENCY 'EKPC_P2-2_BONNIE 138/69' /* KU BONNIEVILLE 138/69 TIE OPEN BUS 324213 /* 4BONNIE END
EKPC_P7-1_COOP 161 DBL 2	CONTINGENCY 'EKPC_P7-1_COOP 161 DBL 2' /* COOPER - ELIHU 161 & COOPER - LAUREL DAM 161 OPEN BRANCH FROM BUS 324141 TO BUS 342718 CKT 1 /* 324141 5ELIHU 161.00 342718 5COOPER2 161.00 OPEN BRANCH FROM BUS 342718 TO BUS 342757 CKT 1 /* 342718 5COOPER2 161.00 342757 5LAUREL DAM 161.00 END
Base Case	

Contingency Name	Contingency Definition
EKPC_P7-1_LAURL 161 DBL	CONTINGENCY 'EKPC_P7-1_LAURL 161 DBL' /* LAUREL CO - LAUREL DAM 161 & LAUREL CO - TYNER 161 OPEN BRANCH FROM BUS 342754 TO BUS 342757 CKT 1 /* 342754 5LAUREL CO 161.00 342757 5LAUREL DAM 161.00 OPEN BRANCH FROM BUS 342754 TO BUS 342781 CKT 1 /* 342754 5LAUREL CO 161.00 342781 5PITTSBURG 161.00 OPEN BRANCH FROM BUS 342781 TO BUS 342820 CKT 1 /* 342781 5PITTSBURG 161.00 342820 5TYNER 161.00 END
EKPC_P2-3_BONNV W8-828	CONTINGENCY 'EKPC_P2-3_BONNV W8-828' /* BONNIEVILLE OPEN BUS 324213 /* 4BONNIE END
EKPC_P2-2_SUMMSHADE 161 #2	CONTINGENCY 'EKPC_P2-2_SUMMSHADE 161 #2' /* SUMMERSHADE 161 BUS /* OPEN BRANCH FROM BUS 342733 TO BUS 342814 CKT 1 /* 342733 5GREEN CO 161.00 342814 5SUMM SHADE 161.00 OPEN BRANCH FROM BUS 964900 TO BUS 342814 CKT 1 /* 964900 AG1-354 TAP 161.00 342814 5SUMM SHADE 161.00 /*OPEN BRANCH FROM BUS 342694 TO BUS 342814 CKT 1 /* 342694 5BARREN CO 161.00 342814 5SUMM SHADE 161.00 OPEN BRANCH FROM BUS 940040 TO BUS 342814 CKT 1 /*OPEN BUS 361788 /* 361788 5SUM SHAD TP161.00 OPEN BUS 342814 END
EKPC_P2-3_SSHAD S11-1044	CONTINGENCY 'EKPC_P2-3_SSHAD S11-1044' /* SUMMERSHADE /*OPEN BRANCH FROM BUS 341059 TO BUS 342694 CKT 1 /* 341059 2BARREN CO 69.000 342694 5BARREN CO 161.00 /*OPEN BRANCH FROM BUS 342694 TO BUS 342814 CKT 1 /* 342694 5BARREN CO 161.00 342814 5SUMM SHADE 161.00 OPEN BRANCH FROM BUS 940040 TO BUS 342814 CKT 1 /* OPEN BRANCH FROM BUS 342733 TO BUS 342814 CKT 1 /* 342733 5GREEN CO 161.00 342814 5SUMM SHADE 161.00 OPEN BRANCH FROM BUS 964900 TO BUS 342814 CKT 1 /* 342733 AG1-354 TAP 161.00 342814 5SUMM SHADE 161.00 /*OPEN BRANCH FROM BUS 361788 TO BUS 342814 CKT 1 /* 361788 5SUM SHAD TP161.00 342814 5SUMM SHADE 161.00 OPEN BUS 361788 OPEN BUS 342814 END
EKPC_P4-5_LAURL S50-1024	CONTINGENCY 'EKPC_P4-5_LAURL S50-1024' /* LAUREL CO OPEN BUS 342754 /* 5LAUREL CO DROPS BUS OPEN BRANCH FROM BUS 324688 TO BUS 342781 CKT 1 /* 324688 2PITTSKU 69.000 342781 5PITTSBURG 161.00 OPEN BRANCH FROM BUS 342781 TO BUS 342820 CKT 1 /* 342781 5PITTSBURG 161.00 342820 5TYNER 161.00 END

Contingency Name	Contingency Definition
EKPC_P2-1_5SUMM SHADE 161.00 TO AE1-246 TAP 161.00	CONTINGENCY 'EKPC_P2-1_5SUMM SHADE 161.00 TO AE1-246 TAP 161.00' OPEN BRANCH FROM BUS 342814 TO BUS 940040 CKT 1 /*5SUMM SHADE 161.00AE1-246 TAP 161.00 END

11 Light Load Analysis

The Queue Project AG1-071 was evaluated as a 45.0 MW injection at the Bon Ayr 69 kV substation in the EKPC area. Project AG1-071 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AG1-071 was studied with a commercial probability of 100.0 %. Potential network impacts were as follows:

11.1 Light Load Deliverability

(Single or N-1 contingencies for the Capacity portion only of the interconnection)

None.

11.2 Multiple Facility Contingency

(Double Circuit Tower Line, Fault with a Stuck Breaker, and Bus Fault contingencies for the full energy output)

None.

11.3 Contribution to Previously Identified Overloads

(This project contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

None.

11.4 Steady-State Voltage Requirements

To be determined during the Facilities Study phase.

11.5 Potential Congestion due to Local Energy Deliverability

PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The developer can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.

Note: Only the most severely overloaded conditions are listed below. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed which shall study all overload conditions associated with the overloaded element(s) identified.

None.

11.6 System Reinforcements

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AG1-071	Upgrade Number
			TOTAL COST	$0	$0	

Note : For customers with System Reinforcements listed: If your present cost allocation to a System Reinforcement indicates $0, then please be aware that as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, the cost responsibilities can change and a cost allocation may be assigned to your project. In addition, although your present cost allocation to a System Reinforcement is presently $0, your project may need this system reinforcement completed to be deliverable to the PJM system. If your project comes into service prior to completion of the system reinforcement, an interim deliverability study for your project will be required.

12 Short Circuit Analysis

The following Breakers are overdutied:

None.

13 Stability and Reactive Power

(Summary of the VAR requirements based upon the results of the dynamic studies)

To be determined in the Facilities Study Phase.

14 Affected Systems

14.1 TVA

None

14.2 Duke Energy Progress

None

14.3 MISO

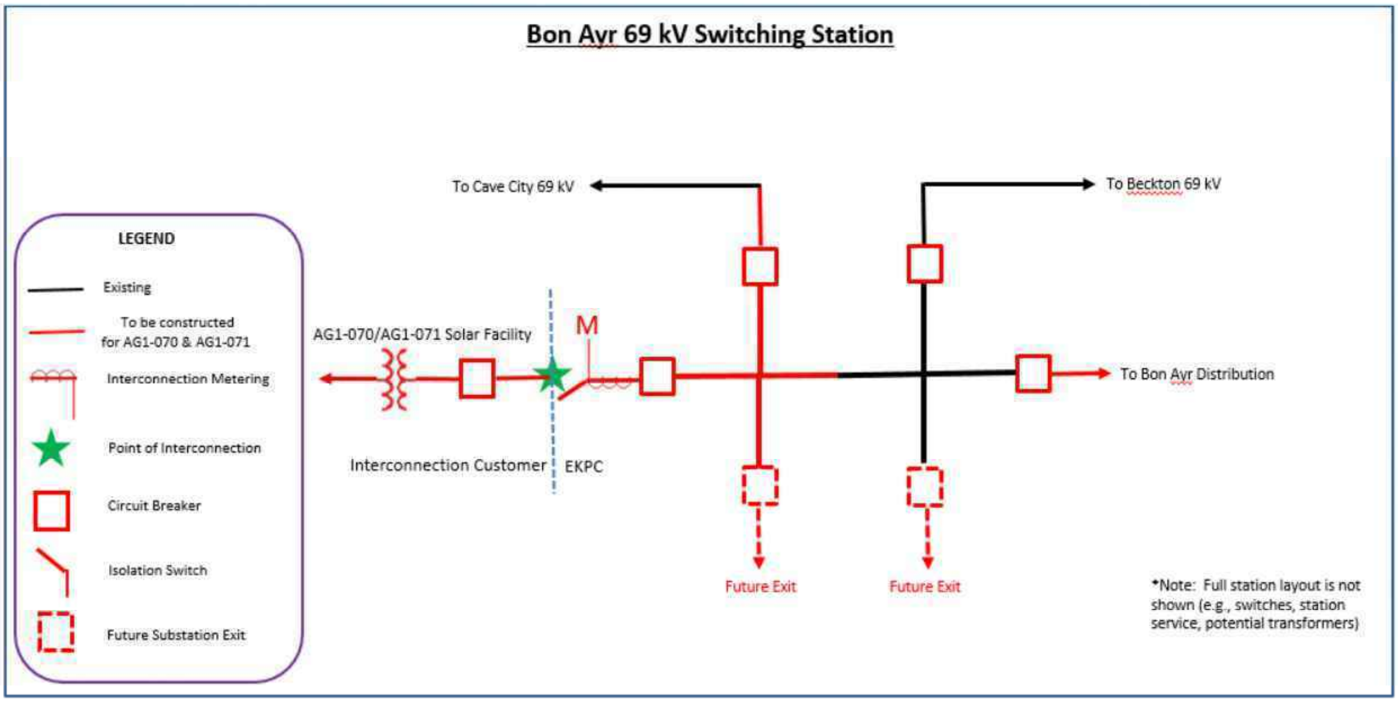
MISO Impacts to be determined during later study phases (as applicable).

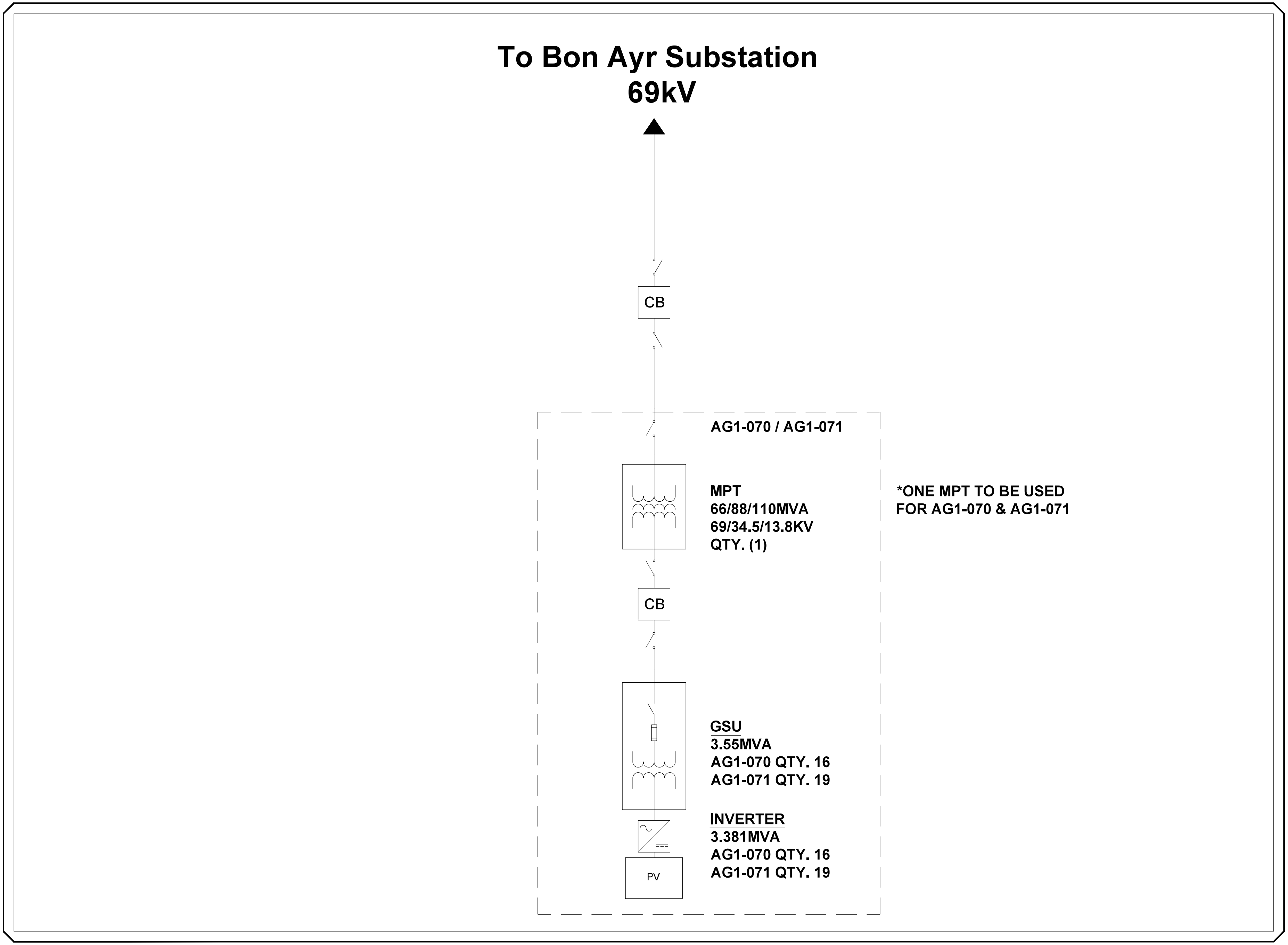
14.4 LG&E

LG&E Impacts to be determined during later study phases (as applicable).

15 Attachment 1: One Line Diagram

AG1-070 & AG1-071 Conceptual Single-Line Diagram of Interconnection Facilities





SLD

geenex simply solar

WOOD DUCK SOLAR

NO.	DATE	REVISION	BY

DWG TITLE

WOOD.DUCK
AG1-070
AG1-071

ENGINEER RBM	CHECKED BY SH
JOB NO 1	DRAWN BY RBM
SCALE NA	DATE 02/10/2025

DWG NO 1

SHEET NO 1 OF 1

EXHIBIT F

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REVISED AND EXPANDED DRAFT: December 13, 2024

TO: Kelley Pope
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FROM: Paul Coomes

RE: Estimated economic impact of Barren County solar project

Executive Summary

Geenex Solar is developing a solar farm with 100 MW generating capacity on about 1,244 acres of rolling farmland in Barren County KY. The company plans to invest approximately $130 million to develop the site, named *Wood Duck*. This note provides estimates of the new local economic and fiscal activity expected from the development.

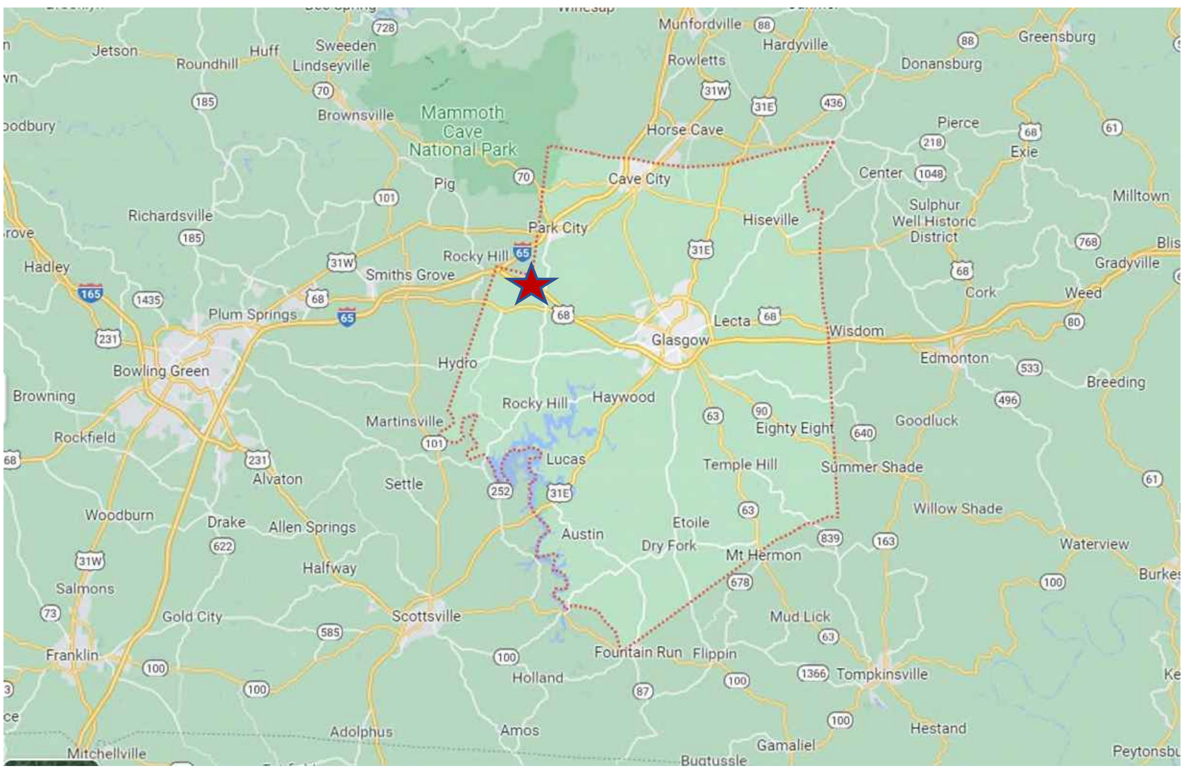
There are two primary impacts expected from the project. First, there will be a spike in construction and linked jobs as the site is built out over approximately one year. Using estimates of the construction payroll, I estimate that there will be a total (direct and spinoff) of 295 new jobs in the county in year one, with new labor compensation of $17.7 million.

The company has provided me with tax projections related to their capital expenditures. Kentucky state government is projected to receive $5.2 million over the subsequent four decades. Local jurisdictions would receive $15.1 million, of which $11.0 would go to the County school system. The leased land parcels generated about $17,000 in property tax revenues for local jurisdictions in 2023. This can be compared to an average of $378,000 potentially generated per year by the solar project over forty years.

The ongoing annual economic impacts from operating the solar farm involve the positive effects of several operational and maintenance jobs plus the effects of the new lease payments to owners of the land. In Appendix B, these are compared to the negative effects of lost agribusiness activity, revealing net annual gain in jobs and labor income over the operating period. Looking out over three decades, and including the impacts of construction, I estimate there is a net gain of 524 job-years and $33.8 million in labor income to Barren County.

Demographic and Economic Characteristics of Barren County

Barren County is located in south central Kentucky, just northeast of Bowling Green. Interstate 65 cuts across its northern border, with three interchanges – Park City, Cave City, and the Cumberland Parkway, near the solar site. The County seat is Glasgow, as shown on the Google map screenshot below. The red star indicates the approximate location of the proposed Wood Duck solar farm.

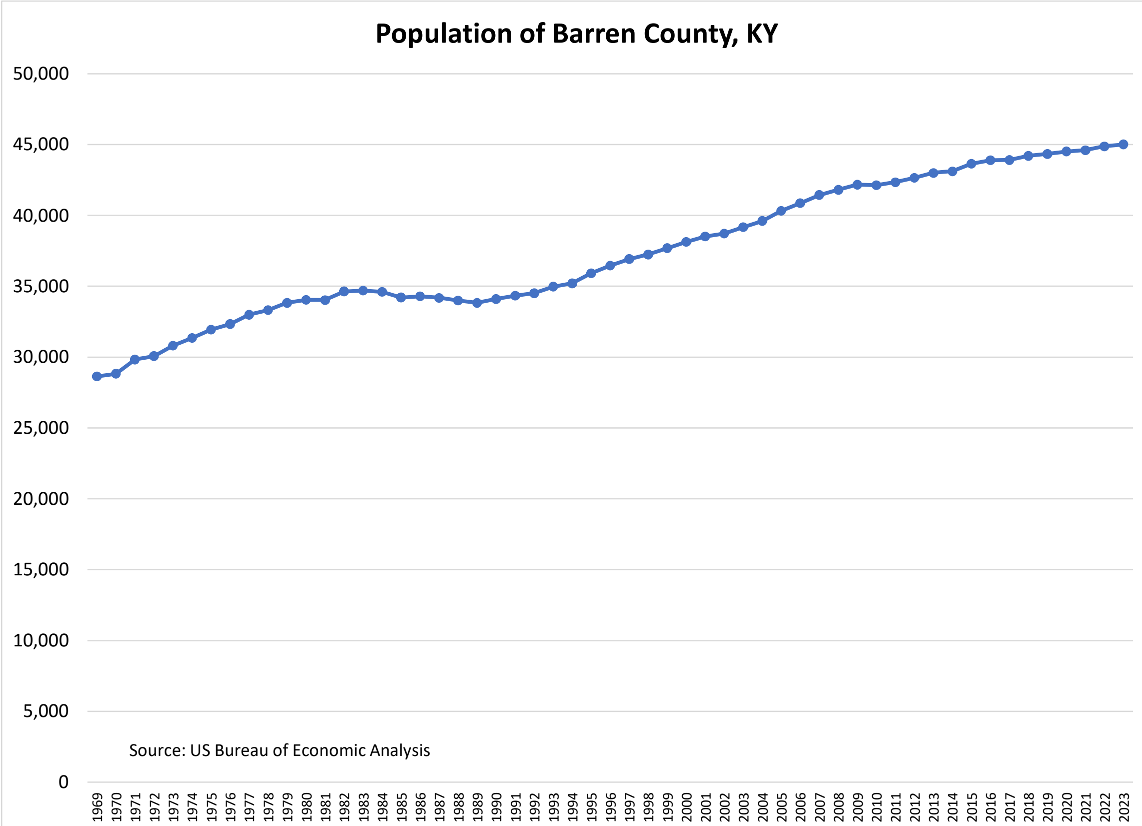


The company provided me with a site KMZ file, and I made a Google Earth Map shown below. The proposed solar farm is along the Cumberland Parkway, just southeast of the I-65 intersection. One can see that the site is rural, mainly rolling farmland.

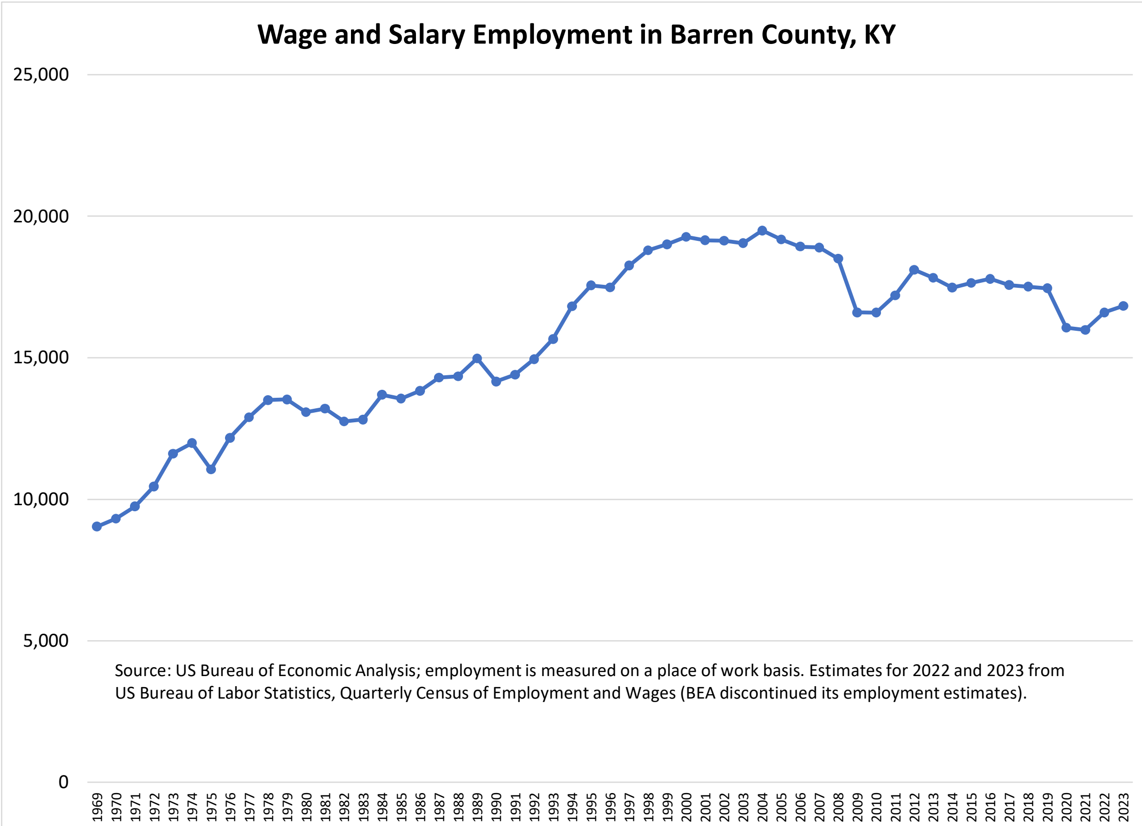
Newly released results from the 2023 American Community Survey provide a nice summary of demographic and economic characteristics of Barren County. Some details are provided in a table in Appendix A. For many of the measures, the county is similar to the State, for example median age, persons per household, and commute times. However, a few things stand out:

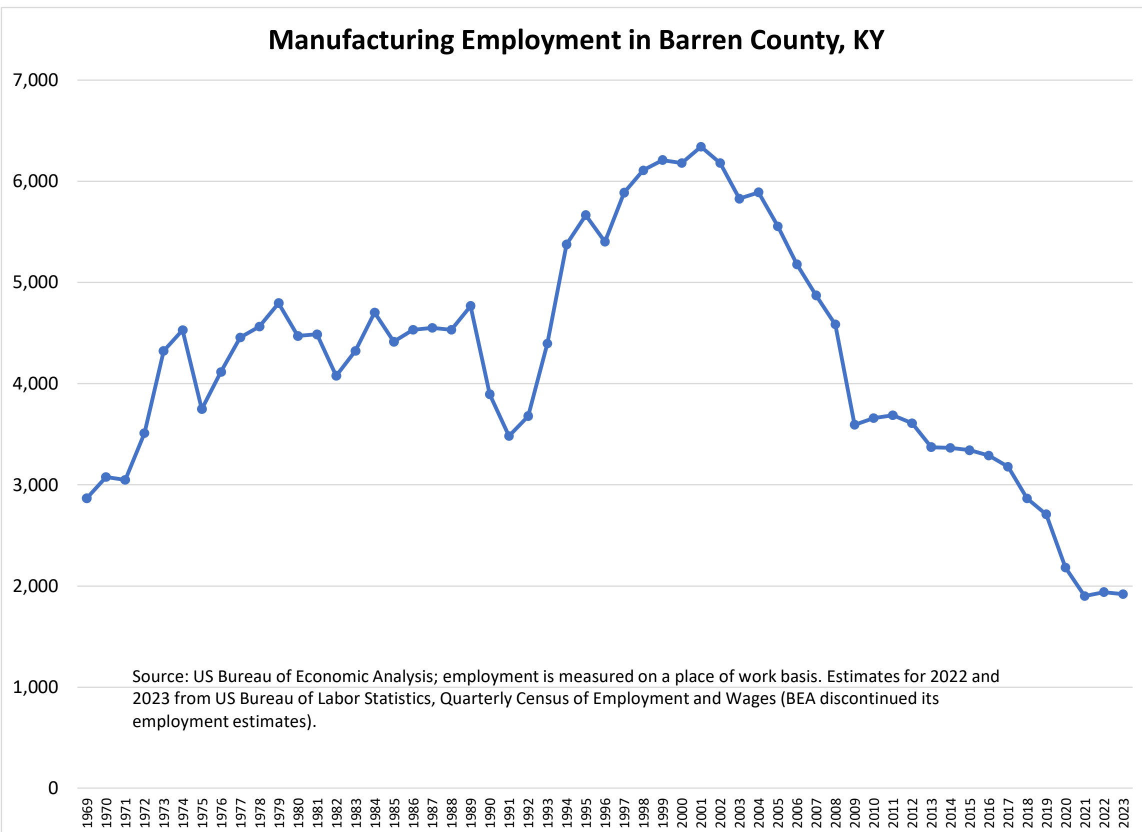
- Compared to the Kentucky state average, the county population is whiter, and less likely to be foreign-born.
- Far fewer adults have a four-year college degree, and a larger percentage of adults are not in the labor force.
- Residents tend to work disproportionately in manufacturing industries around the region, and in production and transportation occupations.
- Median household income was $49,200, compared to a state average of $62,400.

Barren County's population has grown fairly steadily over the past several decades, and now has around 45,000 residents. It has grown 57 percent over the period shown below (1969 to 2023), with some slippage in the 1980s. Interestingly, this demographic pattern seems uncorrelated with the number of jobs in the county, as is evident in the second chart.



The County was gaining jobs in the 1980s while losing population. And the county then began losing jobs after peaking around 2004, but then gained population. The county added about 5,000 jobs in the 1982 to 2004 period, driven particularly by growth in manufacturing employment in the 1990s. However, since then the county has lost most of its manufacturing jobs, and growth in other sectors has not been sufficient to prevent an overall net loss. The five sectors that added significant employment over the past two decades were retail trade, finance and insurance, health care, hotels, and restaurants. But their combined growth was only 2,200 jobs, not enough to offset the severe loss in manufacturing employment. Moreover, average pay in the growing hospitality sector is much less than that in manufacturing.


Wage and Salary Employment in Barren County, KY
Source: US Bureau of Economic Analysis; employment is measured on a place of work basis. Estimates for 2022 and 2023 from US Bureau of Labor Statistics, Quarterly Census of Employment and Wages (BEA discontinued its employment estimates).


Manufacturing Employment in Barren County, KY
Source: US Bureau of Economic Analysis; employment is measured on a place of work basis. Estimates for 2022 and 2023 from US Bureau of Labor Statistics, Quarterly Census of Employment and Wages (BEA discontinued its employment estimates).

The loss of manufacturing jobs in Barren County caused a flip in the net flow of income to residents. Until the mid-2000s, nonresidents working in the County earned more than Barren County residents working in other counties. This resulted in tens of millions of dollars in negative annual adjustments to the estimated personal income of Barren County residents. After 2006, the residence adjustment flipped the other way, and by 2023 the adjustment was a positive $94 million – meaning residents earned that much more working outside the county than nonresidents earned working in the county. This commuting out to Bowling Green and other nearby places of work has helped stabilize the income and population of Barren County.

It appears from historical data on personal income that county residents are increasingly dependent on income from government transfer payments. It is the fastest growing component of personal income in Barren County. The share of residents' personal income from government transfer payments rose from 11 to 33 percent over the last five-plus decades. The value of those transfer payments to residents, such as Social Security, Medicare, and Medicaid was $652 million in 2023. By comparison, wages and salaries paid to workers in the County were only $774 million.

Data on commuting patterns are only published with a long lag, but reveal the historical interchange of workers to and from Barren County. In the latest survey, there were 17,174 persons working in Barren County. Local residents fill 74 percent of the jobs in the county, and a significantarge flow of nonresidents commute in from Metcalfe, Hart, Monroe and Warrencounties.

County of Residence for Barren County Workers

	Number	Share of Total
Barren County	12,661	73.7%
Metcalfe County	1,281	7.5%
Hart County	792	4.6%
Monroe County	753	4.4%
Warren County	737	4.3%
Allen County	210	1.2%
Adair County	135	0.8%
other	605	3.5%
Total	17,174	100.0%

Source: US Census Bureau, American Community Survey, Residence County to Workplace County Commuting Flows, 5-Year ACS, 2015-2020.

Consider now the opposite flow, where Barren County residents work. In this survey there were 17,785 working Barren County residents, of which 71 percent worked in their home county. Where do the rest of the residents work? One can see the primary work locations in the next table. Warren, Hart and Allen counties are the primary destinations.

County of Work for Barren County Residents		
	Number	**Share of Total**
Barren County	12,661	71.2%
Warren County	2,541	14.3%
Hart County	1,123	6.3%
Allen County	333	1.9%
Metcalfe County	243	1.4%
Edmonson County	138	0.8%
Hardin County	114	0.6%
other	746	4.2%
Total workers	17,785	100.0%

Source: US Census Bureau, American Community Survey, Residence County to Workplace County Commuting Flows, 5-Year ACS, 2015-2020.

Warren County (Bowling Green) is by far the most developed area in the region, with diversified industries, many high paying jobs, and a full complement of retail and services. It is also one of the fastest growing counties in Kentucky.

Modeling the Economic Impacts

I take a conventional approach to modeling the regional economic impacts, using a customized input-output model of Barren County[1]. I have purchased annual economic data for all 120 Kentucky counties, and use these as needed to construct regional models – of a county, a group of counties, or the whole state. The model has detailed information about the linkages among over 500 potential industries in each regional economy, as well as the relationship between household spending and demand for local retail goods and services due to the employee compensation or other forms of income. When there is new industrial activity in a region, the model can predict how much of the supply chain can be met by local businesses and how much the new payroll will result in additional sales (and jobs) by local businesses.

The ratio of the change in total regional economic activity to a change in activity by a local industry is called a multiplier. For example, if a new manufacturing company adds 100 jobs and the county were to ultimately see another 80 jobs due to related spinoff activity, the employment multiplier would be 1.8 (180 total jobs divided by 100 direct jobs). Similar multiplier effects are generated for business output, employee compensation, and value-added[2].

The relevant sector for the construction phase is number 47, "Construction of new power and communication structures", and I use this to model the initial investment. The employment multiplier for that sector in Barren County is 1.231. This is a very modest multiplier, due to the fact that almost all the materials used to assemble a solar farm are made outside the county; thus, there are few inter-industry impacts locally. Moreover, the county is not developed enough to supply all the goods and services demanded by households, and thus the predicted impact of the new construction wages is also relatively small.

There will also be some modest spin-off impacts from ongoing operations. Unfortunately, for the operations phase, the relevant IMPLAN sector, number 37, "Electric Power Generation – Solar", is empty of data and results for Barren County. This is because there is no history of solar electricity generation and therefore no basic economic data to construct industry relationships. However, the sector has data for the statewide model.

[1] For documentation of IMPLAN modeling, see www.implan.com/history/.

[2] Value-added is a measure of how much economic activity actually sticks to a region. For example, if one purchases a new vehicle for $40,000 from a local dealership, only a few thousand dollars actually is captured in the county. Business revenues rise by $40,000, but most of it flows right out to the place where the vehicle was made. Local value-added measures the fraction of the sale that ends up paying workers and owners at the dealership, as well as any local taxes captured as a result of the sale.

Construction Payroll and Local Economic Impacts

From an economic perspective, the solar project has two phases, construction and operations. The construction phase is expected to last about one year, while the operations phase will last several decades. Almost all the employment occurs in the construction phase. The regional economic impacts consist of the direct effects of spending by the developer, and any spinoff impacts due to local purchases of supplies and new spending by households as a result of the increased incomes.

Direct effects

The company expects to invest approximately $130 million in the solar project. The investment involves land acquisition, site preparation, solar panel and electrical equipment installation, plus landscaping and security fencing. Geenex Solar plans to enter into an Engineering, Procurement, and Construction (EPC) contract for this project, so it is not possible to know precisely how many workers will be employed nor their total compensation. For modeling purposes, I am using an estimate of average employment over a one-year construction phase. The results of a recent California study of six large photovoltaic projects suggests that there will be an average of 240 direct jobs over a twelve-month construction period for this project[3].

The California study also provides a range of results for construction wages and benefits. The lowest average annual construction wage reported was $52,736, and the average wage across the six projects was $78,002, as shown in the table. California is, of course, a high wage state, with a much higher cost of living than Kentucky. On the other hand, the wage results are from projects developed a decade ago, and there have been large

Construction wages and benefits from 2014 Berkeley study

	Average annual wage	Average annual benefits	Total compensation
CA Valley & Topaz Combined, Low Wage	$52,736	$24,104	$76,840
Average Across Six Solar Projects	$78,002	$36,880	$114,882

Source: https://laborcenter.berkeley.edu/pdf/2014/building-solar-ca14.pdf

increases in average wages across the US since then.[4]

[3] A University of California-Berkeley study looked at six large PV projects in California, and summarized the economics. The author finds a ratio of 2.4 FTE construction jobs per MW. Applied to Barren County project's 100 MW one gets 240 direct construction jobs. He shows the permanent operations jobs per MW, and applied to this project one gets 3.2 FTEs. See page 28 of *Economic and Environmental Benefits of Building Solar in California*, by Peter Philips, November 10, 2014, https://laborcenter.berkeley.edu/pdf/2014/building-solar-ca14.pdf

[4] By contrast, a recent union-oriented report on Ohio solar projects claims temp workers there are only making $18 to $20 per hour, implying average annual pay of around $40,000; See

Occupations include construction managers, earth grader operators, panel installers, electricians, and fencers. I searched the federal database on hundreds of occupations to learn how much these workers are likely to earn on the project. There is no listing in the Kentucky data for "Solar Photovoltaic Installer", but the national average annual wage in 2023 was $53,149[5].

Kentucky Wages for Related Occupations, 2023

Occupation (SOC code)	Employment	Hourly Mean Wage	Annual Mean Wage
Construction Managers(119021)	1,280	$50.36	$104,750
Operating Engineers and Other Construction Equipment Operators(472073)	6,530	$27.45	$57,100
Electricians(472111)	9,620	$28.18	$58,610
Fence Erectors(474031)	260	$20.19	$41,980
Industrial Engineers(172112)	6,020	$43.76	$91,010
Materials Engineers(172131)	500	$46.99	$97,740
Mechanical Engineers(172141)	2,970	$47.55	$98,900
Heating, Air Conditioning, and Refrigeration Mechanics and Installers(499021)	6,500	$25.90	$53,870
Electrical Power-Line Installers and Repairers(499051)	2,870	$35.72	$74,300
Telecommunications Line Installers and Repairers(499052)	900	$27.19	$56,560

Source: US Bureau of Labor Statistics, Occupational Employment Survey,
https://data.bls.gov/oes/#/geoOcc/Multiple%20occupations%20for%20one%20geographical%20area

Good inferences about other relevant occupations can be gleaned from the accompanying table. The construction managers are likely to earn over $100,000, heavy equipment operators and installers over $53,000, electricians around $59,000, and fencers $42,000. The average annual pay for all jobs in Barren County in 2023 was $45,952[6]. Based on this information, I assume the average annual pay across the construction occupations will be $50,000, excluding fringe benefits.

Multiplying the expected number of jobs times the assumed average pay per job yields a direct construction payroll of $12.0 million. The average fringe benefits, such as employer payments for health insurance, in Kentucky for the construction industry is 18 percent[7]; so, total labor compensation for these jobs is $14.2 million, or $59,100 per job.

https://columbusfreepress.com/article/ohio-solar-panel-farms-are-booming-construction-workers-are-being-exploited-make-it-happen

[5] Source: US Bureau of Labor Statistics, Occupational Employment Survey. For national data on solar photovoltaic installer, see www.bls.gov/oes/current/oes_nat.htm#47-2231 . For Kentucky data, see www.bls.gov/oes/current/oes_ky.htm County-level data are not available.

[6] Source: Wages salaries from US Bureau of Economic Analysis (BEA), Table CAINC4; wage and salary employment from US Bureau of Labor Statistics, Quarterly Census of Employment and Wages.

[7] BEA provides estimates of both total compensation and total wages by industry for the state. Dividing total construction industry compensation by wages in 2023 yields 1.18.

Total impacts in Barren County from construction

The construction phase will have some spin-off effects in Barren County, due to materials and labor purchased locally. The economic impact of local supplies purchased is called the indirect effect, and the impact of new local household spending is called the induced effect. Adding these two effects to the direct effect yields the total effect of a development, and dividing the total effect by the direct effect yields a multiplier. Using the Barren County multipliers for the relevant construction sector, and the direct construction budget, I project there will be a total of 295 new jobs in the County, and new labor compensation of $17.7 million[8].

The accompanying table illustrates the various impact components across several standard economic measures. These results can be scaled up or down to fit any assumed number of construction jobs[9]. Note that both the indirect and induced effects are quite small. The indirect effect is small due to the lack of local suppliers of solar farm materials. The induced effect is somewhat bigger, though still small due to the lack of retail and service businesses in the county to absorb the new household income linked to the construction jobs.

240 Jobs in Sector 47, Construction of new power and communication structures

Impact Type	Employ-ment	Labor Income	Value Added	Output
Direct	240.0	$10,454,078	$14,873,125	$27,561,251
Indirect	23.3	$1,231,814	$2,266,715	$4,475,042
Induced	32.1	$1,353,080	$2,814,685	$4,805,343
Total	295.4	$13,038,972	$19,954,525	$36,841,636
implied multiplier	1.231	1.247	1.342	1.337

Source: IMPLAN model of Barren County, using 2023 economic data.

Wider regional impacts from construction

Some readers may wonder why I have focused on impacts in Barren County as opposed to more widespread regional impacts. Keep in mind that most federal-state statistical

[8] IMPLAN data for the county show a lower average labor income ($44,000) for the direct jobs than I have assumed ($50,000).

[9] This linear scaling is a feature of IMPLAN and other regional input-output modeling systems. It is reasonable in the case of a solar farm construction project. The feature becomes a problem in cases where an industrial development dramatically changes a local economy, for example, in the case of a large manufacturing plant in rural county. In that case, one could expect complicated and nonlinear effects, such as growth in the local population, much higher wage rates, and growth in support industries.

agencies and models measure employment on a place of work basis, as opposed to a place of residence basis. So, all construction workers at the site are counted as Barren County jobs. Nevertheless, clearly there will be some spinoff economic activity in surrounding counties, as supplies are purchased and workers spend their paychecks at retail establishments.

To investigate possible broader regional impacts, I built another IMPLAN model, this time of Barren, Hart, Metcalfe, Monroe, and Warren counties. The results are slightly larger than that of the Barren-only simulation.

The job multipliers for the solar farm construction phase are 1.231 for Barren alone, and 1.352 for the five-county region, for a net change of 29 total predicted jobs. (Other economic multipliers, such as labor income and business output, are also consistently in that range). I also performed a comparable simulation using a model covering the whole state of Kentucky. That job multiplier for the solar farm is 1.440, slightly higher than that for the five-county region. Based on our impact analysis tools, there are not significant differences in the predicted regional impacts when zooming out to adjacent counties or statewide[10]. In this case, the economic multipliers are relatively small whether one models one county, five, or 120. This is due primarily to the lack of industrial linkages in the region to the solar industry.

Impact of Ongoing Operations

The California PV study cited above found that a ratio of 31.3 MW per permanent operations job. Applied to the Barren County project, this results in an estimate of 3.2 permanent operational jobs at the site. Using the most conservative California wage and benefit data yields total annual compensation of $328,000. As mentioned in the above discussion of modeling methods, the IMPLAN sector for solar farm operations is empty of data. However, the state-level model does show activity in sector 37, Electric Power Generation – Solar. The multipliers for the Kentucky sector are 2.708 for employment and 1.636 for labor income. Applying the state multipliers to the Barren County site yields annual employment of 8.7, with labor compensation of $536,000. This is a reasonable approach, given that the maintenance activity is by nature local and labor-oriented.

[10] For other industrial developments around Kentucky it is common for our models to predict job multipliers of 3, 4, or 5, particularly for complicated manufacturing operations such as motor vehicles and parts.

Local Tax Revenues

Barren County and the Commonwealth of Kentucky levy property taxes on real estate and tangible property, and the Commonwealth taxes the value of manufacturing machinery. The table provides the latest published tax rates that are applied countywide. They total about one percent of the assessed value of real estate property, with about two-thirds of the revenue going to the county public school system. There are three municipal taxing jurisdictions in Barren County – Cave City, Glasgow, and Park City - but the project is outside their city boundaries and thus would not be subject to those property taxes.

Barren County Property Tax Rates, 2023 in cents per $100 valuation			
Jurisdiction	**Real Estate**	**Tangible Personal**	**Manufacturers' Machinery**
Ambulance	2.4000	2.4000	
Extension Service	1.6000	2.0300	
General Fiscal Court	13.5000	15.3000	
Library	2.9000	2.5400	
Health	2.5000	2.5000	
County Public Schools	67.2000	67.4000	
State of Kentucky	11.4000	45.0000	15.0000
Total, County-wide	101.5000	137.1700	15.0000
Source: Kentucky Department of Revenue https://revenue.ky.gov/News/Publications/Pages/Property-tax-rate-books.aspx			

Barren County does not levy a countywide occupational or net profits tax, though the cities of Cave City (2%) and Glasgow (1.75%) do[11].

The company has provided me with a property tax projection for their intended investment. Much of the capital expenditures will be for equipment classified as manufacturing machinery, which is taxed at the state level, but not locally. The value of the real estate is enhanced by two factors. The solar project will add fencing and other improvements that increase the land value; and the lease payments to the landowners greatly increase the valuation as compared to its former agricultural use. Kentucky state

[11] See https://barrencoea.com/taxes

government is projected to receive $5.2 million over the subsequent four decades. Local jurisdictions would receive $15.1 million, of which $11.0 would go to the county school system[12]. So, local jurisdictions would receive an average of $378,000 per year under this projection.

The company may pursue an Industrial Revenue Bond (IRB) for the project through Barren County Fiscal Court. Under an IRB, the County would actually own the property for the likely 30-40 year life of the bond, and thus the investment is exempt from property taxes. Under the IRB the company makes the debt service payments and the County incurs no financial risk. Moreover, the company would likely make Payments in Lieu of Taxes (PILOT) each year to partially replace the tax revenues that the County would have received.

The company also provided me with the parcel numbers of the land for the site, and I looked up the 2023 tax bills from the Barren County Sheriff. There are twenty-five land parcels, currently leased at the site, and total taxes paid in 2023 of about $17,000. This can be compared to an average of $378,000 expected to be generated by the solar project per year over four decades. It should be pointed out that solar projects like this require almost no public services from local government; and because they require so few people to operate do not add students and expenses to the county public school system.

[12] The ultimate net financial benefit to the schools is more complicated than this. Extra property tax revenues to the County school system would trigger a reduction in state SEEK funding to the district.

Appendix A

Demographic and Economic Characteristics of Barren County		
	Barren County	State of Kentucky
Number of residents	*44,670*	*4,510,725*
Median age	40.1	39.1
Percent white	88.8%	83.7%
Percent of noninstitutionalized population w disability	21.5%	17.7%
Percent foreign-born	2.50%	4.40%
Percent 18 and older veteran	5.9%	6.8%
Percent living in same house as a year ago	88.0%	87.1%
High school attainment rate, population aged 25+	86.5%	88.5%
College attainment rate, population aged 25+	17.8%	27.0%
Number of Households	17,972	1,791,991
Median household income	$49,171	$62,417
Persons per household	2.49	2.52
With broadband internet subscription	85.0%	87.2%
Population 16+	*35,390*	*3,605,426*
In the labor force	54.8%	59.6%
Employed civilian	52.1%	56.4%
Unemployed	2.6%	2.9%
Armed forces	0.0%	0.4%
Not in labor force	45.2%	40.4%
Median travel time to work (minutes)	22.8	24.0
Civilian employed population 16 years and over	*18,450*	*2,032,890*
Management, business, science, and arts occupations	31.2%	37.1%
Service occupations	16.5%	15.4%
Sales and office occupations	18.4%	20.3%
Natural resources, construction, and maintenance occupations	11.0%	8.8%
Production, transportation, and material moving occupations	22.8%	18.4%
Industry		
Agriculture, forestry, fishing and hunting, and mining	3.1%	1.8%
Construction	5.5%	6.3%
Manufacturing	21.2%	14.3%
Wholesale trade	2.4%	2.2%
Retail trade	11.5%	11.8%
Transportation and warehousing, and utilities	5.8%	6.9%
Information	1.2%	1.3%
Finance and insurance, and real estate and rental and leasing	4.2%	5.6%
Professional, scientific, and mgmt, and admin and waste mgmt services	6.6%	9.0%
Educational services, and health care and social assistance	22.7%	24.2%
Arts, entertainment, and recreation, and accommodation and food	8.5%	8.0%
Other services, except public administration	5.3%	4.5%
Public administration	1.9%	4.2%

Source: US Census Bureau, American Community Survey, 5-year profiles, 2019-23, www.census.gov/acs/www/data/data-tables-and-tools/data-profiles/

Appendix B

Measuring the Net Economic Impact of the Change in Land Use

The conversion of agricultural land to a solar farm involves both positive and negative economic effects on the regional economy. The negative effects involve the reduction in farming activity, and the linkages that has on local suppliers of seed, feed, fertilizer, equipment and labor, summarized by a reduction in business activity employment and personal income. Many of the positive effects are described in the body of the report, including the one-time construction impacts, the several operations and maintenance jobs at the site, plus the increase in property tax payments to local jurisdictions. But there is also another important positive effect to consider – the impact of the annual lease payments to the farmland owners. This involves not only the actual new income, but also the regional spinoff impacts as the income is spent on goods and services in the local economy.

In this appendix, I attempt to account for all these factors and put them together to measure the net economic impact of the change in land use. No direct accounting-type information is available on actual farm operations at the solar site, but rich data are available on farmland activity at the county level. Using county data on crop yields, livestock production and prices provide a reasonable basis to estimate farm output at the solar site. Annual lease payments to the farmland owners, as provided by the solar developer, provides a fairly precise measure of the new income to the owners. If the lease information is not available, national studies can be used to approximate the rate per acres. Then I use a custom IMPLAN model of the county to predict the linkages of both farm output and new lease income to the local economy.

As context, it is useful to remember that many if not most farmers hold a nonfarm job in a nearby city or industrial site, as often do their spouses. The income from nonfarm work is generally much greater than what they can earn from actual farming, and is how the family is able to pay its bills. Because farming is a seasonal activity, farmers of small and midsize plots can work extra hours during the growing season and hopefully supplement their household incomes. I say hopefully because historical data reveal that net farm income is highly volatile and sometimes negative.

Lost Economic Activity From Farming

1. Determine the solar site's share of county farmland. In most Kentucky contexts, the relevant components are acres harvested of corn for grain, acres harvested for soybeans, and inventory of cattle and other livestock. The county totals are published every five years in the Census of Agriculture, with 2022 the latest

available[13]. Farmland use at the solar site is estimated based on visual inspection, as it is not feasible to do an actual acre by acre survey. The distribution of farmland use at the site will be similar to the county distribution, to the extent the topography and soil quality is similar throughout the county.

2. Obtain the yield per acre and the value per bushel for corn and soybeans from the county tables in the Census of Agriculture. Multiply the site acreage by the yield and value to obtain farm revenues (Output) for the site. A similar calculation can be made for any livestock activity.

3. Use IMPLAN to simulate the Output loss in the county from the loss of farm activity. IMPLAN has three sectors that usually apply: Oilseed Farming (#1), Grain Farming (#2), and Beef Cattle Ranching and Farming (#11). If needed, there are also sectors for Dairy Cattle (#12), Poultry and Egg (#13), Other Animal Production (pigs and hogs) (#14). IMPLAN will return a statement of the direct, indirect and induced economic impacts in the county from the loss of the farm activity. It also provides a detailed listing of the impacted sectors in the county, such as farm supplies.

4. Care should be taken at this point to distinguish between Output and Value Added. Output is the total sales, while Value Added measures only the dollars that stick to the county. For example, if farmers purchase $50,000 of fuel most of those dollars go to the refinery in another county or state. Only the portion used to compensate the local distributor results in lost income in the county. Employment and Labor Income impacts are the most useful for our purposes.

New Income from Leasing Land to Solar Company

1. The solar farm developer will have confidential data on the contracted amount they will pay landowners for the use of their land each year. If the company cannot release the lease payments, the only recourse is to estimate them based on studies of other places. According to a recent paper, “More rural areas with high land prices and high solar demand may be in the ballpark of $1,000 an acre near a substation with capacity. Areas where land price is much lower, and the land doesn’t offer much in the way of agriculture, may drop rent rates to around $500

[13] The 2022 Census of Agriculture statistics for Kentucky were released in February 2024. See www.nass.usda.gov/Publications/AgCensus/2022/Full_Report/Volume_1,_Chapter_2_County_Level/Kentucky/

per acre"[14]. Below, I use a midpoint estimate of $750 per acre for the solar site. The lease payments rise over time, but I do not have access to the details of the contracts.

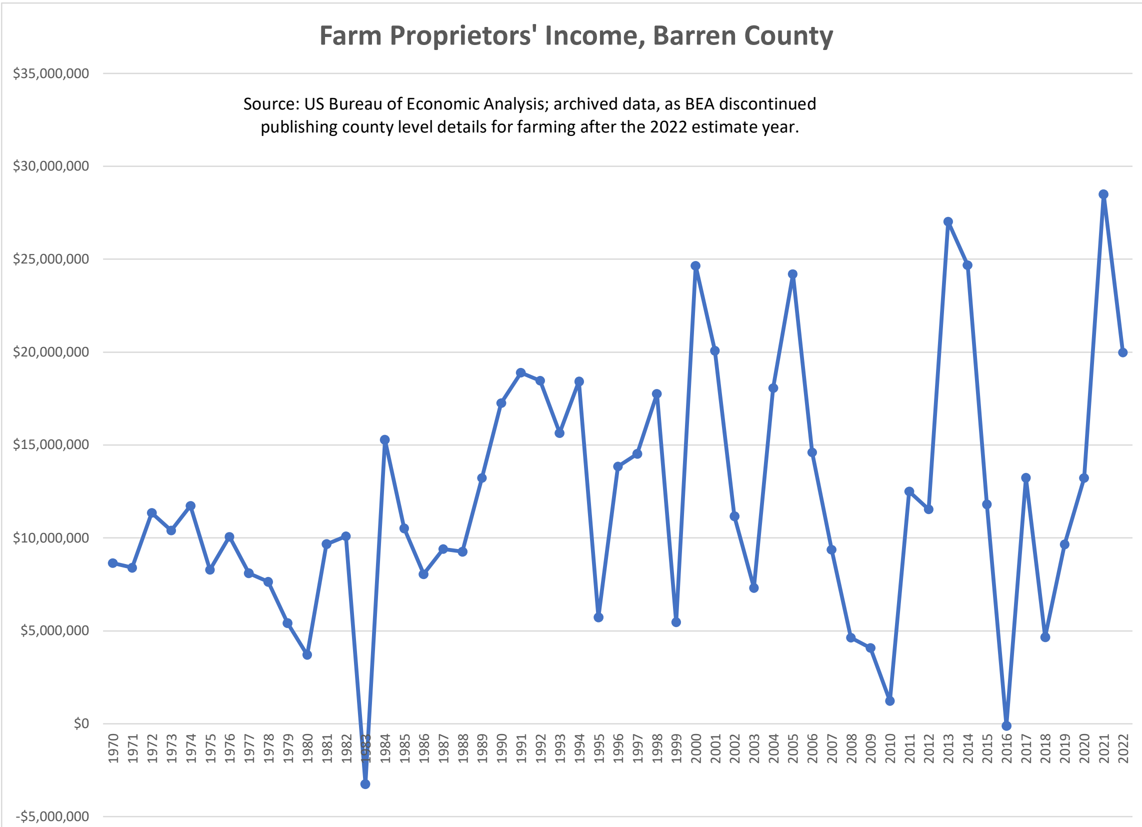
2. To estimate the economic impact of this new income, IMPLAN can be used again. This involves a simulation of new household income and spending, resulting in estimates of the impact on other sectors in the county. Changes to household income have predictable impacts on residential construction, retail sales, health care, insurance, banking, restaurants, entertainment, education and a large range of activities covered by the IMPLAN modeling system. We follow the methods employed in a recent Minnesota study, which allocates one-half the lease payments to net household income and the other half to payments on their real estate mortgage and other debts[15]. The more urbanized the county, the greater the portion of household spending that is captured in the county versus imported from other regions. Again, one should distinguish between Output and Value Added, so the focus is on the new dollars that stick to the county.

[14] These sites have good overviews of the factors involved: https://uslightenergy.com/news/solar-land-lease-rates-how-much-do-solar-companies-pay-to-lease-land/ and www.solarlandlease.com/lease-rates-for-solar-farms-how-valuable-is-my-land

[15] See Economic Impacts of a Proposed Solar Energy Project in Freeborn County, Minnesota, by Brigid Tuck, University of Minnesota Extension, April 2021: https://conservancy.umn.edu/handle/11299/223053

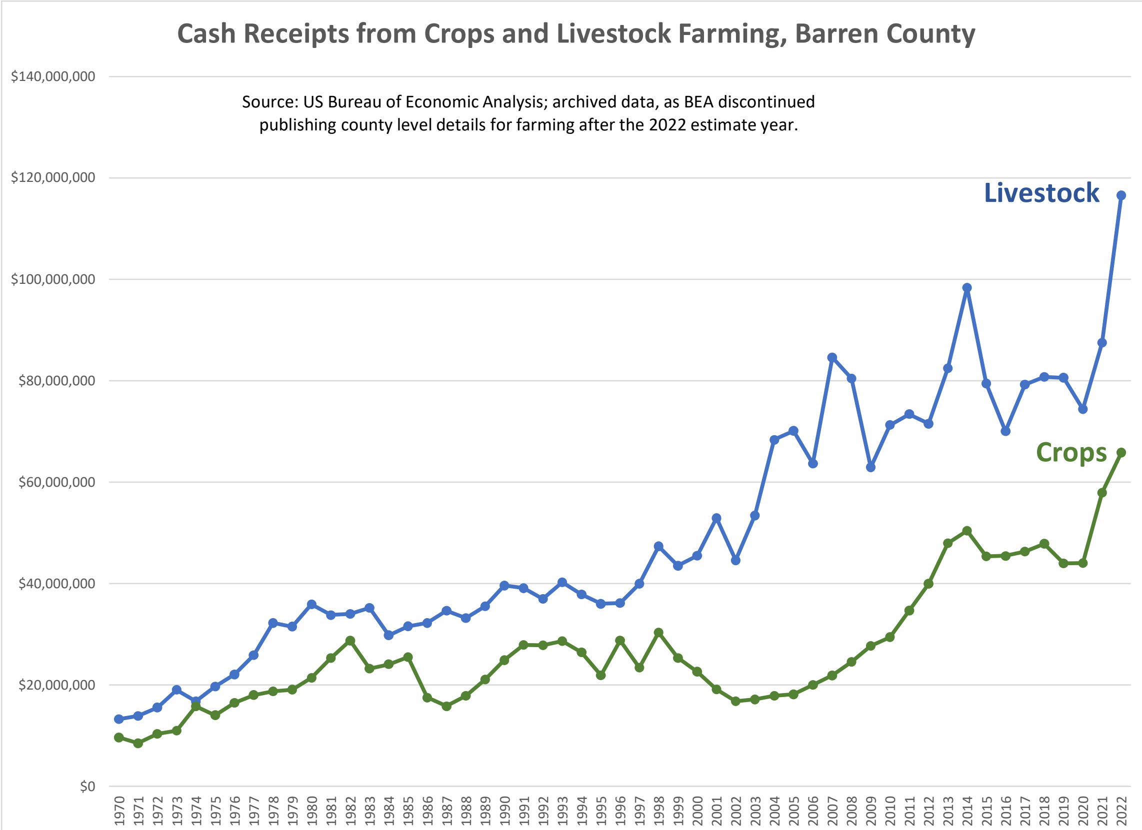
Barren County

I now apply the method to the Wood Duck solar site, which is located in Barren County. Before estimating farm income at the site, it is worth looking briefly at agricultural conditions at the county level. The next chart shows net farm income over the past five decades. Note the volatility of farm income due to changes in product prices and costs of production. The average over the period shown was $12.0 million per year (in nominal terms, not adjusted for inflation).



In the next chart, we see that livestock revenues have been consistently higher than crop revenues.

A summary of 2022 Census of Agriculture results is provided in the next table. The solar site accounts for about one-half of one percent of the farmland in Barren County. Cattle, calves, and milk production accounted for most of the livestock activity. Corn, soybeans and tobacco accounted for most of the crop activity. In 2022, Barren County had the third highest tobacco production among Kentucky’s 120 counties, after Christian and Calloway counties.



Dividing bushels by acreage, we see that Barren County had an average soybean yield of 50 bushels per acre, For corn, Barren County had a yield of 133 bushels per acre. And 60 percent of cattle inventory were sold that year. Soybean revenue per bushel was $14.13, and corn revenue per bushel was $7.12. The average price per cow sold was $878.

According to the developer, the site for the above-ground infrastructure encompasses 1,244 acres, with several hundred more surrounding acres also possibly under lease. The primary agricultural activity is pasture and hay for cattle, accounting for almost one-half of the site, followed by crop cultivation. There is no indication of dairy farming or tobacco production. The remaining land is forested or nonfarm acreage. For crops, I assume the land is split equally between corn and soybeans, roughly the countywide proportions. I have estimated the number of cattle grazing, using the results of a study by the University of Kentucky[16]. They find that beef cows need two to four acres of pasture per head, depending on the soil quality and the amount of hay used as feed. Taking the midpoint value of three acres per head, this implies that the acreage would support about 190 head of cattle.

[16] https://agecon.ca.uky.edu/sacred-cows-and-stocking-rates

Summary Agricultural Statistics, Barren County, 2022	
Farms	1,621
Land in farms, acres	230,539
Corn for grain, acres	16,870
Corn for grain, bushels	2,249,743
Soybeans, acres	20,246
Soybeans, bushels	1,012,611
Tobacco, acres	4,841
Tobacco, pounds	5,865,390
Forage - land used for hay, grass silage, acres	59,476
Forage - land used for hay, grass silage, tons	123,400
Cattle and calves inventory	80,293
Cattle and calves sold	48,194
Milk cows	6,578
Corn, value sold (000)	$16,009
Soybeans, value sold (000)	$14,307
Tobacco, value (000)	$13,907
Cattle and calves sold, market value (000)	$42,297
Milk from cows (000)	$38,066
Farm production expenses (000)	$152,658
Net cash farm income from operations (000)	$48,611
Farms with net gains	715
Farms with net losses	906
Government paymens received (000)	$4,535
Hired farm labor, workers	890
Hired farm labor (000), payroll	$10,920
Volume 1, Geographic Area Series, Part 17, February 2024.	
www.nass.usda.gov/Publications/AgCensus/2022/Full_Report/Volume_1,_Chapter_2_County_Level/Kentucky/	

Applying county-wide yields and prices to the agricultural activity at the site gives us an estimate of the total annual agricultural revenue, as shown in the next table. Total estimated cash receipts are about $400,000.

Estimate of Annual Agricultural Revenues at Solar Site	
Corn	$171,056
Soybeans	$127,379
Cattle	$101,465
Total farm revenues	$399,900

Next, I use IMPLAN to simulate the full economic impact of these revenues on the county. One can see that this agricultural activity is predicted to support almost five jobs in the county and $155,000 in labor income.

Solar Site Agrifultural Loss, Estimated County Impacts

Impact	Employ ment	Labor Income	Value Added	Output
Direct	3.5	$103,302	$174,096	$399,900
Indirect	0.9	$33,769	$47,195	$93,277
Induced	0.4	$17,651	$36,766	$62,717
Total	4.8	$154,722	$258,057	$555,894

Source: IMPLAN model of Barren County, using 2023 economic data.

These negative farm-related jobs and labor income need to be compared to the positive economic impacts related to the solar farm. Beyond the one-time construction impacts, the solar operation generates two new annual revenue streams – the operation of the solar site and the lease payments to farmland owners.

In the body of the report, I estimated that the operation of the solar farm will support about 8.7 jobs, with labor income of $536,000 annually. I assume the lease payments are $750 per acre, implying new household income of $933,000. I simulate this two ways. In Table A, I assume that all the lease income is available for household spending, using the income bracket $70,000 to $100,000 annually. This results in four jobs and $175,000 in new labor income in the county. The reader may wonder where the rest of the lease dollars went. Taxes and savings reduce the amount available for spending. More importantly, in a rural county there are fewer goods and services available locally than in an urban county, and thus the dollars leak out of the county in the form of imports[17]. The most impacted sectors in Barren County are child day care services, hospitals, education services, mental health services, home health care, offices of dentists, offices of physicians, retail clothing, and retail food and beverage.

A. Estimated Annual Impact of Lease Payments

Impact	Employ ment	Labor Income	Value Added	Output
Direct	0.0	$0	$0	$0
Indirect	0.0	$0	$0	$0
Induced	4.0	$174,843	$348,452	$595,530
Total	4.0	$174,843	$348,452	$595,530

Source: IMPLAN model of Barren County, using 2023 economic data. All lease income simulated as increase in household income.

In Table B, the results are based on the assumption that one-half of lease income goes unrestricted to households in the income bracket $70,000 to $100,000. The other half is simulated at going to the banking system to pay down real estate mortgage and other debts[18]. The results are shown in the accompanying table. I estimate that the lease payments will support 4.9 jobs in Barren County, with labor income of $259,000. One can see that there is little difference between the results of the two approaches in this case. I will use the more conservative one, in Table A, in the net calculations below.

B. Estimated Annual Impact of Lease Payments

Impact	Employ ment	Labor Income	Value Added	Output
Direct	1.6	$118,803	$239,203	$466,500
Indirect	0.9	$36,474	$59,295	$140,646
Induced	2.4	$103,333	$207,276	$354,242
Total	4.9	$258,610	$505,774	$961,388

Source: IMPLAN model of Barren County, using 2023 economic data. Half the lease income treated as new household income; half as new expenditures in the banking system to pay down debts.

[17] By comparison, the same simulation in Jefferson County (Louisville) results in a total of 6.3 jobs, $434.000 in labor income, value added of $732,000, and total output of $1,168,000.
[18] IMPLAN sector 423 “Monetary authorities and depository credit intermediation”.

Summarizing, one can see that the negative agricultural impacts are more than offset by the positive impacts from operating the solar site, revealing an annual net gain in jobs and labor income.

Estimated Net Annual Barren County Impacts

	Employ ment	Labor Income
Farming	-4.8	-$154,722
Solar operations	8.7	$536,326
Lease payments to landowners	4.0	$174,843
Net	7.9	$556,448

Looking out over three decades, and including the impacts of construction, there is a net gain of 324 job -years and $33.8 million in labor income to the county.

Estimated Net Economic Impact Over Three Decades

	Year 1 Construction	Years 2 through 29, annual average	Cumulative 30 years
Solar-related employment	299.4	12.7	667.2
Solar-related labor income	$17,852,102	$711,170	$38,476,019
Agricultural-related employment	-4.8	-4.8	-143.5
Agricultural-related labor income	-$154,722	-$154,722	-$309,444
Net employment	294.6	7.9	**523.7**
Net labor income	$17,697,380	$556,448	**$33,834,364**

EXHIBIT G

Kirkland Appraisals, LLC

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9408 Northfield Court
Raleigh, North Carolina 27603
Phone (919) 414-8142
rkirkland2@gmail.com
www.kirklandappraisals.com

May 25, 2023

Ms. Kelley Pope
Geenex Solar
1000 NC Music Factory Boulevard, Suite C3
Charlotte, NC 28206

RE: Wood Duck Solar, Off Cumberland Parkway, Glasgow, Barren County, KY

Ms. Pope

At your request, I have considered the impact of a 100 MW solar farm proposed to be constructed on a 1,126.70-acre portion of a 2,259.40-acre assemblage of land off Cumberland Parkway, Glasgow, Barren County, Kentucky. Specifically, I have been asked to give my professional opinion on whether the proposed solar farm will have any impact on adjoining property value and whether "the location and character of the use, if developed according to the plan as submitted and approved, will be in harmony with the area in which it is to be located."

To form an opinion on these issues, I have researched and visited existing and proposed solar farms in Kentucky as well as other states, researched articles through the Appraisal Institute and other studies, and discussed the likely impact with other real estate professionals. I have not been asked to assign any value to any specific property.

This letter is a limited report of a real property appraisal consulting assignment and subject to the limiting conditions attached to this letter. My client is Geenex Solar, represented to me by Kelley Pope. My findings support the Kentucky Siting Board Application. The effective date of this consultation is May 25, 2023.

While based in NC, I am also a Kentucky State Certified General Appraiser #5522.

Conclusion

The adjoining properties are well set back from the proposed solar panels and supplemental vegetation is proposed to enhance the areas where the existing trees do not currently provide a proper screen. The closest non-participating home will be 300 feet from the nearest panel and the average distance will be 1,298 feet.

The matched pair analysis shows no impact on home values due to abutting or adjoining a solar farm as well as no impact to abutting or adjacent vacant residential or agricultural land where the solar farm is properly screened and buffered. The criteria that typically correlates with downward adjustments on property values such as noise, odor, and traffic all indicate that a solar farm is a compatible use for rural/residential transition areas and that it would function in a harmonious manner with this area.

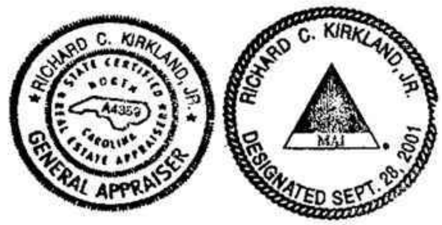
Data from the university studies, broker commentary, and other appraisal studies support a finding of no impact on property value adjoining a solar farm with proper setbacks and landscaped buffers.

Very similar solar farms in very similar areas have been found by hundreds of towns and counties not to have a substantial negative effect to abutting or adjoining properties, and many of those findings of no impact have been upheld by appellate courts. Similar solar farms have been approved with adjoining agricultural uses, schools, churches, and residential developments.

Based on the data and analysis in this report, it is my professional opinion that the solar farm proposed at the subject property will have no impact on the value of adjoining or abutting properties and that the proposed use is in harmony with the area in which it is located. I note that some of the positive implications of a solar farm that have been expressed by people living next to solar farms include protection from future development of residential developments or other more intrusive uses, reduced dust, odor and chemicals from former farming operations, protection from light pollution at night, it is quiet, and there is minimal traffic.

If you have any questions please contact me.

Sincerely,



Richard C. Kirkland, Jr., MAI
NC Certified General Appraiser A4359
KY Certified General Appraiser #5522

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I. Proposed Project and Adjoining Uses

Proposed Use Description

This 100 MW solar farm is proposed to be constructed on a 1,126.70-acre portion of a 2,259.40-acre assemblage of land off Cumberland Parkway, Glasgow, Barren County, Kentucky.

Adjoining Properties

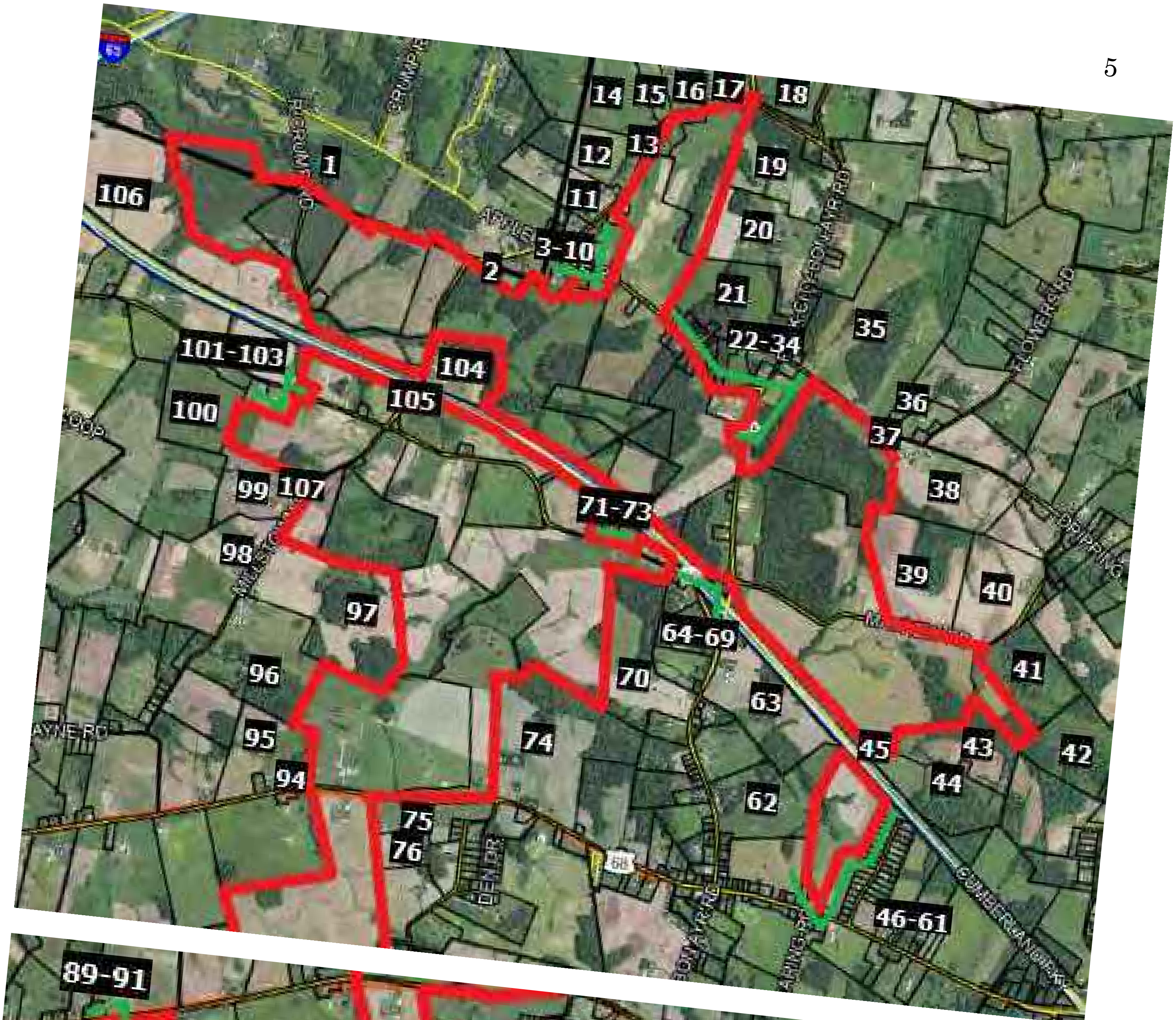
I have considered adjoining uses and included a map to identify each parcel's location. Based on the current site plan the closest adjoining home will be 300 feet from the closest solar panel and the average distance to adjoining homes will be 1,298 feet to the nearest solar panel. Most of these setbacks are larger than what is typically found and will go beyond what is needed to protect adjoining property values when coupled with sufficient landscaped buffers. The minimum distance noted is further than some of the examples identified later in this report showing no impact on property values.

Adjoining land is primarily a mix of residential and agricultural uses, which is very typical of solar farm sites.

The breakdown of those uses by acreage and number of parcels is summarized below.

Adjoining Use Breakdown

	Acreage	Parcels
Residential	5.64%	54.21%
Agricultural	35.37%	17.76%
Agri/Res	58.64%	25.23%
Utility	0.33%	1.87%
Commercial	0.02%	0.93%
Total	**100.00%**	**100.00%**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WALLER RD

Surrounding Uses

			GIS Data		Adjoin	Adjoin	Distance (ft)	L.F
#	MAP ID	Owner	Acres	Present Use	Acres	Parcels	Home/Panel	Adjacent
1	Edmonson County	N/A	0.00	Agri/Res	0.00%	0.93%	N/A	7025
2	19-4A	Burris	2.18	Residential	0.07%	0.93%	485	505
3	19-6B	Hinkle	5.94	Residential	0.18%	0.93%	630	1385
4	18-6	Partridge	3.15	Residential	0.10%	0.93%	950	55
5	18-6B	Burris	3.08	Residential	0.09%	0.93%	710	1
6	19-6A	Pendleton	2.30	Residential	0.07%	0.93%	920	400
7	19-6C	Childress	5.00	Residential	0.15%	0.93%	1,040	1210
8	19-6	Edmonds	0.48	Residential	0.01%	0.93%	760	120
9	19-7	Burris	7.75	Residential	0.24%	0.93%	N/A	1305
10	18-6C	Harris	3.48	Residential	0.11%	0.93%	615	245
11	18-3E	John	34.47	Agricultural	1.06%	0.93%	N/A	420
12	18-3F	Croley	38.39	Agricultural	1.18%	0.93%	N/A	840
13	18-5	Farrell	2.86	Residential	0.09%	0.93%	335	490
14	18-3H	Mitchell	108.47	Agricultural	3.34%	0.93%	N/A	140
15	18-3J	Croley	42.78	Agricultural	1.32%	0.93%	N/A	330
16	18-3B	Croley	23.18	Agri/Res	0.71%	0.93%	1,650	640
17	18-3	Aidala	32.02	Agri/Res	0.99%	0.93%	2,170	950
18	31-25A	Bunnell	135.88	Agri/Res	4.18%	0.93%	3,635	1
19	32-5	Trulock	139.08	Agri/Res	4.28%	0.93%	3,475	1845
20	32-14	Fox	71.50	Agri/Res	2.20%	0.93%	2,440	1450
21	32-15	Campbell	70.50	Agri/Res	2.17%	0.93%	1,915	1670
22	32-15H	Pancake	1.00	Residential	0.03%	0.93%	530	395
23	32-15J	Sexton	2.00	Residential	0.06%	0.93%	690	195
24	32-15M	Torres	1.00	Residential	0.03%	0.93%	675	80
25	32-15K	Patton	1.00	Residential	0.03%	0.93%	595	80
26	32-15F	Stout	1.00	Residential	0.03%	0.93%	670	100
27	32-15P	Vibbert	2.00	Residential	0.06%	0.93%	720	95
28	32-15G	Craft	1.00	Residential	0.03%	0.93%	645	95
29	32-15N	McDavitt	2.00	Residential	0.06%	0.93%	500	235
30	32-15E	Hill	1.46	Residential	0.04%	0.93%	N/A	405
31	32-15B	Campbell	5.00	Residential	0.15%	0.93%	N/A	130
32	32-15A	Esters	3.03	Residential	0.09%	0.93%	1,145	240
33	32-19	Ortega	28.90	Agricultural	0.89%	0.93%	N/A	3875
34	32-17B	Aidala	0.84	Residential	0.03%	0.93%	710	565
35	32-13	Stephens	175.52	Agri/Res	5.41%	0.93%	1,690	1510
36	32-13A	Martin	5.49	Residential	0.17%	0.93%	N/A	1
37	32-24A	Martin	1.14	Residential	0.04%	0.93%	705	380
38	32-24	Martin	98.86	Agri/Res	3.04%	0.93%	830	1340
39	32-40B	Martin	80.44	Agricultural	2.48%	0.93%	N/A	3865

			GIS Data		Adjoin	Adjoin	Distance (ft)	L.F
#	**MAP ID**	**Owner**	**Acres**	**Present Use**	**Acres**	**Parcels**	**Home/Panel**	**Adjacent**
40	32-37C	Martin	55.88	Agri/Res	1.72%	0.93%	1,715	730
41	32-38	Ewing	50.00	Agricultural	1.54%	0.93%	N/A	2030
42	33-58	Burks	48.42	Agricultural	1.49%	0.93%	N/A	425
43	33-12	Martin	46.15	Agri/Res	1.42%	0.93%	300	3775
44	33-12B	Kendrick	50.22	Agri/Res	1.55%	0.93%	800	215
45	32-40A	Walker	0.58	Utility	0.02%	0.93%	N/A	370
46	33B-18	Carroll	1.29	Residential	0.04%	0.93%	1,590	305
47	33B-17	Campbell	0.94	Residential	0.03%	0.93%	1,625	120
48	33B-16	Scott	0.95	Residential	0.03%	0.93%	1,745	130
49	33B-15	Martin	0.99	Residential	0.03%	0.93%	1,860	125
50	33B-14	Walker	1.03	Residential	0.03%	0.93%	1,940	130
51	33B-13	Wilson	1.12	Residential	0.03%	0.93%	N/A	145
52	33B-12	Savers	1.06	Residential	0.03%	0.93%	N/A	135
53	33B-11	Wright	1.03	Residential	0.03%	0.93%	2,330	125
54	33B-10	Deal	1.02	Residential	0.03%	0.93%	2,440	1
55	33-7C	East	10.00	Utility	0.31%	0.93%	N/A	1495
56	33-7F	Savers	0.70	Commercial	0.02%	0.93%	N/A	125
57	33-23	Miller	1.47	Residential	0.05%	0.93%	3,750	35
58	33-23G	Goodman	0.93	Residential	0.03%	0.93%	3,750	55
59	33-7E	Robertson	0.93	Residential	0.03%	0.93%	N/A	410
60	33-7	Robertson	1.27	Residential	0.04%	0.93%	3,525	360
61	33-31A	Holmes	31.46	Agricultural	0.97%	0.93%	N/A	905
62	33-6	Emerson	62.36	Agri/Res	1.92%	0.93%	3,395	1815
63	32-40	Martin	69.91	Agri/Res	2.15%	0.93%	1,275	3190
64	32-41J	Wells	1.24	Residential	0.04%	0.93%	N/A	660
65	32-41K	Garrett	1.36	Residential	0.04%	0.93%	740	1
66	32-41F	Wells	6.80	Residential	0.21%	0.93%	1,220	145
67	32-41G	Furlong	0.76	Residential	0.02%	0.93%	1,480	160
68	32-41D	England	0.99	Residential	0.03%	0.93%	1,580	50
69	32-21A	Woodland	0.11	Residential	0.00%	0.93%	N/A	350
70	32-43	Emerson	71.99	Agricultural	2.22%	0.93%	N/A	3915
71	32-20C	Arms	3.69	Residential	0.11%	0.93%	510	1250
72	32-20	Kirby	3.58	Residential	0.11%	0.93%	600	485
73	32-20B	Simpson	29.30	Residential	0.90%	0.93%	985	1235
74	19-33	Lyons	127.07	Agri/Res	3.91%	0.93%	1,055	4850
75	20-6	Burks	25.55	Agri/Res	0.79%	0.93%	365	3190
76	20-5B	Burks	27.10	Agri/Res	0.83%	0.93%	1,530	620
77	20-5A	Burks	27.14	Agri/Res	0.84%	0.93%	905	1730
78	20-7	Houchens	11.12	Residential	0.34%	0.93%	1,410	60

#	MAP ID	Owner	GIS Data Acres	Present Use	Adjoin Acres	Adjoin Parcels	Distance (ft) Home/Panel	L.F Adjacent
79	20-2V	Gray	13.00	Residential	0.40%	0.93%	N/A	1
80	20-9C	James	1.00	Residential	0.03%	0.93%	595	250
81	20-9C	Froedge	9.99	Residential	0.31%	0.93%	670	935
82	20-2P	Hawkins	113.18	Agricultural	3.49%	0.93%	N/A	4875
83	20-2F	Allen	56.82	Agricultural	1.75%	0.93%	N/A	1870
84	20-14A	Chambers	0.78	Residential	0.02%	0.93%	365	120
85	20-14	Allen	28.87	Agricultural	0.89%	0.93%	N/A	280
86	20-13	Allen	50.00	Agri/Res	1.54%	0.93%	640	2640
87	9-8	Allen	163.50	Agri/Res	5.04%	0.93%	2,535	1590
88	20-1	Gordeuk	40.00	Agri/Res	1.23%	0.93%	1,420	2485
89	19-28	Boatman	1.97	Residential	0.06%	0.93%	1,720	300
90	19-28A	Pennycuff	50.00	Agricultural	1.54%	0.93%	N/A	1010
91	20-2D	Gray	1.88	Residential	0.06%	0.93%	1,085	1300
92	20-3	Pennycuff	50.00	Agri/Res	1.54%	0.93%	1,840	3825
93	20-4	Pennycuff	74.62	Agricultural	2.30%	0.93%	N/A	3740
94	19-30B	Copas	2.86	Residential	0.09%	0.93%	1,550	260
95	19-30	Wininger	46.90	Agricultural	1.44%	0.93%	N/A	1205
96	19-25	Double	73.00	Agri/Res	2.25%	0.93%	1,980	1335
97	19-23	Millstown	109.21	Agricultural	3.36%	0.93%	N/A	5900
98	19-17	Roark	81.52	Agricultural	2.51%	0.93%	N/A	365
99	19-16A	Roark	39.68	Agri/Res	1.22%	0.93%	365	2360
100	19-13B	Williams	52.00	Agricultural	1.60%	0.93%	N/A	730
101	19-12	Bellamy	10.75	Residential	0.33%	0.93%	N/A	1475
102	19-10B	Vincent	0.97	Residential	0.03%	0.93%	415	670
103	19-13	Williams	35.50	Agri/Res	1.09%	0.93%	1,300	685
104	19-5A	Gingerich	33.65	Agri/Res	1.04%	0.93%	595	5065
105	19-10C	Cook	1.07	Residential	0.03%	0.93%	340	670
106	19-13A	Williams	180.74	Agri/Res	5.57%	0.93%	720	5660
107	19-16	West	1.83	Residential	0.06%	0.93%	345	730
		Total	**3246.970**		**100.00%**	**100.00%**	1,298	

N/A indicates that there is no adjoining home to which to measure. Linear feet of adjacency listed in red means that the property is across a right of way from the subject property. Linear feet of adjacency of 1 foot is assigned where properties meet at a corner.

II. Demographics

I have pulled the following demographics for a 1-mile, 3-mile and 5-mile radius around the proposed solar farm project.

Housing Profile

1507-1999 Oak Grove Church Rd, Smiths Grove, Kentucky,
Ring: 1 mile radius

Prepared by Esri
Latitude: 37.04481
Longitude: -86.08548

Population		Households	
2010 Total Population	102	2022 Median Household Income	$44,005
2020 Total Population	104	2027 Median Household Income	$56,362
2022 Total Population	105	2022-2027 Annual Rate	5.07%
2027 Total Population	106		
2022-2027 Annual Rate	0.19%		

	Census 2010		2022		2027	
Housing Units by Occupancy Status and Tenure	Number	Percent	Number	Percent	Number	Percent
Total Housing Units	38	100.0%	39	100.0%	39	100.0%
Occupied	35	92.1%	37	94.9%	37	94.9%
Owner	27	71.1%	28	71.8%	28	71.8%
Renter	8	21.1%	9	23.1%	9	23.1%
Vacant	3	7.9%	3	7.7%	2	5.1%

	2022		2027	
Owner Occupied Housing Units by Value	Number	Percent	Number	Percent
Total	27	100.0%	28	100.0%
<$50,000	5	18.5%	5	17.9%
$50,000-$99,999	6	22.2%	6	21.4%
$100,000-$149,999	4	14.8%	4	14.3%
$150,000-$199,999	5	18.5%	5	17.9%
$200,000-$249,999	3	11.1%	3	10.7%
$250,000-$299,999	2	7.4%	3	10.7%
$300,000-$399,999	1	3.7%	1	3.6%
$400,000-$499,999	1	3.7%	1	3.6%
$500,000-$749,999	0	0.0%	0	0.0%
$750,000-$999,999	0	0.0%	0	0.0%
$1,000,000-$1,499,999	0	0.0%	0	0.0%
$1,500,000-$1,999,999	0	0.0%	0	0.0%
$2,000,000+	0	0.0%	0	0.0%
Median Value	$131,250		$137,500	
Average Value	$147,222		$151,786	

Census 2010 Housing Units	Number	Percent
Total	38	100.0%
In Urbanized Areas	0	0.0%
In Urban Clusters	0	0.0%
Rural Housing Units	38	100.0%

Data Note: Persons of Hispanic Origin may be of any race.
Source: Esri forecasts for 2022 and 2027. U.S. Census Bureau 2010 decennial Census data converted by Esri into 2020 geography.

May 23, 2023

Housing Profile

1507-1999 Oak Grove Church Rd, Smiths Grove, Kentucky,
Ring: 3 mile radius

Prepared by Esri
Latitude: 37.04451
Longitude: -86.08548

Population		Households	
2010 Total Population	1,634	2022 Median Household Income	$51,347
2020 Total Population	1,653	2027 Median Household Income	$59,717
2022 Total Population	1,644	2022-2027 Annual Rate	3.07%
2027 Total Population	1,639		
2022-2027 Annual Rate	-0.06%		

	Census 2010		2022		2027	
Housing Units by Occupancy Status and Tenure	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Total Housing Units	683	100.0%	698	100.0%	700	100.0%
Occupied	601	88.0%	625	89.5%	623	89.0%
Owner	471	69.0%	482	69.1%	482	68.9%
Renter	130	19.0%	143	20.5%	141	20.1%
Vacant	82	12.0%	73	10.5%	77	11.0%

	2022		2027	
Owner Occupied Housing Units by Value	**Number**	**Percent**	**Number**	**Percent**
Total	483	100.0%	483	100.0%
<$50,000	107	22.2%	92	19.0%
$50,000-$99,999	91	18.8%	80	16.6%
$100,000-$149,999	65	13.5%	57	11.8%
$150,000-$199,999	98	20.3%	109	22.6%
$200,000-$249,999	44	9.1%	49	10.1%
$250,000-$299,999	38	7.9%	47	9.7%
$300,000-$399,999	17	3.5%	22	4.6%
$400,000-$499,999	16	3.3%	20	4.1%
$500,000-$749,999	2	0.4%	2	0.4%
$750,000-$999,999	0	0.0%	0	0.0%
$1,000,000-$1,499,999	1	0.2%	1	0.2%
$1,500,000-$1,999,999	0	0.0%	0	0.0%
$2,000,000+	4	0.8%	4	0.8%
Median Value	$133,462		$155,734	
Average Value	$165,166		$179,400	

Census 2010 Housing Units	**Number**	**Percent**
Total	683	100.0%
In Urbanized Areas	0	0.0%
In Urban Clusters	0	0.0%
Rural Housing Units	683	100.0%

Data Note: Persons of Hispanic Origin may be of any race.
Source: Esri forecasts for 2022 and 2027. U.S. Census Bureau 2010 decennial Census data converted by Esri into 2020 geography.

May 23, 2023

Housing Profile

1507-1999 Oak Grove Church Rd, Smiths Grove, Kentucky,
Ring: 5 mile radius

Prepared by Esri
Latitude: 37.04451
Longitude: -86.08548

Population		Households	
2010 Total Population	4,958	2022 Median Household Income	$50,459
2020 Total Population	5,217	2027 Median Household Income	$58,633
2022 Total Population	5,225	2022-2027 Annual Rate	3.05%
2027 Total Population	5,279		
2022-2027 Annual Rate	0.21%		

	Census 2010		2022		2027	
Housing Units by Occupancy Status and Tenure	Number	Percent	Number	Percent	Number	Percent
Total Housing Units	2,074	100.0%	2,177	100.0%	2,200	100.0%
Occupied	1,881	90.7%	2,009	92.3%	2,031	92.3%
Owner	1,442	69.5%	1,476	67.8%	1,497	68.0%
Renter	439	21.2%	533	24.5%	534	24.3%
Vacant	194	9.4%	167	7.7%	169	7.7%

	2022		2027	
Owner Occupied Housing Units by Value	Number	Percent	Number	Percent
Total	1,476	100.0%	1,498	100.0%
<$50,000	293	19.9%	244	16.3%
$50,000-$99,999	255	17.3%	222	14.8%
$100,000-$149,999	185	12.5%	159	10.6%
$150,000-$199,999	289	19.6%	317	21.2%
$200,000-$249,999	162	11.0%	184	12.3%
$250,000-$299,999	147	10.0%	184	12.3%
$300,000-$399,999	85	5.8%	117	7.8%
$400,000-$499,999	37	2.5%	45	3.0%
$500,000-$749,999	12	0.8%	15	1.0%
$750,000-$999,999	0	0.0%	0	0.0%
$1,000,000-$1,499,999	4	0.3%	4	0.3%
$1,500,000-$1,999,999	0	0.0%	0	0.0%
$2,000,000+	7	0.5%	7	0.5%
Median Value	$150,865		$169,558	
Average Value	$170,512		$187,867	

Census 2010 Housing Units	Number	Percent
Total	2,074	100.0%
In Urbanized Areas	0	0.0%
In Urban Clusters	7	0.3%
Rural Housing Units	2,067	99.7%

Data Note: Persons of Hispanic Origin may be of any race.
Source: Esri forecasts for 2022 and 2027. U.S. Census Bureau 2010 decennial Census data converted by Esri into 2020 geography.

May 23, 2023

III. Methodology and Discussion of Issues

Standards and Methodology

I conducted this analysis using the standards and practices established by the Appraisal Institute and that conform to the Uniform Standards of Professional Appraisal Practice. The analyses and methodologies contained in this report are accepted by all major lending institutions, and they are used in Kentucky and across the country as the industry standard by certified appraisers conducting appraisals, market analyses, or impact studies and are considered adequate to form an opinion of the impact of a land use on neighboring properties. These standards and practices have also been accepted by the courts at the trial and appellate levels and by federal courts throughout the country as adequate to reach conclusions about the likely impact a use will have on adjoining or abutting properties.

The aforementioned standards compare property uses in the same market and generally within the same calendar year so that fluctuating markets do not alter study results. Although these standards do not require a linear study that examines adjoining property values before and after a new use (e.g. a solar farm) is developed, some of these studies do in fact employ this type of analysis. Comparative studies, as used in this report, are considered an industry standard.

The type of analysis employed is a Matched Pair Analysis or Paired Sales Analysis. This methodology is outlined in **The Appraisal of Real Estate**, Twelfth Edition by the Appraisal Institute pages 438-439. It is further detailed in **Real Estate Damages**, Third Edition, pages 33-36 by Randall Bell PhD, MAI. Paired sales analysis is used to support adjustments in appraisal work for factors ranging from the impact of having a garage, golf course view, or additional bedrooms. It is an appropriate methodology for addressing the question of impact of an adjoining solar farm. The paired sales analysis is based on the theory that when two properties are in all other respects equivalent, a single difference can be measured to indicate the difference in price between them. Dr. Bell describes it as comparing a test area to control areas. In the example provided by Dr. Bell he shows five paired sales in the test area compared to 1 to 3 sales in the control areas to determine a difference. I have used 3 sales in the control areas in my analysis for each sale developed into a matched pair.

Determining what is an External Obsolescence

An external obsolescence is a use of property that, because of its characteristics, might have a negative impact on the value of adjacent or nearby properties because of identifiable impacts. Determining whether a use would be considered an external obsolescence requires a study that isolates that use, eliminates any other causing factors, and then studies the sales of nearby versus distant comparable properties. The presence of one or a combination of key factors does not mean the use will be an external obsolescence, but a combination of these factors tend to be present when market data reflects that a use is an external obsolescence.

External obsolescence is evaluated by appraisers based on several factors. These factors include but are not limited to:

1) Traffic. Solar Farms are not traffic generators.

2) Odor. Solar farms do not produce odor.

3) Noise. Solar farms generate no noise concerns according to a wide range of noise studies that have been completed.

4) Environmental. Solar farms do not produce toxic or hazardous waste. Grass is maintained underneath the panels so there is minimal impervious surface area.

5) Appearance/Viewshed. This is the one area that potentially applies to solar farms. However, solar farms are generally required to provide significant setbacks and landscaping buffers to address that concern. Furthermore, any consideration of appearance of viewshed impacts has to be considered in comparison with currently allowed uses on that site. For example if a residential subdivision is already an allowed use, the question becomes in what way does the appearance impact adjoining property owners above and beyond the appearance of that allowed subdivision or other similar allowed uses.

6) Other factors. I have observed and studied many solar farms and have never observed any characteristic about such facilities that prevents or impedes neighbors from fully using their homes or farms or businesses for the use intended.

Market Imperfection

Throughout this analysis, I have specifically considered the influence of market imperfection on data analysis. Market imperfection is the term that refers to the fact that unlike a can of soup at the supermarket or in your online shopping cart, real estate cannot be comparison shopped for the best price and purchased at the best price for that same identical product. Real estate products are always similar and never identical. Even two adjacent lots that are identical in almost every way, have a slight difference in location. Once those lots are developed with homes, the number of differences begin to multiply, whether it is size of the home, landscaping, layout, age of interior upfit, quality of interior upfit, quality of maintenance and so on.

Neoclassical economics indicates a perfectly competitive market as having the following: A large number of buyers and sellers (no one person dominates the market), no barriers or transaction costs, homogeneous product, and perfect information about the product and pricing. Real estate is clearly not homogeneous. The number of buyers and sellers for a particular product in a particular location is limited by geography, financing, and the limited time period within a property is listed. There are significant barriers that limit the liquidity in terms of time, costs and financing. Finally, information on real estate is often incomplete or partial – especially at the time that offers are made and prices set, which is prior to appraisals and home inspections. So real estate is very imperfect based on this definition and the impact of this are readily apparent in the real estate market.

What appear to be near-identical homes that are in the same subdivision will often sell with slight variations in price. When multiple appraisers approach the same property, there is often a slight variation among all of those conclusions of value, due to differences in comparables used or analysis of those comparables. This is common and happens all of the time. In fact, within each appraisal, after making adjustments to the comparables, the appraiser will typically have a range of values that are supported that often vary more than +/-5% from the median or average adjusted value.

Based on this understanding of market imperfection, it is important to note that very minor differences in value within an impact study do not necessarily indicate either a negative or positive impact. When the impacts measured fall within that +/-5%, I consider this to be within typical market variation/imperfection. Therefore it may be that there is a negative or positive impact identified if the impact is within that range, but given that it is indistinguishable from what amounts to the background noise or static within the real estate data, I do not consider indications of +/-5% to support a finding of a negative or positive impact.

Impacts greater than that range are however, considered to be strong indications of impacts that fall outside of typical market imperfection. I have used this as a guideline while considering the impacts identified within this report.

Relative Solar Farm Sizes

Solar farms have been increasing in size in recent years. Much of the data collected is from existing, older solar farms of smaller size, but there are numerous examples of sales adjoining 75 to 80 MW facilities that show a similar trend as the smaller solar farms. This is understandable given that the primary concern relative to a solar farm is the appearance or view of the solar farm, which is typically addressed through setbacks and landscaping buffers. The relevance of data from smaller solar farms to larger solar farms is due to the primary question being one of appearance. If the solar farm is properly screened, then little of the solar farm would be seen from adjoining property regardless of how many acres are involved.

Larger solar farms are often set up in sections where any adjoining owner would only be able to see a small section of the project even if there were no landscaping screen. Once a landscaping screen is in place, the primary view is effectively the same whether you are adjoining a 5 MW, 20 MW or 100 MW facility.

I have split out the data for the matched pairs adjoining larger solar farms only to illustrate the similarities later in this report. I note that I have matched pairs adjoining solar farms up to 500 MWs in size showing no impact on property value.

Steps Involved in the Analysis

The paired sales analysis employed in this report follows the following process:

1. Identify sales of property adjoining existing solar farms.
2. Compare those sales to similar property that does not adjoin an existing solar farm.
3. Confirmation of sales are noted in the analysis write ups.
4. Distances from the homes to panels are included as a measure of the setbacks.
5. Topographic differences across the solar farms themselves are likewise noted along with demographic data for comparing similar areas.

There are a number of Sale/Resale comparables included in the write ups, but most of the data shown is for sales of homes after a solar farm has been announced (where noted) or after a solar farm has been constructed.

IV. Research on Solar Farms

A. Appraisal Market Studies

I have also considered a number of impact studies completed by other appraisers as detailed below.

CohnReznick – Property Value Impact Study: Adjacent Property Values Solar Impact Study: A Study of Eight Existing Solar Facilities

Patricia McGarr, MAI, CRE, FRICS, CRA and Andrew R. Lines, MAI with CohnReznick completed an impact study for a proposed solar farm in Cheboygan County, Michigan completed on June 10, 2020. I am familiar with this study as well as a number of similar such studies completed by CohnReznick. I have not included all of these studies but I submit this one as representative of those studies.

This study addresses impacts on value from eight different solar farms in Michigan, Minnesota, Indiana, Illinois, Virginia and North Carolina. These solar farms are 19.6 MW, 100 MW, 11.9 MW, 23 MW, 71 MW, 61 MW, 40 MW, and 19 MW for a range from 11.9 MW to 100 MW with an average of 31 MW and a median of 31.5 MW. They analyzed a total of 24 adjoining property sales in the Test Area and 81 comparable sales in the Control Area over a five-year period.

The conclusion of this study is that there is no evidence of any negative impact on adjoining property values based on sales prices, conditions of sales, overall marketability, potential for new development or rate of appreciation.

Christian P. Kaila & Associates – Property Impact Analysis – Proposed Solar Power Plant Guthrie Road, Stuarts Draft, Augusta County, Virginia

Christian P. Kaila, MAI, SRA and George J. Finley, MAI developed an impact study as referenced above dated June 16, 2020. This was for a proposed 83 MW facility on 886 acres.

Mr. Kaila interviewed appraisers who had conducted studies and reviewed university studies and discussed the comparable impacts of other development that was allowed in the area for a comparative analysis of other impacts that could impact viewshed based on existing allowed uses for the site. He also discussed in detail the various other impacts that could cause a negative impact and how solar farms do not have such characteristics.

Mr. Kaila also interviewed County Planners and Real Estate Assessor's in eight different Virginia counties with none of the assessor's identifying any negative impacts observed for existing solar projects.

Mr. Kaila concludes on a finding of no impact on property values adjoining the indicated solar farm.

Fred Beck, MAI, CCIM – Impact Analysis in Lincoln County 2013

Mr. Fred Beck, MAI, CCIM completed an impact analysis in 2013 for a proposed solar farm that concluded on a negative impact on value. That report relied on a single cancelled contract for an adjoining parcel where the contracted buyers indicated that the solar farm was the reason for the cancellation. It also relied on the activities of an assessment impact that was applied in a nearby county.

Mr. Beck was interviewed as part of the Christian Kalia study noted above. From that I quote "Mr. Beck concluded on no effect on moderate priced homes, and only a 5% change in his limited research of higher priced homes. His one sale that fell through is hardly a reliable sample. It also was misleading on Mr. Beck's part to report the lower re-assessments since the primary cause of the re-assesments were based on the County Official, who lived adjacent to the solar farm, appeal to the assessor for reductions with his own home." In that Clay County Case study the noted lack of lot sales after announcement of the solar farm also coincided with the recession in 2008/2009 and lack of lot sales effectively defined that area during that time. I contacted the Clay County Assessor who indicated that there is no set downward adjustment for properties adjoining solar farms in the county at this time.

I further note, that I was present at the hearing where Mr. Beck presented these findings and the predominance of his argument before the Lincoln County Board of Commissioner's was based on the one cancelled sale as well as a matched pair analysis of high-end homes adjoining a four-story call center. He hypothesized that a similar impact from that example could be compared to being adjacent solar farm without explaining the significant difference in view, setbacks, landscaping, traffic, light, and noise. Furthermore, Mr. Beck did have matched pairs adjoining a solar farm in his study that he put in the back of his report and then ignored as they showed no impact on property value.

Also noted in the Christian Kalia interview notes is a response from Mr. Beck indicating that in his opinion "the homes were higher priced homes and had full view of the solar farm." Based on a description of screening so that "the solar farm would not be in full view to adjoining property owners. Mr. Beck said in that case, he would not see any drop in property value."

NorthStar Appraisal Company – Impact Analysis for Nichomus Run Solar, Pilesgrove, NJ, September 16, 2020

Mr. William J. Sapio, MAI with NorthStar Appraisal Company considered a matched pair analysis for the potential impact on adjoining property values to this proposed 150 MW solar farm. Mr. Sapio considered sales activity in a subdivision known as Point of Woods in South Brunswick Township and identified two recent new homes that were constructed and sold adjoining a 13 MW solar farm and compared them to similar homes in that subdivision that did not adjoin the solar farm. These homes sold in the $1,290,450 to $1,336,613 price range and these homes were roughly 200 feet from the closest solar panel.

Based on this analysis, he concluded that the adjoining solar farm had no impact on adjoining property value.

Mary McClinton Clay, MAI – McCracken County Solar Project Value Impact Report, July 10, 2021

Ms. Mary Clay, MAI reviewed a report by Kirkland Appraisals in this case and also provided a differing opinion of impact. She cites a number of other appraisal studies and interestingly finds fault with heavily researched opinions, while praising the results of poorly researched studies that found the opposing view.

Her analysis includes details from solar farms that show no impact on value, but she dismisses those.

She cites the University of Texas study noted later in this report, but she cites only isolated portions of that study to conclude the opposite of what that study specifically concludes.

She cites the University of Rhode Island study noted alter in this report, but specifically excludes the conclusion of that study that in rural areas they found no impact on property value.

She cites lot sales near Spotsylvania Solar without confirming the purchase prices with brokers as indicative of market impact and has made no attempt to compare lot prices that are contemporaneous. In her 5 lot sales that she identifies, all of the lot prices decline with time from 2015 through 2019. This includes the 3 lot sales prior to the approval of the solar farm. The lot sales she cites showing a drop are all related to the original developer of that subdivision 20+ years ago liquidating all of their lots in that time period and shows significant drops on all of the lots due to it being a liquidation value. More recent lot sales show lot prices over $100,000 with the most recent land sale adjoining the solar farm having sold in December of 2021 for $140,000. I spoke with Chris Kalia, MAI out of VA about these lot sales and he confirmed along with two other appraisers in that market that he connected me with that the lot sales Ms. Clay identified were all related to that liquidation and not related to the solar farm. All three appraisers agreed that they had seen no negative impacts from Spotsylvania Solar and that lot prices among builders and home owners were going up and home prices in the neighborhood were likewise going up. Additional analysis on Spotsylvania Solar is shown later in this report with a new section of homes and new price points significantly higher than historical sales in this subdivision.

She considers data at McBride Place Solar Farm and does a sale/resale analysis based on Zillow Home Value Index, which is not a reliable indication for appreciation in the market. She then adjusted her initial sales prior to the solar farm over 7 years to determine what she believes the home should have appreciated by and then compares that to an actual sale. She has run no tests or any analysis to show that the appreciation rates she is using are consistent with the market but more importantly she has not attempted to confirm any of these sales with market participants. I have spoken with brokers active in the sales that she cites and they have all indicated that the solar farm was not a negative factor in marketing or selling those homes.

She has considered lot sales at Sunshine Farms in Grandy, NC. She indicates that the lots next to the solar farm are selling for less than lots not near the solar farm, but she is actually using lot sales next to the solar farm prior to the solar farm being approved. She also ignores recent home sales adjoining this solar farm after it was built that show no impact on property value.

She also notes a couple of situations where solar developers have purchased adjoining homes and resold them or where a neighbor agreement was paid as proof of a negative impact on property value. Given that there are over 2,500 solar farms in the USA as of 2018 according to the U.S. Energy Information Administration and there are only a handful of such examples, this is clearly not an industry standard but a business decision. Furthermore, solar developers are not in the business of flipping homes and are in a position very similar to a bank that acquires a home as OREO (Other Real Estate Owned), where homes are frequently sold at discounted prices, not because of any drop in value, but because they are not a typically motivated seller. Market value requires an analysis of a typically motivated buyer and seller. So these are not good indicators of market value impacts.

The comments throughout this study are heavy in adjectives, avoids stating facts contrary to the conclusion and shows a strong selection bias.

Kevin T. Meeks, MAI – Corcoran Solar Impact Study, June 19, 2017

Mr. Kevin Meeks, MAI reviewed a report by Kirkland Appraisals in this case and also provided additional research on the topic with additional paired sales. The sales he considered are well presented and show that they were confirmed by third parties and all of the broker commentary is aligned with the conclusion that the adjoining solar farms considered had no impact on the adjoining home values.

Mr. Meeks also researched a 100 MW project in Chisago County, known as North Star Solar Garden in MN. He interviewed local appraisers and a broker who was actively marketing homes adjoining that solar farm to likewise support a finding of no impact on property value.

Conclusion of Impact Studies

Of the six studies noted three included actual sales data to derive an opinion of no impact on value. The two studies to conclude on a negative impact includes the Fred Beck study based on no actual sales data, and he has since indicated that with landscaping screens he would not conclude on a negative impact. The other study by Mary Clay shows improper adjustments for time, a lack of confirmation of sales comparables, and exclusion of data that does not support her position.

I have relied on these studies as additional support for the findings in this impact analysis.

B. Articles

I have also considered a number of articles on this subject as well as conclusions and analysis as noted below.

Farm Journal Guest Editor, March 22, 2021 – Solar's Impact on Rural Property Values

Andy Ames, ASFMRA (American Society of Farm Managers and Rural Appraisers) published this article that includes a discussion of his survey of appraisers and studies on the question of property value related to solar farms. He discusses the university studies that I have cited as well as Patricia McGarr, MAI.

He also discusses the findings of Donald A. Fisher, ARA, who served six years at the Chair of the ASFMRA's National Appraisal Review Committee. He is also the Executive Vice President of the CNY Pomeroy Appraiser and has conducted several market studies on solar farms and property impact. He is quoted in the article as saying, "Most of the locations were in either suburban or rural areas, and all of those studies found either a neutral impact, or ironically, a positive impact, where values on properties after installation of solar farms went up higher than time trends."

Howard Halderman, AFM, President and CEO of Halderman Real Estate and Farm Management attended the ASFMRA solar talk hosted by the Indiana Chapter of the ASFMRA and he concludes that other rural properties would likely see no impact and farmers and landowners shown even consider possible benefits. "In some cases, farmers who rent land to a solar company will insure the viability of their farming operation for a longer time period. This makes them better long-term tenants or land buyers so one can argue that higher rents and land values will follow due to the positive impact the solar leases offer."

More recently in August 2022, Donald Fisher, ARA, MAI and myself led a webinar on this topic for the ASFMRA discussing the issues, the university studies and specific examples of solar farms having no impact on adjoining property values.

National Renewable Energy Laboratory – Top Five Large-Scale Solar Myths, February 3, 2016

Megan Day reports form NREL regarding a number of concerns neighbors often express. Myth #4 regarding property value impacts addresses specifically the numerous studies on wind farms that show no impact on property value and that solar farms have a significantly reduced visual impact from wind farms. She highlights that the appearance can be addressed through mitigation measures to reduce visual impacts of solar farms through vegetative screening. Such mitigations are not available to wind farms given the height of the windmills and again, those studies show no impact on value adjoining wind farms.

North Carolina State University: NC Clean Energy Technology Center White Paper: Balancing Agricultural Productivity with Ground-Based Solar Photovoltaic (PV) Development (Version 2), May 2019

Tommy Cleveland and David Sarkisian wrote a white paper for NCSU NC Clean Energy Technology Center regarding the potential impacts to agricultural productivity from a solar farm use. I have interviewed Tommy Cleveland on numerous occasions and I have also heard him speak on these issues at length as well. He addresses many of the common questions regarding how solar farms work and a detailed explanation of how solar farms do not cause significant impacts on the soils, erosion and other such concerns. This is a heavily researched paper with the references included.

North Carolina State University: NC Clean Energy Technology Center White Paper: Health and Safety Impacts of Solar Photovoltaics, May 2017

Tommy Cleveland wrote a white paper for NCSU NC Clean Energy Technology Center regarding the health and safety impacts to address common questions and concerns related to solar farms. This is a heavily researched white paper addressing questions ranging from EMFs, fire safety, as well as vegetation control and the breakdown of how a solar farm works.

C. Broker Commentary

In the process of working up the matched pairs used later in this report, I have collected comments from brokers who have actually sold homes adjoining solar farms indicating that the solar farm had no impact on the marketing, timing, or sales price for the adjoining homes. I have comments from brokers noted within the solar farm write ups of this report including brokers from Kentucky, Virginia, Tennessee, and North Carolina. I have additional commentary from other states including New Jersey and Michigan that provide the same conclusion.

V. University Studies

I have also considered the following studies completed by four different universities related to solar farms and impacts on property values.

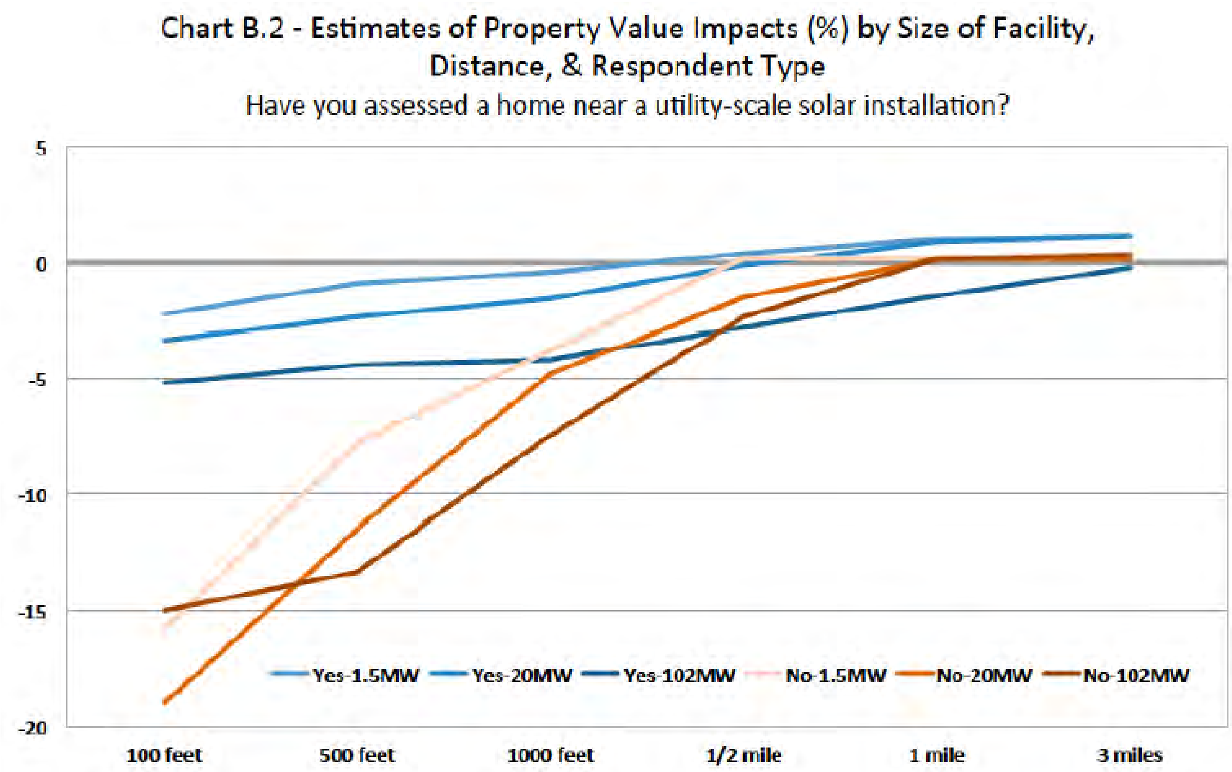
A. University of Texas at Austin, May 2018

An Exploration of Property-Value Impacts Near Utility-Scale Solar Installations

This study considers solar farms from two angles. First it looks at where solar farms are being located and concludes that they are being located primarily in low density residential areas where there are fewer homes than in urban or suburban areas.

The second part is more applicable in that they conducted a survey of appraisers/assessors on their opinions of the possible impacts of proximity to a solar farm. They consider the question in terms of size of the adjoining solar farm and how close the adjoining home is to the solar farm. I am very familiar with this part of the study as I was interviewed by the researchers multiple times as they were developing this. One very important question that they ask within the survey is very illustrative. They asked if the appraiser being surveyed had ever appraised a property next to a solar farm. There is a very noticeable divide in the answers provided by appraisers who have experience appraising property next to a solar farm versus appraisers who self-identify as having no experience or knowledge related to that use.

On Page 16 of that study they have a chart showing the responses from appraisers related to proximity to a facility and size of the facility, but they separate the answers as shown below with appraisers with experience in appraising properties next to a solar farm shown in blue and those inexperienced shown in brown. Even within 100 feet of a 102 MW facility the response from experienced appraisers were -5% at most on impact. While inexperienced appraisers came up with significantly higher impacts. This chart clearly shows that an uninformed response widely diverges from the sales data available on this subject.



Furthermore, the question cited above does not consider any mitigating factors such as landscaping buffers or screens which would presumably reduce the minor impacts noted by experienced appraisers on this subject.

The conclusion of the researchers is shown on Page 23 indicated that "Results from our survey of residential home assessors show that the majority of respondents believe that proximity to a solar installation has either no impact or a positive impact on home values."

This analysis supports the conclusion of this report that the data supports no impact on adjoining property values. The only impact suggested by this study is -5% if a home was within 100 feet of a 100 MW solar farm with little to no landscaping screening. The proposed project has a landscaping screening, is much further setback than 100 feet from adjoining homes, and is less than 100 MW.

B. University of Rhode Island, September 2020

Property Value Impacts of Commercial-Scale Solar Energy in Massachusetts and Rhode Island

The University of Rhode Island published a study entitled **Property Value Impacts of Commercial-Scale Solar Energy in Massachusetts and Rhode Island** on September 29, 2020 with lead researchers being Vasundhara Gaur and Corey Lang. I have read that study and interviewed Mr. Corey Lang related to that study. This study is often cited by opponents of solar farms but the findings of that study have some very specific caveats according to the report itself as well as Mr. Lang from the interview.

While that study does state in the Abstract that they found depreciation of homes within 1-mile of a solar farm, that impact is limited to non-rural locations. On Pages 16-18 of that study under Section 5.3 Heterogeneity in treatment effect they indicate that the impact that they found was limited to non-rural locations with the impact in rural locations effectively being zero. For the study they defined "rural" as a municipality/township with less than 850 population per square mile.

They further tested the robustness of that finding and even in areas up to 2,000 population per square mile they found no statistically significant data to suggest a negative impact. They have not specifically defined a point at which they found negative impacts to begin, as the sensitivity study stopped checking at the 2,000-population per square mile.

Where they did find negative impacts was in high population density areas that was largely a factor of running the study in Massachusetts and Rhode Island which the study specifically cites as being the 2nd and 3rd most population dense states in the USA. Mr. Lang in conversation as well as in recorded presentations has indicated that the impact in these heavily populated areas may reflect a loss in value due to the scarce greenery in those areas and not specifically related to the solar farm itself. In other words, any development of that site might have a similar impact on property value.

Based on this study I have checked the population for the Rocky Hill Division of Barren County, which has a population of 3,571 population for 2022 based on HomeTownLocator using Census Data and a total area of 64.93 square miles. This indicates a population density of 55 people per square mile which puts this well below the threshold indicated by the Rhode Island Study.

I therefore conclude that the Rhode Island Study supports the indication of no impact on adjoining properties for the proposed solar farm project.

Rocky Hill Division Data & Demographics (As of July 1, 2022)

POPULATION	
Total Population	3,571 (100%)
Population in Households	3,571 (100.0%)
Population in Families	3,033 (84.9%)
Population in Group Quarters[1]	0
Population Density	55
Diversity Index[2]	18

HOUSING	
Total HU (Housing Units)	1,592 (100%)
Owner Occupied HU	1,080 (67.8%)
Renter Occupied HU	281 (17.7%)
Vacant Housing Units	231 (14.5%)
Median Home Value	$165,546
Average Home Value	$195,718
Housing Affordability Index[3]	154

INCOME	
Median Household Income	$54,230
Average Household Income	$69,396
% of Income for Mortgage[4]	16%
Per Capita Income	$26,448
Wealth Index[5]	53

HOUSEHOLDS	
Total Households	1,361
Average Household Size	2.62
Family Households	992
Average Family Size	3

C. Georgia Institute of Technology, October 2020

Utility-Scale Solar Farms and Agricultural Land Values

This study was completed by Nino Abashidze as Post-Doctoral Research Associate of Health Economics and Analytics Labe (HEAL), School of Economics, Georgia Institute of Technology. This research was started at North Carolina State University and analyzes properties near 451 utility-scale ground-mount solar installations in NC that generate at least 1 MW of electric power. A total of 1,676 land sales within 5-miles of solar farms were considered in the analysis.

This analysis concludes on Page 21 of the study "Although there are no direct effects of solar farms on nearby agricultural land values, we do find evidence that suggests construction of a solar farm may create a small, positive, option -value for land owners that is capitalized into land prices. Specifically, after construction of a nearby solar farm, we find that agricultural land that is also located near transmission infrastructure may increase modestly in value."

This study supports a finding of no impact on adjoining agricultural property values and in some cases could support a modest increase in value.

D. Master's Thesis: ECU by Zachary Dickerson July 2018

A Solar Farm in *My* Backyard? Resident Perspectives of Utility-Scale Solar in Eastern North Carolina

This study was completed as part of a Master of Science in Geography Master's Thesis by Zachary Dickerson in July 2018. This study sets out to address three questions:

1. Are there different aspects that affect resident satisfaction regarding solar farms?

2. Are there variations in satisfaction for residents among different geographic settings, e.g. neighborhoods adjacent to the solar farms or distances from the solar farms?

3. How can insight from both the utility and planning sectors, combined with knowledge gained from residents, fill gaps in communication and policy writing in regard to solar farms?

This was done through survey and interview with adjacent and nearby neighbors of existing solar farms. The positive to neutral comments regarding the solar farms were significantly higher than negative. The researcher specifically indicates on Page 46 "The results show that respondents generally do not believe the solar farms pose a threat to their property values."

The most negative comments regarding the solar farms were about the lack of information about the approval process and the solar farm project prior to construction.

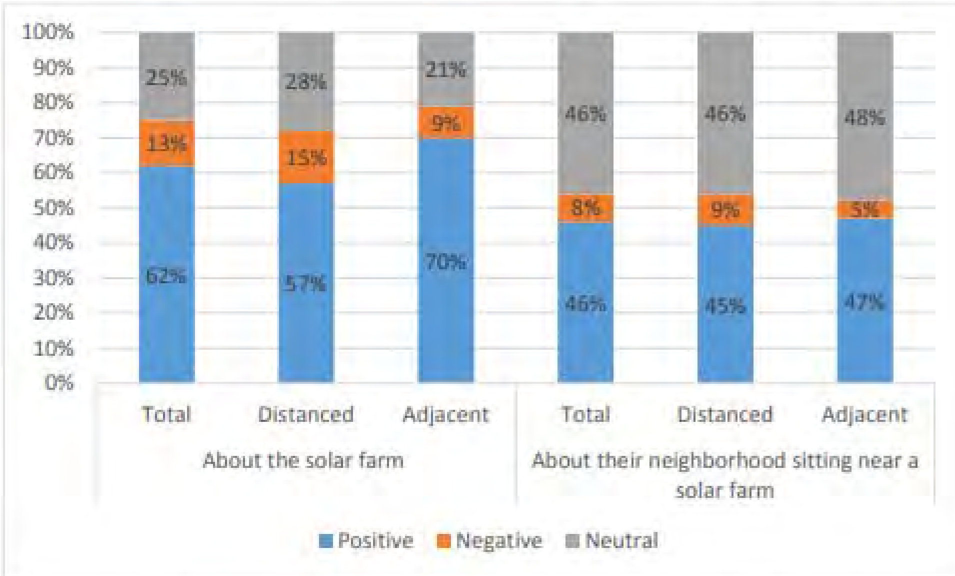
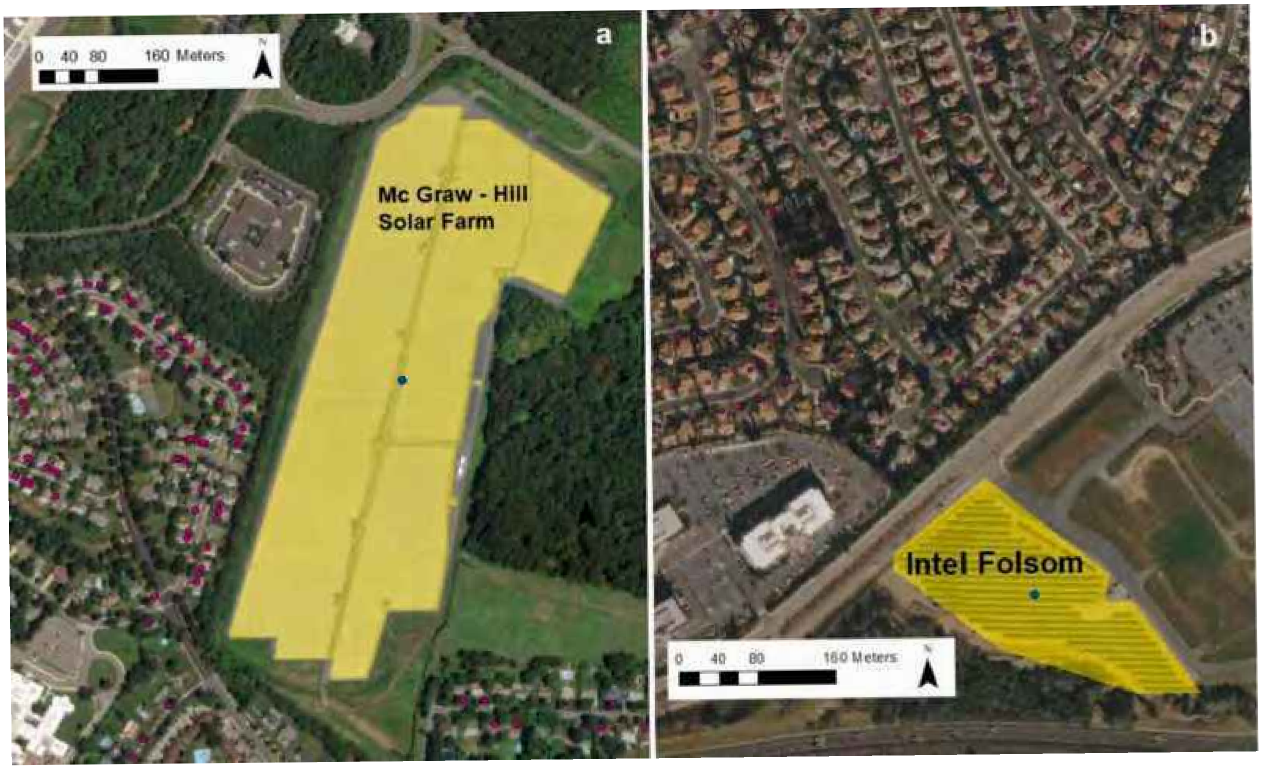


Figure 11: Residents' positive/negative word choices by geographic setting for both questions

E. Lawrence Berkeley National Lab, March 2023

Shedding light on large-scale solar impacts: An analysis of property values and proximity to photovoltaics across six U.S. states

This study was completed by researchers including Salma Elmallah, Ben Hoen, K. Sydny Fujita, Dana Robson, and Eric Brunner. This analysis considers home sales before and after solar farms were installed within a 1 mile radius and compared them to home sales before and after the solar farms at a 2-4 mile radius. The conclusion found a 1.5% impact within 1 mile of a solar farm as compared to homes 2-4 miles from solar farms. This is the largest study of this kind on solar and addresses a number of issues, but also does not address a number of items that could potentially skew these results. First of all, the study found no impact in the three states with the most solar farm activity and only found impacts in smaller sets of data. The data does not in any way discuss actual visibility of solar farms or address existing vegetation screens. This lack of addressing this is highlighted by the fact that they suggest in the abstract that vegetative shading may be needed to address possible impacts. Another notable issue is the fact that they do not address other possible impacts within the radii being considered. This lack of consideration is well illustrated within the study on Figure A.1 where they show satellite images of McGraw Hill Solar Farm in NJ and Intel Folsom in CA. The Folsom image clearly shows large highways separating the solar farm from nearby housing, but with tower office buildings located closer to the housing being considered. In no place do they address the presence of these towers that essentially block those homes from the solar farm in some places. An excerpt of Fig. A.1. is shown below.



For each of these locations, I have panned out a little further on Google Earth to show the areas illustrated to more accurately reflect the general area. For the McGraw Hill Solar Farm you can see there is a large distribution warehouse to the west along with a large offices and other industrial uses. Further to the west is a large/older apartment complex (Princeton Arms). To the east there are more large industrial buildings. However, it is even more notable that 1.67 miles away to the west is Cranbury Golf Club. Given how this analysis was set up, these homes around the industrial buildings are being compared to homes within this country club to help establish impacts from the solar farm. Even considering the idea that each set is compared to itself before and after the solar farm, it is not a reasonable supposition that homes in each area would appreciate at the same rates even if no solar farm was included. Furthermore the site where the solar farm is located an all of the surrounding uses not improved with residential housing to the south is zoned Research Office (RO) which allows for: manufacturing, preparation, processing or fabrication of products, with all activities and product storage taking place within a completely enclosed building, scientific or research laboratories, warehousing, computer centers, pharmaceutical operations, office buildings, industrial office parks among others. Homes adjoining such a district would likely have impacts and influences not seen in areas zoned and surrounded by zoning strictly for residential uses.

Windsor Corporate Park
Healthy Kids Pediatric Group
East Windsor Township
Muslim Center of Greater Princeton
PenFed Credit Union
133
Windsor Center Dr
EAG Laboratories
Krauszer's Food Store
Oak Creek Estates Association
Princeton Arms
Devonshire Dr
Yorkshire Dr
Kent Ln
Pebble Rd
Oak Creek Rd
Arias Constructions NJ
Melvin H. Kreps Middle School
Wilmor Dr
Scott Rd
Dutch Neck Dental
Windsor Derma
Princeton Hightstown Rd
571
The Orchards
1 Mile Rd Ext
Wickham Ln
Wiltshire Dr
Heathwood Dr
Cherry Brook Ln
Dutch Neck Rd
Wiltshire Park
Beth El Synagogue
Tarr Ct


COVENTRY AT NATOMA STATION
Center
Natoma Station Elementary School
Waterford Place
NATOMA STATION
Deer Rabbit Mini Park
Iron Point Rd
Elite Scholars
Redfin | Sacramento Real Estate Agents
R RUN
Iron Point Rd
El Dorado Fwy
50
Alder Creek
Safeway
Prairie City Rd
Iron Point Rd
Intel Corporation
Intel - FM7
Intel - FM6
El Dorad

On the Intel Folsom map I have shown the images of two of the Intel Campus buildings, but there are roughly 8 such buildings on that site with additional solar panels installed in the parking lot as shown in that image. I included two photos that show the nearby housing having clear and close views of adjoining office parking lots. This illustrates that the homes in that 1 mile radius are significantly more impacted by the adjoining office buildings than a solar farm located distantly that are not within the viewshed of those homes. Also, this solar farm is located on land adjoining the Intel Campus on a tract that is zoned M-1 PD, which is a Light Industrial/Manufacturing zoning. Nearby homes. Furthermore, the street view at the solar farm shows not only the divided four-lane highway that separates the office buildings and homes from the solar farm, but also shows that there is no landscaping buffer at this location. All of these factors are ignored by this study. Below is another image of the Folsom Solar at the corner of Iron Point Road and Intel West Driveway which shows just how close and how unscreened this project is.

Compare that image from the McGraw Hill street view facing south from County Rte 571. There is a distant view and much of the project is hidden by a mix of berms and landscaping. The analysis makes no distinction between these projects.

The third issue with this study is that it identifies impacts following development in areas where they note that "more adverse home price impacts might be found where LSPVPS (large-scale photovoltaic project) displace green space (consistent with results that show higher property values near green space." The problem with this statement is that it assumes that the greenspace is somehow guaranteed in these areas, when in fact, they could just as readily be developed as a residential subdivision and have the same impacts. They have made no effort to differentiate loss of greenspace through other development purposes such as schools, subdivisions, or other uses versus the impact of solar farms. In other words, they may have simply identified the impact of all forms of development on property value. This would in fact be consistent with the comments in the Rhode Island study where the researchers noted that the loss of greenspace in the highly urban areas was likely due to the loss of greenspace in particular and not due to the addition of solar panels.

Despite these three shortcomings in the analysis – the lack of differentiating landscape screening, the lack of consideration of other uses within the area that could be impacting property values, and the lack of consideration of alternative development impacts – the study still only found impacts between 0 and 5% with a conclusion of 1.5% within a 1-mile radius. As discussed later in this report, real estate is an imperfect market and real estate transactions typically sell for much wider variability than 5% even where there are no external factors operating on property value.

I therefore conclude that the minor impacts noted in this study support a finding of no impact on property value. Most appraisals show a variation between the highest and lowest comparable sale that is substantially greater than 1.5% and this measured impact for all it flaws would just be lost in the static of normal real estate transactions.

VI. Assessor Surveys

While I have not completed a survey of assessors in Kentucky as of yet, I have been reaching out to assessors in other states about their experience and research on solar farm impacts.

I have completed surveys in North Carolina, Virginia, Colorado, New Mexico, and Mississippi. I have so far found no responses from any assessor that they make negative adjustments to adjoining properties. I currently have 39 responses in North Carolina, 16 responses from Virginia, 4 from Mississippi, and 15 from Colorado. Adding in the 5 responses in New Mexico, I have a total of 79 assessor responses and all 79 indicate either no negative impacts on adjoining property values, or else they did not respond to that part of the question. A total of 69 of the responses were definitively "No" with an additional 10 being "No response" to that question.

I have included the breakdown of that data on the following pages.

New Mexico Tax Assessors

County	Number of Farms in Operation	Change in adjacent property value
Colfax	3, 1 in planning	No
Curry	1, quite a few in talks	No
Dona Ana	2 owned by city and county	No
Lincoln	1	No
Union	1	No
	Total Responses With Solar	5
	Total Responses "No"	5
	Total Responses "Yes"	0

NC Assessor Survey on Solar Farm Property Value Impacts

County	Assessor's Name	Number of Farms	Change in Adjacent Property Value
Alexander	Doug Fox	3	No
Buncombe	Lisa Kirbo	1	No
Burke	Daniel Isenhour	3, 2 on 1 parcel, 1 on 3 parcels	No
Cabarrus	Justin	less than 10, more in the works	No
Caldwell	Monty Woods	3 small	No, but will look at data in 2025
Catawba	Lori Ray	14	No
Chatham	Jenny Williams	13	No
Cherokee	Kathy Killian	9	No
Chowan	Melissa Radke	3, I almost operational	No
Clay	Bonnie L. Lyvers		No
Davidson	Libby	1	No
Duplin	Gary Rose	34, 2 more in planning	No
Franklin	Marion Cascone	11	No
Gaston	Traci Hovis	3	No
Gates	Chris Hill	3	No
Granville	Jenny Griffin	8	No
Halifax	C. Shane Lynch	Multiple	No
Hoke	Mandi Davis	4	No
Hyde	Donnie Shumate	1 to supplement egg processing plant	No
Iredell	Wes Long	2, 3 others approved	No
Lee	Lisa Faulkner	8	No
Lincoln	Susan Sain	2	No
Moore	Michael Howery	10	No
New Hanover	Rhonda Garner	35	No
Orange	Chad Phillip	2 or 7 depending on breakdown	No
Pender	Kayla Bolick Futrell	6	No
Person	Russell Jones	9	No
Pitt	Russell D. Hill	8, 1 in planning	No
Randolph	Mark Frick	19	No
Rockingham	Mark C McClintock	6	No
Rutherford	Kim Aldridge	20	No
Sampson	Jim Johnson	9, 1 in construction	No
Scotland	James Brown	15, 1 in process	No
Stokes	Richard Brim	2	No
Surry	Penny Harrison	4, 2 more in process	No
Union	Robin E. Merry	6	No
Vance	Cathy E. Renn	13	No
Warren	John Preston	7	No
Wayne	Alan Lumpkin	32	No
Wilson	William (Witt) Putney	~16	No, mass appraisal standards applied

Responses: 39
Negative Impact on Adjoining Value = Yes: 0
Negative Impact on Adjoining Value = No: 39

VIRGINIA Commissioner of the Revenue

County	Assessor Name	Number of Farms in Operation	Change in adjacent property value
Appomattox	Sara Henderson	1, plus one in process	No
Augusta	W. Jean Shrewsbury	no operational	No
Buckingham	Stephanie D. Love	1	No
Charlotte	Naisha Pridgen Carter	1, several others in the works	No
Clarke	Donna Peake	1	No
Frederick	Seth T. Thatcher	none, 2 appoved for 2022	No, assuming compatible with rural area
Goochland	Mary Ann Davis		No
Hanover	Ed Burnett	1	No
Louisa	Stacey C. Fletcher	2 operational by end of year	No, only if supported by market data
Mecklenburg	Joseph E. "Ed" Taylor		No
Nottoway	Randy Willis with Pearson Assessors		No
Powhatan	Charles Everest	2 approved, 1 built	Likely increase in value
Rockingham	Dan Cullers	no operational	Likely no
Southampton	Amy B. Carr	1	Not normally
Surry	Jonathan F. Judkins	1	None at this time
Westmoreland	William K. Hoover	4	No

Responses: 16
Negative Impact on Adjoining Value = Yes: 0
Negative Impact on Adjoining Value = No: 16

MS Assessor Survey on Solar Farm Property Value Impacts

County	Assessor's Name	Number of Farms	Change in Adjacent Property Value
Desoto	Jeff Fitch	1, 1 in planning	No response
Monroe	Mitzi Presley	2 in planning	No response
Stone	Charles Williams, Jr.	1 in planning	No
Union	Tameri Dunnam	1	No

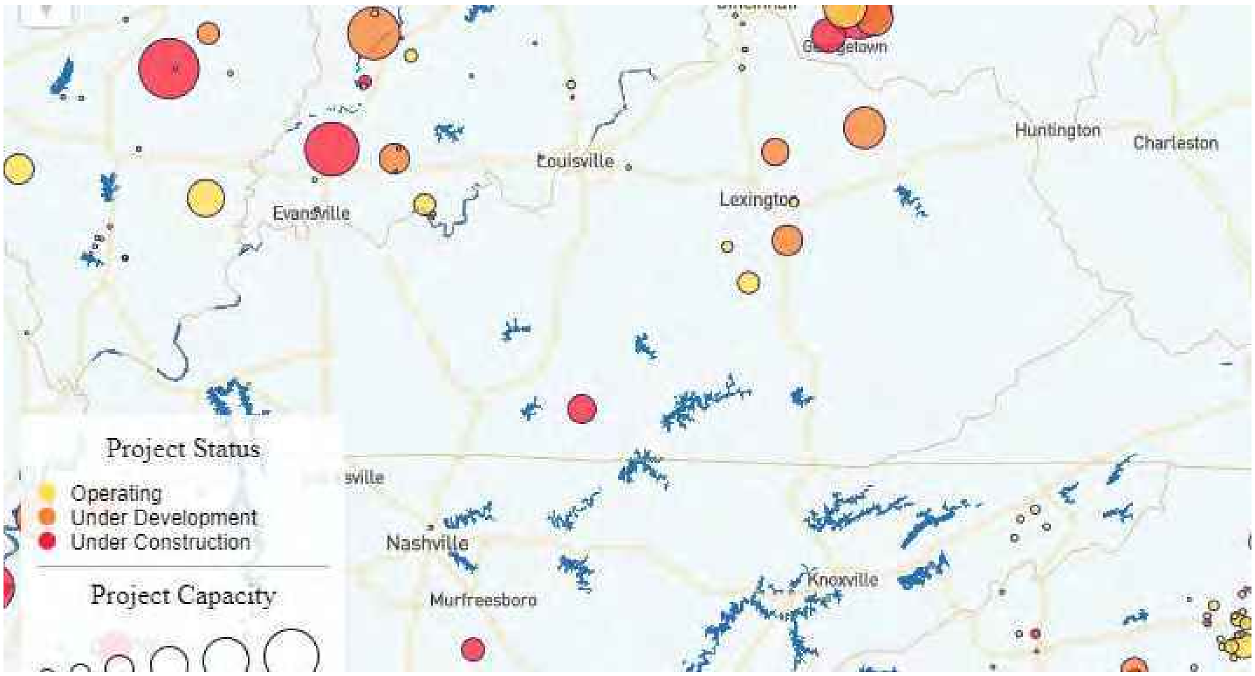
CO Assessor Survey on Solar Farm Property Value Impacts

County	Assessor's Name	Number of Farms	Change in Adjacent Property Value
Conejos	Naomi Keys	3 or 4	No response
Denver	Keith Erffmeyer	3	No
Garfield	Jim Yellico (Vicki Riley)	No response	Classification and value could change
Kiowa	Marci Miller	0, 2 in planning	No
La Plata	Carrie Woodson	0, 1 in planning	No response
Las Animas	Jodi Amato	1 operational, 1 in planning	No
Moffat	Charles "Chuck" Cobb	0, 5 in planning	No
Montezuma	Leslie Bugg	3 approved	No
Montrose	Brad Hughes	2, 1 in planning	Maybe, but would be based on sales data
Morgan	Tim Amen	2, operational, 3 in planning	No
Pitkin	Wendy Schultz	1	No
Rio Blanco	Renae Neilson	2	No response
Saguache	Peter Peterson	1	No
San Miguel	Sarah Enders	1	Not enough data
Yuma	Cindy Taylor	1 in planning	No response

Responses: 15
Negative Impact on Adjoining Value = Yes: 0
Negative Impact on Adjoining Value = No: 7
Negative Impact on Adjoining Value = No Response: 8

VII. **Summary of Solar Projects in Kentucky**

I have researched the solar projects in Kentucky. I identified the solar farms through the Solar Energy Industries Association (SEIA) Major Projects List and then excluded the roof mounted facilities. This leaves only six solar farms in Kentucky for analysis at this time. Below is a map pulled from SEIA on Major Projects and it shows projects under development in orange and under construction in red, with only the smaller yellow dots representing existing solar farms. It was from this map that I have identified the six existing solar farms researched in Kentucky.



One of these six solar farms has limited analysis potential: E.W. Brown near Harrodsburg in Mercer County. The E. W. Brown 10 MW solar farm was built in 2014 and adjoins three coal-fired units. Given that research studies that I have read regarding fossil fuel power plants including "The Effect of Power Plants on Local Housing Values and Rents" by Lucas W. Davis and published May 2010, it would not be appropriate to use any data from this solar farm due to the influence of the coal-fired power plant that could have an impact on up to a one-mile radius. I note that the closest home to a solar panel at this site is 565 feet and the average distance is 1,026 feet. The homes are primarily clustered at the Herrington Lake frontage. Recent sales in this area range from $164,000 to $212,000 for these waterfront homes. Again, no usable data can be derived from this solar farm due to the adjoining coal fired plant.

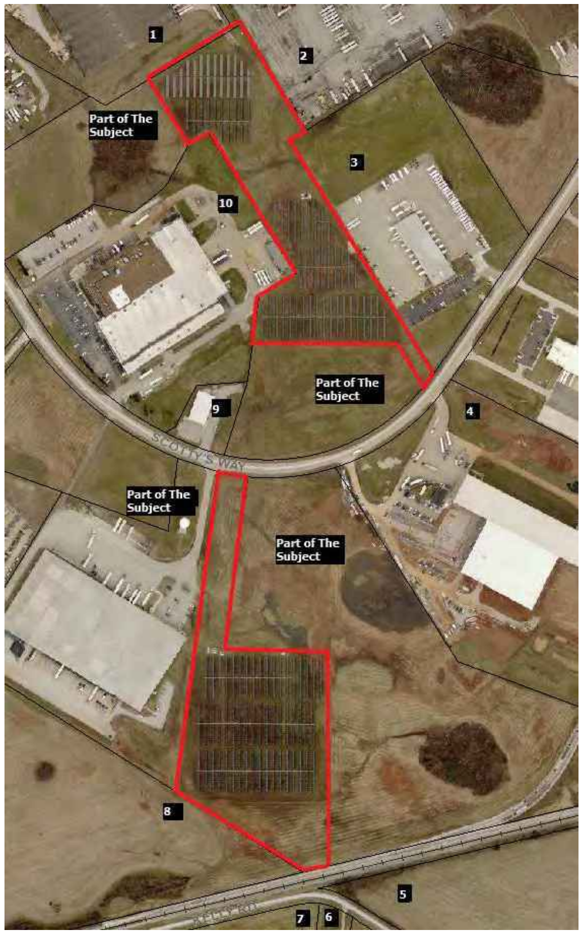
Furthermore, the Cooperative solar farm in Shelby County is a 0.5 MW facility on 35 acres built in 2020 that is proposed to eventually be 4 MW. This project is too new and there have been no home sales adjoining this facility. I also cannot determine how close the nearby homes are to the adjoining solar panels as the aerial imagery does not yet show these panels.

I have provided a summary of projects below and additional detailed information on the projects on the following pages. I specifically note the similarity in most of the sites in Kentucky in terms of mix of adjoining uses, topography, and distances to adjoining homes.

The number of solar farms currently in Kentucky is low compared to a number of other states and North Carolina in particular. I have looked at solar farms in Kentucky for sales activity, but the small number of sites coupled with the relatively short period of time these solar farms have been in place has not provided as many examples of sales adjoining a solar farm as I am able to pull from other places. I have therefore also considered sales in other states, but I have shown in the summary how the demographics around the solar farms in other locations relate to the demographics around the proposed solar farm to show that generally similar locations are being considered. The similarity of the sites in terms of adjoining uses and surrounding demographics makes it reasonable to compare the lack of significant impacts in other areas would translate into a similar lack of significant impacts at the subject site.

						Total	Used	Avg. Dist	Closest	Adjoining Use by Acre					Adjoining Use by Number			
Parcel #	**State**	**County**	**City**	**Name**	**Output (MW)**	**Acres**	**Acres**	**to home**	**Home**	**Res**	**Agri**	**Agri/Res**	**Com**		**Reside**	**Agricul**	**Comm/Ind**	**%**
610	KY	Warren	Bowling Green	Bowling Green	2	17.36	17.36	720	720	1%	64%	0%	36%	100%	10%	30%	60%	100%
611	KY	Clark	Winchester	Cooperative Solar I	8.5	181.47	63	2,110	2,040	0%	96%	3%	0%	100%	22%	78%	0%	100%
612	KY	Kenton	Walton	Walton 2	2	58.03	58.03	891	120	21%	0%	60%	19%	100%	65%	0%	35%	100%
613	KY	Grant	Crittenden	Crittenden	2.7	181.7	34.1	1,035	345	22%	27%	51%	0%	100%	96%	4%	0%	100%
617	KY	Metcalfe	Summer Shade	Glover Creek		968.2	322.4	1,731	375	6%	25%	69%	0%	100%	83%	17%	0%	100%
618	KY	Garrard	Lancaster	Turkey Creek		752.8	297.1	976	240	8%	36%	51%	5%	100%	73%	12%	15%	100%
		Total Number of Solar Farms			6													
				Average	3.80	359.9	132.0	1244	640	9%	41%	39%	10%		58%	24%	18%	
				Median	2.35	181.6	60.5	1006	360	7%	32%	51%	3%		69%	14%	7%	
				High	8.50	968.2	322.4	2110	2040	22%	96%	69%	36%		96%	78%	60%	
				Low	2.00	17.4	17.4	720	120	0%	0%	0%	0%		3%	0%	0%	

610: Bowling Green Solar, Bowling Green, KY



This project was built in 2011 and located on 17.36 acres for a 2 MW project on Scotty's Way with the adjoining uses being primarily industrial. The closest dwelling is 720 feet from the nearest panel.

Adjoining Use Breakdown

	Acreage	Parcels
Residential	0.58%	10.00%
Agricultural	63.89%	30.00%
Industrial	35.53%	60.00%
Total	**100.00%**	**100.00%**

611: Cooperative Solar I, Winchester, KY

This project was built in 2017 on 63 acres of a 181.47-acre parent tract for an 8.5 MW project with the closest home at 2,040 feet from the closest solar panel.

Adjoining Use Breakdown

	Acreage	Parcels
Residential	0.15%	11.11%
Agricultural	96.46%	77.78%
Agri/Res	3.38%	11.11%
Total	**100.00%**	**100.00%**

612: Walton 2 Solar, Walton, KY

This project was built in 2017 on 58.03 acres for a 2 MW project with the closest home 120 feet from the closest panel.

Adjoining Use Breakdown

	Acreage	Parcels
Residential	20.84%	47.06%
Agri/Res	59.92%	17.65%
Commercial	19.25%	35.29%
Total	**100.00%**	**100.00%**

613: Crittenden Solar, Crittenden, KY

This project was built in late 2017 on 34.10 acres out of a 181.70-acre tract for a 2.7 MW project where the closest home is 345 feet from the closest panel.

Adjoining Use Breakdown

	Acreage	Parcels
Residential	1.65%	32.08%
Agricultural	73.39%	39.62%
Agri/Res	23.05%	11.32%
Commercial	0.64%	9.43%
Industrial	0.19%	3.77%
Airport	0.93%	1.89%
Substation	0.15%	1.89%
Total	**100.00%**	**100.00%**

659: Cooperative Shelby Solar, Simpsonville, KY

This project was built in 2020 on 35 acres for a 0.5 MW project that is approved for expansion up to 4 MW.

Adjoining Use Breakdown

	Acreage	Parcels
Residential	6.04%	44.44%
Agricultural	10.64%	11.11%
Agri/Res	31.69%	33.33%
Institutional	51.62%	11.11%
Total	**100.00%**	**100.00%**

660: E.W. Brown Solar, Harrodsburg, KY

This project was built in 2016 on 50 acres for a 10 MW project. This solar facility adjoins three coal-fired units, which makes analysis of these nearby home sales problematic as it is impossible to extract the impact of the coal plant on the nearby homes especially given the lake frontage of the homes shown.

Adjoining Use Breakdown

	Acreage	Parcels
Residential	2.77%	77.27%
Agricultural	43.92%	9.09%
Agri/Res	28.56%	9.09%
Industrial	24.75%	4.55%
Total	**100.00%**	**100.00%**

VIII. Market Analysis of the Impact on Value from Solar Farms

I have researched hundreds of solar farms in numerous states to determine the impact of these facilities on the value of adjoining properties. This research has primarily been in North Carolina, but I have also conducted market impact analyses in Virginia, South Carolina, Tennessee, Texas, Oregon, Mississippi, Maryland, New York, California, Missouri, Florida, Montana, Georgia, Kentucky, and New Jersey.

I have derived a breakdown of the adjoining uses to show where solar farms are located. A summary showing the results of compiling that data over hundreds of solar farms is shown later in the Scope of Research section of this report.

I also consider whether the properties adjoining a solar farm in one location have characteristics similar to the properties abutting or adjoining the proposed site so that I can make an assessment of market impact on each proposed site. Notably, in most cases solar farms are placed in areas very similar to the site in question, which is surrounded by low density residential and agricultural uses. In my over 700 studies, I have found a striking repetition of that same typical adjoining property use mix in over 90% of the solar farms I have looked at. Matched pair results in multiple states are strikingly similar, and all indicate that solar farms – which generate very little traffic, and do not generate noise, dust or have other harmful effects – do not negatively impact the value of adjoining or abutting properties.

I have previously been asked by the Kentucky Siting Board about how the solar farms and the matched pair sets were chosen. This is the total of all the usable home sales adjoining the 900+ solar farms that I have looked at over the last 12 years. Most of the solar farms that I have looked at are only a few years old and have not been in place long enough for home or land sales to occur next to them for me to analyze. There is nothing unusual about this given the relatively rural locations of most of the solar farms where home and land sales occur much less frequently than they do in urban and suburban areas and the number of adjoining homes is relatively small.

I review the solar farms that I have looked at periodically to see if there are any new sales. If there is a sale I have to be sure it is not an inhouse sale or to a related family member. A great many of the rural sales that I find are from one family member to another, which makes analysis impossible given that these are not "arm's length" transactions. There are also numerous examples of sales that are "arm's length" but are still not usable due to other factors such as adjoining significant negative factors such as a coal fired plant or at a landfill or prison. I have looked at homes that require a driveway crossing a railroad spur, homes in close proximity to large industrial uses, as well as homes adjoining large state parks, or homes that are over 100 years old with multiple renovations. Such sales are not usable as they have multiple factors impacting the value that are tangled together. You can't isolate the impact of the coal fired plant, the industrial building, or the railroad unless you are comparing that sale to a similar property with similar impacts. Matched pair analysis requires that you isolate properties that only have one differential to test for, which is why the type of sales noted above is not appropriate for analysis.

After my review of all sales and elimination of the family transactions and those sales with multiple differentials, I am left with the matched pairs shown in this report to analyze. I do have additional matched pair data in other areas of the United States that were not included in this report due to being states less comparable to Kentucky than those shown. The only other sales that I have eliminated from the analysis are home sales under $100,000, which there haven't been many such examples, but at that price range it is difficult to identify any impacts through matched pair analysis. I have not cherry picked the data to include just the sales that support one direction in value, but I have included all of them both positive and negative with a preponderance of the evidence supporting no impact to mild positive impacts.

A. Kentucky and Adjoining States Data

<u>1. Matched Pair – Crittenden Solar, Crittenden, Grant County, KY</u>

This solar farm was built in December 2017 on a 181.70-acre tract but utilizing only 34.10 acres. This is a 2.7 MW facility with residential subdivisions to the north and south.

I have identified five home sales to the north of this solar farm on Clairborne Drive and one home sale to the south on Eagle Ridge Drive since the completion of this solar farm. The home sale on Eagle Drive is for a $75,000 home and all of the homes along that street are similar in size and price range. According to local broker Steve Glacken with Cutler Real Estate these are the lowest price range/style home in the market. I have not analyzed that sale as it would unlikely provide significant data to other homes in the area.

Mr. Glacken has been selling lots at the west end of Clairborne for new home construction. He indicated in 2020 that the solar farm near the entrance of the development has been a complete non-factor and none of the home sales are showing any concern over the solar farm. Most of the homes are in the $250,000 to $280,000 price range. The vacant residential lots are being marketed for $28,000 to $29,000. The landscaping buffer is considered light, but the rolling terrain allows for distant views of the panels from the adjoining homes along Clairborne Drive.

The first home considered is a bit of an anomaly for this subdivision in that it is the only manufactured home that was allowed in the community. It sold on January 3, 2019. I compared that sale to three other manufactured home sales in the area making minor adjustments as shown on the next page to account for the differences. After all other factors are considered the adjustments show a -1% to +13% impact due to the adjacency of the solar farm. The best indicator is 1250 Cason, which shows a 3% impact. A 3% impact is within the normal static of real estate transactions and therefore not considered indicative of a positive impact on the property, but it strongly supports an indication of no negative impact.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
	Adjoins	250 Claiborne	0.96	1/3/2019	$120,000	2000	2,016	$59.52	3/2	Drive	Manuf	
	Not	1250 Cason	1.40	4/18/2018	$95,000	1994	1,500	$63.33	3/2	2-Det	Manuf	Carport
	Not	410 Reeves	1.02	11/27/2018	$80,000	2000	1,456	$54.95	3/2	Drive	Manuf	
	Not	315 N Fork	1.09	5/4/2019	$107,000	1992	1,792	$59.71	3/2	Drive	Manuf	

Adjustments

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	250 Claiborne								$120,000			373
Not	1250 Cason	$2,081		$2,850	$26,144		-$5,000	-$5,000	$116,075	3%		
Not	410 Reeves	$249		$0	$24,615				$104,865	13%		
Not	315 N Fork	-$1,091		$4,280	$10,700				$120,889	-1%		
											5%	

I also looked at three other home sales on this street as shown below. These are stick-built homes and show a higher price range.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
	Adjoins	300 Claiborne	1.08	9/20/2018	$212,720	2003	1,568	$135.66	3/3	2-Car	Ranch	Brick
	Not	460 Claiborne	0.31	1/3/2019	$229,000	2007	1,446	$158.37	3/2	2-Car	Ranch	Brick
	Not	2160 Sherman	1.46	6/1/2019	$265,000	2005	1,735	$152.74	3/3	2-Car	Ranch	Brick
	Not	215 Lexington	1.00	7/27/2018	$231,200	2000	1,590	$145.41	5/4	2-Car	Ranch	Brick

Adjustments

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	300 Claiborne								$213,000			488
Not	460 Claiborne	-$2,026		-$4,580	$15,457	$5,000			$242,850	-14%		
Not	2160 Sherman	-$5,672		-$2,650	-$20,406				$236,272	-11%		
Not	215 Lexington	$1,072		$3,468	-$2,559	-$5,000			$228,180	-7%		
											-11%	

This set of matched pairs shows a minor negative impact for this property. I was unable to confirm the sales price or conditions of this sale. The best indication of value is based on 215 Lexington, which required the least adjusting and supports a -7% impact.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
	Adjoins	350 Claiborne	1.00	7/20/2018	$245,000	2002	1,688	$145.14	3/3	2-Car	Ranch	Brick
	Not	460 Claiborne	0.31	1/3/2019	$229,000	2007	1,446	$158.37	3/2	2-Car	Ranch	Brick
	Not	2160 Sherman	1.46	6/1/2019	$265,000	2005	1,735	$152.74	3/3	2-Car	R/FBsmt	Brick
	Not	215 Lexington	1.00	7/27/2018	$231,200	2000	1,590	$145.41	5/4	2-Car	Ranch	Brick

Adjustments

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	350 Claiborne								$245,000			720
Not	460 Claiborne	-$3,223		-$5,725	$30,660	$5,000			$255,712	-4%		
Not	2160 Sherman	-$7,057		-$3,975	-$5,743				$248,225	-1%		
Not	215 Lexington	-$136		$2,312	$11,400	-$5,000			$239,776	2%		
											-1%	

The following photograph shows the light landscaping buffer and the distant view of panels that was included as part of the marketing package for this property. The panels are visible somewhat on the left and somewhat through the trees in the center of the photograph. The first photograph is from the home, with the second photograph showing the view near the rear of the lot.

This set of matched pairs shows a no negative impact for this property. The range of adjusted impacts is -4% to +2%. The best indication is -1%, which as described above is within the typical market static and supports no impact on adjoining property value.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
	Adjoins	370 Claiborne	1.06	8/22/2019	$273,000	2005	1,570	$173.89	4/3	2-Car	2-Story	Brick
	Not	2160 Sherman	1.46	6/1/2019	$265,000	2005	1,735	$152.74	3/3	2-Car	R/FBsmt	Brick
	Not	2290 Dry	1.53	5/2/2019	$239,400	1988	1,400	$171.00	3/2.5	2-Car	R/FBsmt	Brick
	Not	125 Lexington	1.20	4/17/2018	$240,000	2001	1,569	$152.96	3/3	2-Car	Split	Brick

Adjustments

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	370 Claiborne								$273,000			930
Not	2160 Sherman	$1,831		$0	-$20,161				$246,670	10%		
Not	2290 Dry	$2,260		$20,349	$23,256	$2,500			$287,765	-5%		
Not	125 Lexington	$9,951		$4,800					$254,751	7%		
											4%	

This set of matched pairs shows a general positive impact for this property. The range of adjusted impacts is -5% to +10%. The best indication is +7%. I typically consider measurements of +/-5% to be within the typical variation in real estate transactions. This indication is higher than that and suggests a positive relationship.

The photograph from the listing shows panels visible between the home and the trampoline shown in the picture.

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	330 Claiborne	1.00	12/10/2019	$282,500	2003	1,768	$159.79	3/3	2-Car	Ranch	Brick/pool
Not	895 Osborne	1.70	9/16/2019	$249,900	2002	1,705	$146.57	3/2	2-Car	Ranch	Brick/pool
Not	2160 Sherman	1.46	6/1/2019	$265,000	2005	1,735	$152.74	3/3	2-Car	R/FBsmt	Brick
Not	215 Lexington	1.00	7/27/2018	$231,200	2000	1,590	$145.41	5/4	2-Car	Ranch	Brick

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	330 Claiborne								$282,500			665
Not	895 Osborne	$1,790		$1,250	$7,387	$5,000		$0	$265,327	6%		
Not	2160 Sherman	$4,288		-$2,650	$4,032			$20,000	$290,670	-3%		
Not	215 Lexington	$9,761		$3,468	$20,706	-$5,000		$20,000	$280,135	1%		
											1%	

This set of matched pairs shows a general positive impact for this property. The range of adjusted impacts is -3% to +6%. The best indication is +6%. I typically consider measurements of +/-5% to be within the typical variation in real estate transactions. This indication is higher than that and suggests a positive relationship. The landscaping buffer on these is considered light with a fair visibility of the panels from most of these comparables and only thin landscaping buffers separating the homes from the solar panels.

I also looked at four sales that were during a rapid increase in home values around 2021, which required significant time adjustments based on the FHFA Housing Price Index. Sales in this time frame are less reliable for impact considerations as the peak buyer demand allowed for homes to sell with less worry over typical issues such as repairs.

The home at 250 Claiborne Drive sold with no impact from the solar farm according to the buyer's broker Lisa Ann Lay with Keller Williams Realty Service. As noted earlier, this is the only manufactured home in the community and is a bit of an anomaly. There was an impact on this sale due to an appraisal that came in low likely related to the manufactured nature of the home. Ms. Lay indicated that there was significant back and forth between both brokers and the appraiser to address the low appraisal, but ultimately, the buyers had to pay $20,000 out of pocket to cover the difference in appraised value and the purchase price. The low appraisal was not attributed to the solar farm, but the difficulty in finding comparable sales and likely the manufactured housing.

Adjoining Residential Sales After Solar Farm Built

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	250 Claiborne	1.05	1/5/2022	$210,000	2002	1,592	$131.91	4/2	Drive	Ranch	Manuf
Not	255 Spillman	0.64	3/4/2022	$166,000	1991	1,196	$138.80	3/1	Drive	Ranch	Remodel
Not	546 Waterworks	0.28	4/29/2021	$179,500	2007	1,046	$171.61	4/2	Drive	Ranch	3/4 Fin B
Not	240 Shawnee	1.18	6/7/2021	$180,000	1977	1,352	$133.14	3/2	Gar	Ranch	N/A

Solar	Address	Time	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	250 Claiborne							$210,000			365
Not	255 Spillman	-$379	$9,130	$43,971	$10,000		-$20,000	$208,722	1%		
Not	546 Waterworks	$1,772	-$4,488	$74,958			-$67,313	$184,429	12%		
Not	240 Shawnee	$1,501	$22,500	$25,562		-$10,000		$219,563	-5%		
										3%	

The photograph of the rear view from the listing is shown below.

The home at 260 Claiborne Drive sold with no impact from the solar farm according to the buyer's broker Jim Dalton with Ashcraft Real Estate Services. He noted that there was significant wood rot and a heavy smoker smell about the house, but even that had no impact on the price due to high demand in the market.

Adjoining Residential Sales After Solar Farm Built

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	260 Claiborne	1.00	10/13/2021	$175,000	2001	1,456	$120.19	3/2	Drive	Ranch	N/A
Not	355 Oakwood	0.58	10/27/2020	$186,000	2002	1,088	$170.96	3/2	Gar	Ranch	3/4 Fin B
Not	30 Ellen Kay	0.50	1/30/2020	$183,000	1988	1,950	$93.85	3/2	Gar	2-Story	N/A
Not	546 Waterworks	0.28	4/29/2021	$179,500	2007	1,046	$171.61	4/2	Drive	Ranch	3/4 Fin B

Solar	Address	Time	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	260 Claiborne							$175,000			390
Not	355 Oakwood	$18,339	-$930	$50,329		-$10,000	-$69,750	$173,988	1%		
Not	30 Ellen Kay	$31,974	$11,895	-$37,088		-$10,000		$179,781	-3%		
Not	546 Waterworks	$8,420	-$5,385	$56,287			-$67,313	$171,510	2%		
										0%	

The photograph of the rear view from the listing is shown below.

These next two were brick and with unfinished basements which made them easier to compare and therefore more reliable. For 300 Claiborne I considered the sale of a home across the street that did not back up to the solar farm and it adjusted to well below the range of the other comparables. I have included it, but would not rely on that which means this next comparable strongly supports a range of 0 to +3% and not up to +19%.

djoining Residential Sales After Solar Farm Built

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	300 Claiborne	0.89	12/18/2021	$290,000	2002	1,568	$184.95	3/3	2-Car	Br Rnch	Bsmt
Not	405 Claiborne	0.41	2/1/2022	$267,750	2004	1,787	$149.83	3/2	2-Car	Br Rnch	Bsmt
Not	39 Pinhook	0.68	3/31/2022	$299,000	1992	1,680	$177.98	3/2	2-Car	Br Rnch	Bsmt
Not	5 Pinhook	0.70	4/7/2022	$309,900	1992	1,680	$184.46	3/2	2-Car	Br Rnch	Bsmt

Solar	Address	Time	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	300 Claiborne							$290,000			570
Not	405 Claiborne	-$3,384	-$2,678	-$26,251				$235,437	19%		
Not	39 Pinhook	-$8,651	$14,950	-$15,947				$289,352	0%		
Not	5 Pinhook	-$9,576	$15,495	-$16,528				$299,291	-3%		
										5%	

The photograph of the rear view from the listing is shown below.

The home at 410 Claiborne included an inground pool with significant landscaping around it that was a challenge. Furthermore, two of the comparables had finished basements. I made no adjustment for the pool on those two comparables and considered the two factors to cancel out

Adjoining Residential Sales After Solar Farm Built

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	410 Claiborne	0.31	2/10/2021	$275,000	2006	1,595	$172.41	3/2	2-Car	Br Rnch	Bsmt/Pool
Not	114 Austin	1.40	12/23/2020	$248,000	1994	1,650	$150.30	3/2	2-Car	Br Rnch	Bsmt
Not	125 Liza	0.29	6/25/2021	$315,000	2005	1,913	$164.66	4/3	2-Car	Br Rnch	Ktchn Bsmt
Not	130 Hannahs	0.42	2/9/2021	$295,000	2007	1,918	$153.81	3/3	2-Car	Br Rnch	Fin Bsmt

Solar	Address	Time	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	410 Claiborne							$275,000			1080
Not	114 Austin	$3,413	$14,880	-$6,613			$20,000	$279,680	-2%		
Not	125 Liza	-$11,945	$1,575	-$41,890	-$10,000			$252,740	8%		
Not	130 Hannahs	$83	-$1,475	-$39,743	-$10,000			$243,864	11%		
										6%	

The nine matched pairs considered in this analysis includes five that show no impact on value, one that shows a negative impact on value, and three that show a positive impact. The negative indication supported by one matched pair is -7% and the positive impacts are +6% and +7%. The two neutral indications show impacts of -5% to +5%. The average indicated impact is +2% when all nine of these indicators are blended.

Furthermore, the comments of the local real estate brokers strongly support the data that shows no negative impact on value due to the proximity to the solar farm.

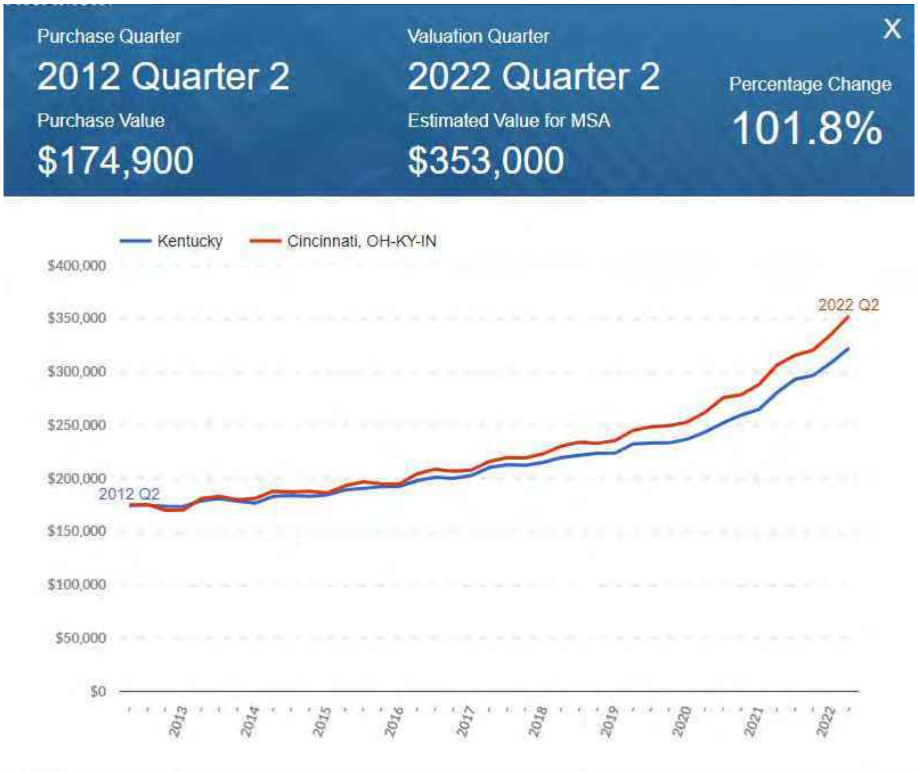
2. Matched Pair – Walton 2, Walton, Kenton County, KY

This project was built in 2017 on 58.03 acres for a 2 MW project with the closest home 120 feet from the closest panel.

The home located on Parcel 1 (783 Jones Road, Walton, KY) in the map above sold on May 4, 2022 for $346,000. This home is 410 feet from the nearest solar panel. I have considered a Sale/Resale analysis of this home as it previously sold on May 7, 2012 for $174,900. This analysis compares that 2012 purchase price and uses the FHFA House Price Index Calculator to identify what real estate values in the area have been appreciating at to determine where it was expected to appreciate to. I have then compared that to the actual sales price to determine if there is any impact attributable to the addition of the solar farm.

As can be seen on the calculator form, the expected value for $174,900 home sold in 2nd quarter 2012 would be $353,000 for 2nd quarter 2022. This is within 2% of the actual sales price and supports a finding of no impact on property value.

I have not attempted a paired sales analysis with other sales, as this property also has the nearby recycling and car lot that would be a potential factor in comparing to other sales. But based on aerial imagery, these same car lots were present in 2012 and therefore has no additional impact when comparing this home sale to itself.


Purchase Quarter
2012 Quarter 2
Purchase Value
$174,900
Valuation Quarter
2022 Quarter 2
Estimated Value for MSA
$353,000
Percentage Change
101.8%
X
Kentucky
Cincinnati, OH-KY-IN
$400,000
$350,000
$300,000
$250,000
$200,000
$150,000
$100,000
$50,000
$0
2012 Q2
2022 Q2
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022

3. Matched Pair – Mulberry, Selmer, McNairy County, TN

This 16 MW solar farm was built in 2014 on 208.89 acres with the closest home being 480 feet.

This solar farm adjoins two subdivisions with Central Hills having a mix of existing and new construction homes. Lots in this development have been marketed for $15,000 each with discounts offered for multiple lots being used for a single home site. I spoke with the agent with Rhonda Wheeler and Becky Hearnsberger with United County Farm & Home Realty who noted that they have seen no impact on lot or home sales due to the solar farm in this community.

I have included a map below as well as data on recent sales activity on lots that adjoin the solar farm or are near the solar farm in this subdivision both before and after the announced plan for this solar farm facility. I note that using the same method I used to breakdown the adjoining uses at the subject property I show that the predominant adjoining uses are residential and agricultural, which is consistent with the location of most solar farms.

Adjoining Use Breakdown

	Acreage	Parcels
Commercial	3.40%	0.034
Residential	12.84%	79.31%
Agri/Res	10.39%	3.45%
Agricultural	73.37%	13.79%
Total	**100.00%**	**100.00%**

I have run a number of direct matched comparisons on the sales adjoining this solar farm as shown below. These direct matched pairs include some of those shown above as well as additional more recent sales in this community. In each of these I have compared the one sale adjoining the solar farm to multiple similar homes nearby that do not adjoin a solar farm to look for any potential impact from the solar farm.

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
3	Adjoins	491 Dusty	6.86	10/28/2016	$176,000	2009	1,801	$97.72	3/2	2-Gar	Ranch	
	Not	820 Lake Trail	1.00	6/8/2018	$168,000	2013	1,869	$89.89	4/2	2-Gar	Ranch	
	Not	262 Country	1.00	1/17/2018	$145,000	2000	1,860	$77.96	3/2	2-Gar	Ranch	
	Not	35 April	1.15	8/16/2016	$185,000	2016	1,980	$93.43	3/2	2-Gar	Ranch	

Adjoining Sales Adjusted

Parcel	Solar	Address	Time	Site	YB	GLA	Park	Other	Total	% Diff	Distance
3	Adjoins	491 Dusty							$176,000		480
	Not	820 Lake Trail	-$8,324	$12,000	-$3,360	-$4,890			$163,426	7%	
	Not	262 Country	-$5,450	$12,000	$6,525	-$3,680			$154,396	12%	
	Not	35 April	$1,138	$12,000	-$6,475	-$13,380			$178,283	-1%	
									Average	6%	

The best matched pair is 35 April Loop, which required the least adjustment and indicates a -1% increase in value due to the solar farm adjacency.

Adjoining Residential Sales After Solar Farm Built

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
12	Adjoins	57 Cooper	1.20	2/26/2019	$163,000	2011	1,586	$102.77	3/2	2-Gar	1.5 Story	Pool
	Not	191 Amelia	1.00	8/3/2018	$132,000	2005	1,534	$86.05	3/2	Drive	Ranch	
	Not	75 April	0.85	3/17/2017	$134,000	2012	1,588	$84.38	3/2	2-Crprt	Ranch	
	Not	345 Woodland	1.15	12/29/2016	$131,000	2002	1,410	$92.91	3/2	1-Gar	Ranch	

Adjoining Sales Adjusted

Parcel	Solar	Address	Sales Price	Time	Site	YB	GLA	Park	Other	Total	% Diff	Distance
12	Adjoins	57 Cooper	$163,000							$163,000		685
	Not	191 Amelia	$132,000	$2,303		$3,960	$2,685	$10,000	$5,000	$155,947	4%	
	Not	75 April	$134,000	$8,029	$4,000	-$670	-$135	$5,000	$5,000	$155,224	5%	
	Not	345 Woodland	$131,000	$8,710		$5,895	$9,811		$5,000	$160,416	2%	
										Average	4%	

The best matched pair is 191 Amelia, which was most similar in time frame of sale and indicates a +4% increase in value due to the solar farm adjacency.

Adjoining Residential Sales After Solar Farm Built

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
15	Adjoins	297 Country	1.00	9/30/2016	$150,000	2002	1,596	$93.98	3/2	4-Gar	Ranch	
	Not	185 Dusty	1.85	8/17/2015	$126,040	2009	1,463	$86.15	3/2	2-Gar	Ranch	
	Not	53 Glen	1.13	3/9/2017	$126,000	1999	1,475	$85.42	3/2	2-Gar	Ranch	Brick

Adjoining Sales Adjusted

Parcel	Solar	Address	Sales Price	Time	Site	YB	GLA	Park	Other	Total	% Diff	Distance
15	Adjoins	297 Country	$150,000							$150,000		650
	Not	185 Dusty	$126,040	$4,355		-$4,411	$9,167	$10,000		$145,150	3%	
	Not	53 Glen	$126,000	-$1,699		$1,890	$8,269	$10,000		$144,460	4%	
										Average	3%	

The best matched pair is 53 Glen, which was most similar in time frame of sale and required less adjustment. It indicates a +4% increase in value due to the solar farm adjacency.

The average indicated impact from these three sets of matched pairs is +4%, which suggests a mild positive relationship due to adjacency to the solar farm. The landscaping buffer for this project is mostly natural tree growth that was retained as part of the development but much of the trees separating the panels from homes are actually on the lots for the homes themselves. I therefore consider the landscaping buffer to be thin to moderate for these adjoining homes.

I have also looked at several lot sales in this subdivision as shown below.

These are all lots within the same community and the highest prices paid are for lots one parcel off from the existing solar farm. These prices are fairly inconsistent, though they do suggest about a $3,000 loss in the lots adjoining the solar farm. This is an atypical finding and additional details suggest there is more going on in these sales than the data crunching shows. First of all Parcel 4 was purchased by the owner of the adjoining home and therefore an atypical buyer seeking to expand a lot and the site is not being purchased for home development. Moreover, using the SiteToDoBusiness demographic tools, I found that the 1-mile radius around this development is expecting a total population increase over the next 5 years of 3 people. This lack of growing demand for lots is largely explained in that context. Furthermore, the fact that finished home sales as shown above are showing no sign of a negative impact on property value makes this data unreliable and inconsistent with the data shown in sales to an end user. I therefore place little weight on this outlier data.

Parcel	Solar	Address	Acres	Date Sold	Sales Price	4/18/2019 Adj for Time	$/AC	4/18/2019 Adj for Time
4	Adjoins	Shelter	2.05	10/25/2017	$16,000	$16,728	$7,805	$8,160
10	Adjoins	Carter	1.70	8/2/2018	$14,000	$14,306	$8,235	$8,415
11	Adjoins	Cooper	1.28	9/17/2018	$12,000	$12,215	$9,375	$9,543
	Not	75 Dusty	1.67	4/18/2019	$20,000	$20,000	$11,976	$11,976
	Not	Lake Trl	1.47	11/7/2018	$13,000	$13,177	$8,844	$8,964
	Not	Lake Trl	1.67	4/18/2019	$20,000	$20,000	$11,976	$11,976

	Adjoins	Per Acre	Not Adjoins	Per Acre	% DIF/Lot	% DIF/AC
Average	$14,416	$8,706	$17,726	$10,972	19%	21%
Median	$14,306	$8,415	$20,000	$11,976	28%	30%
High	$16,728	$9,543	$20,000	$11,976	16%	20%
Low	$12,215	$8,160	$13,177	$8,964	7%	9%

4. Matched Pair – Grand Ridge Solar, Streator, LaSalle County, IL

This solar farm has a 20 MW output and is located on a 160-acre tract. The project was built in 2012.

I have considered the recent sale of Parcel 13 shown above, which sold in October 2016 after the solar farm was built. I have compared that sale to a number of nearby residential sales not in proximity to the solar farm as shown below. Parcel 13 is 480 feet from the closest solar panel. The landscaping buffer is considered light.

Adjoining Residential Sales After Solar Farm Completed

#	TAX ID	Acres	Date Sold	Sales Price	Built	GBA	$/GBA
13	34-21-237-000	2	Oct-16	$186,000	1997	2,328	$79.90

Not Adjoining Residential Sales After Solar Farm Completed

#	TAX ID	Acres	Date Sold	Sales Price	Built	GBA	$/GBA
712 Columbus Rd	32-39-134-005	1.26	Jun-16	$166,000	1950	2,100	$79.05
504 N 2782 Rd	18-13-115-000	2.68	Oct-12	$154,000	1980	2,800	$55.00
7720 S Dwight Rd	11-09-300-004	1.14	Nov-16	$191,000	1919	2,772	$68.90
701 N 2050th Rd	26-20-105-000	1.97	Aug-13	$200,000	2000	2,200	$90.91
9955 E 1600th St	04-13-200-007	1.98	May-13	$181,858	1991	2,600	$69.95

TAX ID	Date Sold	Adjustments Time	Total	$/Sf
34-21-237-000	Oct-16		$186,000	$79.90
32-39-134-005	Jun-16		$166,000	$79.05
18-13-115-000	Oct-12	$12,320	$166,320	$59.40
11-09-300-004	Nov-16		$191,000	$68.90
26-20-105-000	Aug-13	$12,000	$212,000	$96.36
04-13-200-007	May-13	$10,911	$192,769	$74.14

	Adjoins Solar Farm		Not Adjoin Solar Farm	
	Average	**Median**	**Average**	**Median**
Sales Price/SF	$79.90	$79.90	$75.57	$74.14
GBA	2,328	2,328	2,494	2,600

Based on the matched pairs I find no indication of negative impact due to proximity to the solar farm.

The most similar comparable is the home on Columbus that sold for $79.05 per square foot. This is higher than the median rate for all of the comparables. Applying that price per square foot to the subject property square footage indicates a value of $184,000.

There is minimal landscaping separating this solar farm from nearby properties and is therefore considered light.

5. Matched Pair – Portage Solar, Portage, Porter County, IN

This solar farm has a 2 MW output and is located on a portion of a 56-acre tract. The project was built in 2012. As can be seen by the more recent map, Lennar Homes is now developing a new subdivision on the vacant land just west of this solar farm.

I have considered the recent sale of Parcels 5 and 12. Parcel 5 is an undeveloped tract, while Parcel 12 is a residential home. I have compared each to a set of comparable sales to determine if there was any impact due to the adjoining solar farm. This home is 1,320 feet from the closest solar panel. The landscaping buffer is considered light.

Adjoining Residential Sales After Solar Farm Completed

#	TAX ID	Acres	Date Sold	Sales Price	Built	GBA	$/GBA
12	64-06-19-326-007.000-015	1.00	Sep-13	$149,800	1964	1,776	$84.35

Nearby Residential Sales After Solar Farm Completed

#	TAX ID	Acres	Date Sold	Sales Price	Built	GBA	$/GBA
2501 Architect Dr	64-04-32-202-004.000-021	1.31	Nov-15	$191,500	1959	2,064	$92.78
336 E 1050 N	64-07-09-326-003.000-005	1.07	Jan-13	$155,000	1980	1,908	$81.24
2572 Pryor Rd	64-05-14-204-006.000-016	1.00	Jan-16	$216,000	1960	2,348	$91.99

Adjoining Land Sales After Solar Farm Completed

#	TAX ID	Acres	Date Sold	Sales Price	$/AC
5	64-06-19-200-003.000-015	18.70	Feb-14	$149,600	$8,000

Nearby Land Sales After Solar Farm Completed

#	TAX ID	Acres	Date Sold	Sales Price	$/AC
	64-07-22-401-001.000-005	74.35	Jun-17	$520,450	$7,000
	64-15-08-200-010.000-001	15.02	Jan-17	$115,000	$7,658

Residential Sale Adjustment Chart

TAX ID	Date Sold	Adjustments Time	Total	$/Sf
64-06-19-326-007.000-015	Sep-13	$8,988	$158,788	$89.41
64-04-32-202-004.000-021	Nov-15	$3,830	$195,330	$94.64
64-07-09-326-003.000-005	Jan-13	$9,300	$164,300	$86.11
64-05-14-204-006.000-016	Jan-16		$216,000	$91.99

2% adjustment/year
Adjusted to 2017

	Adjoins Solar Farm		Not Adjoin Solar Farm	
	Average	Median	Average	Median
Sales Price/SF	$89.41	$89.41	$90.91	$91.99
GBA	1,776	1,776	2,107	2,064

After adjusting the price per square foot is 2.88% less for the home adjoining the solar farm versus those not adjoining the solar farm. This is within the typical range of variation to be anticipated in any real estate transaction and indicates no impact on property value.

Applying the price per square foot for the 336 E 1050 N sale, which is the most similar to the Parcel 12 sale, the adjusted price at $81.24 per square foot applied to the Parcel 12 square footage yields a value of $144,282.

The landscaping separating this solar farm from the homes is considered light.

Land Sale Adjustment Chart

		Adjustments		
TAX ID	**Date Sold**	**Time**	**Total**	**$/Acre**
64-06-19-200-003.000-015	Feb-14	$8,976	$158,576	$8,480
64-07-22-401-001.000-005	Jun-17		$520,450	$7,000
64-15-08-200-010.000-001	Jan-17		$115,000	$7,658

2% adjustment/year
Adjusted to 2017

	Adjoins Solar Farm		Not Adjoin Solar Farm	
	Average	**Median**	**Average**	**Median**
Sales Price/Ac	$8,480	$8,480	$7,329	$7,329
Acres	18.70	18.70	44.68	44.68

After adjusting the price per acre is higher for the property adjoining the solar farm, but the average and median size considered is higher which suggests a slight discount. This set of matched pair supports no indication of negative impact due to the adjoining solar farm.

Alternatively, adjusting the 2017 sales back to 2014 I derive an indicated price per acre for the comparables at $6,580 per acre to $7,198 per acre, which I compare to the unadjusted subject property sale at $8,000 per acre.

6. Matched Pair – Dominion Indy III, Indianapolis, Marion County, IN

This solar farm has an 8.6 MW output and is located on a portion of a 134-acre tract. The project was built in 2013.

There are a number of homes on small lots located along the northern boundary and I have considered several sales of these homes. I have compared those homes to a set of nearby not adjoining home sales as shown below. The adjoining homes that sold range from 380 to 420 feet from the nearest solar panel, with an average of 400 feet. The landscaping buffer is considered light.

Adjoining Residential Sales After Solar Farm Completed

#	TAX ID	Acres	Date Sold	Sales Price	Built	GBA	$/GBA
2	2013249	0.38	12/9/2015	$140,000	2006	2,412	$58.04
4	2013251	0.23	9/6/2017	$160,000	2006	2,412	$66.33
5	2013252	0.23	5/10/2017	$147,000	2009	2,028	$72.49
11	2013258	0.23	12/9/2015	$131,750	2011	2,190	$60.16
13	2013260	0.23	3/4/2015	$127,000	2005	2,080	$61.06
14	2013261	0.23	2/3/2014	$120,000	2010	2,136	$56.18

Nearby Not Adjoining Residential Sales After Solar Farm Completed

#	TAX ID	Acres	Date Sold	Sales Price	Built	GBA	$/GBA
5836 Sable Dr	2013277	0.14	Jun-16	$141,000	2005	2,280	$61.84
5928 Mosaic Pl	2013845	0.17	Sep-15	$145,000	2007	2,280	$63.60
5904 Minden Dr	2012912	0.16	May-16	$130,000	2004	2,252	$57.73
5910 Mosaic Pl	2000178	0.15	Aug-16	$146,000	2009	2,360	$61.86
5723 Minden Dr	2012866	0.26	Nov-16	$139,900	2005	2,492	$56.14

		Adjustments		
TAX ID	Date Sold	Time	Total	$/Sf
2013249	12/9/2015	$5,600	$145,600	$60.36
2013251	9/6/2017		$160,000	$66.33
2013252	5/10/2017		$147,000	$72.49
2013258	12/9/2015	$5,270	$137,020	$62.57
2013260	3/4/2015	$5,080	$132,080	$63.50
2013261	2/3/2014	$7,200	$127,200	$59.55
2013277	6/1/2016	$2,820	$143,820	$63.08
2013845	9/1/2015	$5,800	$150,800	$66.14
2012912	5/1/2016	$2,600	$132,600	$58.88
2000178	8/1/2016	$2,920	$148,920	$63.10
2012866	11/1/2016	$2,798	$142,698	$57.26

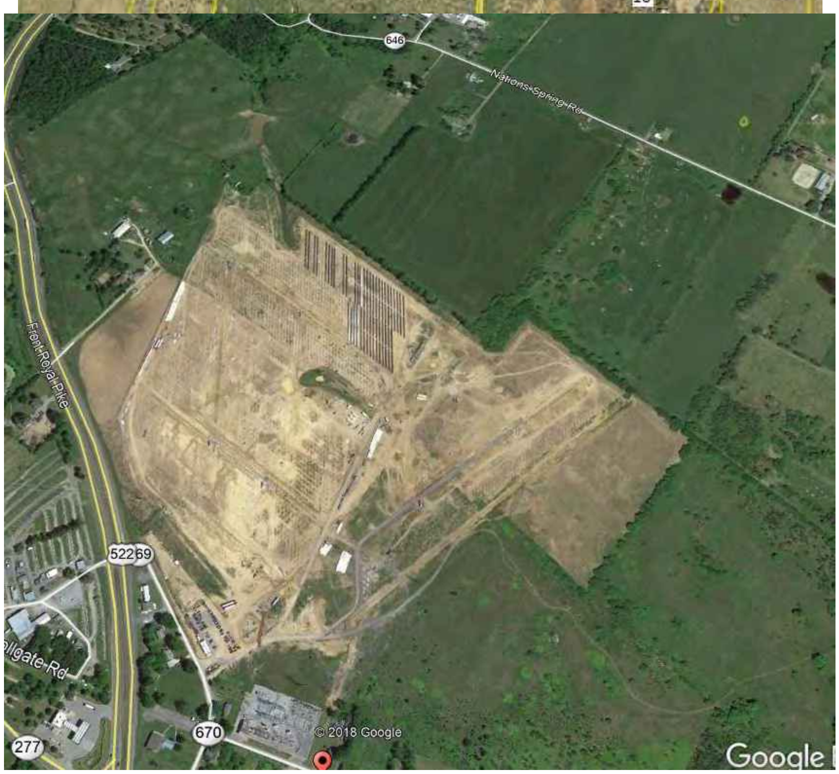
2% adjustment/year
Adjusted to 2017

	Adjoins Solar Farm		Not Adjoin Solar Farm	
	Average	Median	Average	Median
Sales Price/SF	$64.13	$63.03	$61.69	$63.08
GBA	2,210	2,163	2,333	2,280

This set of homes provides very strong indication of no impact due to the adjacency to the solar farm and includes a large selection of homes both adjoining and not adjoining in the analysis.

The landscaping screen is considered light in relation to the homes considered above.

<u>7. Matched Pair – Clarke County Solar, Double Tollgate Road, White Post, Clarke County, VA</u>



This project is a 20 MW facility located on a 234-acre tract that was built in 2017.

I have considered a recent sale or Parcel 3. The home on this parcel is 1,230 feet from the closest panel as measured in the second map from Google Earth, which shows the solar farm under construction.

I've compared this home sale to a number of similar rural homes on similar parcels as shown below. I have used multiple sales that bracket the subject property in terms of sale date, year built, gross living area, bedrooms and bathrooms. Bracketing the parameters insures that all factors are well balanced out in the adjustments. The trend for these sales shows a positive value for the adjacency to the solar farm.

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	833 Nations Spr	5.13	1/9/2017	$295,000	1979	1,392	$211.93	3/2	Det Gar	Ranch	Unfin bsmt
Not	85 Ashby	5.09	9/11/2017	$315,000	1982	2,333	$135.02	3/2	2 Gar	Ranch	
Not	541 Old Kitchen	5.07	9/9/2018	$370,000	1986	3,157	$117.20	4/4	2 Gar	2 story	
Not	4174 Rockland	5.06	1/2/2017	$300,000	1990	1,688	$177.73	3/2	3 Gar	2 story	
Not	400 Sugar Hill	1.00	6/7/2018	$180,000	1975	1,008	$178.57	3/1	Drive	Ranch	

Adjoining Residential Sales After Solar Farm Approved					Adjoining Sales Adjusted								
Solar	**Address**	**Acres**	**Date Sold**	**Sales Price**	**Time**	**Acres**	**YB**	**GLA**	**BR/BA**	**Park**	**Other**	**Total**	**% Diff**
Adjoins	833 Nations Spr	5.13	1/9/2017	$295,000								$295,000	
Not	85 Ashby	5.09	9/11/2017	$315,000	-$6,300		-$6,615	-$38,116		-$7,000	$15,000	$271,969	8%
Not	541 Old Kitchen	5.07	9/9/2018	$370,000	-$18,500		-$18,130	-$62,057		-$7,000	$15,000	$279,313	5%
Not	4174 Rockland	5.06	1/2/2017	$300,000			-$23,100	-$15,782		-$12,000	$15,000	$264,118	10%
Not	400 Sugar Hill	1.00	6/7/2018	$180,000	-$9,000	$43,000	$5,040	$20,571	$10,000	$3,000	$15,000	$267,611	9%
												Average	8%

The landscaping screen is primarily a newly planted buffer with a row of existing trees being maintained near the northern boundary and considered light.

8. Matched Pair – Walker-Correctional Solar, Barham Road, Barhamsville, New Kent County, VA

This project was built in 2017 and located on 484.65 acres for a 20 MW with the closest home at 110 feet from the closest solar panel with an average distance of 500 feet.

I considered the recent sale identified on the map above as Parcel 19, which is directly across the street and based on the map shown on the following page is 250 feet from the closest panel. A limited buffering remains along the road with natural growth being encouraged, but currently the panels are visible from the road. Alex Uminski, SRA with MGMiller Valuations in Richmond VA confirmed this sale with the buying and selling broker. The selling broker indicated that the solar farm was not a negative influence on this sale and in fact the buyer noticed the solar farm and then discovered the listing. The privacy being afforded by the solar farm was considered a benefit by the buyer. I used a matched pair analysis with a similar sale nearby as shown below and found no negative impact on the sales price. Property actually closed for more than the asking price. The landscaping buffer is considered light.

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	5241 Barham	2.65	10/18/2018	$264,000	2007	1,660	$159.04	3/2	Drive	Ranch	Modular
Not	17950 New Kent	5.00	9/5/2018	$290,000	1987	1,756	$165.15	3/2.5	3 Gar	Ranch	
Not	9252 Ordinary	4.00	6/13/2019	$277,000	2001	1,610	$172.05	3/2	1.5-Gar	Ranch	
Not	2416 W Miller	1.04	9/24/2018	$299,000	1999	1,864	$160.41	3/2.5	Gar	Ranch	

Adjoining Sales Adjusted

Solar	Address	Time	Ac/Loc	YB	GLA	BR/BA	Park	Other	Total	% Diff	Dist
Adjoins	5241 Barham								$264,000		250
Not	17950 New Kent		-$8,000	$29,000	-$4,756	-$5,000	-$20,000	-$15,000	$266,244	-1%	
Not	9252 Ordinary	-$8,310	-$8,000	$8,310	$2,581		-$10,000	-$15,000	$246,581	7%	
Not	2416 W Miller		$8,000	$11,960	-$9,817	-$5,000	-$10,000	-$15,000	$279,143	-6%	
									Average Diff	0%	

I also spoke with Patrick W. McCrerey of Virginia Estates who was marketing a property that sold at 5300 Barham Road adjoining the Walker-Correctional Solar Farm. He indicated that this property was unique with a home built in 1882 and heavily renovated and updated on 16.02 acres. The solar farm was through the woods and couldn't be seen by this property and it had no impact on marketing this property. This home sold on April 26, 2017 for $358,000. I did not set up any matched pairs for this property as it was such a unique property that any such comparison would be difficult to rely on. The broker's comments do support the assertion that the adjoining solar farm had no impact on value. The home in this case was 510 feet from the closest panel.

9. Matched Pair – Sappony Solar, Stony Creek, Sussex County, VA

This project is a 30 MW facility located on a 322.68-acre tract that was built in the fourth quarter of 2017.

I have considered the 2018 sale of Parcel 17 as shown below. From Parcel 17 the retained trees and setbacks are a light to medium landscaped buffer.

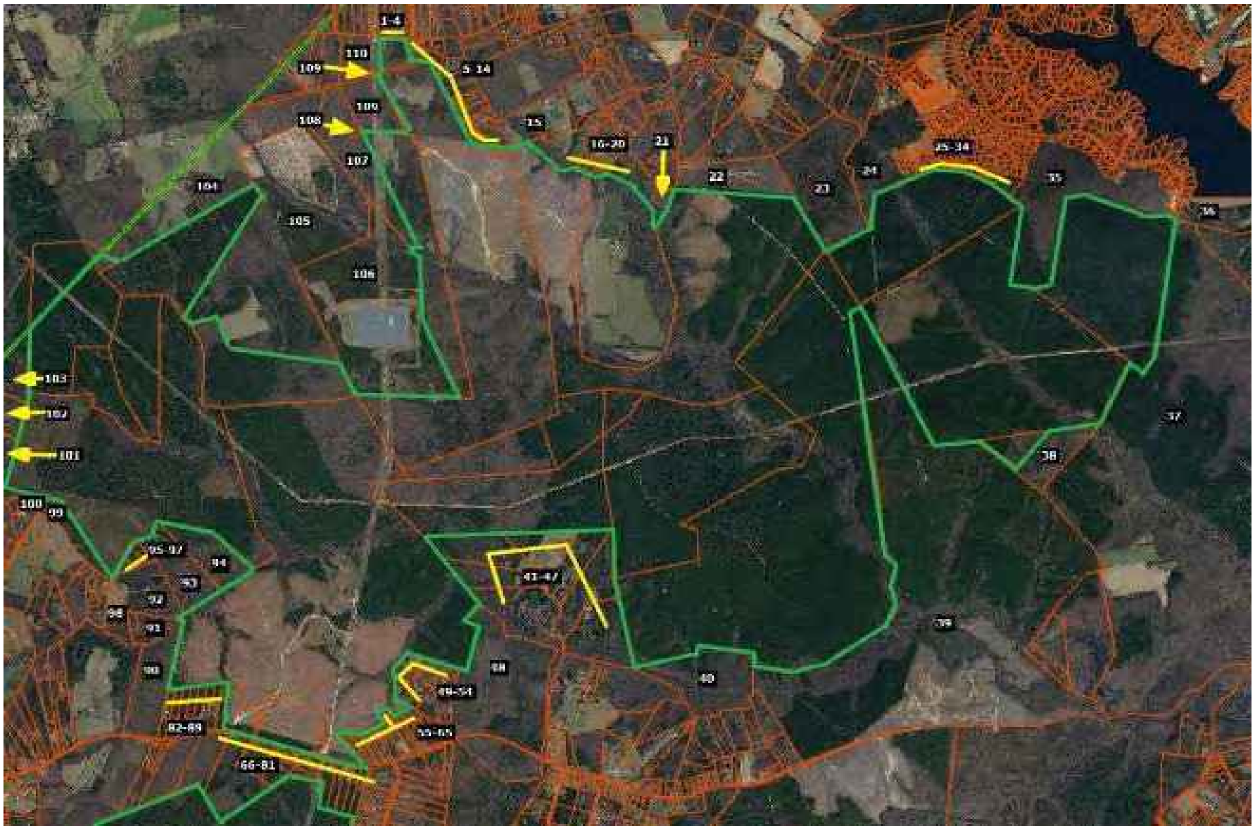
Adjoining Residential Sales After Solar Farm Approved

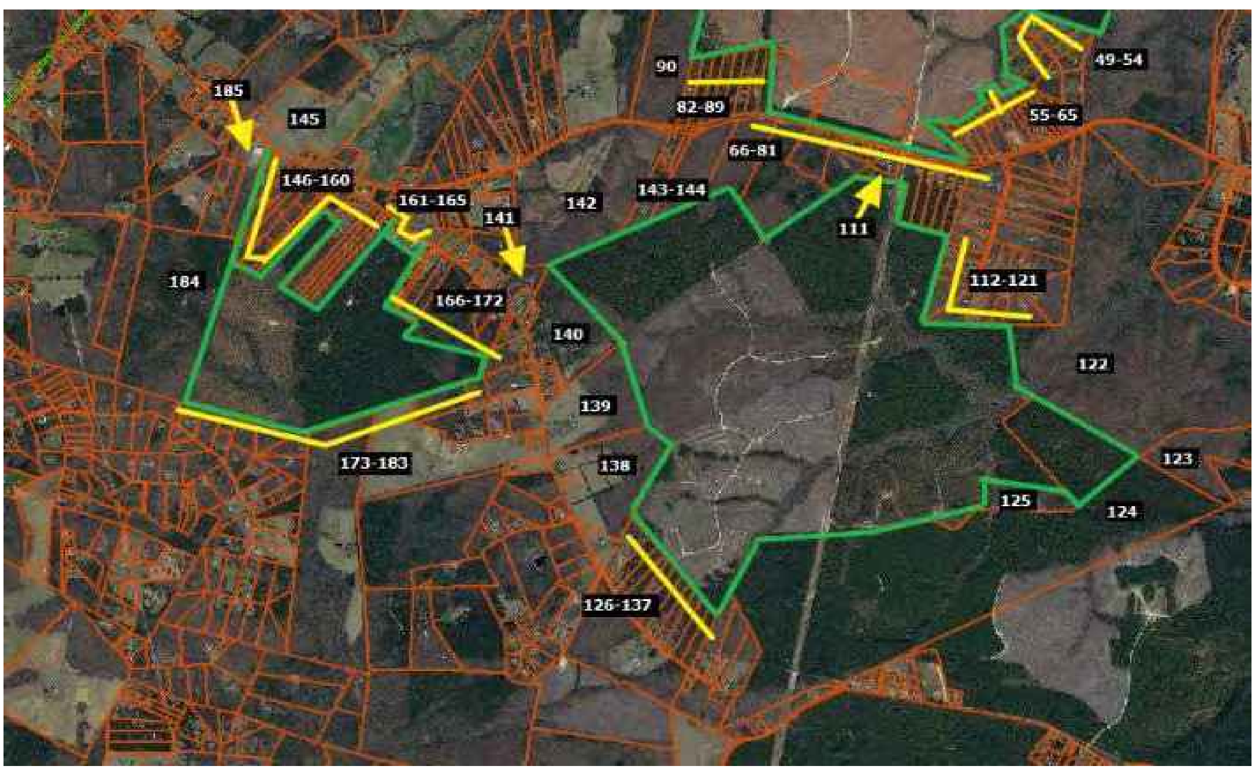
Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
	Adjoins	12511 Palestine	6.00	7/31/2018	$128,400	2013	1,900	$67.58	4/2.5	Open	Manuf	
	Not	15698 Concord	3.92	7/31/2018	$150,000	2010	2,310	$64.94	4/2	Open	Manuf	Fence
	Not	23209 Sussex	1.03	7/7/2020	$95,000	2005	1,675	$56.72	3/2	Det Crpt	Manuf	
	Not	6494 Rocky Br	4.07	11/8/2018	$100,000	2004	1,405	$71.17	3/2	Open	Manuf	

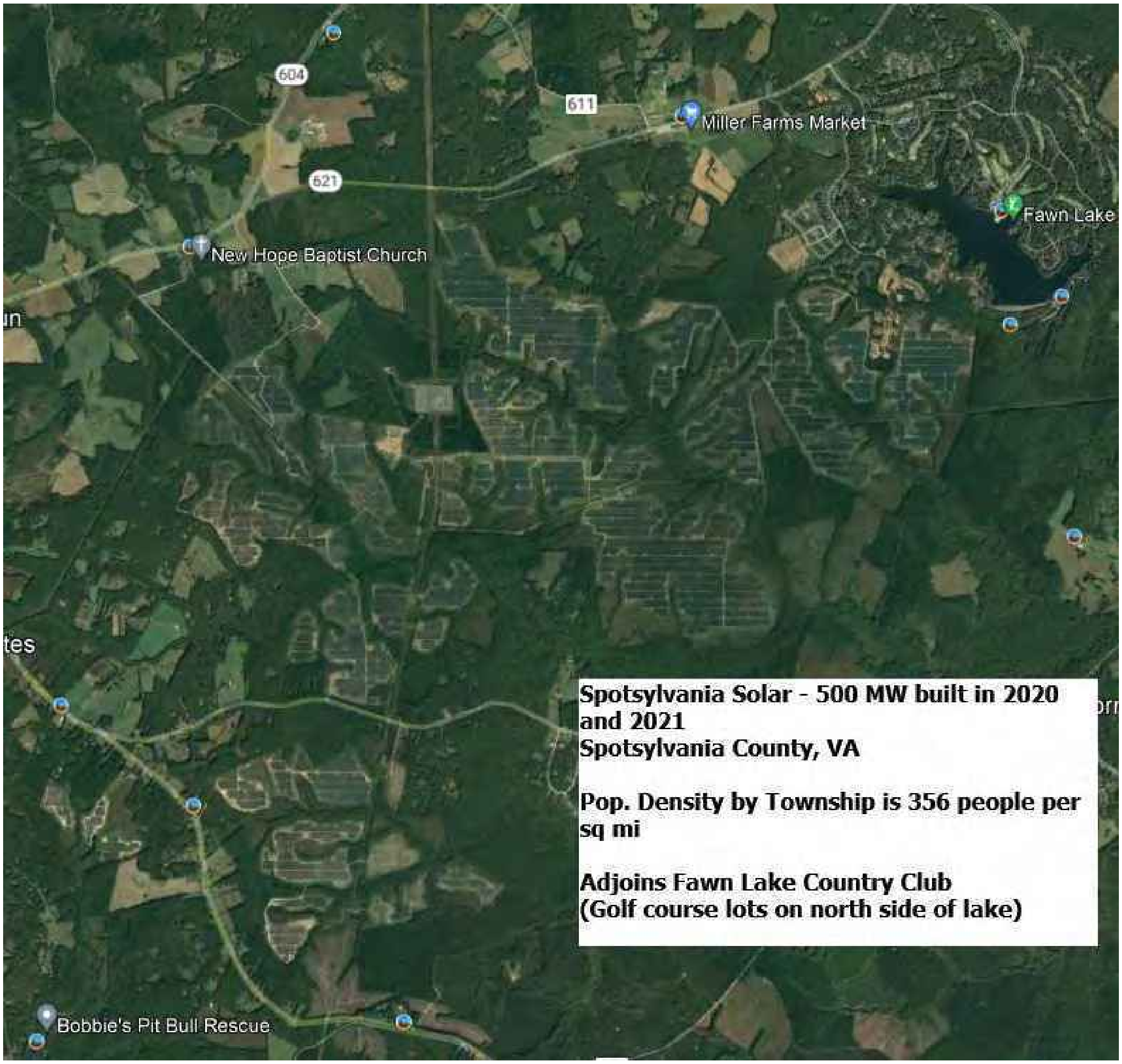
Adjoining Sales Adjusted

Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
							$128,400			1425
$0		$2,250	-$21,299	$5,000			$135,951	-6%		
-$5,660	$13,000	$3,800	$10,209	$5,000	$1,500		$122,849	4%		
-$843		$4,500	$28,185				$131,842	-3%		
									-1%	

<u>10. Matched Pair – Spotsylvania Solar, Paytes, Spotsylvania County, VA</u>







This solar farm is being built in four phases with the area known as Site C having completed construction in November 2020 after the entire project was approved in April 2019. Site C, also known as Pleinmont 1 Solar, includes 99.6 MW located in the southeast corner of the project and shown on the maps above with adjoining parcels 111 through 144. The entire Spotsylvania project totals 617 MW on 3500 acres out of a parent tract assemblage of 6,412 acres.

I have identified three adjoining home sales that occurred during construction and development of the site in 2020.

The first is located on the north side of Site A on Orange Plank Road. The second is located on Nottoway Lane just north of Caparthin Road on the south side of Site A and east of Site C. The third is located on Post Oak Road for a home that backs up to Site C that sold in September 2020 near the completion of construction for Site C.

Spotsylvania Solar Farm

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	12901 Orng Plnk	5.20	8/27/2020	$319,900	1984	1,714	$186.64	3/2	Drive	1.5	Un Bsmt
Not	8353 Gold Dale	3.00	1/27/2021	$415,000	2004	2,064	$201.07	3/2	3 Gar	Ranch	
Not	6488 Southfork	7.26	9/9/2020	$375,000	2017	1,680	$223.21	3/2	2 Gar	1.5	Barn/Patio
Not	12717 Flintlock	0.47	12/2/2020	$290,000	1990	1,592	$182.16	3/2.5	Det Gar	Ranch	

Adjoining Sales Adjusted

Address	Time	Ac/Loc	YB	GLA	BR/BA	Park	Other	Total	% Diff	Dist
12901 Orng Plnk								$319,900		1270
8353 Gold Dale	-$5,219	$20,000	-$41,500	-$56,298		-$20,000		$311,983	2%	
6488 Southfork	-$401	-$20,000	-$61,875	$6,071		-$15,000		$283,796	11%	
12717 Flintlock	-$2,312	$40,000	-$8,700	$17,779	-$5,000	-$5,000		$326,767	-2%	
								Average Diff	4%	

I contacted Keith Snider to confirm this sale. This is considered to have a medium landscaping screen.

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	9641 Nottoway	11.00	5/12/2020	$449,900	2004	3,186	$141.21	4/2.5	Garage	2-Story	Un Bsmt
Not	26123 Lafayette	1.00	8/3/2020	$390,000	2006	3,142	$124.12	3/3.5	Gar/DtG	2-Story	
Not	11626 Forest	5.00	8/10/2020	$489,900	2017	3,350	$146.24	4/3.5	2 Gar	2-Story	
Not	10304 Pny Brnch	6.00	7/27/2020	$485,000	1998	3,076	$157.67	4/4	2Gar/Dt2	Ranch	Fn Bsmt

Adjoining Sales Adjusted

Address	Time	Ac/Loc	YB	GLA	BR/BA	Park	Other	Total	% Diff	Dist
9641 Nottoway								$449,900		1950
26123 Lafayette	-$2,661	$45,000	-$3,900	$4,369	-$10,000	-$5,000		$417,809	7%	
11626 Forest	-$3,624		-$31,844	-$19,187		-$5,000		$430,246	4%	
10304 Pny Brnch	-$3,030		$14,550	$13,875	-$15,000	-$15,000	-$10,000	$470,396	-5%	
								Average Diff	2%	

I contacted Annette Roberts with ReMax about this transaction. This is considered to have a medium landscaping screen.

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	13353 Post Oak	5.20	9/21/2020	$300,000	1992	2,400	$125.00	4/3	Drive	2-Story	Fn Bsmt
Not	9609 Logan Hgt	5.86	7/4/2019	$330,000	2004	2,352	$140.31	3/2	2Gar	2-Story	
Not	12810 Catharpian	6.18	1/30/2020	$280,000	2008	2,240	$125.00	4/2.5	Drive	2-Story	Bsmt/Nd Pnt
Not	10725 Rbrt Lee	5.01	10/26/2020	$295,000	1995	2,166	$136.20	4/3	Gar	2-Story	Fn Bsmt

Adjoining Sales Adjusted

Address	Time	Ac/Loc	YB	GLA	BR/BA	Park	Other	Total	% Diff	Dist
13353 Post Oak								$300,000		1171
9609 Logan Hgt	$12,070		-$19,800	$5,388		-$15,000	$15,000	$327,658	-9%	
12810 Catharpian	$5,408		-$22,400	$16,000	$5,000		$15,000	$299,008	0%	
10725 Rbrt Lee	-$849		-$4,425	$25,496		-$10,000		$305,222	-2%	
								Average Diff	-4%	

I contacted Joy Pearson with CTI Real Estate about this transaction. This is considered to have a heavy landscaping screen.

All three of these homes are well set back from the solar panels at distances over 1,000 feet and are well screened from the project. All three show no indication of any impact on property value.

There are a couple of recent lot sales located along Southview Court that have sold since the solar farm was approved. The most recent lot sales include 11700 Southview Court that sold on December 29, 2021 for $140,000 for a 0.76-acre lot. This property was on the market for less than 2 months before closing within 6% of the asking price. This lot sold earlier in September 2019 for $55,000 based on a liquidation sale from NTS to an investor.

A similar 0.68-acre lot at 11507 Stonewood Court within the same subdivision located away from the solar farm sold on March 9, 2021 for $109,000. This lot sold for 18% over the asking price within 1 month of listing suggesting that this was priced too low. Adjusting this lot value upward by 12% for very strong growth in the market over 2021, the adjusted indicated value is $122,080 for this lot. This is still showing a 15% premium for the lot backing up to the solar farm.

The lot at 11009 Southview Court sold on August 5, 2019 for $65,000, which is significantly lower than the more recent sales. This lot was sold by NTS the original developer of this subdivision, who was in the process of liquidating lots in this subdivision with multiple lot sales in this time period throughout the subdivision being sold at discounted prices. The home was later improved by the buyer with a home built in 2020 with 2,430 square feet ranch, 3.5 bathrooms, with a full basement, and a current assessed value of $492,300.

I spoke with Chris Kalia, MAI, Mark Doherty, local real estate investor, and Alex Doherty, broker, who are all three familiar with this subdivision and activity in this neighborhood. All three indicated that there was a deep sell off of lots in the neighborhood by NTS at discounted prices under $100,000 each. Those lots since that time are being sold for up to $140,000. The prices paid for the lots below $100,000 were liquidation values and not indicative of market value. Homes are being built in the neighborhood on those lots with home prices ranging from $600,000 to $800,000 with no sign of impact on pricing due to the solar farm according to all three sources.


New areas of new lot construction started after approval of solar farm in 2019 outlined in green.
Future development to the south shown with preliminary road clearing outlined in blue.
Fawn Lake Virginia
Ryan Homes at Fawn Lake
Orchard Hill Ln
Osprey Trl
Fawn Lake Pkwy
Vanderbilt Cove
Pinnacle Dr
Brandermill Park
Cobble Run
Southview Ct
Whitehall Creek

Fawn Lake Lot Sales

Parcel		Solar?	Address	Acres	Sale Date	Sale Price	Ad. For Time	% Diff
A		Adjoins	11700 Southview Ct	0.76	12/29/2021	$140,000		
	1	1 parcel away	11603 Southview Ct	0.44	3/31/2022	$140,000	$141,960	-1.4%
	2	Not adjoin	11507 Stonewood Ct	0.68	3/9/2021	$109,000	$118,374	15.4%
	3	Not adjoin	11312 Westgate Wy	0.83	10/15/2020	$125,000	$142,000	-1.4%
	4	Not adjoin	11409 Darkstone Pl	0.589	9/23/2021	$118,000	$118,000	15.7%

Average	7.1%
Median	7.0%
Least Adjusted	15.7%
2nd Least Adjusted	-1.4%
(Parcel 1 off solar farm)	

Time Adjustments are based on the FHFA Housing Price Index

<u>11. Matched Pair – Whitehorn Solar, Gretna, Pittsylvania County, VA</u>

This project was built in 2021 for a solar project with 50 MW. Adjoining uses are residential and agricultural. There was a sale located at 1120 Taylors Mill Road that sold on December 20, 2021, which is about the time the solar farm was completed. This sold for $224,000 for 2.02 acres with a 2,079 s.f. mobile home on it that was built in 2010. The property was listed for $224,000 and sold for that same price within two months (went under contract almost exactly 30 days from listing). This sales price works out to $108 per square foot. This home is 255 feet from the nearest panel.

I have compared this sale to an August 20, 2020 sale at 1000 Long Branch Drive that included 5.10 acres with a 1,980 s.f. mobile home that was built in 1993 and sold for $162,000, or $81.82 per square foot. Adjusting this upward for significant growth between this sale date and December 2021 relied on data provided by the FHFA House Pricing Index, which indicates that for homes in the Roanoke, VA MSA would be expected to appreciate from $162,000 to $191,000 over that period of time. Using $191,000 as the effective value as of the date of comparison, the indicated value of this sale works out to $96.46 per square foot. Adjusting this upward by 17% for the difference in year built, but downward by 5% for the much larger lot size at this comparable, I derive an adjusted indication of value of $213,920, or $108 per square foot.

This indicates no impact on value attributable to the new solar farm located across from the home on Taylors Mill Road.

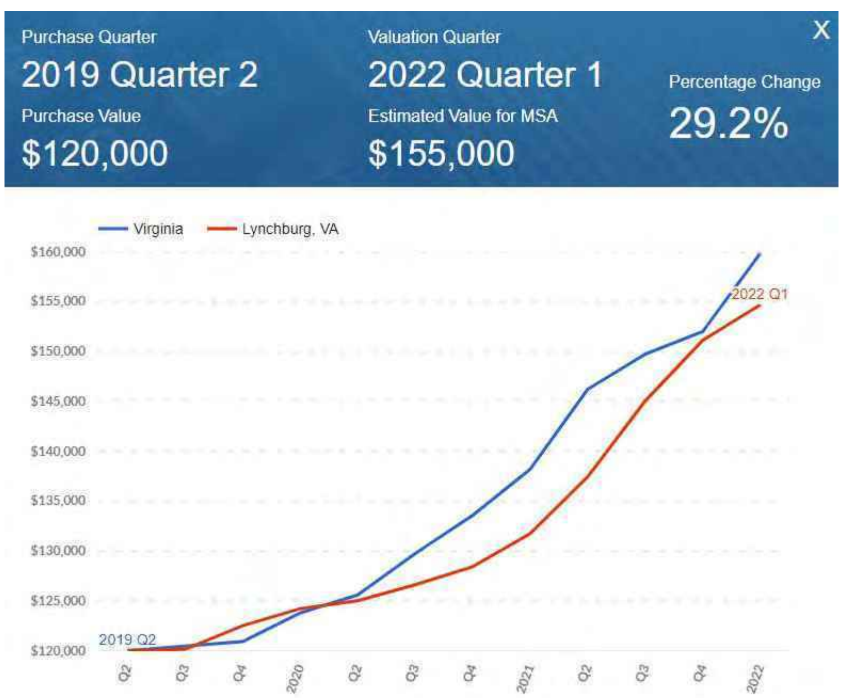
12. Matched Pair – Altavista Solar, Altavista, Campbell County, VA

This project was mostly built in 2021 with final construction finished in 2022. This is an 80 MW facility on 720 acres just north of Roanoke River and west of Altavista. Adjoining uses are residential and agricultural.

I have done a Sale/Resale analysis of 3211 Leesville Road which is approximately 540 feet from the nearest solar panel. There was an existing row of trees between this home and the panels that was supplemented with additional screening for a narrow landscaped buffer between the home and the solar panels.

This home sold in December 2018 for $72,500 for this 1,451 s.f. home built in 1940 with a number of additional outbuildings on 3.35 acres. This was before any announcement of a solar farm. This home sold again on March 28, 2022 for $124,048 after the solar farm was constructed. This shows a 71% increase in value on this property since 2018. There was significant growth in the market between these dates and to accurately reflect that I have considered the FHFA House Price Index that is specific for the Lynchburg area of Virginia (the closest regional category), which shows an expected increase in home values over that same time period of 33.8%, which would suggest a normal growth in value up to $97,000. The home sold for significantly more than this which certainly does not support a finding of a negative impact and in fact suggests a significant positive impact. However, I was not able to discuss this sale with the broker and it is possible that the home also was renovated between 2018 and 2022, which may account for that additional increase in value. Still give that the home increased in value so significantly over the initial amount there is no sign of any negative impact due to the solar farm adjacency.

Similarly, I looked at 3026 Bishop Creek Road that is approximately 600 feet from the nearest solar panel. This home sold on July 16, 2019 for $120,000, which was before construction of the solar farm. This home sold again on February 23, 2022 for $150,000. This shows a 25% increase in value over that time period. Using the same FHFA House Price Index Calculator, the expected increase in value was 29.2% for an indicated expected value of $155,000. This is within 3% of the actual closed price, which supports a finding of no impact from the solar farm. This home has a dense wooded area between it and the adjoining solar farm.



13. Matched Pair – DG Amp Piqua, Piqua, Miami County, OH

This project is located on the southeast corner of Manier Street and N Washington Road, Piqua, OH. There are a number of nearby homes to the north, south and west of this solar farm.

I considered one adjoining sale and one nearby sale (one parcel off) that happened since the project was built in 2019. I did not consider the sale of a home located at Parcel 20 that happened in that time period as that property was marketed with damaged floors in the kitchen and bathroom, rusted baseboard heaters and generally was sold in an As-Is condition that makes it difficult to compare to move-in ready homes. I also did not consider some sales to the north that sold for prices significantly under $100,000. The homes in that community includes a wide range of smaller, older homes that have been selling for prices ranging from $25,000 to $80,000. I have not been tracking home sales under $100,000 as homes in that price range are less susceptible to external factors.

The adjoining sale at 6060 N Washington is a brick range fronting on a main road. I did not adjust the comparables for that factor despite the subdivision exposure on those comparables was superior. I considered the difference in lot size to be balancing factors. If I adjusted further for that main road frontage, then it would actually show a positive impact for adjoining the solar farm.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
22	Adjoins	6060 N Washington	0.80	10/30/2019	$119,500	1961	1,404	$85.11	3/1	2 Gar	Br Rnch	Updates
	Not	1523 Amesbury	0.25	5/7/2020	$119,900	1973	1,316	$91.11	3/2	Gar	Br Rnch	Updates
	Not	1609 Haverhill	0.17	10/17/2019	$114,900	1974	1,531	$75.05	3/1	Gar	Br Rnch	Updates
	Not	1511 Sweetbriar	0.17	8/6/2020	$123,000	1972	1,373	$89.58	4/2	Gar	Br Rnch	Updates

Adjoining Sales Adjusted

Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
							$119,500			155
-$1,920		-$7,194	$6,414	-$5,000	$7,500	$0	$119,700	0%		
$126		-$7,469	-$7,625		$7,500	$0	$107,432	10%		
-$2,913		-$6,765	$2,222	-$5,000	$7,500	$0	$118,044	1%		
									4%	

I also considered a home fronting on Plymouth Avenue which is one lot to the west of the solar farm with a rear view towards the solar farm. After adjustments this set of matched pairs shows no impact on the value of the property due to proximity to the solar farm.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
	Nearby	1011 Plymouth	0.21	2/24/2020	$113,000	1973	1,373	$82.30	4/2	Gar	1.5 Stry	Fnce/Shd
	Not	1630 Haverhill	0.32	8/18/2019	$94,900	1973	1,373	$69.12	4/2	Gar	1.5 Stry	N/A
	Not	1720 Williams	0.17	12/4/2019	$119,900	1968	1,682	$71.28	4/1	2Gar	1.5 Br	Fnce/Shd
	Not	1710 Cambridge	0.17	1/22/2018	$116,000	1968	1,648	$70.39	4/2	Det 2	1.5 Br	Fnce/Shd

Adjoining Sales Adjusted

Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
							$113,000			585
$1,519		$0	$0			$10,000	$106,419	6%		
$829		$2,998	-$17,621	$5,000			$111,105	2%		
$7,459		$2,900	-$15,485				$110,873	2%		
									3%	

I considered a home located at 6010 N Washington that sold on August 3, 2021. This property was sold with significant upgrades that made it more challenging to compare, but I focused on similar older brick ranches with updates in the analysis. The comparables suggest an enhancement to this property due to proximity from the solar farm, but it is more likely that the upgrades at the subject were superior. Still this strongly supports a finding of no impact on the value of the property due to proximity to the solar farm.

Adjoining Residential Sales After Solar Farm Built

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
24	Adjoins	6010 N Washington	0.80	8/3/2021	$176,900	1961	1,448	$122.17	4/2	2 Gar	Br Ranch	Updates
	Not	1244 Severs	0.19	10/29/2021	$149,900	1962	1,392	$107.69	3/2	Gar	Br Ranch	Updates
	Not	1515 Amesbury	0.19	5/5/2022	$156,500	1973	1,275	$122.75	3/2	2 Gar	Br Ranch	Updates
	Not	1834 Wilshire	0.21	12/3/2021	$168,900	1979	1,265	$133.52	3/2	2 Gar	Br Ranch	Updates

Adjoining Sales Adjusted

Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
							$176,900			155
-$1,099		-$750	$4,221		$7,000		$159,273	10%		
-$3,627		-$9,390	$16,988				$160,471	9%		
-$1,736		-$14,357	$19,547				$172,354	3%		
									7%	

I considered a home located at 6240 N Washington that sold on October 15, 2021. The paired sale located at 532 Wilson included a sunroom that I did not adjust for. The -4% impact from that sale is related to that property having a superior sunroom and not related to proximity to the solar farm. The other two comparables strongly support that assertion as well as a finding of no impact on the value of the property due to proximity to the solar farm.

Adjoining Residential Sales After Solar Farm Built

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
	Adjoins	6240 N Washington	1.40	10/15/2021	$155,000	1962	1,582	$97.98	2/1	Det 3	Ranch	
	Not	1408 Brooks	0.13	8/20/2021	$105,000	1957	1,344	$78.13	3/1	Drive	Ranch	
	Not	532 Wilson	0.14	7/29/2021	$159,900	1948	1,710	$93.51	3/2	Det Gar	Ranch	Sunroom
	Not	424 Pinewood	0.17	5/20/2022	$151,000	1960	1,548	$97.55	4/2	Gar	Ranch	

Adjoining Sales Adjusted

Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
							$155,000			160
$496		$2,625	$13,016		$15,000		$136,136	12%		
$1,051		$11,193	-$9,575	-$10,000	$8,000		$160,569	-4%		
-$2,761		-$2,265	$2,653	-$10,000	$7,000		$145,627	6%		
									5%	

Based on these four matched pairs, the data at this solar farm supports a finding of no impact on property value due to the proximity of the solar farm for homes as close as 155 feet.

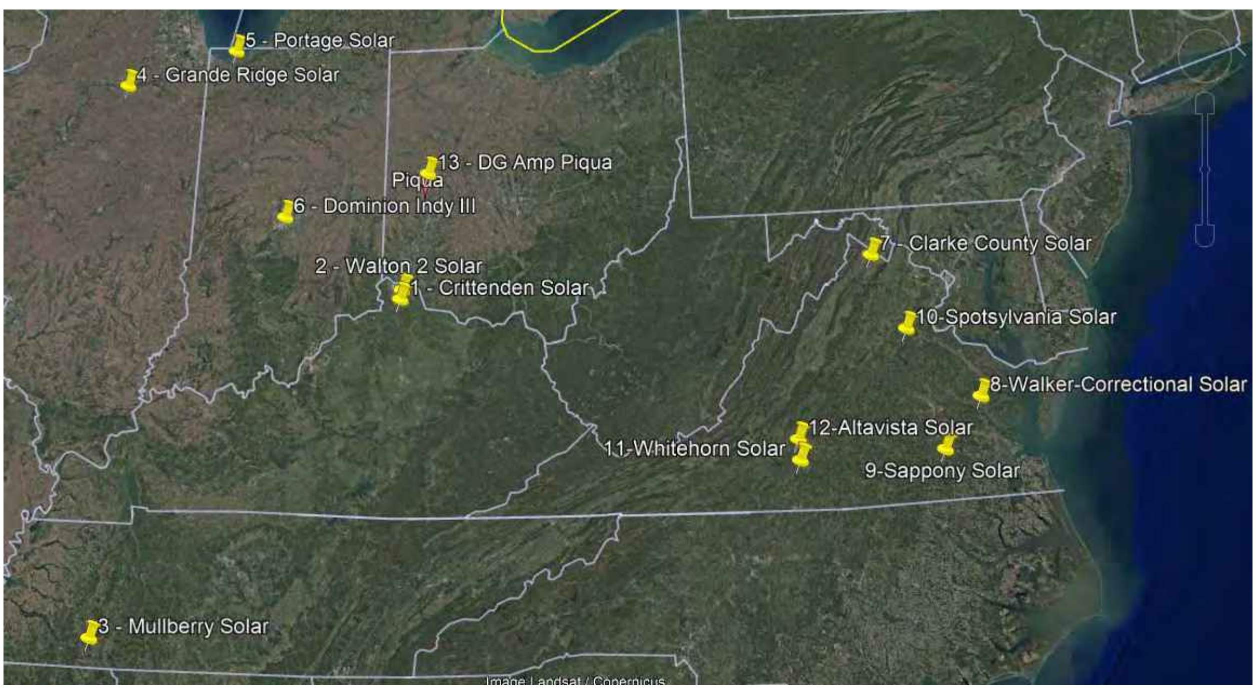
I also identified three new construction home sales on Arrowhead Drive that sold in 2022. I have reached out to the builder regarding those homes, but these homes sold between $250,000 and $275,000 each and were located within 350 feet of the solar farm. These sales show that the presence of the solar farm is not inhibiting new home construction in proximity to the solar farm.

Conclusion

The solar farm matched pairs shown above have similar characteristics to each other in terms of population, but with several outliers showing solar farms in far more urban areas. The median income for the population within 1 mile of a solar farm among this subset of matched pairs is $61,115 with a median housing unit value of $186,463. Most of the comparables are under $300,000 in the home price, with $483,333 being the high end of the set, though I have matched pairs in other states over $1,600,000 in price adjoining large solar farms. The predominate adjoining uses are residential and agricultural. These figures are in line with the larger set of solar farms that I have looked at with the predominant adjoining uses being residential and agricultural and similar to the solar farm breakdown shown for Kentucky and adjoining states as well as the proposed subject property.

Based on the similarity of adjoining uses and demographic data between these sites and the subject property, I consider it reasonable to compare these sites to the subject property.

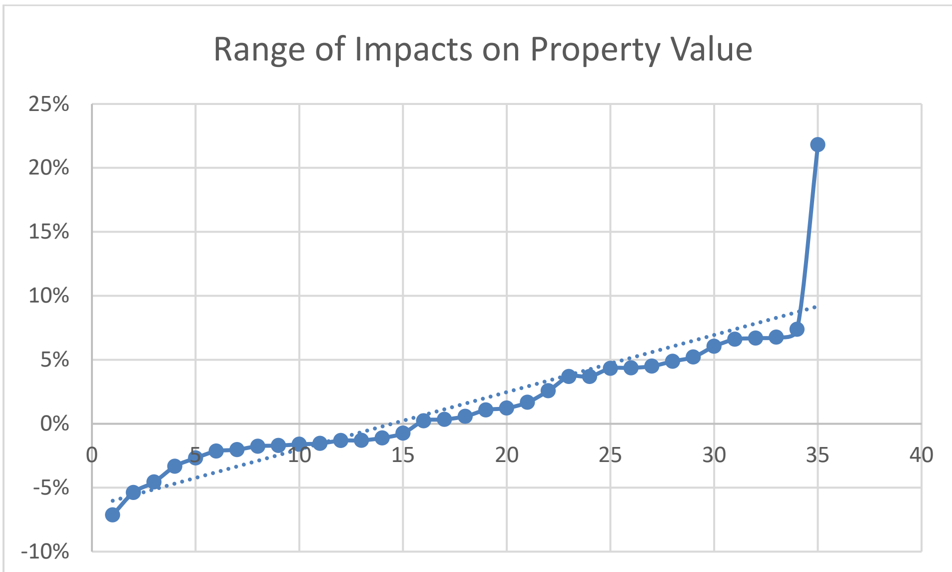
Matched Pair Summary							Adj. Uses By Acreage				1 mile Radius (2010-2022 Data)			
	Name	City	State	Acres	MW	Topo Shift	Res	Ag	Ag/Res	Com/Ind	Population	Med. Income	Avg. Housing Unit	Veg. Buffer
1	Crittenden	Crittenden	KY	34	2.70	40	22%	51%	27%	0%	1,419	$60,198	$178,643	Light
2	Walton 2	Walton	KY	58	2.00	90	21%	0%	60%	19%	880	$81,709	$277,717	Light
3	Mulberry	Selmer	TN	160	5.00	60	13%	73%	10%	3%	467	$40,936	$171,746	Lt to Med
4	Grand Ridge	Streator	IL	160	20.00	1	8%	87%	5%	0%	96	$70,158	$187,037	Light
5	Portage	Portage	IN	56	2.00	0	19%	81%	0%	0%	6,642	$65,695	$186,463	Light
6	Dominion	Indianapolis	IN	134	8.60	20	3%	97%	0%	0%	3,774	$61,115	$167,515	Light
7	Clarke Cnty	White Post	VA	234	20.00	70	14%	39%	46%	1%	578	$81,022	$374,453	Light
8	Walker	Barhamsville	VA	485	20.00	N/A	12%	68%	20%	0%	203	$80,773	$320,076	Light
9	Sappony	Stony Crk	VA	322	20.00	N/A	2%	98%	0%	0%	74	$51,410	$155,208	Medium
10	Spotyslvania	Paytes	VA	3,500	500.00	160	37%	52%	11%	0%	74	$120,861	$483,333	Med to Hvy
11	Whitehorn	Gretna	VA	N/A	50.00	N/A	N/A	N/A	N/A	N/A	166	$43,179	$168,750	None to Lt
12	Altavista	Altavista	VA	720	80.00	N/A	N/A	N/A	N/A	N/A	7	$50,000	$341,667	Light
13	DG Amp Piqua	Piqua	OH	86	12.60	2	26%	16%	58%	0%	6,735	$38,919	$96,555	
	Average			496	57.15	49	16%	60%	22%	2%	1,624	$65,075	$239,166	
	Median			160	20.00	40	14%	68%	11%	0%	467	$61,115	$186,463	
	High			3,500	500.00	160	37%	98%	60%	19%	6,735	$120,861	$483,333	
	Low			34	2.00	0	2%	0%	0%	0%	7	$38,919	$96,555	



These are very similar to the demographics shown around these comparable solar farms.

On the following page is a summary of the 35 matched pairs for all of the solar farms noted above. They show a pattern of results from -7% to +22%. As can be seen in the chart of those results below, most of the data points are between -2% and +5%. This variability is common with real estate and consistent with market imperfection. I therefore conclude that these results strongly support an indication of no impact on property value due to the adjacent solar farm.

There is one significant outlier that shows a 22% enhancement due to adjacency to a solar farm. I have attempted to confirm that sale as it appears likely that renovations were done that would explain that significant difference. I have not considered that to be a reliable indicator on property value impacts. Excluding that one indicator the range is -7% to +7%.



	MW	Avg. Distance	% Dif
Average	65.53	625	2%
Median	8.60	480	1%
High	617.00	1,950	22%
Low	2.00	155	-7%

Residential Dwelling Matched Pairs Adjoining Solar Farms

Pair	Solar Farm	City	State	Area	MW	Approx Distance	Tax ID/Address	Sale Date	Sale Price	Adj. Price	% Diff	Notes
1	Portage	Portage	IN	Rural	2	1320	836 N 450 W	Sep-13	$149,800			
							336 E 1050 N	Jan-13	$155,000	$144,282	4%	
2	Dominion	Indianapolis	IN	Rural	8.6	400	2013249 (Tax ID)	Dec-15	$140,000			
							5723 Minden	Nov-16	$139,900	$132,700	5%	
3	Dominion	Indianapolis	IN	Rural	8.6	400	2013251 (Tax ID)	Sep-17	$160,000			
							5910 Mosaic	Aug-16	$146,000	$152,190	5%	
4	Dominion	Indianapolis	IN	Rural	8.6	400	2013252 (Tax ID)	May-17	$147,000			
							5836 Sable	Jun-16	$141,000	$136,165	7%	
5	Dominion	Indianapolis	IN	Rural	8.6	400	2013258 (Tax ID)	Dec-15	$131,750			
							5904 Minden	May-16	$130,000	$134,068	-2%	
6	Dominion	Indianapolis	IN	Rural	8.6	400	2013260 (Tax ID)	Mar-15	$127,000			
							5904 Minden	May-16	$130,000	$128,957	-2%	
7	Dominion	Indianapolis	IN	Rural	8.6	400	2013261 (Tax ID)	Feb-14	$120,000			
							5904 Minden	May-16	$130,000	$121,930	-2%	
8	DG Amp	Piqua	OH	Suburban	12.6	155	6060 N Washington	Oct-19	$119,500			
							1511 Sweetbriar	Aug-20	$123,000	$118,044	1%	
9	DG Amp	Piqua	OH	Suburban	12.6	585	1011 Plymouth	Feb-20	$113,000			
							1720 Williams	Dec-19	$119,900	$111,105	2%	
10	DG Amp	Piqua	OH	Suburban	12.6	155	6010 N Washington	Aug-21	$176,900			
							1834 Wilshire	Dec-21	$168,900	$172,354	3%	
11	DG Amp	Piqua	OH	Suburban	12.6	160	6240 N Washington	Oct-21	$155,000			
							424 Pinewood	May-22	$151,000	$145,627	6%	
12	Spotsylvania	Paytes	VA	Rural	617	1270	12901 Orange Plnk	Aug-20	$319,900			Medium
							12717 Flintlock	Dec-20	$290,000	$326,767	-2%	
13	Spotsylvania	Paytes	VA	Rural	617	1950	9641 Nottoway	May-20	$449,900			Medium
							11626 Forest	Aug-20	$489,900	$430,246	4%	
14	Spotsylvania	Paytes	VA	Rural	617	1171	13353 Post Oak	Sep-20	$300,000			Heavy
							12810 Catharpin	Jan-20	$280,000	$299,008	0%	
15	Walker	Barhamsville	VA	Rural	20	250	5241 Barham	Oct-18	$264,000			Light
							9252 Ordinary	Jun-19	$277,000	$246,581	7%	
16	Clarke Cnty	White Post	VA	Rural	20	1230	833 Nations Spr	Aug-19	$385,000			Light
							2393 Old Chapel	Aug-20	$330,000	$389,286	-1%	
17	Sappony	Stony Creek	VA	Rural	20	1425	12511 Palestine	Jul-18	$128,400			Medium
							6494 Rocky Branch	Nov-18	$100,000	$131,842	-3%	
18	Crittenden	Crittenden	KY	Suburban	2.7	373	250 Claiborne	Jan-19	$120,000			
							315 N Fork	May-19	$107,000	$120,889	-1%	
19	Crittenden	Crittenden	KY	Suburban	2.7	488	300 Claiborne	Sep-18	$213,000			
							1795 Bay Valley	Dec-17	$231,200	$228,180	-7%	
20	Crittenden	Crittenden	KY	Suburban	2.7	720	350 Claiborne	Jul-18	$245,000			
							2160 Sherman	Jun-19	$265,000	$248,225	-1%	
21	Crittenden	Crittenden	KY	Suburban	2.7	930	370 Claiborne	Aug-19	$273,000			
							125 Lexington	Apr-18	$240,000	$254,751	7%	
22	Crittenden	Crittenden	KY	Suburban	2.7	365	250 Claiborne	Jan-22	$210,000			Light
							240 Shawnee	Jun-21	$166,000	$219,563	-5%	
23	Crittenden	Crittenden	KY	Suburban	2.7	390	260 Claiborne	Oct-21	$175,000			Light
							355 Oakwood	Oct-20	$186,000	$173,988	1%	
24	Crittenden	Crittenden	KY	Suburban	2.7	570	300 Claiborne	Dec-21	$290,000			Light
							39 Pinhook	Mar-22	$299,000	$289,352	0%	
25	Crittenden	Crittenden	KY	Suburban	2.7	1080	410 Claiborne	Feb-21	$275,000			Light
							114 Austin	Dec-20	$248,000	$279,680	-2%	
26	Mulberry	Selmer	TN	Rural	5	400	0900A011	Jul-14	$130,000			Light
							099CA043	Feb-15	$148,900	$136,988	-5%	
27	Mulberry	Selmer	TN	Rural	5	400	099CA002	Jul-15	$130,000			Light
							0990NA040	Mar-15	$120,000	$121,200	7%	
28	Mulberry	Selmer	TN	Rural	5	480	491 Dusty	Oct-16	$176,000			Light
							35 April	Aug-16	$185,000	$178,283	-1%	
29	Mulberry	Selmer	TN	Rural	5	650	297 Country	Sep-16	$150,000			Medium
							53 Glen	Mar-17	$126,000	$144,460	4%	
30	Mulberry	Selmer	TN	Rural	5	685	57 Cooper	Feb-19	$163,000			Medium
							191 Amelia	Aug-18	$132,000	$155,947	4%	
31	Grand Ridge	Streator	IL	Rural	20	480	1497 E 21st	Oct-16	$186,000			Light
							712 Columbus	Jun-16	$166,000	$184,000	1%	
32	Walton 2	Walton	KY	Suburban	2	410	783 Jones	May-22	$346,000			Light
							783 Jones	May-12	$174,900	$353,000	-2%	
33	Whitehorn	Gretna	VA	Rural	50	255	1120 Taylors Mill	Dec-21	$224,000			Light
							100 Long Branch	Aug-20	$162,000	$213,920	5%	
34	Altavista	Altavista	VA	Rural	80	540	3211 Leesville	Mar-22	$124,048			Light
							3211 Leesville	Dec-18	$72,500	$97,000	22%	
35	Altavista	Altavista	VA	Rural	80	600	3026 Bishop Crk	Feb-22	$150,000			Heavy
							3026 Bishop Crk	Jul-19	$120,000	$155,000	-3%	

B. Southeastern USA Data – Over 5 MW

1. Matched Pair – AM Best Solar Farm, Goldsboro, Wayne County, NC

This 5 MW solar farm adjoins Spring Garden Subdivision which had new homes and lots available for new construction during the approval and construction of the solar farm. The recent home sales have ranged from $200,000 to $250,000. This subdivision sold out the last homes in late 2014. The solar farm is clearly visible particularly along the north end of this street where there is only a thin line of trees separating the solar farm from the single-family homes.

Homes backing up to the solar farm are selling at the same price for the same floor plan as the homes that do not back up to the solar farm in this subdivision. According to the builder, the solar farm has been a complete non-factor. Not only do the sales show no difference in the price paid for the various homes adjoining the solar farm versus not adjoining the solar farm, but there are actually more recent sales along the solar farm than not. There is no impact on the sellout rate, or time to sell for the homes adjoining the solar farm.

I spoke with a number of owners who adjoin the solar farm and none of them expressed any concern over the solar farm impacting their property value.

The data presented on the following page shows multiple homes that have sold in 2013 and 2014 adjoining the solar farm at prices similar to those not along the solar farm. These series of sales indicate that the solar farm has no impact on the adjoining residential use.

The homes that were marketed at Spring Garden are shown below.

The homes adjoining the solar farm are considered to have a light landscaping screen as it is a narrow row of existing pine trees supplemented with evergreen plantings.

Matched Pairs
As of Date: 9/3/2014

Adjoining Sales After Solar Farm Completed

TAX ID	Owner	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	Style
3600195570	Helm	0.76	Sep-13	$250,000	2013	3,292	$75.94	2 Story
3600195361	Leak	1.49	Sep-13	$260,000	2013	3,652	$71.19	2 Story
3600199891	McBrayer	2.24	Jul-14	$250,000	2014	3,292	$75.94	2 Story
3600198632	Foresman	1.13	Aug-14	$253,000	2014	3,400	$74.41	2 Story
3600196656	Hinson	0.75	Dec-13	$255,000	2013	3,453	$73.85	2 Story
	Average	1.27		$253,600	2013.4	3,418	$74.27	
	Median	1.13		$253,000	2013	3,400	$74.41	

Adjoining Sales After Solar Farm Announced

TAX ID	Owner	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	Style
0	Feddersen	1.56	Feb-13	$247,000	2012	3,427	$72.07	Ranch
0	Gentry	1.42	Apr-13	$245,000	2013	3,400	$72.06	2 Story
	Average	1.49		$246,000	2012.5	3,414	$72.07	
	Median	1.49		$246,000	2012.5	3,414	$72.07	

Adjoining Sales Before Solar Farm Announced

TAX ID	Owner	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	Style
3600183905	Carter	1.57	Dec-12	$240,000	2012	3,347	$71.71	1.5 Story
3600193097	Kelly	1.61	Sep-12	$198,000	2012	2,532	$78.20	2 Story
3600194189	Hadwan	1.55	Nov-12	$240,000	2012	3,433	$69.91	1.5 Story
	Average	1.59		$219,000	2012	2,940	$74.95	
	Median	1.59		$219,000	2012	2,940	$74.95	

Nearby Sales After Solar Farm Completed

TAX ID	Owner	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	Style
3600193710	Barnes	1.12	Oct-13	$248,000	2013	3,400	$72.94	2 Story
3601105180	Nackley	0.95	Dec-13	$253,000	2013	3,400	$74.41	2 Story
3600192528	Mattheis	1.12	Oct-13	$238,000	2013	3,194	$74.51	2 Story
3600198928	Beckman	0.93	Mar-14	$250,000	2014	3,292	$75.94	2 Story
3600196965	Hough	0.81	Jun-14	$224,000	2014	2,434	$92.03	2 Story
3600193914	Preskitt	0.67	Jun-14	$242,000	2014	2,825	$85.66	2 Story
3600194813	Bordner	0.91	Apr-14	$258,000	2014	3,511	$73.48	2 Story
3601104147	Shaffer	0.73	Apr-14	$255,000	2014	3,453	$73.85	2 Story
	Average	0.91		$246,000	2013.625	3,189	$77.85	
	Median	0.92		$249,000	2014	3,346	$74.46	

Nearby Sales Before Solar Farm Announced

TAX ID	Owner	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	Style
3600191437	Thomas	1.12	Sep-12	$225,000	2012	3,276	$68.68	2 Story
3600087968	Lilley	1.15	Jan-13	$238,000	2012	3,421	$69.57	1.5 Story
3600087654	Burke	1.26	Sep-12	$240,000	2012	3,543	$67.74	2 Story
3600088796	Hobbs	0.73	Sep-12	$228,000	2012	3,254	$70.07	2 Story
	Average	1.07		$232,750	2012	3,374	$69.01	
	Median	1.14		$233,000	2012	3,349	$69.13	

Matched Pair Summary

	Adjoins Solar Farm		Nearby Solar Farm	
	Average	**Median**	**Average**	**Median**
Sales Price	$253,600	$253,000	$246,000	$249,000
Year Built	2013	2013	2014	2014
Size	3,418	3,400	3,189	3,346
Price/SF	$74.27	$74.41	$77.85	$74.46

Percentage Differences

Median Price	-2%
Median Size	-2%
Median Price/SF	0%

I note that 2308 Granville Drive sold again in November 2015 for $267,500, or $7,500 more than when it was purchased new from the builder two years earlier (Tax ID 3600195361, Owner: Leak). The neighborhood is clearly showing appreciation for homes adjoining the solar farm.

The Median Price is the best indicator to follow in any analysis as it avoids outlying samples that would otherwise skew the results. The median sizes and median prices are all consistent throughout the sales both before and after the solar farm whether you look at sites adjoining or nearby to the solar farm. The average size for the homes nearby the solar farm shows a smaller building size and a higher price per square foot. This reflects a common occurrence in real estate where the price per square foot goes up as the size goes down. So even comparing averages the indication is for no impact, but I rely on the median rates as the most reliable indication for any such analysis.

I have also considered four more recent resales of homes in this community as shown on the following page. These comparable sales adjoin the solar farm at distances ranging from 315 to 400 feet. The matched pairs show a range from -9% to +6%. The range of the average difference is -2% to +1% with an average of 0% and a median of +0.5%. These comparable sales support a finding of no impact on property value.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other	Distance
	Adjoins	103 Granville Pl	1.42	7/27/2018	$265,000	2013	3,292	$80.50	4/3.5	2-Car	2-Story		385
	Not	2219 Granville	1.15	1/8/2018	$260,000	2012	3,292	$78.98	4/3.5	2-Car	2-Story		
	Not	634 Friendly	0.96	7/31/2019	$267,000	2018	3,053	$87.45	4/4.5	2-Car	2-Story		
	Not	2403 Granville	0.69	4/23/2019	$265,000	2014	2,816	$94.11	5/3.5	2-Car	2-Story		

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
Adjoins	103 Granville Pl								$265,000		-2%
Not	2219 Granville	$4,382		$1,300	$0				$265,682	0%	
Not	634 Friendly	-$8,303		-$6,675	$16,721	-$10,000			$258,744	2%	
Not	2403 Granville	-$6,029		-$1,325	$31,356				$289,001	-9%	

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other	Distance
	Adjoins	104 Erin	2.24	6/19/2017	$280,000	2014	3,549	$78.90	5/3.5	2-Car	2-Story		315
	Not	2219 Granville	1.15	1/8/2018	$260,000	2012	3,292	$78.98	4/3.5	2-Car	2-Story		
	Not	634 Friendly	0.96	7/31/2019	$267,000	2018	3,053	$87.45	4/4.5	2-Car	2-Story		
	Not	2403 Granville	0.69	4/23/2019	$265,000	2014	2,816	$94.11	5/3.5	2-Car	2-Story		

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
Adjoins	104 Erin								$280,000		0%
Not	2219 Granville	-$4,448		$2,600	$16,238				$274,390	2%	
Not	634 Friendly	-$17,370		-$5,340	$34,702	-$10,000			$268,992	4%	
Not	2403 Granville	-$15,029		$0	$48,285				$298,256	-7%	

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other	Distance
	Adjoins	2312 Granville	0.75	5/1/2018	$284,900	2013	3,453	$82.51	5/3.5	2-Car	2-Story		400
	Not	2219 Granville	1.15	1/8/2018	$260,000	2012	3,292	$78.98	4/3.5	2-Car	2-Story		
	Not	634 Friendly	0.96	7/31/2019	$267,000	2018	3,053	$87.45	4/4.5	2-Car	2-Story		
	Not	2403 Granville	0.69	4/23/2019	$265,000	2014	2,816	$94.11	5/3.5	2-Car	2-Story		

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
Adjoins	2312 Granville								$284,900		1%
Not	2219 Granville	$2,476		$1,300	$10,173				$273,948	4%	
Not	634 Friendly	-$10,260		-$6,675	$27,986	-$10,000			$268,051	6%	
Not	2403 Granville	-$7,972		-$1,325	$47,956				$303,659	-7%	

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other	Distance
	Adjoins	2310 Granville	0.76	5/14/2019	$280,000	2013	3,292	$85.05	5/3.5	2-Car	2-Story		400
	Not	2219 Granville	1.15	1/8/2018	$260,000	2012	3,292	$78.98	4/3.5	2-Car	2-Story		
	Not	634 Friendly	0.96	7/31/2019	$267,000	2018	3,053	$87.45	4/4.5	2-Car	2-Story		
	Not	2403 Granville	0.69	4/23/2019	$265,000	2014	2,816	$94.11	5/3.5	2-Car	2-Story		

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
Adjoins	2310 Granville								$280,000		1%
Not	2219 Granville	$10,758		$1,300	$0				$272,058	3%	
Not	634 Friendly	-$1,755		-$6,675	$16,721	-$10,000			$265,291	5%	
Not	2403 Granville	$469		-$1,325	$31,356				$295,500	-6%	

I have also considered the original sales prices in this subdivision relative to the recent resale values as shown in the chart below. This rate of appreciation is right at 2.5% over the last 6 years. Zillow indicates that the average home value within the 27530 zip code as of January 2014 was $101,300 and as of January 2020 that average is $118,100. This indicates an average increase in the market of 2.37%. I conclude that the appreciation of the homes adjoining the solar farm are not impacted by the presence of the solar farm based on this data.

		Initial Sale		Second Sale		Year		%	Apprec.
	Address	Date	Price	Date	Price	Diff	Apprec.	Apprec.	%/Year
1	103 Granville Pl	4/1/2013	$245,000	7/27/2018	$265,000	5.32	$20,000	8.16%	1.53%
2	105 Erin	7/1/2014	$250,000	6/19/2017	$280,000	2.97	$30,000	12.00%	4.04%
3	2312 Granville	12/1/2013	$255,000	5/1/2015	$262,000	1.41	$7,000	2.75%	1.94%
4	2312 Granville	5/1/2015	$262,000	5/1/2018	$284,900	3.00	$22,900	8.74%	2.91%
5	2310 Granville	8/1/2013	$250,000	5/14/2019	$280,000	5.79	$30,000	12.00%	2.07%
6	2308 Granville	9/1/2013	$260,000	11/12/2015	$267,500	2.20	$7,500	2.88%	1.31%
7	2304 Granville	9/1/2012	$198,000	6/1/2017	$225,000	4.75	$27,000	13.64%	2.87%
8	102 Erin	8/1/2014	$253,000	11/1/2016	$270,000	2.25	$17,000	6.72%	2.98%
								Average	2.46%
								Median	2.47%

2. Matched Pair – Mulberry, Selmer, McNairy County, TN

This 16 MW solar farm was built in 2014 on 208.89 acres with the closest home being 480 feet.

This solar farm adjoins two subdivisions with Central Hills having a mix of existing and new construction homes. Lots in this development have been marketed for $15,000 each with discounts offered for multiple lots being used for a single home site. I spoke with the agent with Rhonda Wheeler and Becky Hearnsberger with United County Farm & Home Realty who noted that they have seen no impact on lot or home sales due to the solar farm in this community.

I have included a map below as well as data on recent sales activity on lots that adjoin the solar farm or are near the solar farm in this subdivision both before and after the announced plan for this solar farm facility. I note that using the same method I used to breakdown the adjoining uses at the subject property I show that the predominant adjoining uses are residential and agricultural, which is consistent with the location of most solar farms.

Adjoining Use Breakdown

	Acreage	Parcels
Commercial	3.40%	0.034
Residential	12.84%	79.31%
Agri/Res	10.39%	3.45%
Agricultural	73.37%	13.79%
Total	**100.00%**	**100.00%**

I have run a number of direct matched comparisons on the sales adjoining this solar farm as shown below. These direct matched pairs include some of those shown above as well as additional more recent sales in this community. In each of these I have compared the one sale adjoining the solar farm to multiple similar homes nearby that do not adjoin a solar farm to look for any potential impact from the solar farm.

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
3	Adjoins	491 Dusty	6.86	10/28/2016	$176,000	2009	1,801	$97.72	3/2	2-Gar	Ranch	
	Not	820 Lake Trail	1.00	6/8/2018	$168,000	2013	1,869	$89.89	4/2	2-Gar	Ranch	
	Not	262 Country	1.00	1/17/2018	$145,000	2000	1,860	$77.96	3/2	2-Gar	Ranch	
	Not	35 April	1.15	8/16/2016	$185,000	2016	1,980	$93.43	3/2	2-Gar	Ranch	

Adjoining Sales Adjusted

Parcel	Solar	Address	Time	Site	YB	GLA	Park	Other	Total	% Diff	Distance
3	Adjoins	491 Dusty							$176,000		480
	Not	820 Lake Trail	-$8,324	$12,000	-$3,360	-$4,890			$163,426	7%	
	Not	262 Country	-$5,450	$12,000	$6,525	-$3,680			$154,396	12%	
	Not	35 April	$1,138	$12,000	-$6,475	-$13,380			$178,283	-1%	
									Average	6%	

The best matched pair is 35 April Loop, which required the least adjustment and indicates a -1% increase in value due to the solar farm adjacency.

Adjoining Residential Sales After Solar Farm Built

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
12	Adjoins	57 Cooper	1.20	2/26/2019	$163,000	2011	1,586	$102.77	3/2	2-Gar	1.5 Story	Pool
	Not	191 Amelia	1.00	8/3/2018	$132,000	2005	1,534	$86.05	3/2	Drive	Ranch	
	Not	75 April	0.85	3/17/2017	$134,000	2012	1,588	$84.38	3/2	2-Crprt	Ranch	
	Not	345 Woodland	1.15	12/29/2016	$131,000	2002	1,410	$92.91	3/2	1-Gar	Ranch	

Adjoining Sales Adjusted

Parcel	Solar	Address	Sales Price	Time	Site	YB	GLA	Park	Other	Total	% Diff	Distance
12	Adjoins	57 Cooper	$163,000							$163,000		685
	Not	191 Amelia	$132,000	$2,303		$3,960	$2,685	$10,000	$5,000	$155,947	4%	
	Not	75 April	$134,000	$8,029	$4,000	-$670	-$135	$5,000	$5,000	$155,224	5%	
	Not	345 Woodland	$131,000	$8,710		$5,895	$9,811		$5,000	$160,416	2%	
										Average	4%	

The best matched pair is 191 Amelia, which was most similar in time frame of sale and indicates a +4% increase in value due to the solar farm adjacency.

Adjoining Residential Sales After Solar Farm Built

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
15	Adjoins	297 Country	1.00	9/30/2016	$150,000	2002	1,596	$93.98	3/2	4-Gar	Ranch	
	Not	185 Dusty	1.85	8/17/2015	$126,040	2009	1,463	$86.15	3/2	2-Gar	Ranch	
	Not	53 Glen	1.13	3/9/2017	$126,000	1999	1,475	$85.42	3/2	2-Gar	Ranch	Brick

Adjoining Sales Adjusted

Parcel	Solar	Address	Sales Price	Time	Site	YB	GLA	Park	Other	Total	% Diff	Distance
15	Adjoins	297 Country	$150,000							$150,000		650
	Not	185 Dusty	$126,040	$4,355		-$4,411	$9,167	$10,000		$145,150	3%	
	Not	53 Glen	$126,000	-$1,699		$1,890	$8,269	$10,000		$144,460	4%	
										Average	3%	

The best matched pair is 53 Glen, which was most similar in time frame of sale and required less adjustment. It indicates a +4% increase in value due to the solar farm adjacency.

The average indicated impact from these three sets of matched pairs is +4%, which suggests a mild positive relationship due to adjacency to the solar farm. The landscaping buffer for this project is mostly natural tree growth that was retained as part of the development but much of the trees separating the panels from homes are actually on the lots for the homes themselves. I therefore consider the landscaping buffer to be thin to moderate for these adjoining homes.

I have also looked at several lot sales in this subdivision as shown below.

These are all lots within the same community and the highest prices paid are for lots one parcel off from the existing solar farm. These prices are fairly inconsistent, though they do suggest about a $3,000 loss in the lots adjoining the solar farm. This is an atypical finding and additional details suggest there is more going on in these sales than the data crunching shows. First of all Parcel 4 was purchased by the owner of the adjoining home and therefore an atypical buyer seeking to expand a lot and the site is not being purchased for home development. Moreover, using the SiteToDoBusiness demographic tools, I found that the 1-mile radius around this development is expecting a total population increase over the next 5 years of 3 people. This lack of growing demand for lots is largely explained in that context. Furthermore, the fact that finished home sales as shown above are showing no sign of a negative impact on property value makes this data unreliable and inconsistent with the data shown in sales to an end user. I therefore place little weight on this outlier data.

Parcel	Solar	Address	Acres	Date Sold	Sales Price	4/18/2019 Adj for Time	$/AC	4/18/2019 Adj for Time
4	Adjoins	Shelter	2.05	10/25/2017	$16,000	$16,728	$7,805	$8,160
10	Adjoins	Carter	1.70	8/2/2018	$14,000	$14,306	$8,235	$8,415
11	Adjoins	Cooper	1.28	9/17/2018	$12,000	$12,215	$9,375	$9,543
	Not	75 Dusty	1.67	4/18/2019	$20,000	$20,000	$11,976	$11,976
	Not	Lake Trl	1.47	11/7/2018	$13,000	$13,177	$8,844	$8,964
	Not	Lake Trl	1.67	4/18/2019	$20,000	$20,000	$11,976	$11,976

	Adjoins	Per Acre	Not Adjoins	Per Acre	% DIF/Lot	% DIF/AC
Average	$14,416	$8,706	$17,726	$10,972	19%	21%
Median	$14,306	$8,415	$20,000	$11,976	28%	30%
High	$16,728	$9,543	$20,000	$11,976	16%	20%
Low	$12,215	$8,160	$13,177	$8,964	7%	9%

3. Matched Pair – Leonard Road Solar Farm, Hughesville, Charles County, MD

This 5 MW solar farm is located on 47 acres and mostly adjoins agricultural and residential uses to the west, south and east as shown above. The property also adjoins retail uses and a church. I looked at a 2016 sale of an adjoining home with a positive impact on value adjoining the solar farm of 2.90%. This is within typical market friction and supports an indication of no impact on property value.

I have shown this data below. The landscaping buffer is considered heavy.

Leonardtown Road Solar Farm, Hughesville, MD

Nearby Residential Sale After Solar Farm Construction

Address	Solar Farm	Acres	Date Sold	Sales Price*	Built	GBA	$/GBA	Style	BR/BA	Bsmt	Park	Upgrades	Other
14595 Box Elder Ct	Adjoins	3.00	2/12/2016	$291,000	1991	2,174	$133.85	Colonial	5/2.5	No	2 Car Att	N/A	Deck
15313 Bassford Rd	Not	3.32	7/20/2016	$329,800	1990	2,520	$130.87	Colonial	3/2.5	Finished	2 Car Att	Custom	Scr Por/Patio

*$9,000 concession deducted from sale price for Box Elder and $10,200 deducted from Bassford

Adjoining Sales Adjusted

Address	Date Sold	Sales Price	Time	GLA	Bsmt	Upgrades	Other	Total
14595 Box Elder Ct	2/12/2016	$291,000						$291,000
15313 Bassford Rd	7/20/2016	$329,800	-$3,400	-$13,840	-$10,000	-$15,000	-$5,000	$282,560
				Difference Attributable to Location				$8,440
								2.90%

This is within typical market friction and supports an indication of no impact on property value.

4. Matched Pair – Gastonia SC Solar, Gastonia, Gaston County, NC

This 5 MW project is located on the south side of Neal Hawkins Road just outside of Gastonia. The property identified above as Parcel 4 was listed for sale while this solar farm project was going

through the approval process. The property was put under contract during the permitting process with the permit being approved while the due diligence period was still ongoing. After the permit was approved the property closed with no concerns from the buyer. I spoke with Jennifer Bouvier, the broker listing the property and she indicated that the solar farm had no impact at all on the sales price. She considered some nearby sales to set the price and the closing price was very similar to the asking price within the typical range for the market. The buyer was aware that the solar farm was coming and they had no concerns.

This two-story brick dwelling was sold on March 20, 2017 for $270,000 for a 3,437 square foot dwelling built in 1934 in average condition on 1.42 acres. The property has four bedrooms and two bathrooms. The landscaping screen is light for this adjoining home due to it being a new planted landscaping buffer.

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
Adjoins	609 Neal Hawkins	1.42	3/20/2017	$270,000	1934	3,427	$78.79	4/2	Open	2-Brick	
Not	1418 N Modena	4.81	4/17/2018	$225,000	1930	2,906	$77.43	3/3	2-Crprt	2-Brick	
Not	363 Dallas Bess	2.90	11/29/2018	$265,500	1968	2,964	$89.57	3/3	Open	FinBsmt	
Not	1612 Dallas Chry	2.74	9/17/2018	$245,000	1951	3,443	$71.16	3/2	Open	2-Brick	Unfin bath

Adjoining Sales Adjusted

Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
609 Neal Hawkins								$270,000			225
1418 N Modena	$7,319		$2,700	$32,271		-$10,000		$257,290	5%		
363 Dallas Bess	$746		-$27,081	$33,179	-$10,000		$53,100	$262,456	3%		
1612 Dallas Chry	$4,110		-$12,495	-$911			$10,000	$235,704	13%		
										7%	

I also considered the newer adjoining home identified as Parcel 5 that sold later in 2017 and it likewise shows no negative impact on property value. This is also considered a light landscaping buffer.

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style
Adjoins	611 Neal Hawkins	0.78	7/6/2017	$288,000	1991	2,256	$127.66	5/3	2-Gar	1.5 Brick
Not	1211 Still Frst	0.51	7/30/2018	$280,000	1989	2,249	$124.50	3/3	2-Gar	Br Rnch
Not	2867 Colony Wds	0.52	8/14/2018	$242,000	1990	2,006	$120.64	3/3	2-Gar	Br Rnch
Not	1010 Strawberry	1.00	10/4/2018	$315,000	2002	2,330	$135.19	3/2.5	2-Gar	1.5 Brick

Adjoining Sales Adjusted

Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
611 Neal Hawkins								$288,000			145
1211 Still Frst	$1,341		$2,800	$697				$284,838	1%		
2867 Colony Wds	$7,714		$1,210	$24,128				$275,052	4%		
1010 Strawberry	-$4,555		-$17,325	-$8,003	$5,000			$290,116	-1%		
										2%	

5. Matched Pair – Summit/Ranchlands Solar, Moyock, Currituck County, NC

This project is located at 1374 Caritoke Highway, Moyock, NC. This is an 80 MW facility on a parent tract of 2,034 acres. Parcels Number 48 and 53 as shown in the map above were sold in 2016. The project was under construction during the time period of the first of the matched pair sales and the permit was approved well prior to that in 2015.

I looked at multiple sales of adjoining and nearby homes and compared each to multiple comparables to show a range of impacts from -10% up to +11% with an average of +2% and a median of +3%. These ranges are well within typical real estate variation and supports an indication of no impact on property value.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other	Distance
48	Adjoins	129 Pinto	4.29	4/15/2016	$170,000	1985	1,559	$109.04	3/2	Drive	MFG		1,060
	Not	102 Timber	1.30	4/1/2016	$175,500	2009	1,352	$129.81	3/2	Drive	MFG		
	Not	120 Ranchland	0.99	10/1/2014	$170,000	2002	1,501	$113.26	3/2	Drive	MFG		

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
Adjoins	129 Pinto								$170,000		-3%
Not	102 Timber	$276	$10,000	-$29,484	$18,809				$175,101	-3%	
Not	120 Ranchland	$10,735	$10,000	-$20,230	$4,598				$175,103	-3%	

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
Adjoins	105 Pinto	4.99	12/16/2016	$206,000	1978	1,484	$138.81	3/2	Det G	Ranch	
Not	111 Spur	1.15	2/1/2016	$193,000	1985	2,013	$95.88	4/2	Gar	Ranch	
Not	103 Marshall	1.07	3/29/2017	$196,000	2003	1,620	$120.99	3/2	Drive	Ranch	
Not	127 Ranchland	0.00	6/9/2015	$219,900	1988	1,910	$115.13	3/2	Gar/3Det	Ranch	

Adjoining Sales Adjusted

Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
105 Pinto								$206,000			980
111 Spur	$6,747	$10,000	-$6,755	-$25,359				$177,633	14%		
103 Marshall	-$2,212	$10,000	-$24,500	-$8,227		$5,000		$176,212	14%		
127 Ranchland	$13,399	$10,000	-$10,995	-$24,523		-$10,000		$197,781	4%		
										11%	

Adjoining Residential Sales After Solar Farm Built

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other	Distance
15	Adjoins	318 Green View	0.44	9/15/2019	$357,000	2005	3,460	$103.18	4/4	2-Car	1.5 Brick		570
	Not	195 St Andrews	0.55	6/17/2018	$314,000	2002	3,561	$88.18	5/3	2-Car	2.0 Brick		
	Not	336 Green View	0.64	1/13/2019	$365,000	2006	3,790	$96.31	6/4	3-Car	2.0 Brick		
	Not	275 Green View	0.36	8/15/2019	$312,000	2003	3,100	$100.65	5/3	2-Car	2.0 Brick		

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
Adjoins	318 Green View								$357,000		4%
Not	195 St Andrews	$12,040		$4,710	-$7,125	$10,000			$333,625	7%	
Not	336 Green View	$7,536		-$1,825	-$25,425			-$5,000	$340,286	5%	
Not	275 Green View	$815		$3,120	$28,986	$10,000			$354,921	1%	

Adjoining Residential Sales After Solar Farm Built

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other	Distance
29	Adjoins	164 Ranchland	1.01	4/30/2019	$169,000	1999	2,052	$82.36	4/2	Gar	MFG		440
	Not	150 Pinto	0.94	3/27/2018	$168,000	2017	1,920	$87.50	4/2	Drive	MFG		
	Not	105 Longhorn	1.90	10/10/2017	$184,500	2002	1,944	$94.91	3/2	Drive	MFG		
	Not	112 Pinto	1.00	7/27/2018	$180,000	2002	1,836	$98.04	3/2	Drive	MFG	Fenced	

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
Adjoins	164 Ranchland								$169,000		-10%
Not	150 Pinto	$5,649		-$21,168	$8,085			$5,000	$165,566	2%	
Not	105 Longhorn	$8,816	-$10,000	-$3,875	$7,175			$5,000	$191,616	-13%	
Not	112 Pinto	$4,202		-$3,780	$14,824			$5,000	$200,245	-18%	

Adjoining Residential Sales After Solar Farm Built

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other	Distance
	Adjoins	358 Oxford	10.03	9/16/2019	$478,000	2008	2,726	$175.35	3/3	2 Gar	Ranch		635
	Not	276 Summit	10.01	12/20/2017	$355,000	2006	1,985	$178.84	3/2	2 Gar	Ranch		
	Not	176 Providence	6.19	5/6/2019	$425,000	1990	2,549	$166.73	3/3	4 Gar	Ranch	Brick	
	Not	1601 B Caratoke	12.20	9/26/2019	$440,000	2016	3,100	$141.94	4/3.5	5 Gar	Ranch	Pool	

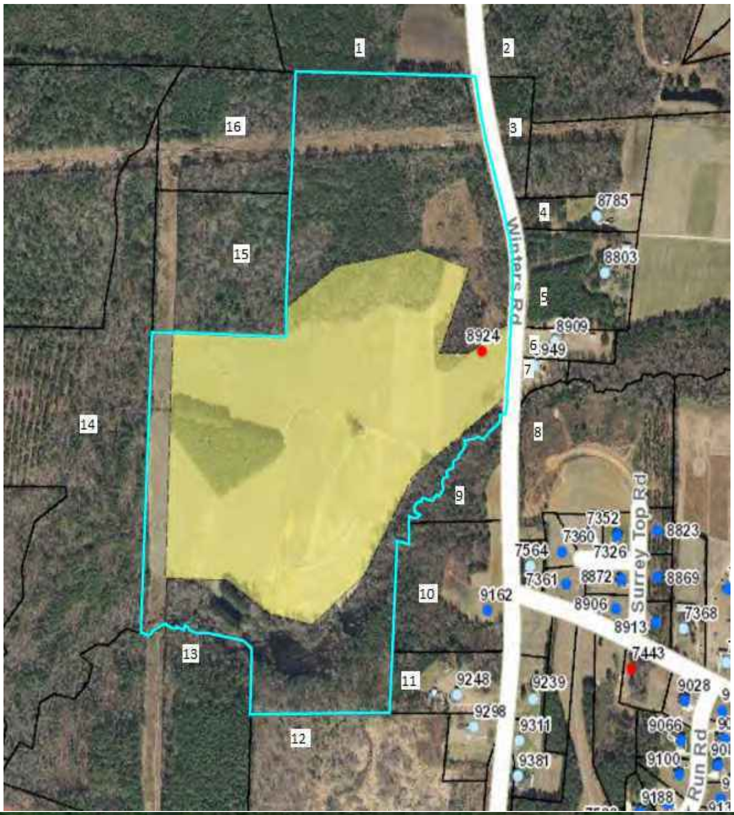
Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
Adjoins	358 Oxford								$478,000		5%
Not	276 Summit	$18,996		$3,550	$106,017	$10,000			$493,564	-3%	
Not	176 Providence	$4,763		$38,250	$23,609		-$10,000	-$25,000	$456,623	4%	
Not	1601 B Caratoke	-$371	$50,000	-$17,600	-$42,467	-$5,000	-$10,000		$414,562	13%	

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other	Distance
	Nearby	343 Oxford	10.01	3/9/2017	$490,000	2016	3,753	$130.56	3/3	2 Gar	1.5 Story	Pool	970
	Not	287 Oxford	10.01	9/4/2017	$600,000	2013	4,341	$138.22	5/4.5	8-Gar	1.5 Story	Pool	
	Not	301 Oxford	10.00	4/23/2018	$434,000	2013	3,393	$127.91	5/3	2 Gar	1.5 Story		
	Not	218 Oxford	10.01	4/4/2017	$525,000	2006	4,215	$124.56	4/3	4 Gar	1.5 Story	VG Barn	

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
Adjoins	343 Oxford								$490,000		3%
Not	287 Oxford	-$9,051		$9,000	-$65,017	-$15,000	-$25,000		$494,932	-1%	
Not	301 Oxford	-$14,995	-$10,000	$6,510	$36,838				$452,353	8%	
Not	218 Oxford	-$1,150		$26,250	-$46,036		-$10,000	-$10,000	$484,064	1%	

6. Matched Pair – Tracy Solar, Bailey, Nash County, NC



This project is located in rural Nash County on Winters Road with a 5 MW facility that was built in 2016 on 50 acres. A local builder acquired parcels 9 and 10 following construction as shown below at rates comparable to other tracts in the area. They then built a custom home for an owner and sold that at a price similar to other nearby homes as shown in the matched pair data below. The retained woods provide a heavy landscaped buffer for this homesite.

Adjoining Land Sales After Solar Farm Completed

#	Solar Farm	TAX ID	Grantor	Grantee	Address	Acres	Date Sold	Sales Price	$/AC	Other
9 &10	Adjoins	316003 & 316004	Cozart	Kingsmill	9162 Winters	13.22	7/21/2016	$70,000	$5,295	
	Not	6056	Billingsly		427 Young	41	10/21/2016	$164,000	$4,000	
	Not	33211	Fulcher	Weikel	10533 Cone	23.46	7/18/2017	$137,000	$5,840	Doublewide, structures
	Not	106807	Perry	Gardner	Claude Lewis	11.22	8/10/2017	$79,000	$7,041	Gravel drive for sub, cleared
	Not	3437	Vaughan	N/A	11354 Old Lewis Sch	18.73	Listing	$79,900	$4,266	Small cemetery,wooded

Adjoining Sales Adjusted

Time	Acres	Location	Other	Adj $/Ac	% Diff
				$5,295	
$0	$400	$0	$0	$4,400	17%
-$292	$292	$0	-$500	$5,340	-1%
-$352	$0	$0	-$1,000	$5,689	-7%
-$213	$0	$0	$213	$4,266	19%
				Average	7%

Adjoining Residential Sales After Solar Farm Completed

#	Solar Farm	n	Address	Acres	Date Sold	Sales Price	Built	GLA	$/GLA	BR/BA	Style	Other
9 &10	Adjoins	g	9162 Winters	13.22	1/5/2017	$255,000	2016	1,616	$157.80	3/2	Ranch	1296 sf wrkshp
	Not	v	7352 Red Fox	0.93	6/30/2016	$176,000	2010	1,529	$115.11	3/2	2-story	

Adjoining Sales Adjusted

Time	Acres	YB	GLA	Style	Other	Total	% Diff
						$255,000	
$0	$44,000	$7,392	$5,007	$5,000	$15,000	$252,399	1%

The comparables for the land show either a significant positive relationship or a mild negative relationship to having and adjoining solar farm, but when averaged together they show no negative impact. The wild divergence is due to the difficulty in comping out this tract of land and the wide variety of comparables used. The two comparables that show mild negative influences include a property that was partly developed as a residential subdivision and the other included a doublewide with some value and accessory agricultural structures. The tax assessed value on the improvements were valued at $60,000. So both of those comparables have some limitations for comparison. The two that show significant enhancement due to adjacency includes a property with a cemetery located in the middle and the other is a tract almost twice as large. Still that larger tract after adjustment provides the best matched pair as it required the least adjustment. I therefore conclude that there is no negative impact due to adjacency to the solar farm shown by this matched pair.

The dwelling that was built on the site was a build-to-suit and was compared to a nearby homesale of a property on a smaller parcel of land. I adjusted for that differenced based on a $25,000 value for a 1-acre home site versus the $70,000 purchase price of the larger subject tract. The other adjustments are typical and show no impact due to the adjacency to the solar farm.

The closest solar panel to the home is 780 feet away.

I note that the representative for Kingsmill Homes indicated that the solar farm was never a concern in purchasing the land or selling the home. He also indicated that they had built a number of nearby homes across the street and it had never come up as an issue.

n is located near Seminole Trail, Parrish, FL. The solar farm has a 74.50 MW output on a 1,180.38 acre tract and was built in 2016. The tract is owned by Florida Power any.

ered the recent sale of 13670 Highland Road, Wimauma, Florida. This one-story, home is located just north of the solar farm and separated from the solar farm by a or. This home is a 3 BR, 3 BA 1,512 s.f. home with a carport and workshop. The des new custom cabinets, granite counter tops, brand new stainless steel appliances, ooms and new carpet in the bedrooms. The home is sitting on 5 acres. The home 997.

red this sale to several nearby homesales as part of this matched pair analysis as The landscaping separating the home from the solar farm is considered heavy.

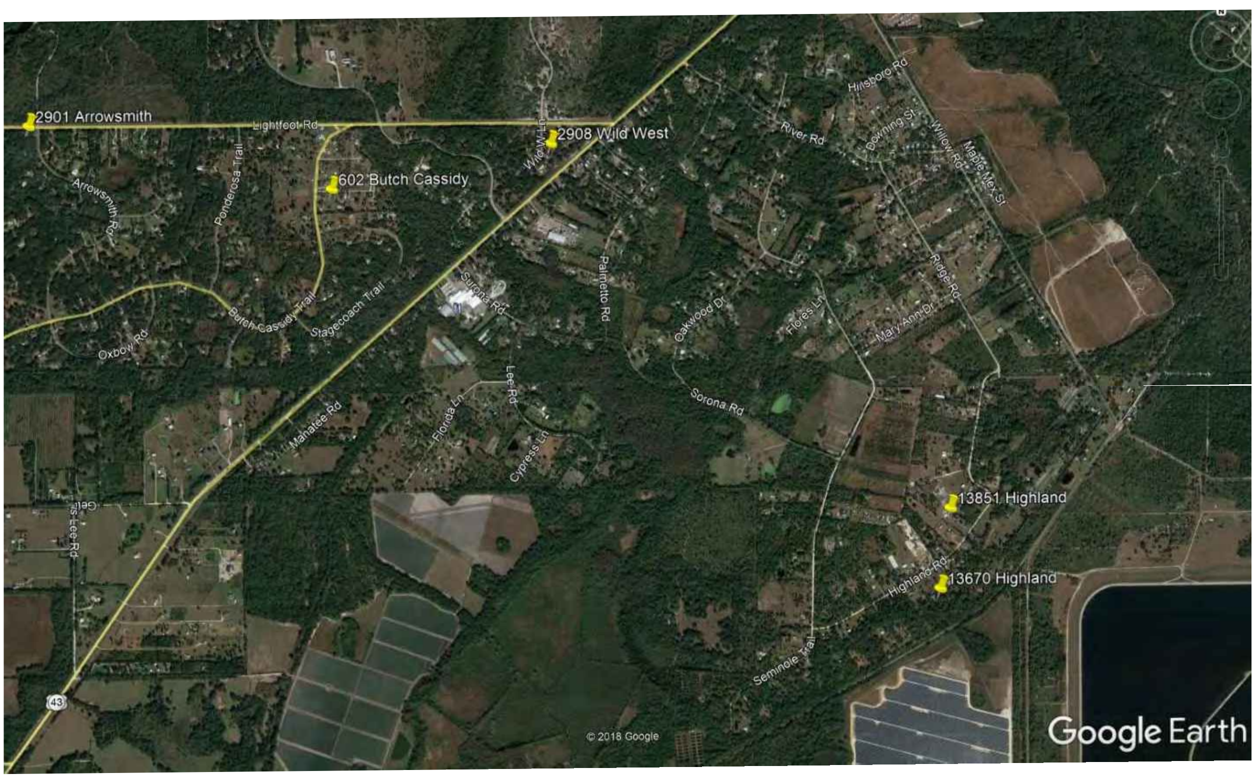
Solar	TAX ID/Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Note
Adjoins	13670 Highland	5.00	8/21/2017	$255,000	1997	1,512	$168.65	3/3	Carport/Wrkshp	Ranch	Renov.
Not	2901 Arrowsmith	1.91	1/31/2018	$225,000	1979	1,636	$137.53	3/2	2 Garage/Wrkshp	Ranch	
Not	602 Butch Cassidy	1.00	5/5/2017	$220,000	2001	1,560	$141.03	3/2	N/A	Ranch	Renov.
Not	2908 Wild West	1.23	7/12/2017	$254,000	2003	1,554	$163.45	3/2	2 Garage/Wrkshp	Ranch	Renov.
Not	13851 Highland	5.00	9/13/2017	$240,000	1978	1,636	$146.70	4/2	3 Garage	Ranch	Renov.

		Adjoining Sales Adjusted								
Solar	**TAX ID/Address**	**Time**	**Acres**	**YB**	**GLA**	**BR/BA**	**Park**	**Note**	**Total**	**% Diff**
Adjoins	13670 Highland								$255,000	
Not	2901 Arrowsmith	$2,250	$10,000	$28,350	-$8,527	$5,000	-$10,000	$10,000	$262,073	-3%
Not	602 Butch Cassidy	-$2,200	$10,000	-$6,160	-$3,385	$5,000	$2,000		$225,255	12%
Not	2908 Wild West	$0	$10,000	-$10,668	-$3,432	$5,000	-$10,000		$244,900	4%
Not	13851 Highland	$0	$0	$31,920	-$9,095	$3,000	-$10,000		$255,825	0%
									Average	3%

The sales prices of the comparables before adjustments range from $220,000 to $254,000. After adjustments they range from $225,255 to $262,073. The comparables range from no impact to a strong positive impact. The comparables showing -3% and +4% impact on value are considered within a typical range of value and therefore not indicative of any impact on property value.

This set of matched pair data falls in line with the data seen in other states. The closest solar panel to the home at 13670 Highland is 1,180 feet. There is a wooded buffer between these two properties.

I have included a map showing the relative location of these properties below.



8. Matched Pair – McBride Place Solar Farm, Midland, Cabarrus County, NC

This project is located on Mount Pleasant Road, Midland, North Carolina. The property is on 627 acres on an assemblage of 974.59 acres. The solar farm was approved in early 2017 for a 74.9 MW facility.

I have considered the sale of 4380 Joyner Road which adjoins the proposed solar farm near the northwest section. This property was appraised in April of 2017 for a value of $317,000 with no consideration of any impact due to the solar farm in that figure. The property sold in November

2018 for $325,000 with the buyer fully aware of the proposed solar farm. The landscaping buffer relative to Joyner Road, Hayden Way, Chanel Court and Kristi Lane is considered medium, while the landscaping for the home at the north end of Chanel Court is considered very light.

I have considered the following matched pairs to the subject property.

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	4380 Joyner	12.00	11/22/2017	$325,000	1979	1,598	$203.38	3/2	2xGar	Ranch	Outbldg
Not	3870 Elkwood	5.50	8/24/2016	$250,000	1986	1,551	$161.19	3/2.5	Det 2xGar	Craft	
Not	8121 Lower Rocky	18.00	2/8/2017	$355,000	1977	1,274	$278.65	2/2	2xCarprt	Ranch	Eq. Fac.
Not	13531 Cabarrus	7.89	5/20/2016	$267,750	1981	2,300	$116.41	3/2	2xGar	Ranch	

Adjoining Sales Adjusted

Time	Acres	YB	Condition	GLA	BR/BA	Park	Other	Total	% Diff
								$325,000	
$7,500	$52,000	-$12,250	$10,000	$2,273	-$2,000	$2,500	$7,500	$317,523	2%
$7,100	-$48,000	$4,970		$23,156	$0	$3,000	-$15,000	$330,226	-2%
$8,033	$33,000	-$3,749	$20,000	-$35,832	$0	$0	$7,500	$296,702	9%
								Average	3%

The home at 4380 Joyner Road is 275 feet from the closest solar panel.

I also considered the recent sale of a lot at 5800 Kristi Lane that is on the east side of the proposed solar farm. This 4.22-acre lot sold in December 2017 for $94,000. A home was built on this lot in 2019 with the closest point from home to panel at 689 feet. The home site is heavily wooded and their remains a wooded buffer between the solar panels and the home. I spoke with the broker, Margaret Dabbs, who indicated that the solar farm was considered a positive by both buyer and seller as it insures no subdivision will be happening in that area. Buyers in this market are looking for privacy and seclusion.

The breakdown of recent lot sales on Kristi are shown below with the lowest price paid for the lot with no solar farm exposure, though that lot has exposure to Mt Pleasant Road South. Still the older lot sales have exposure to the solar farm and sold for higher prices than the front lot and adjusting for time would only increase that difference.

Adjoining Lot Sales After Solar Farm Built

Parcel	Solar	Address	Acres	Date Sold	Sales Price	$/AC	$/Lot
	Adjoins	5811 Kristi	3.74	5/1/2018	$100,000	$26,738	$100,000
	Adjoins	5800 Kristi	4.22	12/1/2017	$94,000	$22,275	$94,000
	Not	5822 Kristi	3.43	2/24/2020	$90,000	$26,239	$90,000

The lot at 5811 Kristi Lane sold in May 2018 for $100,000 for a 3.74-acre lot. The home that was built later in 2018 is 505 feet to the closest solar panel. This home then sold to a homeowner for $530,000 in April 2020. I have compared this home sale to other properties in the area as shown below.

Adjoining Residential Sales After Solar Farm Built

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	5811 Kristi	3.74	3/31/2020	$530,000	2018	3,858	$137.38	5/3.5	2 Gar	2-story	Cement Ext
Not	3915 Tania	1.68	12/9/2019	$495,000	2007	3,919	$126.31	3/3.5	2 Gar	2-story	3Det Gar
Not	6782 Manatee	1.33	3/8/2020	$460,000	1998	3,776	$121.82	4/2/2h	2 Gar	2-story	Water
Not	314 Old Hickory	1.24	9/20/2019	$492,500	2017	3,903	$126.18	6/4.5	2 Gar	2-story	

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
Adjoins	5811 Kristi								$530,000		5%
Not	3915 Tania	$6,285		$27,225	-$3,852		-$20,000		$504,657	5%	
Not	6782 Manatee	$1,189		$46,000	$4,995	$5,000			$517,183	2%	
Not	314 Old Hickory	$10,680		$2,463	-$2,839	-$10,000			$492,803	7%	

After adjusting the comparables, I found that the average adjusted value shows a slight increase in value for the subject property adjoining a solar farm. As in the other cases, this is a mild positive impact on value but within the typical range of real estate transactions.

I also looked at 5833 Kristi Lane that sold on 9/14/2020 for $625,000. This home is 470 feet from the closest panel.

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
Nearby	5833 Kristi	4.05	9/14/2020	$625,000	2008	4,373	$142.92	5/4	3-Car	2-Brick	
Not	4055 Dakeita	4.90	12/30/2020	$629,000	2005	4,427	$142.08	4/4	4-Car	2-Brick	4DetGar/Stable
Not	9615 Bales	2.16	6/30/2020	$620,000	2007	4,139	$149.79	4/5	3-Car	2-Stone	2DetGar
Not	9522 Bales	1.47	6/18/2020	$600,000	2007	4,014	$149.48	4/4.5	3-Car	2-Stone	

Adjoining Sales Adjusted

Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
5833 Kristi								$625,000			470
4055 Dakeita	-$9,220		$5,661	-$6,138		-$25,000		$594,303	5%		
9615 Bales	$6,455		$1,860	$28,042	-$10,000	-$15,000		$631,356	-1%		
9522 Bales	$7,233		$1,800	$42,930	-$5,000			$646,963	-4%		
										0%	

The average difference is 0% impact and the differences are all within a close range with this set of comparables and supports a finding of no impact on property value.

I have also looked at 4504 Chanel Court. This home sold on January 1, 2020 for $393,500 for this 3,010 square foot home built in 2004 with 3 bedrooms, 3.5 bathrooms, and a 3-car garage. This home includes a full partially finished basement that significantly complicates comparing this to other sales. This home previously sold on January 23, 2017 for $399,000. This was during the time that the solar farm was a known factor as the solar farm was approved in early 2017 and public discussions had already commenced. I spoke with Rachelle Killman with Real Estate Realty, LLC the buyer's agent for this transaction and she indicated that the solar farm was not a factor or consideration for the buyer. She noted that you could see the panels sort of through the trees, but it wasn't a concern for the buyer. She was not familiar with the earlier 2017 sale, but indicated that it was likely too high. This again goes back to the partially finished basement issue. The basement has a fireplace, and an installed 3/4 bathroom but otherwise bare studs and concrete floors with different buyers assigning varying value to that partly finished space. I also reached out to Don Gomez with Don Anthony Realty, LLC as he was the listing agent.

I also looked at the recent sale of 4599 Chanel Court. This home is within 310 feet of solar panels but notably does not have a good landscaping screen in place as shown in the photo below. The plantings appear to be less than 3-feet in height and only a narrow, limited screen of existing hardwoods were kept. The photograph is from the listing.

According to Scott David with Better Homes and Gardens Paracle Realty, this property was under contract for $550,000 contingent on the buyer being able to sell their former home. The former home was apparently overpriced and did not sell and the contract stretched out over 2.5 months.

The seller was in a bind as they had a home they were trying to buy contingent on this closing and were about to lose that opportunity. A cash buyer offered them a quick close at $500,000 and the seller accepted that offer in order to not lose the home they were trying to buy. According to Mr. David, the original contracted buyer and the actual cash buyer never considered the solar farm as a negative. In fact Mr. David noted that the actual buyer saw it as a great opportunity to purchase a home where a new subdivision could not be built behind his house. I therefore conclude that this property supports a finding of no impact on adjoining property, even where the landscaping screen still requires time to grow in for a year-round screen.

I also considered a sale/resale analysis on this property. This same home sold on September 15, 2015 for $462,000. Adjusting this upward by 5% per year for the five years between these sales dates suggests a value of $577,500. Comparing that to the $550,000 contract that suggests a 5% downward impact, which is within a typical market variation. Given that the broker noted no negative impact from the solar farm and the analysis above, I conclude this sale supports a finding of no impact on value.

9. Matched Pair – Mariposa Solar, Blacksnake Road, Stanley, Gaston County, NC

This project is a 5 MW facility located on 35.80 acres out of a parent tract of 87.61 acres at 517 Blacksnake Road, Stanley that was built in 2016.

I have considered a number of recent sales around this facility as shown below.

The first is identified in the map above as Parcel 1, which is 215 Mariposa Road. This is an older dwelling on large acreage with only one bathroom. I've compared it to similar nearby homes as shown below. The landscaping buffer for this home is considered light.

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style
Adjoins	215 Mariposa	17.74	12/12/2017	$249,000	1958	1,551	$160.54	3/1	Garage	Br/Rnch
Not	249 Mariposa	0.48	3/1/2019	$153,000	1974	1,792	$85.38	4/2	Garage	Br/Rnch
Not	110 Airport	0.83	5/10/2016	$166,000	1962	2,165	$76.67	3/2	Crprt	Br/Rnch
Not	1249 Blacksnake	5.01	9/20/2018	$242,500	1980	2,156	$112.48	3/2	Drive	1.5
Not	1201 Abernathy	27.00	5/3/2018	$390,000	1970	2,190	$178.08	3/2	Crprt	Br/Rnch

Adjoining Residential Sales After Solar Farm Approved					Adjoining Sales Adjusted								
Solar	**Address**	**Acres**	**Date Sold**	**Sales Price**	**Time**	**YB**	**Acres**	**GLA**	**BR/BA**	**Park**	**Other**	**Total**	**% Diff**
Adjoins	215 Mariposa	17.74	12/12/2017	$249,000								$249,000	
Not	249 Mariposa	0.48	3/1/2019	$153,000	-$5,583	-$17,136	$129,450	-$20,576	-$10,000			$229,154	8%
Not	110 Airport	0.83	5/10/2016	$166,000	$7,927	-$4,648	$126,825	-$47,078	-$10,000			$239,026	4%
Not	1249 Blacksnake	5.01	9/20/2018	$242,500	-$5,621	-$37,345	$95,475	-$68,048	-$10,000	$5,000		$221,961	11%
Not	1201 Abernathy	27.00	5/3/2018	$390,000	-$4,552	-$32,760	-$69,450	-$60,705	-$10,000			$212,533	15%
												Average	9%

The average difference after adjusting for all factors is +9% on average, which suggests an enhancement due to the solar farm across the street. Given the large adjustments for acreage and size, I will focus on the low end of the adjusted range at 4%, which is within the typical deviation and therefore suggests no impact on value.

I have also considered Parcel 4 that sold after the solar farm was approved but before it had been constructed in 2016. The landscaping buffer for this parcel is considered light.

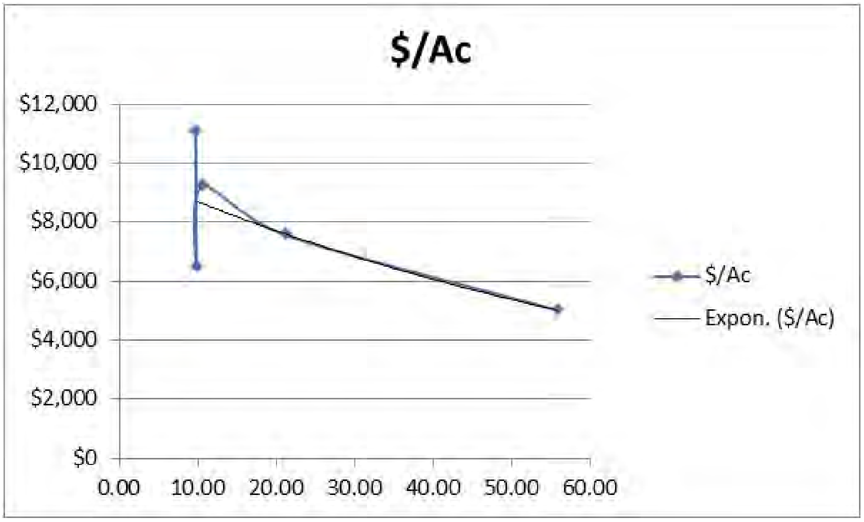
Adjoining Residential Sales After Solar Farm Approved											
Solar	**Address**	**Acres**	**Date Sold**	**Sales Price**	**Built**	**GBA**	**$/GBA**	**BR/BA**	**Park**	**Style**	**Other**
Adjoins	242 Mariposa	2.91	9/21/2015	$180,000	1962	1,880	$95.74	3/2	Carport	Br/Rnch	Det Wrkshop
Not	249 Mariposa	0.48	3/1/2019	$153,000	1974	1,792	$85.38	4/2	Garage	Br/Rnch	
Not	110 Airport	0.83	5/10/2016	$166,000	1962	2,165	$76.67	3/2	Crprt	Br/Rnch	
Not	1249 Blacksnake	5.01	9/20/2018	$242,500	1980	2,156	$112.48	3/2	Drive	1.5	

Adjoining Residential Sales After Solar Farm Approved					Adjoining Sales Adjusted								
Solar	**Address**	**Acres**	**Date Sold**	**Sales Price**	**Time**	**YB**	**Acres**	**GLA**	**BR/BA**	**Park**	**Other**	**Total**	**% Diff**
Adjoins	242 Mariposa	2.91	9/21/2015	$180,000								$180,000	
Not	249 Mariposa	0.48	3/1/2019	$153,000	-$15,807	-$12,852	$18,468	$7,513		-$3,000	$25,000	$172,322	4%
Not	110 Airport	0.83	5/10/2016	$166,000	-$3,165	$0	$15,808	-$28,600			$25,000	$175,043	3%
Not	1249 Blacksnake	5.01	9/20/2018	$242,500	-$21,825	-$30,555	-$15,960	-$40,942		$2,000	$25,000	$160,218	11%
												Average	6%

The average difference after adjusting for all factors is +6%, which is again suggests a mild increase in value due to the adjoining solar farm use. The median is a 4% adjustment, which is within a standard deviation and suggests no impact on property value.

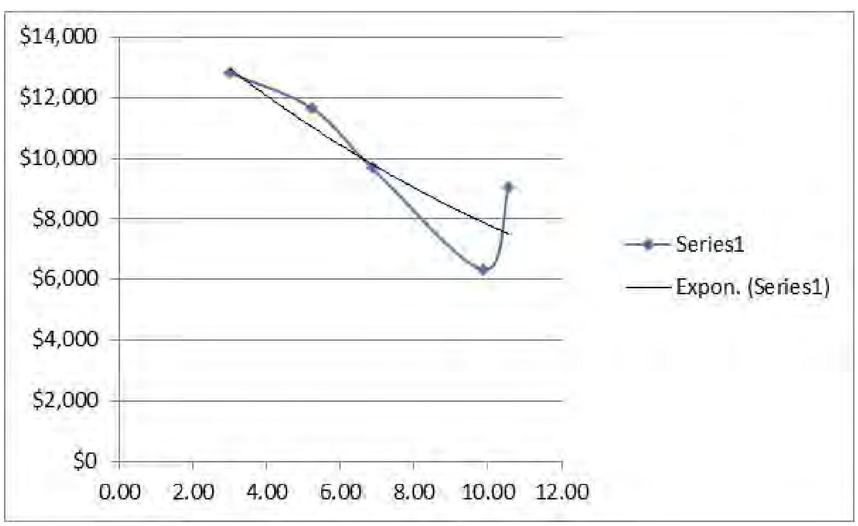
I have also considered the recent sale of Parcel 13 that is located on Blacksnake Road south of the project. I was unable to find good land sales in the same 20-acre range, so I have considered sales of larger and smaller acreage. I adjusted each of those land sales for time. I then applied the price per acre to a trendline to show where the expected price per acre would be for 20 acres. As can be seen in the chart below, this lines up exactly with the purchase of the subject property. I therefore conclude that there is no impact on Parcel 13 due to proximity to the solar farm.

Adjoining Residential Land Sales After Solar Farm Approved						Adjoining Sales Adjusted	
Solar	**Tax/Street**	**Acres**	**Date Sold**	**Sales Price**	**$/Ac**	**Time**	**$/Ac**
Adjoins	174339/Blacksnake	21.15	6/29/2018	$160,000	$7,565		$7,565
Not	227852/Abernathy	10.57	5/9/2018	$97,000	$9,177	$38	$9,215
Not	17443/Legion	9.87	9/7/2018	$64,000	$6,484	-$37	$6,447
Not	164243/Alexis	9.75	2/1/2019	$110,000	$11,282	-$201	$11,081
Not	176884/Bowden	55.77	6/13/2018	$280,000	$5,021	$7	$5,027

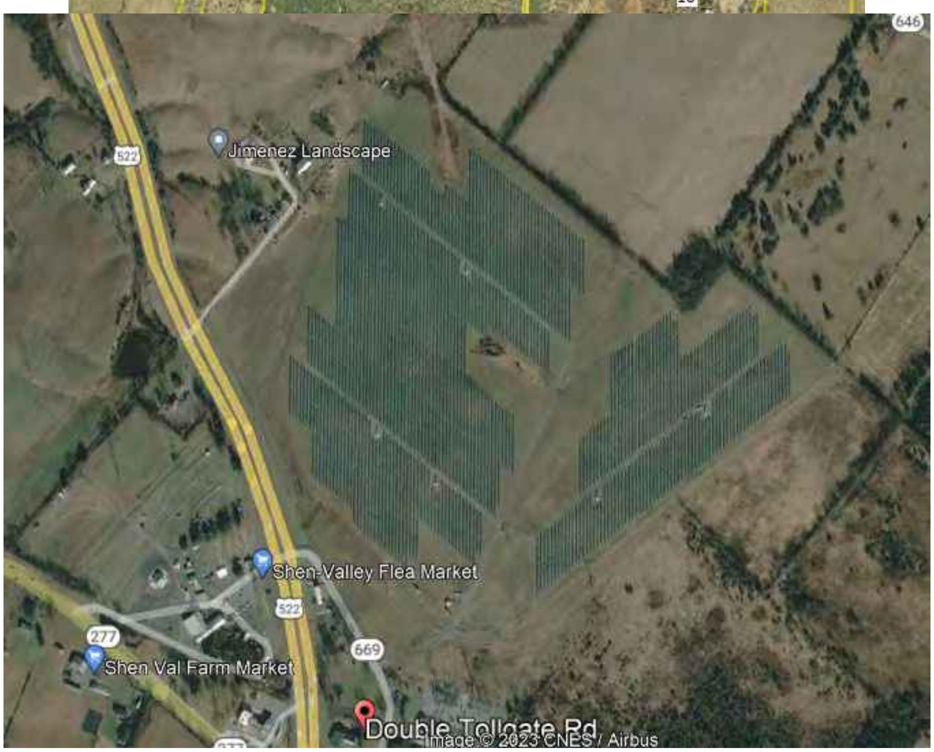


Finally, I have considered the recent sale of Parcel 17 that sold as vacant land. I was unable to find good land sales in the same 7 acre range, so I have considered sales of larger and smaller acreage. I adjusted each of those land sales for time. I then applied the price per acre to a trendline to show where the expected price per acre would be for 7 acres. As can be seen in the chart below, this lines up with the trendline running right through the purchase price for the subject property. I therefore conclude that there is no impact on Parcel 13 due to proximity to the solar farm. I note that this property was improved with a 3,196 square foot ranch built in 2018 following the land purchase, which shows that development near the solar farm was unimpeded.

Adjoining Residential Land Sales After Solar Farm Approved						**Adjoining Sales Adjusted**		
Solar	**Tax/Street**	**Acres**	**Date Sold**	**Sales Price**	**$/Ac**	**Time**	**Location**	**$/Ac**
Adjoins	227039/Mariposa	6.86	12/6/2017	$66,500	$9,694			$9,694
Not	227852/Abernathy	10.57	5/9/2018	$97,000	$9,177	-$116		$9,061
Not	17443/Legion	9.87	9/7/2018	$64,000	$6,484	-$147		$6,338
Not	177322/Robinson	5.23	5/12/2017	$66,500	$12,715	$217	-$1,272	$11,661
Not	203386/Carousel	2.99	7/13/2018	$43,500	$14,548	-$262	-$1,455	$12,832



10. Matched Pair – Clarke County Solar, Double Tollgate Road, White Post, Clarke County, VA



This project is a 20 MW facility located on a 234-acre tract that was built in 2017.

I have considered two recent sales of Parcel 3. The home on this parcel is 1,230 feet from the closest panel as measured in the second map from Google Earth, which shows the solar farm under construction. This home sold in January 2017 for $295,000 and again in August 2019 for $385,000. I show each sale below and compare those to similar home sales in each time frame. The significant increase in price between 2017 and 2019 is due to a major kitchen remodel, new roof, and related upgrades as well as improvement in the market in general. The sale and later resale of the home with updates and improvements speaks to pride of ownership and increasing overall value as properties perceived as diminished are less likely to be renovated and sold for profit.

I note that 102 Tilthammer includes a number of barns that I did not attribute any value in the analysis. The market would typically give some value for those barns but even without that adjustment there is an indication of a positive impact on value due to the solar farm. The landscaping buffer from this home is considered light.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
3	Adjoins	833 Nations Spr	5.13	8/18/2019	$385,000	1979	1,392	$276.58	3/2	Det Gar	Ranch	UnBsmt
	Not	167 Leslie	5.00	8/19/2020	$429,000	1980	1,665	$257.66	3/2	Det2Gar	Ranch	
	Not	2393 Old Chapel	2.47	8/10/2020	$330,000	1974	1,500	$220.00	3/1.5	Det Gar	Ranch	
	Not	102 Tilthammer	6.70	5/7/2019	$372,000	1970	1,548	$240.31	3/1.5	Det Gar	Ranch	UnBsmt

Adjoining Sales Adjusted

Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
							$385,000			1230
-$13,268		-$2,145	-$56,272		-$5,000	$50,000	$402,315	-4%		
-$9,956	$25,000	$8,250	-$19,008	$5,000		$50,000	$389,286	-1%		
$3,229		$16,740	-$29,991	$5,000			$366,978	5%		
									0%	

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
3	Adjoins	833 Nations Spr	5.13	1/9/2017	$295,000	1979	1,392	$211.93	3/2	Det Gar	Ranch	UnBsmt
	Not	6801 Middle	2.00	12/12/2017	$249,999	1981	1,584	$157.83	3/2	Open	Ranch	
	Not	4174 Rockland	5.06	1/2/2017	$300,000	1990	1,688	$177.73	3/2	2 Gar	2-story	
	Not	400 Sugar Hill	1.00	6/7/2018	$180,000	1975	1,008	$178.57	3/1	Open	Ranch	

Adjoining Sales Adjusted

Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
							$295,000			1230
-$7,100	$25,000	-$2,500	-$24,242		$5,000	$50,000	$296,157	0%		
$177		-$16,500	-$42,085		-$10,000	$50,000	$281,592	5%		
-$7,797		$3,600	$54,857	$10,000	$5,000	$50,000	$295,661	0%		
									1%	

11. Matched Pair – Candace Solar, US 70 Highway, Princeton, Johnston County, NC

This 5 MW solar farm is located at 4839 US 70 Highway just east of Herring Road. This solar farm was completed on October 25, 2016.

I identified three adjoining sales to this tract after development of the solar farm with frontage on US 70. I did not attempt to analyze those sales as they have exposure to an adjacent highway and railroad track. Those homes are therefore problematic for a matched pair analysis unless I have similar homes fronting on a similar corridor.

I did consider a land sale and a home sale on adjoining parcels without those complications.

The lot at 499 Herring Road sold to Paradise Homes of Johnston County of NC, Inc. for $30,000 in May 2017 and a modular home was placed there and sold to Karen and Jason Toole on September 29, 2017. I considered the lot sale first as shown below and then the home sale that followed. The landscaping buffer relative to this parcel is considered medium.

Adjoining Land Sales After Solar Farm Approved							**Adjoining Sales Adjusted**				
Parcel	**Solar**	**Address**	**Acres**	**Date Sold**	**Sales Price**	**Other**	**Time**	**Site**	**Other**	**Total**	**% Diff**
16	Adjoins	499 Herring	2.03	5/1/2017	$30,000					$30,000	
	Not	37 Becky	0.87	7/23/2019	$24,500	Sub/Pwr	-$1,679	$4,900		$27,721	8%
	Not	5858 Bizzell	0.88	8/17/2016	$18,000		$390	$3,600		$21,990	27%
	Not	488 Herring	2.13	12/20/2016	$35,000		$389			$35,389	-18%
										Average	5%

Following the land purchase, the modular home was placed on the site and sold. I have compared this modular home to the following sales to determine if the solar farm had any impact on the purchase price.

Adjoining Residential Sales After Solar Farm Approved												
Parcel	**Solar**	**Address**	**Acres**	**Date Sold**	**Sales Price**	**Built**	**GBA**	**$/GBA**	**BR/BA**	**Park**	**Style**	**Other**
16	Adjoins	499 Herring	2.03	9/27/2017	$215,000	2017	2,356	$91.26	4/3	Drive	Modular	
	Not	678 WC	6.32	3/8/2019	$226,000	1995	1,848	$122.29	3/2.5	Det Gar	Mobile	Ag bldgs
	Not	1810 Bay V	8.70	3/26/2018	$170,000	2003	2,356	$72.16	3/2	Drive	Mobile	Ag bldgs
	Not	1795 Bay V	1.78	12/1/2017	$194,000	2017	1,982	$97.88	4/3	Drive	Modular	

Adjoining Residential Sales Af			**Adjoining Sales Adjusted**									**Avg**	
Parcel	**Solar**	**Address**	**Time**	**Site**	**YB**	**GLA**	**BR/BA**	**Park**	**Other**	**Total**	**% Diff**	**% Diff**	**Distance**
16	Adjoins	499 Herring								$215,000			488
	Not	678 WC	-$10,037	-$25,000	$24,860	$37,275	-$5,000	-$7,500	-$20,000	$220,599	-3%		
	Not	1810 Bay V	-$2,579	-$20,000	$11,900	$0				$159,321	26%		
	Not	1795 Bay V	-$1,063		$0	$21,964				$214,902	0%		
												8%	

The best comparable is 1795 Bay Valley as it required the least adjustment and was therefore most similar, which shows a 0% impact. This signifies no impact related to the solar farm.

The range of impact identified by these matched pairs ranges are therefore -3% to +26% with an average of +8% for the home and an average of +4% for the lot, though the best indicator for the lot shows a $5,000 difference in the lot value due to the proximity to the solar farm or a -12% impact.

12. Matched Pair – Walker-Correctional Solar, Barham Road, Barhamsville, New Kent County, VA

This project was built in 2017 and located on 484.65 acres for a 20 MW with the closest home at 110 feet from the closest solar panel with an average distance of 500 feet.

I considered the recent sale identified on the map above as Parcel 19, which is directly across the street and based on the map shown on the following page is 250 feet from the closest panel. A limited buffering remains along the road with natural growth being encouraged, but currently the panels are visible from the road. Alex Uminski, SRA with MGMiller Valuations in Richmond VA confirmed this sale with the buying and selling broker. The selling broker indicated that the solar farm was not a negative influence on this sale and in fact the buyer noticed the solar farm and then discovered the listing. The privacy being afforded by the solar farm was considered a benefit by the buyer. I used a matched pair analysis with a similar sale nearby as shown below and found no negative impact on the sales price. Property actually closed for more than the asking price. The landscaping buffer is considered light.

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	5241 Barham	2.65	10/18/2018	$264,000	2007	1,660	$159.04	3/2	Drive	Ranch	Modular
Not	17950 New Kent	5.00	9/5/2018	$290,000	1987	1,756	$165.15	3/2.5	3 Gar	Ranch	
Not	9252 Ordinary	4.00	6/13/2019	$277,000	2001	1,610	$172.05	3/2	1.5-Gar	Ranch	
Not	2416 W Miller	1.04	9/24/2018	$299,000	1999	1,864	$160.41	3/2.5	Gar	Ranch	

Adjoining Sales Adjusted

Solar	Address	Time	Ac/Loc	YB	GLA	BR/BA	Park	Other	Total	% Diff	Dist
Adjoins	5241 Barham								$264,000		250
Not	17950 New Kent		-$8,000	$29,000	-$4,756	-$5,000	-$20,000	-$15,000	$266,244	-1%	
Not	9252 Ordinary	-$8,310	-$8,000	$8,310	$2,581		-$10,000	-$15,000	$246,581	7%	
Not	2416 W Miller		$8,000	$11,960	-$9,817	-$5,000	-$10,000	-$15,000	$279,143	-6%	
									Average Diff	0%	

I also spoke with Patrick W. McCrerey of Virginia Estates who was marketing a property that sold at 5300 Barham Road adjoining the Walker-Correctional Solar Farm. He indicated that this property was unique with a home built in 1882 and heavily renovated and updated on 16.02 acres. The solar farm was through the woods and couldn't be seen by this property and it had no impact on marketing this property. This home sold on April 26, 2017 for $358,000. I did not set up any matched pairs for this property since it is a unique property that any such comparison would be difficult to rely on. The broker's comments do support the assertion that the adjoining solar farm had no impact on value. The home in this case was 510 feet from the closest panel.

<u>13. Matched Pair – Innovative Solar 46, Roslin Farm Rd, Hope Mills, Cumberland County, NC</u>

This project was built in 2016 and located on 532 acres for a 78.5 MW solar farm with the closest home at 125 feet from the closest solar panel with an average distance of 423 feet.

I considered the recent sale of a home on Roslin Farm Road just north of Running Fox Road as shown below. This sale supports an indication of no impact on property value. The landscaping buffer is considered light.

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other	Distance
Adjoins	6849 Roslin Farm	1.00	2/18/2019	$155,000	1967	1,610	$96.27	3/3	Drive	Ranch	Brick	435
Not	6592 Sim Canady	2.43	9/5/2017	$185,000	1974	2,195	$84.28	3/2	Gar	Ranch	Brick	
Not	1614 Joe Hall	1.63	9/3/2019	$145,000	1974	1,674	$86.62	3/2	Det Gar	Ranch	Brick	
Not	109 Bledsoe	0.68	1/17/2019	$150,000	1973	1,663	$90.20	3/2	Gar	Ranch	Brick	

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
Adjoins	6849 Roslin Farm								$155,000		5%
Not	6592 Sim Canady	$8,278		-$6,475	-$39,444	$10,000	-$5,000		$152,359	2%	
Not	1614 Joe Hall	-$2,407		-$5,075	-$3,881	$10,000	-$2,500		$141,137	9%	
Not	109 Bledsoe	$404	$10,000	-$4,500	-$3,346		-$5,000		$147,558	5%	

14. Matched Pair – Innovative Solar 42, County Line Rd, Fayetteville, Cumberland County, NC

This project was built in 2017 and located on 413.99 acres for a 71 MW with the closest home at 135 feet from the closest solar panel with an average distance of 375 feet.

I considered the recent sales identified on the map above as Parcels 2 and 3, which is directly across the street these homes are 330 and 340 feet away. Parcel 2 includes an older home built in 1976, while Parcel 3 is a new home built in 2019. So the presence of the solar farm had no impact on new construction in the area.

The matched pairs for each of these are shown below. The landscaping buffer relative to these parcels is considered light.

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other	Distance
Adjoins	2923 County Ln	8.98	2/28/2019	$385,000	1976	2,905	$132.53	3/3	2-Car	Ranch	Brick/Pond	340
Not	1928 Shaw Mill	17.00	7/3/2019	$290,000	1977	3,001	$96.63	4/4	2-Car	Ranch	Brick/Pond/Rental	
Not	2109 John McM.	7.78	4/25/2018	$320,000	1978	2,474	$129.35	3/2	Det Gar	Ranch	Vinyl/Pool,Stable	

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
Adjoins	2923 County Ln								$385,000		3%
Not	1928 Shaw Mill	-$3,055	$100,000	-$1,450	-$7,422	-$10,000			$368,074	4%	
Not	2109 John McM.	$8,333		-$3,200	$39,023	$10,000		$5,000	$379,156	2%	

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other	Distance
Adjoins	2935 County Ln	1.19	6/18/2019	$266,000	2019	2,401	$110.79	4/3	Gar	2-Story		330
Not	3005 Hemingway	1.17	5/16/2019	$269,000	2018	2,601	$103.42	4/3	Gar	2-Story		
Not	7031 Glynn Mill	0.60	5/8/2018	$255,000	2017	2,423	$105.24	4/3	Gar	2-Story		
Not	5213 Bree Brdg	0.92	5/7/2019	$260,000	2018	2,400	$108.33	4/3	3-Gar	2-Story		

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
Adjoins	2935 County Ln								$266,000		3%
Not	3005 Hemingway	$748		$1,345	-$16,547				$254,546	4%	
Not	7031 Glynn Mill	$8,724		$2,550	-$1,852				$264,422	1%	
Not	5213 Bree Brdg	$920		$1,300	$76			-$10,000	$252,296	5%	

Both of these matched pairs adjust to an average of +3% on impact for the adjoining solar farm, meaning there is a slight positive impact due to proximity to the solar farm. This is within the standard +/- of typical real estate transactions, which strongly suggests no impact on property value. I noted specifically that for 2923 County Line Road, the best comparable is 2109 John McMillan as it does not have the additional rental unit on it. I made no adjustment to the other sale for the value of that rental unit, which would have pushed the impact on that comparable downward – meaning there would have been a more significant positive impact.

15. Matched Pair – Sunfish Farm, Keenebec Rd, Willow Spring, Wake County, NC

This project was built in 2015 and located on 49.6 acres (with an inset 11.25 acre parcel) for a 6.4 MW project with the closest home at 135 feet with an average distance of 105 feet.

I considered the 2017 sale identified on the map above, which is 205 feet away from the closest panel. The matched pairs for each of these are shown below followed by a more recent map showing the panels at this site. The average difference in the three comparables and the subject property is +3% after adjusting for differences in the sales date, year built, gross living area, and other minor differences. This data is supported by the comments from the broker Brian Schroepfer with Keller Williams that the solar farm had no impact on the purchase price. The landscaping screen is considered light.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style
	Adjoins	7513 Glen Willow	0.79	9/1/2017	$185,000	1989	1,492	$123.99	3/2	Gar	BR/Rnch
	Not	2968 Tram	0.69	7/17/2017	$155,000	1984	1,323	$117.16	3/2	Drive	BR/Rnch
	Not	205 Pine Burr	0.97	12/29/2017	$191,000	1991	1,593	$119.90	3/2.5	Drive	BR/Rnch
	Not	1217 Old Honeycutt	1.00	12/15/2017	$176,000	1978	1,558	$112.97	3/2.5	2Carprt	VY/Rnch

Adjustments

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
Adjoins	7513 Glen Willow								$185,000		
Not	2968 Tram	$601		$3,875	$15,840		$10,000		$185,316	0%	
Not	205 Pine Burr	-$1,915		-$1,910	-$9,688	-$5,000			$172,487	7%	
Not	1217 Old Honeycut	-$1,557		$9,680	-$5,965	-$5,000		$5,280	$178,438	4%	
											3%

16. Matched Pair – Sappony Solar, Sussex Drive, Stony Creek, Sussex County, VA

This project is a 30 MW facility located on a 322.68-acre tract that was built in the fourth quarter of 2017.

I have considered the 2018 sale of Parcel 17 as shown below. This was a 1,900 s.f. manufactured home on a 6.00-acre lot that sold in 2018. I have compared that to three other nearby manufactured homes as shown below. The range of impacts is within typical market variation with an average of -1%, which supports a conclusion of no impact on property value. The landscaping buffer is considered medium.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
	Adjoins	12511 Palestine	6.00	7/31/2018	$128,400	2013	1,900	$67.58	4/2.5	Open	Manuf	
	Not	15698 Concord	3.92	7/31/2018	$150,000	2010	2,310	$64.94	4/2	Open	Manuf	Fence
	Not	23209 Sussex	1.03	7/7/2020	$95,000	2005	1,675	$56.72	3/2	Det Crpt	Manuf	
	Not	6494 Rocky Br	4.07	11/8/2018	$100,000	2004	1,405	$71.17	3/2	Open	Manuf	

Adjoining Sales Adjusted

Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
							$128,400			1425
$0		$2,250	-$21,299	$5,000			$135,951	-6%		
-$5,660	$13,000	$3,800	$10,209	$5,000	$1,500		$122,849	4%		
-$843		$4,500	$28,185				$131,842	-3%		
									-1%	

17. Matched Pair – Camden Dam, Shiloh, Camden County, NC

This 5 MW project was built in 2019 and located on a portion of 49.83 acres.

Parcel 1 noted above along with the home on the adjoining parcel to the north of that parcel sold in late 2018 after this solar farm was approved but prior to construction being completed in 2019. I have considered this sale as shown below. The landscaping screen is considered light.

The comparable at 548 Trotman is the most similar and required the least adjustment shows no impact on property value. The other two comparables were adjusted consistently with one showing significant enhancement and another as showing a mild negative. The best indication is the one requiring the least adjustment. The other two sales required significant site adjustments which make them less reliable. The best comparable and the average of these comparables support a finding of no impact on property value.

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
Adjoins	122 N Mill Dam	12.19	11/29/2018	$350,000	2005	2,334	$149.96	3/3.5	3-Gar	Ranch	
Not	548 Trotman	12.10	5/31/2018	$309,000	2007	1,960	$157.65	4/2	Det2G	Ranch	Wrkshp
Not	198 Sand Hills	2.00	12/22/2017	$235,000	2007	2,324	$101.12	4/3	Open	Ranch	
Not	140 Sleepy Hlw	2.05	8/12/2019	$330,000	2010	2,643	$124.86	4/3	1-Gar	1.5 Story	

Adjoining Sales Adjusted

Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
122 N Mill Dam								$350,000			342
548 Trotman	$6,163		-$3,090	$35,377	$5,000			$352,450	-1%		
198 Sand Hills	$8,808	$45,000	-$2,350	$607		$30,000		$317,064	9%		
140 Sleepy Hlw	-$9,258	$45,000	-$8,250	-$23,149	$5,000	$30,000		$369,343	-6%		
										1%	

18. Matched Pair – Grandy Solar, Uncle Graham Road, Grandy, Currituck County, NC

This 20 MW project was built in 2019 and located on a portion of 121 acres.

Parcels 40 and 50 have sold since construction began on this solar farm. I have considered both in matched pair analysis below. I note that the marketing for Parcel 40 (120 Par Four) identified the lack of homes behind the house as a feature in the listing. The marketing for Parcel 50 (269 Grandy) identified the property as "very private." Landscaping for both of these parcels is considered light.

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
Adjoins	120 Par Four	0.92	8/17/2019	$315,000	2006	2,188	$143.97	4/3	2-Gar	1.5 Story	Pool
Not	102 Teague	0.69	1/5/2020	$300,000	2005	2,177	$137.80	3/2	Det 3G	Ranch	
Not	112 Meadow Lk	0.92	2/28/2019	$265,000	1992	2,301	$115.17	3/2	Gar	1.5 Story	
Not	116 Barefoot	0.78	9/29/2020	$290,000	2004	2,192	$132.30	4/3	2-Gar	2 Story	

Adjoining Sales Adjusted

Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
120 Par Four								$315,000			405
102 Teague	-$4,636		$1,500	$910	$10,000		$20,000	$327,774	-4%		
112 Meadow Lk	$4,937		$18,550	-$7,808	$10,000	$10,000	$20,000	$320,679	-2%		
116 Barefoot	-$12,998		$2,900	-$318			$20,000	$299,584	5%		
										0%	

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
Adjoins	269 Grandy	0.78	5/7/2019	$275,000	2019	1,535	$179.15	3/2.5	2-Gar	Ranch	
Not	307 Grandy	1.04	10/8/2018	$240,000	2002	1,634	$146.88	3/2	Gar	1.5 Story	
Not	103 Branch	0.95	4/22/2020	$230,000	2000	1,532	$150.13	4/2	2-Gar	1.5 Story	
Not	103 Spring Lf	1.07	8/14/2018	$270,000	2002	1,635	$165.14	3/2	2-Gar	Ranch	Pool

Adjoining Sales Adjusted

Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
269 Grandy								$275,000			477
307 Grandy	$5,550		$20,400	-$8,725	$5,000	$10,000		$272,225	1%		
103 Branch	-$8,847		$21,850	$270				$243,273	12%		
103 Spring Lf	$7,871		$22,950	-$9,908	$5,000		-$20,000	$275,912	0%		
										4%	

Both of these matched pairs support a finding of no impact on value. This is reinforced by the listings for both properties identifying the privacy due to no housing in the rear of the property as part of the marketing for these homes.

19. Matched Pair – Champion Solar, Pelion, Lexington County, SC

This project is a 10 MW facility located on a 366.04-acre tract that was built in 2017.

I have considered the 2020 sale of an adjoining home located off 517 Old Charleston Road. Landscaping is considered light.

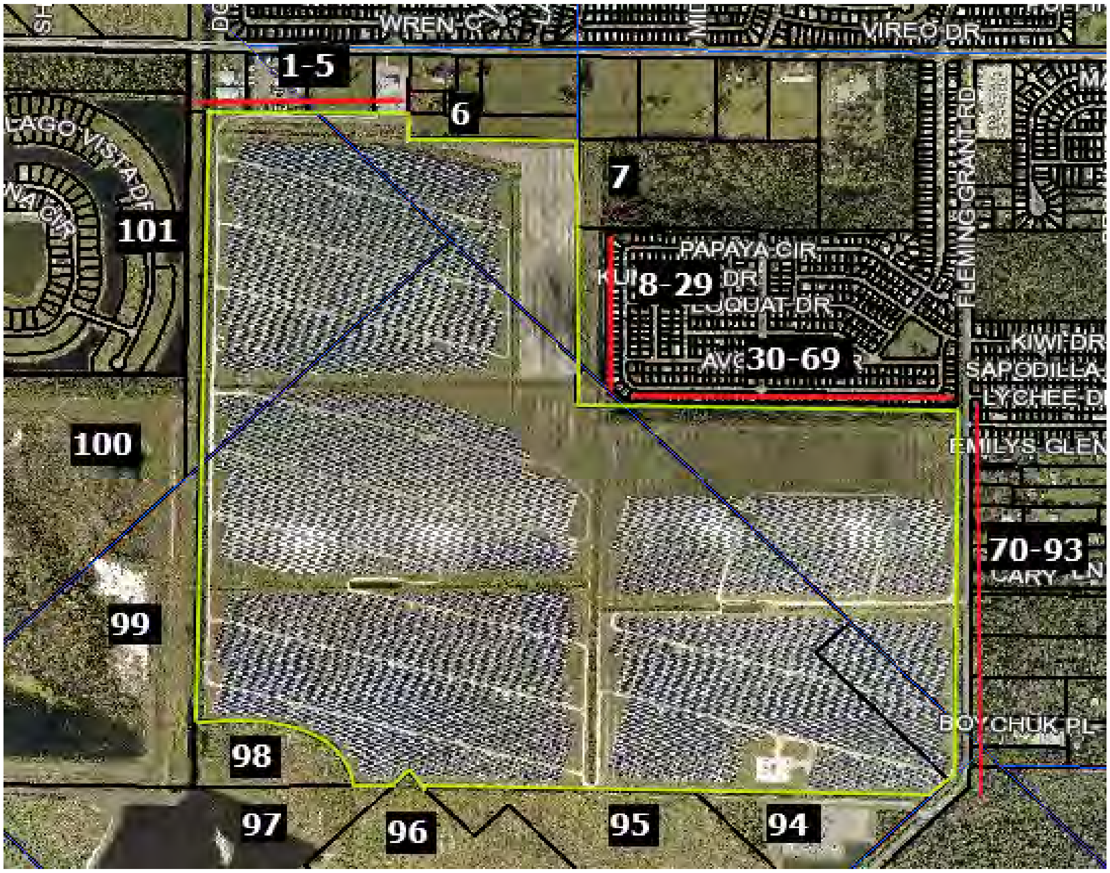
Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	517 Old Charleston	11.05	8/25/2020	$110,000	1962	925	$118.92	3/1	Crport	Br Rnch	
Not	133 Buena Vista	2.65	6/21/2020	$115,000	1979	1,104	$104.17	2/2	Crport	Br Rnch	
Not	214 Crystal Spr	2.13	6/10/2019	$102,500	1970	1,025	$100.00	3/2	Crport	Rnch	
Not	1429 Laurel	2.10	2/21/2019	$126,000	1960	1,250	$100.80	2/1.5	Open	Br Rnch	3 Gar/Brn

Adjoining Sales Adjusted

Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
517 Old Charleston								$110,000			505
133 Buena Vista	$410	$17,000	-$9,775	-$14,917	-$10,000			$97,718	11%		
214 Crystal Spr	$2,482	$18,000	-$4,100	-$8,000	-$10,000		$10,000	$110,882	-1%		
1429 Laurel	$3,804	$18,000	$1,260	-$26,208	-$5,000	$5,000	-$15,000	$107,856	2%		
										4%	

20. Matched Pair – Barefoot Bay Solar Farm, Barefoot Bay, Brevard County, FL



This project is located on 504 acres for a 74.5 MW facility. Most of the adjoining uses are medium density residential with some lower density agricultural uses to the southwest. This project was built in 2018. There is a new subdivision under development to the west.

I have considered a number of recent home sales from the Barefoot Bay Golf Course in the Barefoot Bay Recreation District. There are a number of sales of these mobile/manufactured homes along the eastern boundary and the lower northern boundary. I have compared those home sales to other similar homes in the same community but without the exposure to the solar farm. Staying within the same community keeps location and amenity impacts consistent. I did avoid any comparison with home sales with golf course or lakefront views as that would introduce another variable.

The six manufactured/double wide homes shown below were each compared to three similar homes in the same community and are consistently showing no impact on the adjoining property values. Based on the photos from the listings, there is limited but some visibility of the solar farm to the east, but the canal and landscaping between are providing a good visual buffer and actually are commanding a premium over the non-canal homes.

Landscaping for these adjoining homes is considered light, though photographs from the listings show that those homes on Papaya that adjoin the solar farm from east/west have no visibility of the solar farm and is effectively medium density due to the height differential. The homes that adjoin the solar farm from north/south along Papaya have some filtered view of the solar farm through the trees.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
14	Adjoins	465 Papaya Cr	0.12	7/21/2019	$155,000	1993	1,104	$140.40	2/2	Drive	Manuf	Canal
	Not	1108 Navajo	0.14	2/27/2019	$129,000	1984	1,220	$105.74	2/2	Crprt	Manuf	Canal
	Not	1007 Barefoot	0.11	9/3/2020	$168,000	2005	1,052	$159.70	2/2	Crprt	Manuf	Canal
	Not	1132 Waterway	0.11	7/10/2020	$129,000	1982	1,012	$127.47	2/2	Crprt	Manuf	Canal

Adjoining Sales Adjusted

Address	Time	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
465 Papaya Cr							$155,000			765
1108 Navajo	$1,565	$5,805	-$9,812				$126,558	18%		
1007 Barefoot	-$5,804	-$10,080	$6,643				$158,759	-2%		
1132 Waterway	-$3,859	$7,095	$9,382				$141,618	9%		
									8%	

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
19	Adjoins	455 Papaya	0.12	9/1/2020	$183,500	2005	1,620	$113.27	3/2	Crprt	Manuf	Canal
	Not	938 Waterway	0.11	2/12/2020	$160,000	1986	1,705	$93.84	2/2	Crprt	Manuf	Canal
	Not	719 Barefoot	0.12	4/14/2020	$150,000	1996	1,635	$91.74	3/2	Crprt	Manuf	Canal
	Not	904 Fir	0.17	9/27/2020	$192,500	2010	1,626	$118.39	3/2	Crprt	Manuf	Canal

Adjoining Sales Adjusted

Address	Time	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
455 Papaya							$183,500			750
938 Waterway	$2,724	$15,200	-$6,381				$171,542	7%		
719 Barefoot	$1,770	$6,750	-$1,101				$157,419	14%		
904 Fir	-$422	-$4,813	-$568				$186,697	-2%		
									6%	

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
37	Adjoins	419 Papaya	0.09	7/16/2019	$127,500	1986	1,303	$97.85	2/2	Crprt	Manuf	Green
	Not	865 Tamarind	0.12	2/4/2019	$133,900	1995	1,368	$97.88	2/2	Crprt	Manuf	Green
	Not	501 Papaya	0.10	6/15/2018	$109,000	1986	1,234	$88.33	2/2	Crprt	Manuf	
	Not	418 Papaya	0.09	8/28/2019	$110,000	1987	1,248	$88.14	2/2	Crprt	Manuf	

Adjoining Sales Adjusted

Address	Time	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
419 Papaya							$127,500			690
865 Tamarind	$1,828	-$6,026	-$5,090				$124,613	2%		
501 Papaya	$3,637	$0	$4,876			$5,000	$122,513	4%		
418 Papaya	-$399	-$550	$3,878			$5,000	$117,930	8%		
									5%	

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
39	Adjoins	413 Papaya	0.09	7/16/2020	$130,000	2001	918	$141.61	2/2	Crprt	Manuf	Grn/Upd
	Not	341 Loquat	0.09	2/3/2020	$118,000	1985	989	$119.31	2/2	Crprt	Manuf	Full Upd
	Not	1119 Pocatella	0.19	1/5/2021	$120,000	1993	999	$120.12	2/2	Crprt	Manuf	Green
	Not	1367 Barefoot	0.10	1/12/2021	$130,500	1987	902	$144.68	2/2	Crprt	Manuf	Green/Upd

Adjoining Sales Adjusted

Address	Time	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
413 Papaya							$130,000			690
341 Loquat	$1,631	$9,440	-$6,777				$122,294	6%		
1119 Pocatella	-$1,749	$4,800	-$7,784			$5,000	$120,267	7%		
1367 Barefoot	-$1,979	$9,135	$1,852				$139,507	-7%		
									2%	

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
48	Adjoins	343 Papaya	0.09	12/17/2019	$145,000	1986	1,508	$96.15	3/2	Crprt	Manuf	Gn/Fc/Upd
	Not	865 Tamarind	0.12	2/4/2019	$133,900	1995	1,368	$97.88	2/2	Crprt	Manuf	Green
	Not	515 Papaya	0.09	3/22/2018	$145,000	2005	1,376	$105.38	3/2	Crprt	Manuf	Green
	Not	849 Tamarind	0.15	6/26/2019	$155,000	1997	1,716	$90.33	3/2	Crprt	Manuf	Grn/Fnce

Adjoining Sales Adjusted

Address	Time	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
343 Papaya							$145,000			690
865 Tamarind	$3,566	-$6,026	$10,963				$142,403	2%		
515 Papaya	$7,759	-$13,775	$11,128				$150,112	-4%		
849 Tamarind	$2,273	-$8,525	-$15,030			$5,000	$138,717	4%		
									1%	

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
52	Nearby	335 Papaya	0.09	4/17/2018	$110,000	1987	1,180	$93.22	2/2	Crprt	Manuf	Green
	Not	865 Tamarind	0.12	2/4/2019	$133,900	1995	1,368	$97.88	2/2	Crprt	Manuf	Green
	Not	501 Papaya	0.10	6/15/2018	$109,000	1986	1,234	$88.33	2/2	Crprt	Manuf	
	Not	604 Puffin	0.09	10/23/2018	$110,000	1988	1,320	$83.33	2/2	Crprt	Manuf	

Adjoining Sales Adjusted

Address	Time	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
335 Papaya							$110,000			710
865 Tamarind	-$3,306	-$5,356	-$14,721			$0	$110,517	0%		
501 Papaya	-$542	$545	-$3,816			$5,000	$110,187	0%		
604 Puffin	-$1,752	-$550	-$9,333			$5,000	$103,365	6%		
									2%	

I also identified a new subdivision being developed just to the west of this solar farm called The Lakes at Sebastian Preserve. These are all canal-lot homes that are being built with homes starting at $271,000 based on the website and closed sales showing up to $342,000. According to Monique, the onsite broker with Holiday Builders, the solar farm is difficult to see from the lots that back up to that area and she does not anticipate any difficulty in selling those future homes or lots or any impact on the sales price. The closest home that will be built in this development will be approximately 340 feet from the nearest panel.

Based on the closed home prices in Barefoot Bay as well as the broker comments and activity at The Lakes at Sebastian Preserve, the data around this solar farm strongly indicates no negative impact on property value.

21. Matched Pair – Miami-Dade Solar Farm, Miami, Dade County, FL

This project is located on 346.80 acres for a 74.5 MW facility. All of the adjoining uses are agricultural and residential. This project was built in 2019.

I considered the recent sale of Parcel 26 to the south that sold for over $1.6 million dollars. This home is located on 4.2 acres with additional value in the palm trees according to the listing. The comparables include similar homes nearby that are all actually on larger lots and several include avocado or palm tree income as well. All of the comparables are in similar proximity to the subject and all have similar proximity to the Miami-Dade Executive airport that is located 2.5 miles to the east.

These sales are showing no impact on the value of the property from the adjoining solar farm. The landscaping is considered light.

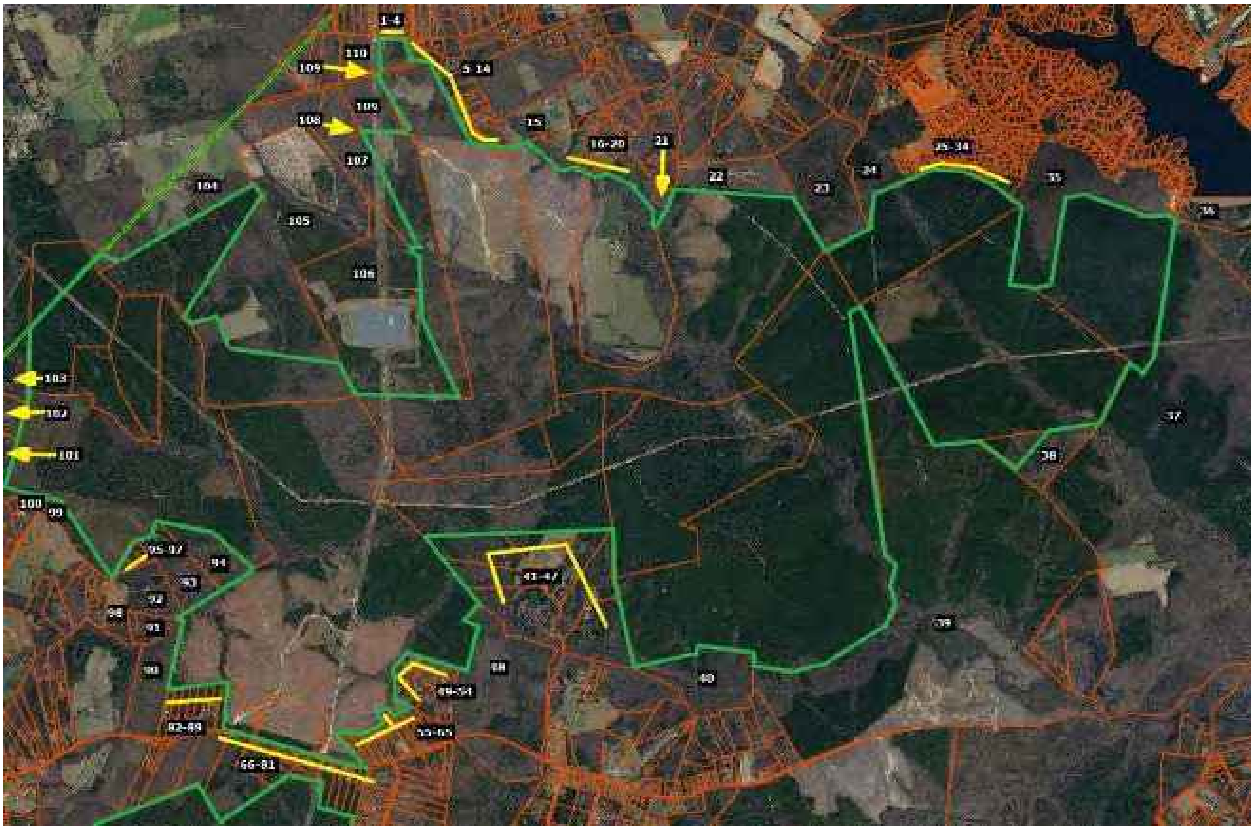
Adjoining Residential Sales After Solar Farm Approved

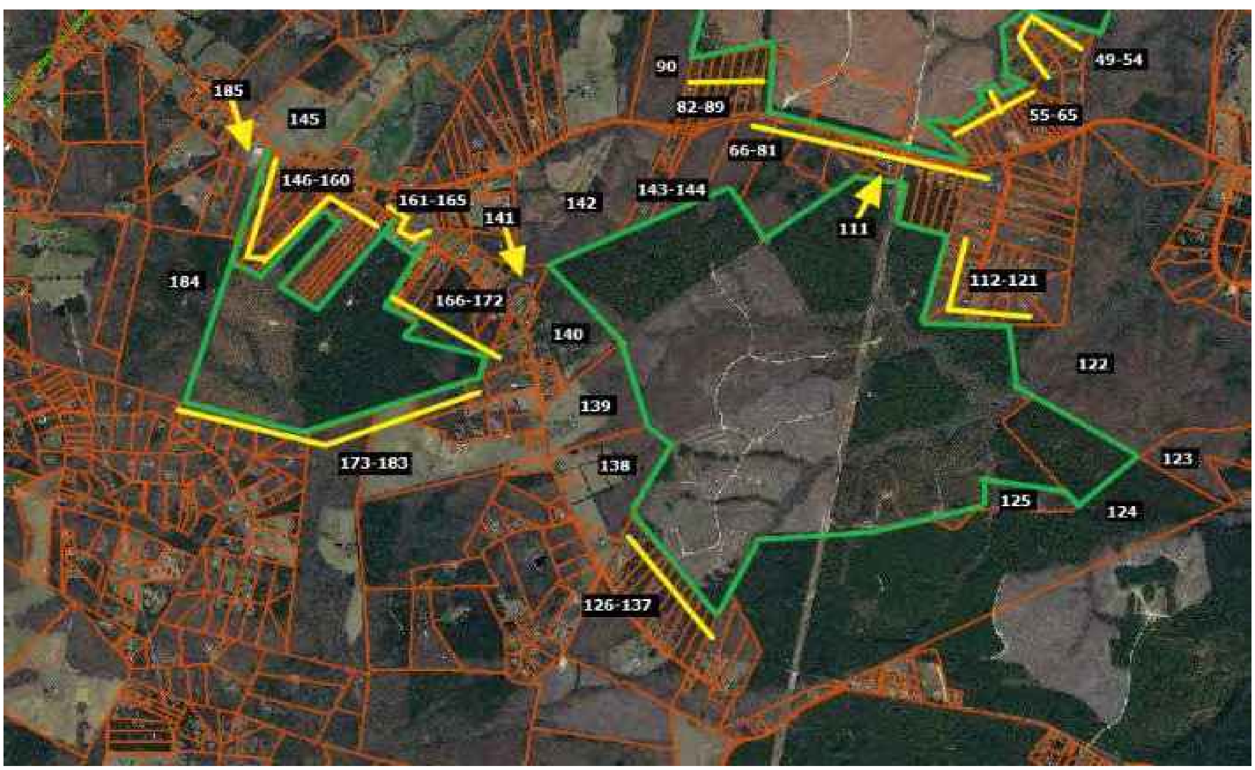
Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
26	Adjoins	13600 SW 182nd	4.20	11/5/2020	$1,684,000	2008	6,427	$262.02	5/5.5	3 Gar	CBS Rnch	Pl/Guest
	Not	18090 SW 158th	5.73	10/8/2020	$1,050,000	1997	3,792	$276.90	5/4	3 Gar	CBS Rnch	
	Not	14311 SW 187th	4.70	10/22/2020	$1,100,000	2005	3,821	$287.88	6/5	3 Gar	CBS Rnch	Pool
	Not	17950 SW 158th	6.21	10/22/2020	$1,730,000	2000	6,917	$250.11	6/5.5	2 Gar	CBS Rnch	Pool

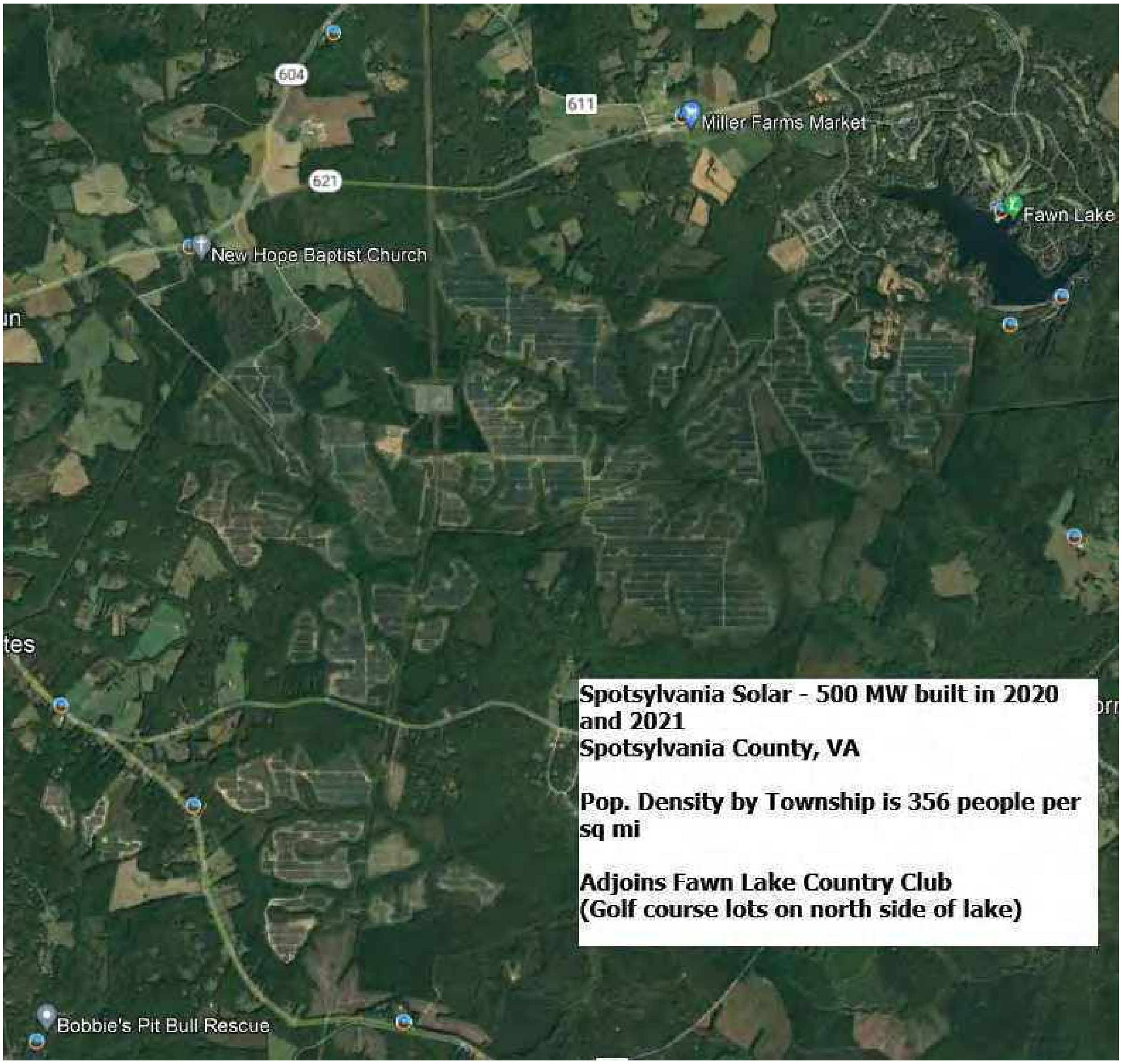
Adjoining Sales Adjusted

Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
13600 SW 182nd								$1,684,000			1390
18090 SW 158th	$2,478		$57,750	$583,703	$30,000			$1,723,930	-2%		
14311 SW 187th	$1,298		$16,500	$600,178	$10,000			$1,727,976	-3%		
17950 SW 158th	$2,041		$69,200	-$98,043		$10,000		$1,713,199	-2%		
										-2%	

22. Matched Pair – Spotsylvania Solar, Paytes, Spotsylvania County, VA







This solar farm is being built in four phases with the area known as Site C having completed construction in November 2020 after the entire project was approved in April 2019. Site C, also known as Pleinmont 1 Solar, includes 99.6 MW located in the southeast corner of the project and shown on the maps above with adjoining parcels 111 through 144. The entire Spotsylvania project totals 617 MW on 3500 acres out of a parent tract assemblage of 6,412 acres.

I have identified three adjoining home sales that occurred during construction and development of the site in 2020.

The first is located on the north side of Site A on Orange Plank Road. The second is located on Nottoway Lane just north of Caparthin Road on the south side of Site A and east of Site C. The third is located on Post Oak Road for a home that backs up to Site C that sold in September 2020 near the completion of construction for Site C.

Spotsylvania Solar Farm

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	12901 Orng Plnk	5.20	8/27/2020	$319,900	1984	1,714	$186.64	3/2	Drive	1.5	Un Bsmt
Not	8353 Gold Dale	3.00	1/27/2021	$415,000	2004	2,064	$201.07	3/2	3 Gar	Ranch	
Not	6488 Southfork	7.26	9/9/2020	$375,000	2017	1,680	$223.21	3/2	2 Gar	1.5	Barn/Patio
Not	12717 Flintlock	0.47	12/2/2020	$290,000	1990	1,592	$182.16	3/2.5	Det Gar	Ranch	

Adjoining Sales Adjusted

Address	Time	Ac/Loc	YB	GLA	BR/BA	Park	Other	Total	% Diff	Dist
12901 Orng Plnk								$319,900		1270
8353 Gold Dale	-$5,219	$20,000	-$41,500	-$56,298		-$20,000		$311,983	2%	
6488 Southfork	-$401	-$20,000	-$61,875	$6,071		-$15,000		$283,796	11%	
12717 Flintlock	-$2,312	$40,000	-$8,700	$17,779	-$5,000	-$5,000		$326,767	-2%	
								Average Diff	4%	

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	9641 Nottoway	11.00	5/12/2020	$449,900	2004	3,186	$141.21	4/2.5	Garage	2-Story	Un Bsmt
Not	26123 Lafayette	1.00	8/3/2020	$390,000	2006	3,142	$124.12	3/3.5	Gar/DtG	2-Story	
Not	11626 Forest	5.00	8/10/2020	$489,900	2017	3,350	$146.24	4/3.5	2 Gar	2-Story	
Not	10304 Pny Brnch	6.00	7/27/2020	$485,000	1998	3,076	$157.67	4/4	2Gar/Dt2	Ranch	Fn Bsmt

Adjoining Sales Adjusted

Address	Time	Ac/Loc	YB	GLA	BR/BA	Park	Other	Total	% Diff	Dist
9641 Nottoway								$449,900		1950
26123 Lafayette	-$2,661	$45,000	-$3,900	$4,369	-$10,000	-$5,000		$417,809	7%	
11626 Forest	-$3,624		-$31,844	-$19,187		-$5,000		$430,246	4%	
10304 Pny Brnch	-$3,030		$14,550	$13,875	-$15,000	-$15,000	-$10,000	$470,396	-5%	
								Average Diff	2%	

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	13353 Post Oak	5.20	9/21/2020	$300,000	1992	2,400	$125.00	4/3	Drive	2-Story	Fn Bsmt
Not	9609 Logan Hgt	5.86	7/4/2019	$330,000	2004	2,352	$140.31	3/2	2Gar	2-Story	
Not	12810 Catharpian	6.18	1/30/2020	$280,000	2008	2,240	$125.00	4/2.5	Drive	2-Story	Bsmt/Nd Pnt
Not	10725 Rbrt Lee	5.01	10/26/2020	$295,000	1995	2,166	$136.20	4/3	Gar	2-Story	Fn Bsmt

Adjoining Sales Adjusted

Address	Time	Ac/Loc	YB	GLA	BR/BA	Park	Other	Total	% Diff	Dist
13353 Post Oak								$300,000		1171
9609 Logan Hgt	$12,070		-$19,800	$5,388		-$15,000	$15,000	$327,658	-9%	
12810 Catharpian	$5,408		-$22,400	$16,000	$5,000		$15,000	$299,008	0%	
10725 Rbrt Lee	-$849		-$4,425	$25,496		-$10,000		$305,222	-2%	
								Average Diff	-4%	

All three of these homes are well set back from the solar panels at distances over 1,000 feet and are well screened from the project. All three show no indication of any impact on property value.

There are a couple of recent lot sales located along Southview Court that have sold since the solar farm was approved. The most recent lot sales include 11700 Southview Court that sold on December 29, 2021 for $140,000 for a 0.76-acre lot. This property was on the market for less than 2 months before closing within 6% of the asking price. This lot sold earlier in September 2019 for $55,000 based on a liquidation sale from NTS to an investor.

A similar 0.68-acre lot at 11507 Stonewood Court within the same subdivision located away from the solar farm sold on March 9, 2021 for $109,000. This lot sold for 18% over the asking price within 1 month of listing suggesting that this was priced too low. Adjusting this lot value upward by 12% for very strong growth in the market over 2021, the adjusted indicated value is $122,080 for this lot. This is still showing a 15% premium for the lot backing up to the solar farm.

The lot at 11009 Southview Court sold on August 5, 2019 for $65,000, which is significantly lower than the more recent sales. This lot was sold by NTS the original developer of this subdivision, who was in the process of liquidating lots in this subdivision with multiple lot sales in this time period throughout the subdivision being sold at discounted prices. The home was later improved by the buyer with a home built in 2020 with 2,430 square feet ranch, 3.5 bathrooms, with a full basement, and a current assessed value of $492,300.

I spoke with Chris Kalia, MAI, Mark Doherty, local real estate investor, and Alex Doherty, broker, who are all three familiar with this subdivision and activity in this neighborhood. All three indicated that there was a deep sell off of lots in the neighborhood by NTS at discounted prices under $100,000 each. Those lots since that time are being sold for up to $140,000. The prices paid for the lots below $100,000 were liquidation values and not indicative of market value. Homes are being built in the neighborhood on those lots with home prices ranging from $600,000 to $800,000 with no sign of impact on pricing due to the solar farm according to all three sources.

Fawn Lake Lot Sales

Parcel	Solar?	Address	Acres	Sale Date	Sale Price	Ad. For Time	% Diff
A	Adjoins	11700 Southview Ct	0.76	12/29/2021	$140,000		
1	1 parcel away	11603 Southview Ct	0.44	3/31/2022	$140,000	$141,960	-1.4%
2	Not adjoin	11507 Stonewood Ct	0.68	3/9/2021	$109,000	$118,374	15.4%
3	Not adjoin	11312 Westgate Wy	0.83	10/15/2020	$125,000	$142,000	-1.4%
4	Not adjoin	11409 Darkstone Pl	0.589	9/23/2021	$118,000	$118,000	15.7%

Average	7.1%
Median	7.0%
Least Adjusted	15.7%
2nd Least Adjusted	-1.4%
(Parcel 1 off solar farm)	

Time Adjustments are based on the FHFA Housing Price Index

23. Matched Pair – Whitehorn Solar, Gretna, Pittsylvania County, VA

This project was built in 2021 for a solar project with 50 MW. Adjoining uses are residential and agricultural. There was a sale located at 1120 Taylors Mill Road that sold on December 20, 2021, which is about the time the solar farm was completed. This sold for $224,000 for 2.02 acres with a 2,079 s.f. mobile home on it that was built in 2010. The property was listed for $224,000 and sold for that same price within two months (went under contract almost exactly 30 days from listing). This sales price works out to $108 per square foot. This home is 255 feet from the nearest panel.

I have compared this sale to an August 20, 2020 sale at 1000 Long Branch Drive that included 5.10 acres with a 1,980 s.f. mobile home that was built in 1993 and sold for $162,000, or $81.82 per square foot. Adjusting this upward for significant growth between this sale date and December 2021 relied on data provided by the FHFA House Pricing Index, which indicates that for homes in the Roanoke, VA MSA would be expected to appreciate from $162,000 to $191,000 over that period of time. Using $191,000 as the effective value as of the date of comparison, the indicated value of this sale works out to $96.46 per square foot. Adjusting this upward by 17% for the difference in year built, but downward by 5% for the much larger lot size at this comparable, I derive an adjusted indication of value of $213,920, or $108 per square foot.

This indicates no impact on value attributable to the new solar farm located across from the home on Taylors Mill Road.

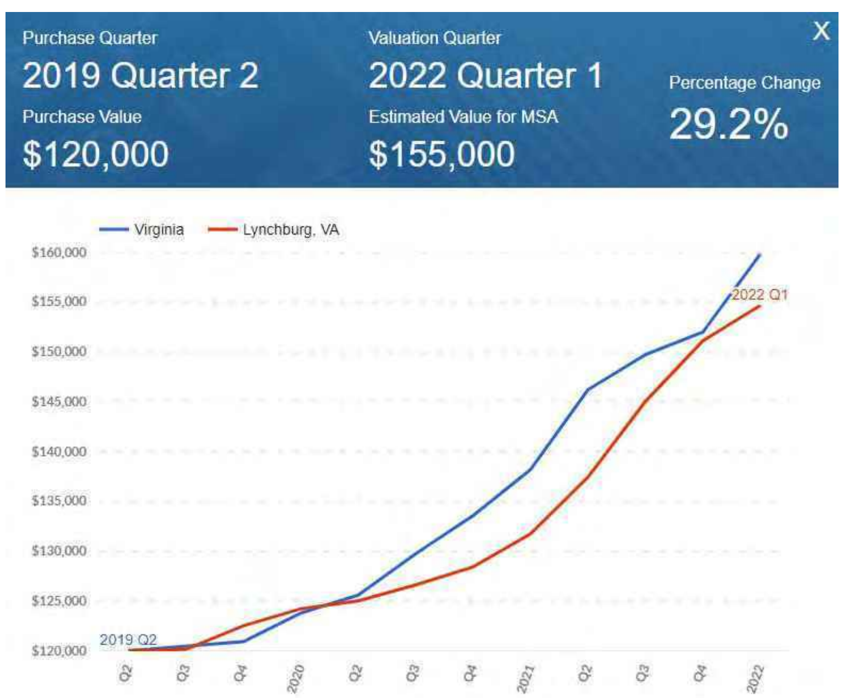
24. Matched Pair – Altavista Solar, Altavista, Campbell County, VA

This project was mostly built in 2021 with final construction finished in 2022. This is an 80 MW facility on 720 acres just north of Roanoke River and west of Altavista. Adjoining uses are residential and agricultural.

I have done a Sale/Resale analysis of 3211 Leesville Road which is approximately 540 feet from the nearest solar panel. There was an existing row of trees between this home and the panels that was supplemented with additional screening for a narrow landscaped buffer between the home and the solar panels.

This home sold in December 2018 for $72,500 for this 1,451 s.f. home built in 1940 with a number of additional outbuildings on 3.35 acres. This was before any announcement of a solar farm. This home sold again on March 28, 2022 for $124,048 after the solar farm was constructed. This shows a 71% increase in value on this property since 2018. There was significant growth in the market between these dates and to accurately reflect that I have considered the FHFA House Price Index that is specific for the Lynchburg area of Virginia (the closest regional category), which shows an expected increase in home values over that same time period of 33.8%, which would suggest a normal growth in value up to $97,000. The home sold for significantly more than this which certainly does not support a finding of a negative impact and in fact suggests a significant positive impact. However, I was not able to discuss this sale with the broker and it is possible that the home also was renovated between 2018 and 2022, which may account for that additional increase in value. Still give that the home increased in value so significantly over the initial amount there is no sign of any negative impact due to the solar farm adjacency.

Similarly, I looked at 3026 Bishop Creek Road that is approximately 600 feet from the nearest solar panel. This home sold on July 16, 2019 for $120,000, which was before construction of the solar farm. This home sold again on February 23, 2022 for $150,000. This shows a 25% increase in value over that time period. Using the same FHFA House Price Index Calculator, the expected increase in value was 29.2% for an indicated expected value of $155,000. This is within 3% of the actual closed price, which supports a finding of no impact from the solar farm. This home has a dense wooded area between it and the adjoining solar farm.



Conclusion – SouthEast Over 5 MW

Southeast USA Over 5 MW
Matched Pair Summary

							Adj. Uses By Acreage				1 mile Radius (2010-2022 Data)			
	Name	**City**	**State**	**Acres**	**MW**	**Topo Shift**	**Res**	**Ag**	**Ag/Res**	**Com/Ind**	**Pop.**	**Med. Income**	**Avg. Housing Unit**	**Veg. Buffer**
1	AM Best	Goldsboro	NC	38	5.00	2	38%	0%	23%	39%	1,523	$37,358	$148,375	Light
2	Mulberry	Selmer	TN	160	5.00	60	13%	73%	10%	3%	467	$40,936	$171,746	Lt to Med
3	Leonard	Hughesville	MD	47	5.00	20	18%	75%	0%	6%	525	$106,550	$350,000	Light
4	Gastonia SC	Gastonia	NC	35	5.00	48	33%	0%	23%	44%	4,689	$35,057	$126,562	Light
5	Summit	Moyock	NC	2,034	80.00	4	4%	0%	94%	2%	382	$79,114	$281,731	Light
6	Tracy	Bailey	NC	50	5.00	10	29%	0%	71%	0%	312	$43,940	$99,219	Heavy
7	Manatee	Parrish	FL	1,180	75.00	20	2%	97%	1%	0%	48	$75,000	$291,667	Heavy
8	McBride	Midland	NC	627	75.00	140	12%	10%	78%	0%	398	$63,678	$256,306	Lt to Med
9	Mariposa	Stanley	NC	36	5.00	96	48%	0%	52%	0%	1,716	$36,439	$137,884	Light
10	Clarke Cnty	White Post	VA	234	20.00	70	14%	39%	46%	1%	578	$81,022	$374,453	Light
11	Candace	Princeton	NC	54	5.00	22	76%	24%	0%	0%	448	$51,002	$107,171	Medium
12	Walker	Barhamsville	VA	485	20.00	N/A	12%	68%	20%	0%	203	$80,773	$320,076	Light
13	Innov 46	Hope Mills	NC	532	78.50	0	17%	83%	0%	0%	2,247	$58,688	$183,435	Light
14	Innov 42	Fayetteville	NC	414	71.00	0	41%	59%	0%	0%	568	$60,037	$276,347	Light
15	Sunfish	Willow Spring	NC	50	6.40	30	35%	35%	30%	0%	1,515	$63,652	$253,138	Light
16	Sappony	Stony Crk	VA	322	20.00	N/A	2%	98%	0%	0%	74	$51,410	$155,208	Light
17	Camden Dam	Camden	NC	50	5.00	0	17%	72%	11%	0%	403	$84,426	$230,288	Light
18	Grandy	Grandy	NC	121	20.00	10	55%	24%	0%	21%	949	$50,355	$231,408	Light
19	Champion	Pelion	SC	100	10.00	N/A	4%	70%	8%	18%	1,336	$46,867	$171,939	Light
20	Barefoot Bay	Barefoot Bay	FL	504	74.50	0	11%	87%	0%	3%	2,446	$36,737	$143,320	Lt to Med
21	Miami-Dade	Miami	FL	347	74.50	0	26%	74%	0%	0%	127	$90,909	$403,571	Light
22	Spotyslvania	Paytes	VA	3,500	617.00	160	37%	52%	11%	0%	74	$120,861	$483,333	Md to Hvy
23	Whitehorn	Gretna	VA	N/A	50.00	N/A	N/A	N/A	N/A	N/A	166	$43,179	$168,750	None to Lt
24	Altavista	Altavista	VA	720	80.00	N/A	N/A	N/A	N/A	N/A	7	$50,000	$341,667	Light
	Average			506	58.83	36	25%	47%	22%	6%	883	$62,000	$237,816	
	Median			234	20.00	20	18%	56%	11%	0%	458	$55,049	$230,848	
	High			3,500	617.00	160	76%	98%	94%	44%	4,689	$120,861	$483,333	
	Low			35	5.00	0	2%	0%	0%	0%	7	$35,057	$99,219	

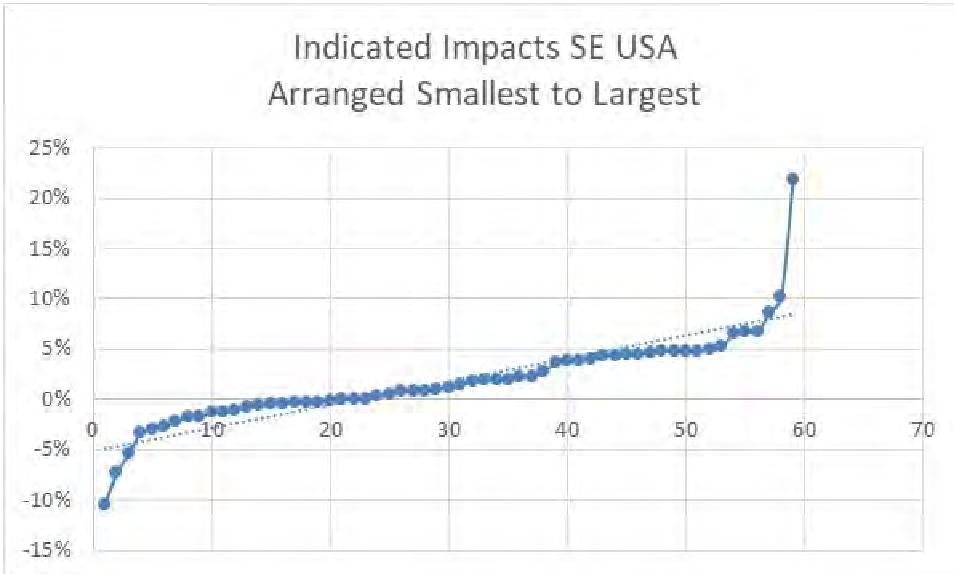
The solar farm matched pairs shown above have similar characteristics to each other in terms of population, but with several outliers showing solar farms in farm more urban areas. The median income for the population within 1 mile of a solar farm is $55,049 with a median housing unit value of $230,848. Most of the comparables are under $300,000 in the home price, with $483,333 being the high end of the set, though I have matched pairs in multiple states over $1,600,000 adjoining solar farms. The adjoining uses show that residential and agricultural uses are the predominant adjoining uses. These figures are in line with the larger set of solar farms that I have looked at with the predominant adjoining uses being residential and agricultural and similar to the solar farm breakdown shown for Virginia and adjoining states as well as the proposed subject property.

Based on the similarity of adjoining uses and demographic data between these sites and the subject property, I consider it reasonable to compare these sites to the subject property.

I have pulled 59 matched pairs from the above referenced solar farms to provide the following summary of home sale matched pairs and land sales next to solar farms. The summary shows that the range of differences is from -10% to +22% with an average of +2% and median of +1%. Excluding the significant 22% outlier, the range is -10% to +10% with an average and median of +1%. This means that the average and median impact is for a slight positive impact due to adjacency to a solar farm. However, this +1% rate is within the typical variability I would expect from real estate. I therefore conclude that this data shows no negative or positive impact due to adjacency to a solar farm.

While the range is seemingly wide, the graph below clearly shows that the vast majority of the data falls between -5% and +5% and most of those are clearly in the 0 to +5% range. This data strongly supports an indication of no impact on adjoining residential uses to a solar farm.

I therefore conclude that these matched pairs support a finding of no impact on value at the subject property for the proposed project, which as proposed will include a landscaped buffer to screen adjoining residential properties.


Indicated Impacts SE USA
Arranged Smallest to Largest
25%
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70

C. *Summary of National Data on Solar Farms*

I have worked in over 20 states related to solar farms and I have been tracking matched pairs in most of those states. On the following pages I provide a brief summary of those findings showing 38 solar farms over 5 MW studied with each one providing matched pair data supporting the findings of this report.

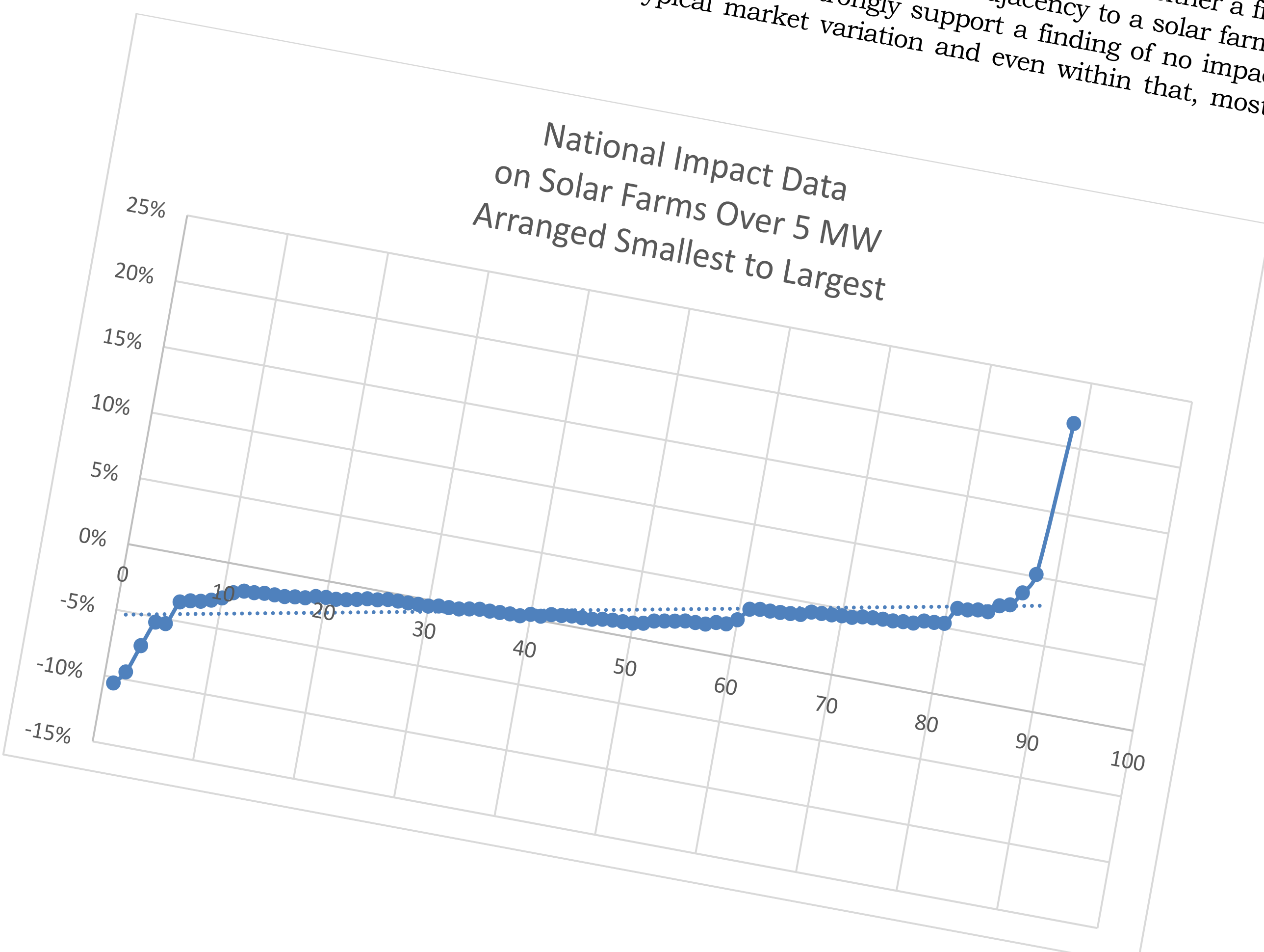
The solar farms summary is shown below with a summary of the matched pair data shown on the following page.

Matched Pair Summary							**Adj. Uses By Acreage**				**1 mile Radius (2020 Data)**		
	Name	**City**	**State**	**Acres**	**MW**	**Topo Shift**	**Res**	**Ag**	**Ag/Res**	**Com/Ind**	**Population**	**Med. Income**	**Avg. Housing Unit**
1	AM Best	Goldsboro	NC	38	5.00	2	38%	0%	23%	39%	1,523	$37,358	$148,375
2	Mulberry	Selmer	TN	160	5.00	60	13%	73%	10%	3%	467	$40,936	$171,746
3	Leonard	Hughesville	MD	47	5.00	20	18%	75%	0%	6%	525	$106,550	$350,000
4	Gastonia SC	Gastonia	NC	35	5.00	48	33%	0%	23%	44%	4,689	$35,057	$126,562
5	Summit	Moyock	NC	2,034	80.00	4	4%	0%	94%	2%	382	$79,114	$281,731
6	Tracy	Bailey	NC	50	5.00	10	29%	0%	71%	0%	312	$43,940	$99,219
7	Manatee	Parrish	FL	1,180	75.00	20	2%	97%	1%	0%	48	$75,000	$291,667
8	McBride	Midland	NC	627	75.00	140	12%	10%	78%	0%	398	$63,678	$256,306
9	Grand Ridge	Streator	IL	160	20.00	1	8%	87%	5%	0%	96	$70,158	$187,037
10	Dominion	Indianapolis	IN	134	8.60	20	3%	97%	0%	0%	3,774	$61,115	$167,515
11	Mariposa	Stanley	NC	36	5.00	96	48%	0%	52%	0%	1,716	$36,439	$137,884
12	Clarke Cnty	White Post	VA	234	20.00	70	14%	39%	46%	1%	578	$81,022	$374,453
13	Flemington	Flemington	NJ	120	9.36	N/A	13%	50%	28%	8%	3,477	$105,714	$444,696
14	Frenchtown	Frenchtown	NJ	139	7.90	N/A	37%	35%	29%	0%	457	$111,562	$515,399
15	McGraw	East Windsor	NJ	95	14.00	N/A	27%	44%	0%	29%	7,684	$78,417	$362,428
16	Tinton Falls	Tinton Falls	NJ	100	16.00	N/A	98%	0%	0%	2%	4,667	$92,346	$343,492
17	Simon	Social Circle	GA	237	30.00	71	1%	63%	36%	0%	203	$76,155	$269,922
18	Candace	Princeton	NC	54	5.00	22	76%	24%	0%	0%	448	$51,002	$107,171
19	Walker	Barhamsville	VA	485	20.00	N/A	12%	68%	20%	0%	203	$80,773	$320,076
20	Innov 46	Hope Mills	NC	532	78.50	0	17%	83%	0%	0%	2,247	$58,688	$183,435
21	Innov 42	Fayetteville	NC	414	71.00	0	41%	59%	0%	0%	568	$60,037	$276,347
22	Demille	Lapeer	MI	160	28.40	10	10%	68%	0%	22%	2,010	$47,208	$187,214
23	Turrill	Lapeer	MI	230	19.60	10	75%	59%	0%	25%	2,390	$46,839	$110,361
24	Sunfish	Willow Spring	NC	50	6.40	30	35%	35%	30%	0%	1,515	$63,652	$253,138
25	Picture Rocks	Tucson	AZ	182	20.00	N/A	6%	88%	6%	0%	102	$81,081	$280,172
26	Avra Valley	Tucson	AZ	246	25.00	N/A	3%	94%	3%	0%	85	$80,997	$292,308
27	Sappony	Stony Crk	VA	322	20.00	N/A	2%	98%	0%	0%	74	$51,410	$155,208
28	Camden Dam	Camden	NC	50	5.00	0	17%	72%	11%	0%	403	$84,426	$230,288
29	Grandy	Grandy	NC	121	20.00	10	55%	24%	0%	21%	949	$50,355	$231,408
30	Champion	Pelion	SC	100	10.00	N/A	4%	70%	8%	18%	1,336	$46,867	$171,939
31	Eddy II	Eddy	TX	93	10.00	N/A	15%	25%	58%	2%	551	$59,627	$139,088
32	Somerset	Somerset	TX	128	10.60	N/A	5%	95%	0%	0%	1,293	$41,574	$135,490
33	DG Amp Piqua	Piqua	OH	86	12.60	2	26%	16%	58%	0%	6,735	$38,919	$96,555
34	Barefoot Bay	Barefoot Bay	FL	504	74.50	0	11%	87%	0%	3%	2,446	$36,737	$143,320
35	Miami-Dade	Miami	FL	347	74.50	0	26%	74%	0%	0%	127	$90,909	$403,571
36	Spotyslvania	Paytes	VA	3,500	500.00	160	37%	52%	11%	0%	74	$120,861	$483,333
37	Whitehorn	Gretna	VA	N/A	50.00	N/A	N/A	N/A	N/A	N/A	166	$43,179	$168,750
38	Altavista	Altavista	VA	720	80.00	N/A	N/A	N/A	N/A	N/A	7	$50,000	$341,667
	Average			372	40.18	32	24%	52%	19%	6%	1,440	$65,255	$243,139
	Median			160	19.80	10	16%	59%	7%	0%	538	$60,576	$230,848
	High			3,500	500.00	160	98%	98%	94%	44%	7,684	$120,861	$515,399
	Low			35	5.00	0	1%	0%	0%	0%	7	$35,057	$96,555

From these 38 solar farms, I have derived 89 matched pairs. The matched pairs show no negative impact at distances as close as 105 feet between a solar panel and the nearest point on a home. The range of impacts is -10% to +10% with an average and median of +1% (after excluding the one +22% outlier that may have other factors influencing it).

	MW	Avg. Distance	% Dif
Average	48.77	569	1%
Median	16.00	400	1%
High	617.00	2,020	22%
Low	5.00	145	-10%

While the range is broad, the two charts below show the data points in range from lowest to highest. There is only 3 data points out of 89 that show a negative impact. The rest support either a finding of no impact or 9 of the data points suggest a positive impact due to adjacency to a solar farm. As discussed earlier in this report, I consider this data to strongly support a finding of no impact on value as most of the findings are within typical market variation and even within that, most are mildly positive findings.



D. *Larger Solar Farms*

I have also considered larger solar farms to address impacts related to larger projects. Projects have been increasing in size and most of the projects between 100 and 1000 MW are newer with little time for adjoining sales. I have included a breakdown of solar farms with 20 MW to 80 MW facilities with one 500 MW facility.

Matched Pair Summary - @20 MW And Larger							Adj. Uses By Acreage				1 mile Radius (2010-2020 Data)		
						Topo						Med.	Avg. Housing
	Name	City	State	Acres	MW	Shift	Res	Ag	Ag/Res	Com/Ind	Population	Income	Unit
1	Summit	Moyock	NC	2,034	80.00	4	4%	0%	94%	2%	382	$79,114	$281,731
2	Manatee	Parrish	FL	1,180	75.00	20	2%	97%	1%	0%	48	$75,000	$291,667
3	McBride	Midland	NC	627	75.00	140	12%	10%	78%	0%	398	$63,678	$256,306
4	Grand Ridge	Streator	IL	160	20.00	1	8%	87%	5%	0%	96	$70,158	$187,037
5	Clarke Cnty	White Post	VA	234	20.00	70	14%	39%	46%	1%	578	$81,022	$374,453
6	Simon	Social Circle	GA	237	30.00	71	1%	63%	36%	0%	203	$76,155	$269,922
7	Walker	Barhamsville	VA	485	20.00	N/A	12%	68%	20%	0%	203	$80,773	$320,076
8	Innov 46	Hope Mills	NC	532	78.50	0	17%	83%	0%	0%	2,247	$58,688	$183,435
9	Innov 42	Fayetteville	NC	414	71.00	0	41%	59%	0%	0%	568	$60,037	$276,347
10	Demille	Lapeer	MI	160	28.40	10	10%	68%	0%	22%	2,010	$47,208	$187,214
11	Turrill	Lapeer	MI	230	19.60	10	75%	59%	0%	25%	2,390	$46,839	$110,361
12	Picure Rocks	Tucson	AZ	182	20.00	N/A	6%	88%	6%	0%	102	$81,081	$280,172
13	Avra Valley	Tucson	AZ	246	25.00	N/A	3%	94%	3%	0%	85	$80,997	$292,308
14	Sappony	Stony Crk	VA	322	20.00	N/A	2%	98%	0%	0%	74	$51,410	$155,208
15	Grandy	Grandy	NC	121	20.00	10	55%	24%	0%	21%	949	$50,355	$231,408
16	Barefoot Bay	Barefoot Bay	FL	504	74.50	0	11%	87%	0%	3%	2,446	$36,737	$143,320
17	Miami-Dade	Miami	FL	347	74.50	0	26%	74%	0%	0%	127	$90,909	$403,571
18	Spotyslvania	Paytes	VA	3,500	500.00	160	37%	52%	11%	0%	74	$120,861	$483,333
19	Whitehorn	Gretna	VA	N/A	50.00	N/A	N/A	N/A	N/A	N/A	166	$43,179	$168,750
20	Altavista	Altavista	VA	720	80.00	N/A	N/A	N/A	N/A	N/A	7	$50,000	$341,667
	Average			644	69.08		19%	64%	17%	4%	658	$67,210	$261,914
	Median			347	40.00		12%	68%	2%	0%	203	$66,918	$273,135
	High			3,500	500.00		75%	98%	94%	25%	2,446	$120,861	$483,333
	Low			121	19.60		1%	0%	0%	0%	7	$36,737	$110,361

The breakdown of adjoining uses, population density, median income and housing prices for these projects are very similar to those of the larger set. The matched pairs for each of these were considered earlier and support a finding of no negative impact on the adjoining home values.

I have included a breakdown of solar farms with 50 MW to 617 MW facilities adjoining.

Matched Pair Summary - @50 MW And Larger							Adj. Uses By Acreage				1 mile Radius (2010-2020 Data)		
						Topo						Med.	Avg. Housing
	Name	City	State	Acres	MW	Shift	Res	Ag	Ag/Res	Com/Ind	Population	Income	Unit
1	Summit	Moyock	NC	2,034	80.00	4	4%	0%	94%	2%	382	$79,114	$281,731
2	Manatee	Parrish	FL	1,180	75.00	20	2%	97%	1%	0%	48	$75,000	$291,667
3	McBride	Midland	NC	627	75.00	140	12%	10%	78%	0%	398	$63,678	$256,306
4	Innov 46	Hope Mills	NC	532	78.50	0	17%	83%	0%	0%	2,247	$58,688	$183,435
5	Innov 42	Fayetteville	NC	414	71.00	0	41%	59%	0%	0%	568	$60,037	$276,347
6	Barefoot Bay	Barefoot Bay	FL	504	74.50	0	11%	87%	0%	3%	2,446	$36,737	$143,320
7	Miami-Dade	Miami	FL	347	74.50	0	26%	74%	0%	0%	127	$90,909	$403,571
8	Spotyslvania	Paytes	VA	3,500	500.00	160	37%	52%	11%	0%	74	$120,861	$483,333
9	Whitehorn	Gretna	VA	N/A	50.00	N/A	N/A	N/A	N/A	N/A	166	$43,179	$168,750
10	Altavista	Altavista	VA	720	80.00	N/A	N/A	N/A	N/A	N/A	7	$50,000	$341,667
	Average			1,095	115.85		19%	58%	23%	1%	646	$67,820	$283,013
	Median			627	75.00		15%	67%	0%	0%	274	$61,858	$279,039
	High			3,500	500.00		41%	97%	94%	3%	2,446	$120,861	$483,333
	Low			347	50.00		2%	0%	0%	0%	7	$36,737	$143,320

The breakdown of adjoining uses, population density, median income and housing prices for these projects are very similar to those of the larger set. The matched pairs for each of these were considered earlier and support a finding of no negative impact on the adjoining home values.

The data for these larger solar farms is shown in the SE USA and the National data breakdowns with similar landscaping, setbacks and range of impacts that fall mostly in the +/-5% range as can be seen earlier in this report.

On the following page I show a summary of 248 projects ranging in size from 50 MW up to 1,000 MW with an average size of 119.7 MW and a median of 80 MW. The average closest distance for an adjoining home is 365 feet, while the median distance is 220 feet. The closest distance is 50 feet. The mix of adjoining uses is similar with most of the adjoining uses remaining residential or agricultural in nature. This is the list of solar farms that I have researched for possible matched pairs and not a complete list of larger solar farms in those states.

Total Number of Solar Farms Researched Over 50 MW	238								
		Total	**Used**	**Avg. Dist**	**Closest**	**Adjoining Use by Acre**			
	Output (MW)	**Acres**	**Acres**	**to home**	**Home**	**Res**	**Agri**	**Agri/Res**	**Com**
Average	119.7	1521.4	1223.3	1092	365	10%	68%	18%	4%
Median	80.0	987.3	805.5	845	220	7%	72%	12%	0%
High	1000.0	19000.0	9735.4	6835	6810	98%	100%	100%	70%
Low	50.0	3.0	3.0	241	50	0%	0%	0%	0%

IX. Distance Between Homes and Panels

I have measured distances at matched pairs as close as 105 feet between panel and home to show no impact on value. This measurement goes from the closest point on the home to the closest solar panel. This is a strong indication that at this distance there is no impact on adjoining homes.

However, in tracking other approved solar farms across Kentucky, North Carolina and other states, I have found that it is common for there to be homes within 100 to 150 feet of solar panels. Given the visual barriers in the form of privacy fencing or landscaping, there is no sign of negative impact.

I have also tracked a number of locations where solar panels are between 50 and 100 feet of single-family homes. In these cases the landscaping is typically a double row of more mature evergreens at time of planting. There are many examples of solar farms with one or two homes closer than 100-feet, but most of the adjoining homes are further than that distance.

X. Topography

As shown on the summary charts for the solar farms, I have been identifying the topographic shifts across the solar farms considered. Differences in topography can impact visibility of the panels, though typically this results in distant views of panels as opposed to up close views. The topography noted for solar farms showing no impact on adjoining home values range from as much as 160-foot shifts across the project. Given that appearance is the only factor of concern and that distance plus landscape buffering typically addresses up close views, this leaves a number of potentially distant views of panels. I specifically note that in Crittenden in KY there are distant views of panels from the adjoining homes that showed no impact on value.

General rolling terrain with some distant solar panel views are showing no impact on adjoining property value.

XI. Potential Impacts During Construction

I have previously been asked by the Kentucky Siting Board about potential impacts during construction. This is not a typical question I get as any development of a site will have a certain amount of construction, whether it is for a commercial agricultural use such as large-scale poultry operations or a new residential subdivision. Construction will be temporary and consistent with other development uses of the land and in fact dust from the construction will likely be less than most other construction projects given the minimal grading. I would not anticipate any impacts on property value due to construction on the site.

I note that in the matched pairs that I have included there have been a number of home sales that happened after a solar farm was approved but before the solar farm was built showing no impact on property value. Therefore the anticipated construction had no impact as shown by that data.

XII. Scope of Research

I have researched over 1,000 solar farms and sites on which solar farms are existing and proposed in Kentucky, Illinois, Tennessee, North Carolina, Virginia as well as other states to determine what uses are typically found in proximity with a solar farm. The data I have collected and provide in this report strongly supports the assertion that solar farms are having no negative consequences on adjoining agricultural and residential values.

Beyond these references, I have quantified the adjoining uses for a number of solar farm comparables to derive a breakdown of the adjoining uses for each solar farm. The chart below shows the breakdown of adjoining or abutting uses by total acreage.

Percentage By Adjoining Acreage	Res	Ag	Res/AG	Comm	Ind	Avg Home	Closest Home	All Res Uses	All Comm Uses
Average	19%	53%	20%	2%	6%	887	344	91%	8%
Median	11%	56%	11%	0%	0%	708	218	100%	0%
High	100%	100%	100%	93%	98%	5,210	4,670	100%	98%
Low	0%	0%	0%	0%	0%	90	25	0%	0%

Res = Residential, Ag = Agriculture, Com = Commercial

Total Solar Farms Considered: 705

I have also included a breakdown of each solar farm by number of adjoining parcels to the solar farm rather than based on adjoining acreage. Using both factors provides a more complete picture of the neighboring properties.

Percentage By Number of Parcels Adjoining	Res	Ag	Res/AG	Comm	Ind	Avg Home	Closest Home	All Res Uses	All Comm Uses
Average	61%	24%	9%	2%	4%	887	344	93%	6%
Median	65%	19%	5%	0%	0%	708	218	100%	0%
High	100%	100%	100%	60%	78%	5,210	4,670	105%	78%
Low	0%	0%	0%	0%	0%	90	25	0%	0%

Res = Residential, Ag = Agriculture, Com = Commercial

Total Solar Farms Considered: 705

Both of the above charts show a marked residential and agricultural adjoining use for most solar farms. Every single solar farm considered included an adjoining residential or residential/agricultural use.

XIII. Specific Factors Related To Impacts on Value

I have completed a number of Impact Studies related to a variety of uses and I have found that the most common areas for impact on adjoining values typically follow a hierarchy with descending levels of potential impact. I will discuss each of these categories and how they relate to a solar farm.

1. Hazardous material
2. Odor
3. Noise
4. Traffic
5. Stigma
6. Appearance

1. Hazardous material

A solar farm presents no potential hazardous waste byproduct as part of normal operation. Any fertilizer, weed control, vehicular traffic, or construction will be significantly less than typically applied in a residential development and even most agricultural uses.

The various solar farms that I have inspected and identified in the addenda have no known environmental impacts associated with the development and operation.

2. Odor

The various solar farms that I have inspected produced no odor.

3. Noise

Whether discussing passive fixed solar panels, or single-axis trackers, there is no negative impact associated with noise from a solar farm. The transformer reportedly has a hum similar to an HVAC that can only be heard in close proximity to this transformer and the buffers on the property are sufficient to make emitted sounds inaudible from the adjoining properties. Even less sound is emitted from the facility at night. The various solar farms that I have inspected were inaudible from the roadways.

4. Traffic

The solar farm will have no onsite employee's or staff. The site requires only minimal maintenance. Relative to other potential uses of the site (such as a residential subdivision), the additional traffic generated by a solar farm use on this site is insignificant.

5. Stigma

There is no stigma associated with solar farms and solar farms and people generally respond favorably towards such a use. While an individual may express concerns about proximity to a solar farm, there is no specific stigma associated with a solar farm. Stigma generally refers to things such as adult establishments, prisons, rehabilitation facilities, and so forth.

Solar panels have no associated stigma and in smaller collections are found in yards and roofs in many residential communities. Solar farms are adjoining elementary, middle and high schools as well as churches and subdivisions. I note that one of the solar farms in this report not only adjoins a church, but is actually located on land owned by the church. Solar panels on a roof are often cited as an enhancement to the property in marketing brochures.

I see no basis for an impact from stigma due to a solar farm.

6. Appearance

I note that larger solar farms using fixed or tracking panels are a passive use of the land that is in keeping with a rural/residential area. As shown below, solar farms are comparable to larger greenhouses. This is not surprising given that a greenhouse is essentially another method for collecting passive solar energy. The greenhouse use is well received in residential/rural areas and has a similar visual impact as a solar farm.

The solar panels are all less than 20 feet high. Were the subject property developed with single family housing, that development would have a much greater visual impact on the surrounding area given that a two-story home with attic could be significantly taller than thee proposed panels.

Whenever you consider the impact of a proposed project on viewshed or what the adjoining owners may see from their property it is important to distinguish whether or not they have a protected viewshed or not. Enhancements for scenic vistas are often measured when considering properties that adjoin preserved open space and parks. However, adjoining land with a preferred view today conveys no guarantee that the property will continue in the current use. Any consideration of the impact of the appearance requires a consideration of the wide variety of other uses a property already has the right to be put to, which for solar farms often includes subdivision development, agricultural business buildings such as poultry, or large greenhouses and the like.

Dr. Randall Bell, MAI, PhD, and author of the book **Real Estate Damages**, Third Edition, on Page 146 "Views of bodies of water, city lights, natural settings, parks, golf courses, and other amenities are considered desirable features, particularly for residential properties." Dr. Bell continues on Page 147 that "View amenities may or may not be protected by law or regulation. It is sometimes argued that views have value only if they are protected by a view easement, a zoning ordinance, or covenants, conditions, and restrictions (CC&Rs), although such protections are relatively uncommon as a practical matter. The market often assigns significant value to desirable views irrespective of whether or not such views are protected by law."

Dr. Bell concludes that a view enhances adjacent property, even if the adjacent property has no legal right to that view. He then discusses a "borrowed" view where a home may enjoy a good view of vacant land or property beyond with a reasonable expectation that the view might be partly or completely obstructed upon development of the adjoining land. He follows that with "This same concept applies to potentially undesirable views of a new development when the development conforms to applicable zoning and other regulations. Arguing value diminution in such cases is difficult, since the possible development of the offending property should have been known." In other words, if there is an allowable development on the site then arguing value diminution with such a development would be difficult. This further extends to developing the site with alternative uses that are less impactful on the view than currently allowed uses.

This gets back to the point that if a property has development rights and could currently be developed in such a way that removes the viewshed such as a residential subdivision, than a less intrusive use such as a solar farm that is easily screened by landscaping would not have a greater impact on the viewshed of any perceived value adjoining properties claim for viewshed. Essentially, if there are more impactful uses currently allowed, then there is no viewshed enhancement to adjoining parcels.

Conclusion

On the basis of the factors described above, it is my professional opinion that the proposed solar farm will not negatively impact adjoining property values. The only category of impact of note is appearance, which is addressed through setbacks and landscaping buffers. The matched pair data supports that conclusion.

XIV. Conclusion

The matched pair analysis shows no negative impact in home values due to abutting or adjoining a solar farm as well as no impact to abutting or adjacent vacant residential or agricultural land. The proposed setbacks are further than those measured showing no impact for similar price ranges of homes and for areas with similar demographics to the subject area. The criteria that typically correlates with downward adjustments on property values such as noise, odor, and traffic all support a finding of no impact on property value. Similar paired sales showed no impact from adjoining battery storage facilities.

Very similar solar farms in very similar areas have been found by hundreds of towns and counties not to have a substantial injury to abutting or adjoining properties, and many of those findings of no impact have been upheld by appellate courts. Similar solar farms have been approved adjoining agricultural uses, schools, churches, and residential developments.

I have found no difference in the mix of adjoining uses or proximity to adjoining homes based on the size of a solar farm and I have found no significant difference in the matched pair data adjoining larger solar farms versus smaller solar farms. The data in the Southeast is consistent with the larger set of data that I have nationally, as is the more specific data located in and around Kentucky.

Based on the data and analysis in this report, it is my professional opinion that the solar farm proposed at the subject property will have no negative impact on the value of adjoining or abutting property. I note that some of the positive implications of a solar farm that have been expressed by people living next to solar farms include protection from future development of residential developments or other more intrusive uses, reduced dust, odor and chemicals from former farming operations, protection from light pollution at night, it's quiet, and there is no traffic.

XV. Certification

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

1. The statements of fact contained in this report are true and correct;

2. The reported analyses, opinions, and conclusions are limited only by the reported assumptions and limiting conditions, and are my personal, unbiased professional analyses, opinions, and conclusions;

3. 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;

4. I have no bias with respect to the property that is the subject of this report or to the parties involved with this assignment;

5. My engagement in this assignment was not contingent upon developing or reporting predetermined results;

6. My compensation for completing this assignment is not contingent upon the development or reporting of a predetermined value or direction in value that favors the cause of the client, the amount of the value opinion, the attainment of a stipulated result, or the occurrence of a subsequent event directly related to the intended use of the appraisal;

7. The reported analyses, opinions, and conclusions were developed, and this report has been prepared, in conformity with the requirements of the Code of Professional Ethics and Standards of Professional Appraisal Practice of the Appraisal Institute;

8. My analyses, opinions and conclusions were developed, and this report has been prepared, in conformity with the Uniform Standards of Professional Appraisal Practice.

9. The use of this report is subject to the requirements of the Appraisal Institute relating to review by its duly authorized representatives;

10. I have not made a personal inspection of the property that is the subject of this report, and;

11. No one provided significant real property appraisal assistance to the person signing this certification.

12. As of the date of this report I have completed the continuing education program for Designated Members of the Appraisal Institute;

13. I have not performed services, regarding the property that is the subject of this report within the three-year period immediately preceding acceptance of this assignment.

Disclosure of the contents of this appraisal report is governed by the bylaws and regulations of the Appraisal Institute and the National Association of Realtors.

Neither all nor any part of the contents of this appraisal report shall be disseminated to the public through advertising media, public relations media, news media, or any other public means of communications without the prior written consent and approval of the undersigned.

Richard C. Kirkland, Jr., MAI
State Certified General Appraiser

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Professional Experience

Kirkland Appraisals, LLC, Raleigh, N.C. — 2003 – Present
Commercial appraiser
Hester & Company, Raleigh, N.C.
Commercial appraiser — 1996 – 2003

Professional Affiliations

MAI (Member, Appraisal Institute) designation #11796	2001
NC State Certified General Appraiser # A4359	1999
VA State Certified General Appraiser # 4001017291	
SC State Certified General Appraiser # 6209	
FL State Certified General Appraiser # RZ3950	
GA State Certified General Appraiser # 321885	
MI State Certified General Appraiser # 1201076620	
PA State Certified General Appraiser # GA004598	
OH State Certified General Appraiser # 2021008689	
IN State Certified General Appraiser # CG42100052	
KY State Certified General Appraiser # 5522	

Education

Bachelor of Arts in English, University of North Carolina, Chapel Hill — 1993

Continuing Education

Uniform Standards of Professional Appraisal Practice Update	2022
Sexual Harassment Prevention Training	2021
Appraisal of Land Subject to Ground Leases	2021
Michigan Appraisal Law	2020
Uniform Standards of Professional Appraisal Practice Update	2020
Uniform Appraisal Standards for Federal Land Acquisitions (Yellow Book)	2019
The Cost Approach	2019
Income Approach Case Studies for Commercial Appraisers	2018
Introduction to Expert Witness Testimony for Appraisers	2018
Appraising Small Apartment Properties	2018
Florida Appraisal Laws and Regulations	2018
Uniform Standards of Professional Appraisal Practice Update	2018
Appraisal of REO and Foreclosure Properties	2017
Appraisal of Self Storage Facilities	2017
Land and Site Valuation	2017
NCDOT Appraisal Principles and Procedures	2017
Uniform Standards of Professional Appraisal Practice Update	2016
Forecasting Revenue	2015
Wind Turbine Effect on Value	2015
Supervisor/Trainee Class	2015

Business Practices and Ethics	2014
Subdivision Valuation	2014
Uniform Standards of Professional Appraisal Practice Update	2014
Introduction to Vineyard and Winery Valuation	2013
Appraising Rural Residential Properties	2012
Uniform Standards of Professional Appraisal Practice Update	2012
Supervisors/Trainees	2011
Rates and Ratios: Making sense of GIMs, OARs, and DCFs	2011
Advanced Internet Search Strategies	2011
Analyzing Distressed Real Estate	2011
Uniform Standards of Professional Appraisal Practice Update	2011
Business Practices and Ethics	2011
Appraisal Curriculum Overview (2 Days – General)	2009
Appraisal Review - General	2009
Uniform Standards of Professional Appraisal Practice Update	2008
Subdivision Valuation: A Comprehensive Guide	2008
Office Building Valuation: A Contemporary Perspective	2008
Valuation of Detrimental Conditions in Real Estate	2007
The Appraisal of Small Subdivisions	2007
Uniform Standards of Professional Appraisal Practice Update	2006
Evaluating Commercial Construction	2005
Conservation Easements	2005
Uniform Standards of Professional Appraisal Practice Update	2004
Condemnation Appraising	2004
Land Valuation Adjustment Procedures	2004
Supporting Capitalization Rates	2004
Uniform Standards of Professional Appraisal Practice, C	2002
Wells and Septic Systems and Wastewater Irrigation Systems	2002
Appraisals 2002	2002
Analyzing Commercial Lease Clauses	2002
Conservation Easements	2000
Preparation for Litigation	2000
Appraisal of Nonconforming Uses	2000
Advanced Applications	2000
Highest and Best Use and Market Analysis	1999
Advanced Sales Comparison and Cost Approaches	1999
Advanced Income Capitalization	1998
Valuation of Detrimental Conditions in Real Estate	1999
Report Writing and Valuation Analysis	1999
Property Tax Values and Appeals	1997
Uniform Standards of Professional Appraisal Practice, A & B	1997
Basic Income Capitalization	1996

EXHIBIT I

Decommissioning Plan
Wood Duck Solar Project
Barren County, Kentucky

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Project No: 237801851
December 8, 2024

This document entitled Decommissioning Plan – Wood Duck Solar Project, Barren County, Kentucky, was prepared by Stantec Consulting Services Inc. ("Stantec") for the use of Wood Duck Solar LLC a subsidiary of Geenex Solar (the "Client"). The material in this document reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in this document are based on conditions and information existing at the time this document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others.

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Civil Engineer

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Senior Project Engineer

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1.0 INTRODUCTION

Wood Duck Solar LLC (Wood Duck) is proposing to construct and operate the Wood Duck Solar Project (Project) in Barren County, Kentucky. The Project location is approximately five miles west of the City of Glasgow. The Project footprint encompasses approximately 1,245 acres within perimeter fencing, out of a 2,259 Project area. The maximum generating capacity of the Project will be up to 100 megawatts, alternating current $(MW)_{[AC]}$.

This Decommissioning Plan (Plan) provides a description of the decommissioning and restoration phase of the Project. Start-of-construction is planned for late-2025, with a projected Commercial Operation Date in late-2026. The Project will consist of the installation of the perimeter fencing; solar modules and associated trackers and steel piles; inverter stations; access and internal roads; electrical collection system and substation (Figure 1).

This Plan is applicable to the decommissioning/deconstruction and restoration phases of the Project. A summary of the components to be removed is provided in Section 1.1. Summaries of the estimated costs and potential salvage value associated with decommissioning the Project are provided in Section 4.

1.1 SOLAR FARM COMPONENTS

The main components of the Project include:

- Solar modules
- Tracking system and steel piles
- Inverter and transformer stations
- Electrical cabling and conduits
- Site access roads
- Perimeter fencing
- Project substation and overhead transmission tie-in line
- Operations and Maintenance (O&M) structure

1.2 TRIGGERING EVENTS AND EXPECTED LIFETIME OF PROJECT

Project decommissioning may be triggered by events such as the end of a power purchase agreement (PPA), expiration of lease agreement(s), abandonment, or when the Project reaches the end of its operational life. It is anticipated that decommissioning will begin within six (6) months of the facility ceasing to produce electricity. The facilities will be removed at the owner's or operator's expense within twelve (12) months of the date it begins decommissioning activities.

The anticipated lifetime of the Project is approximately 40 years. At the end of the Project's useful life, the modules and associated components will be decommissioned and removed from the Project site.

Components of the solar facility that have resale value may be sold in the wholesale market. Components with no wholesale value will be salvaged and sold as scrap for recycling or disposed of at an approved offsite licensed solid waste disposal facility (landfill). Decommissioning activities will include removal of the arrays and associated components as listed in Section 1.1 and described in Section 2.

1.3 DECOMMISSIONING SEQUENCE

Decommissioning activities will begin within six (6) months of the Project ceasing operation. Wood Duck will be the responsible party. Monitoring and site restoration may extend beyond this period to ensure successful revegetation and rehabilitation. The anticipated sequence of decommissioning and removal is described below; however, overlap of activities is expected.

- Reinforce access roads, if needed, and prepare site for component removal
- Install erosion control materials and other best management practices (BMPs) to protect sensitive resources and control erosion during decommissioning activities.
- De-energize solar arrays.
- Dismantle and remove panels and above-ground wiring.
- Remove tracking equipment and piles.
- Remove inverter/transformer stations along with support system and foundation pads.
- Remove electrical cables and conduits
- Remove array fence.
- Remove access and internal roads and grade site (if required).
- Remove substation and associated overhead transmission tie-in line.
- De-compact subsoils as needed, restore, and revegetate disturbed land to pre-construction conditions to the extent practicable.

2.0 PROJECT COMPONENTS AND DECOMMISSIONING ACTIVITIES

The solar facility components and decommissioning activities necessary to restore the Project area, as near as practicable, to pre-construction conditions are described within this section.

2.1 OVERVIEW OF SOLAR FACILITY SYSTEM

Wood Duck anticipates utilizing approximately 204,525 solar modules, with a total generating capacity of 100 MW alternating current (AC). The Project footprint encompasses approximately 1,245 acres of the larger 2,259-acre Project area and will be surrounded by perimeter fencing as shown on Figure 1. The land within the perimeter fencing is predominantly agricultural land.

Foundations, steel piles, and electric cabling and conduit will be removed. Access roads and fence may be left in place if requested and/or agreed to by the landowner; however, for purposes of this assessment, all access roads are assumed to be removed. Wood Duck will communicate with the appropriate local agency to coordinate the repair of damaged or modified public roads during the decommissioning and restoration process.

Estimated quantities of materials to be removed and sold, salvaged, or disposed of are included in this section. Many of the materials described have salvage value, although there are some components that will likely have none at the time of decommissioning. Removed materials that cannot be sold on the resale market will be salvaged or recycled to the extent possible. Other waste materials will be disposed of in accordance with state and federal law in an approved licensed solid waste facility.

Solar panels may have value in a resale market, depending on their condition at the end of the Project life. If the Project is decommissioned prior to the anticipated 40-year timeframe, the components resale value will be substantially higher than at the end of the projected Project.

Table 1 presents a summary of the primary components of the Project included in this decommissioning plan.

Table 1 Primary Components of Solar Farm to be Decommissioned

Component	Quantity	Unit of Measure
Solar Modules (approximate)	204,525	Each
Tracking System (equivalent full trackers)	2,351	Tracker
Steel Piles	28,632	Each
Inverter Stations with Piers or Foundations	35	Each
Subsurface Electrical Cables and Conduits (to be abandoned at depth greater than three feet)	59,141	Linear Foot (estimated)
Perimeter Fencing	159,740	Linear Foot
Access Roads (approximate)	99,714	Linear Foot
Overhead Transmission Line	500	Linear Foot
Project Substation	1	Each

2.2 SOLAR MODULES

Wood Duck intends to use Canadian Solar CS7N-MB-AG 660-watt bifacial panels for the Project. This module assembly (with frame) will have a total weight of approximately 83.6 pounds and will be approximately 93.9 inches by 51.3 inches in size. The modules are mainly comprised of non-metallic materials such as silicon, glass, plastic, and epoxies, with an anodized aluminum frame.

At the time of decommissioning, module components in working condition may be refurbished and sold in a secondary market yielding greater revenue than selling as salvage material. The estimates in this report have been calculated using a conservative approach, considering revenue from salvage only, rather than resale of Project components.

2.3 TRACKING SYSTEM AND SUPPORT

The solar modules will be mounted on a horizontal single-axis, one-in-portrait tracking system. Wood Duck intends to use the DuraTrack HZ v3 tracker or similar system. Each full, three-string tracker will be approximately 380 feet in length and will support 87 solar modules. Smaller trackers will be employed at the edges of the layout to efficiently utilize available space. The tracking system is mainly comprised of high-strength, galvanized steel and anodized aluminum; steel piles that support the system are assumed to be comprised of galvanized steel.

The solar arrays will be deactivated from the surrounding electrical system and made safe for disassembly. Liquid wastes, including oils and hydraulic fluids will be removed and properly disposed of or recycled according to regulations current at the time of decommissioning. Electronic components, and internal electrical wiring will be removed and salvaged. The steel piles will be completely removed from the ground.

The supports, tracking system, and posts contain salvageable materials which can be sold to provide revenue to offset the decommissioning costs.

2.4 INVERTER/TRANSFOMER STATIONS

The inverter and transformer stations are located within the arrays and will sit on platforms supported by steel piles. The inverters and transformers will be deactivated, disassembled, and removed. Depending on the condition of the unit at decommissioning, the equipment may be sold for refurbishment and re-use. If not re-used, they will be salvaged or disposed of at an approved solid waste management facility.

2.5 ELECTRICAL CABLING AND CONDUITS

The Project's underground electrical collection system will be placed at a depth greater than three feet (36 inches). All collection and communications cabling will be removed and salvaged. No recovery value has been assumed for the collection cabling, although it is likely to have salvage value at the time of removal.

2.6 PROJECT SUBSTATION AND TIE-IN TRANSMISSION LINE

Wood Duck Solar will include a Project substation within an approximately 2.0-acre footprint. The substation will contain within its perimeter, a gravel pad, power transformers and footings, electrical control house and concrete foundations, as needed. An approximately 500-foot-long, dedicated overhead transmission line will connect the Project to a larger regional transmission line. The Project owned transmission line and the substation, including all components and accessories will be removed during decommissioning.

The substation transformers may be sold for re-use or salvage. Components of the substation that cannot be salvaged will be transported off-site for disposal at an approved waste management facility. Foundations and footings will be demolished and removed. A short span of generation tie-in transmission line and associated structures will be removed.

2.7 OPERATIONS AND MAINTENANCE BUILDING

One operations and maintenance (O&M) building is being included as part of the Project. It is assumed the building will be sold or reverted to the landowner at the time of decommissioning; therefore, no O&M building removal cost is included in this Plan.

2.8 PERIMETER FENCING AND ACCESS ROADS

The Project will include a security fence around the perimeter of the site and exclusionary area. The fence will total approximately 159,740 feet in length.

Access drives from local roads and along the inner perimeter of the arrays will provide direct access to the solar facility and substation equipment. It is estimated that the site access drives will be approximately 16 feet in width and total approximately 99,714 feet (18.89 miles) in length. The access road lengths may change with final Project design. Landowners may choose to retain the access roads at completion of the Project; however, to be conservative, the decommissioning estimate assumes that all inner site access roads will be removed.

During installation of the Project, site access drives will be excavated to remove topsoil, the subgrade will be compacted, and up to eight inches of aggregate fill will be placed. The estimated quantity of these materials is provided in Table 2.

Table 2 Typical Access Road Construction Materials

Item	Quantity	Unit
Aggregate fill, 8-inch thick – to be removed	39,393	Cubic Yards

Decommissioning activities include the removal and stockpiling of aggregate materials onsite for salvage preparation. It is conservatively assumed that all aggregate materials will be removed from the Project site and hauled up to five miles from the Project area. Following removal of aggregate, the access road areas will be de-compacted with deep ripper or chisel plow (ripped to 18 inches), backfilled with native subsoil and topsoil, as needed, and graded as necessary.

3.0 LAND USE AND ENVIRONMENT

3.1 SOILS AND AGRICULTURAL LAND

Areas of the Project will be restored to reasonably similar conditions that existed immediately prior to project construction. Soils compacted during de-construction activities will be de-compacted, as necessary.

3.2 RESTORATION AND REVEGETATION

Areas of the Project that have been excavated and backfilled will be graded as previously described. If present, drain tiles that have been damaged will be restored to pre-construction condition. Restored areas will be revegetated in consultation with the current landowner and in compliance with regulations in place at the time of decommissioning. Work will be completed to comply with the conditions agreed upon by Wood Duck and the County or as directed by Kentucky Public Service Commission regulations in effect at the time of decommissioning.

If permitted by the landowner who retains control of the land following decommissioning of the Project, Wood Duck will monitor the site and ensure revegetation has been completed.

3.3 SURFACE WATER DRAINAGE AND CONTROL

The proposed Project is predominantly located on agricultural land. The Project facilities are being sited to minimize impacts to wetlands and waterways. The existing Project site conditions and proposed BMPs to protect surface water features will be detailed in a Project Stormwater Pollution Prevention Plan (SWPPP) prior to the commencement of decommissioning construction activities.

Surface water conditions at the Project site will be reassessed prior to the decommissioning phase. Wood Duck will obtain the required water quality permits from the Kentucky Energy and Environmental Cabinet (KEEC) and the U.S. Army Corp of Engineers (USACE), if needed, before decommissioning of the Project. Decommissioning construction stormwater permits will also be obtained and a SWPPP prepared describing the protection needed to reflect conditions present at the time of decommissioning. BMPs may include enhancement of construction entrances, temporary seeding, permanent seeding, mulching (in non-agricultural areas), erosion control matting, silt fence, filter berms, and filter socks.

3.4 MAJOR EQUIPMENT REQUIRED FOR DECOMMISSIONING

The activities involved in decommissioning the Project include removal of the above- and below-ground ground components of the Project and restoration as described in Sections 2, 3.1 and 3.2.

Equipment required for the decommissioning activities is similar to what is needed to construct the solar facility and may include, but is not limited to: small cranes, low ground pressure (LGP) tracked excavators, backhoes, LGP tracked bulldozers and dump trucks, front-end loaders, deep rippers, water trucks, disc plows and tractors to restore subgrade conditions, along with ancillary equipment. Standard dump trucks may be used to transport material removed from the site to disposal facilities.

4.0 DECOMMISSIONING COST ESTIMATE SUMMARY

Expenses associated with decommissioning the Project will be dependent on labor costs at the time of decommissioning. For the purposes of this report, approximate 2024 average market values were used to estimate labor expenses. Fluctuation and inflation of the labor costs were not factored into the estimates.

The value of the individual components of the solar facility will vary with time. In general, the highest component value would be expected at the time of construction with declining value over the life of the Project. Over most of the life of the Project, components such as the solar panels could be sold in the wholesale market for reuse or refurbishment. As efficiency and power production of the panels decrease due to aging and/or weathering, the resale value will decline accordingly. Secondary markets for used solar components include other utility scale solar facilities with similar designs that may require replacement equipment due to damage or normal wear over time; or other buyers (e.g., developers, consumers) that are willing to accept a slightly lower power output in return for a significantly lower price point when compared to new equipment.

4.1 DECOMMISSIONING RISK OVER THE LIFECYCLE OF A PROJECT

The probability of an event that would lead to abandonment or long-term interruption is extremely low during the first 15 to 20 years of the Project life. Accordingly, the risk of decommissioning the Project is extremely low during this time frame. The reasons why the risk to decommission the Project is extremely low in the early phases of the Project include, but are not limited to, the resale value of the facilities; power purchase agreements in place; manufacturer warranties on components; property damage and business interruption insurance coverage; and the value of renewable energy in general in the current market.

4.2 DECOMMISSIONING EXPENSES

Project decommissioning will incur costs associated with disposal of components not sold for salvage, including materials which will be disposed of at a licensed facility, as required. Decommissioning costs also include backfilling, grading and restoration of the Project site as described in Sections 2 and 3. Table 3 summarizes the estimates for activities associated with the major components of the Project.

Table 3 Estimated Decommissioning Expenses

Activity	Unit	Quantity	Cost per Unit	Total
Overhead and management (includes estimated permitting required and public road repairs)	Lump Sum	1	$632,500	$632,500
Solar modules; disassembly and removal	Each	204,525	$5.30	$1,083,983
Tracking System disassembly and removal (equivalent full trackers)	Each	2,351	$770	$1,810,270
Steel pile/post removal	Each	32,914	$12.80	$421,299
Transformers and inverters	Each	35	$1,930	$67,550

Activity	Unit	Quantity	Cost per Unit	Total
Inverter steel pile/post removal	Each	420	$54.20	$22,764
Remove buried cable	Linear Feet	59,141	$0.93	$55,001
Access road excavation and removal	Lump Sum	1	$441,400	$441,400
Perimeter fence removal (wildlife fence)	Linear Feet	159,740	$3.10	$495,194
Topsoil replacement and rehabilitation of site	Lump Sum	1	$1,405,400	$1,405,400
Remove overhead transmission line	Linear Mile	0.10	$275,000	$27,500
Substation removal and site grading	Each	1	$495,000	$495,000
Total Estimated Decommissioning Cost				**$6,957,861**

4.3 DECOMMISSIONING REVENUES

Revenue from decommissioning the Project will be realized through the sale of the solar facility components and construction materials. As previously described, the value of the decommissioned components will be higher in the early stages of the Project and decline over time. Resale of components such as solar panels is expected to be greater than salvage (i.e., scrap) value for most of the life of the Project.

Modules and other solar plant components may be sold within a secondary market or as salvage. A current sampling of reused solar panels indicates a wide range of pricing depending on age and condition ($0.10 to $0.30 per watt). Future pricing of solar panels is difficult to predict, due to the relatively young age of the market, changes to solar panel technology, and the ever-increasing product demand. A conservative estimation of the value of solar panels at $0.10 per watt would yield approximately $13,500,000. To preserve the integrity of the modules, higher removal and handling costs would be expected for module resale versus salvage. However, although costs would be higher, the net revenue due to resale would still be substantially greater than the estimated salvage value.

The resale value of components such as trackers, may decline more quickly; however, the salvage value of the steel that makes up a large portion of the tracker is expected to stay at or above the value used in this report.

The market value of steel and other materials fluctuates daily and has varied widely over the past five years. Salvage value estimates were based on an approximate five-year-average price of steel derived from sources including on-line recycling companies and United States Geological Survey (USGS) commodity summaries. The price used to value the steel used in this report is $254 per metric ton; aluminum at $0.40 per pound; silicon at

$0.40 per pound and glass at $0.05 per pound. The main component of the tracking system and piles is assumed to be salvageable steel. Solar panels are estimated to contain approximately 75 percent glass, 8 percent aluminum and 5 percent silicon. A 50 percent recovery rate was assumed for aluminum and all panel components, due to the processing required to separate the panel components. Alternative and more efficient methods of recycling solar panels are anticipated before this Project is decommissioned, given the large number of solar facilities that are currently being developed. Table 4 summarizes the potential salvage value for the solar array components and construction materials.

Table 4 Estimated Decommissioning Revenues

Item	Unit of Measurement	Quantity per Unit	Salvage Price per Unit	Total Salvage Price per Item	Number of Items	Total
Panels - Silicon	Pounds per Panel	2.1	$0.40	$0.840	204,525	$171,801
Panels - Aluminum	Pounds per Panel	3.3	$0.40	$1.320	204,525	$269,973
Panels - Glass	Pounds per Panel	31.3	$0.05	$1.565	204,525	$320,082
Tracking System and Posts	Metric tons per MW$_{[DC]}$	32.0	$273	$8,736	135.00	$1,179,360
Substation	Each	1	$75,000	$75,000	1	$75,000
Total Estimated Decommissioning Revenue						**$2,016,216***

* Revenue based on salvage value only. Revenue from used panels at $0.10 per watt could raise $13,500,000 as resale versus the estimated salvage revenue.

4.4 DECOMMISSIONING COST SUMMARY

Table 5 provides a summary of the estimated cost to decommission the Project, using the information detailed in Sections 4.2. Estimates are based 2024 prices, with no market fluctuations or inflation considered.

Table 5 Net Decommissioning Cost Summary

Item	(Cost)/Revenue
Decommissioning Expenses	**($6,957,861)**
Potential Revenue – salvage value of panel components and recoverable materials	**$2,016,216**
Net Decommissioning Cost	**($4,941,645)**

Decommissioning Cost per $MW_{[DC]}$	**($36,605)**
Decommissioning Cost per $MW_{[AC]}$	**($49,416)**

4.5 FINANCIAL ASSURANCE

In accordance with Kentucky regulations, KRS 278.706(2)(m), this decommissioning plan shall include plans to secure a bond or other similar security for the Project to assure financial performance of the decommissioning obligation. As stated in the regulations, the amount of the proposed bond or security shall be determined by an independent, licensed engineer who is experienced in the decommission of solar electric generating facilities and shall be either the net present value of the total estimated cost of completing decommissioning or the bond amount required by a county or municipal government. As Barren County has not established a decommissioning bond or other similar security bond, the counties shall be named as a secondary beneficiary. The bond or security shall be provided by an insurance company or surety that at all times shall maintain at least an "Excellent" rating as measured by the AM Best rating agency or by any national credit rating agency and, if available, shall be noncancelable by the customer until completion of the decommissioning plan. Wood Duck will be responsible for decommissioning the Project facilities.

FIGURE

Figure 1 Proposed Project Layout

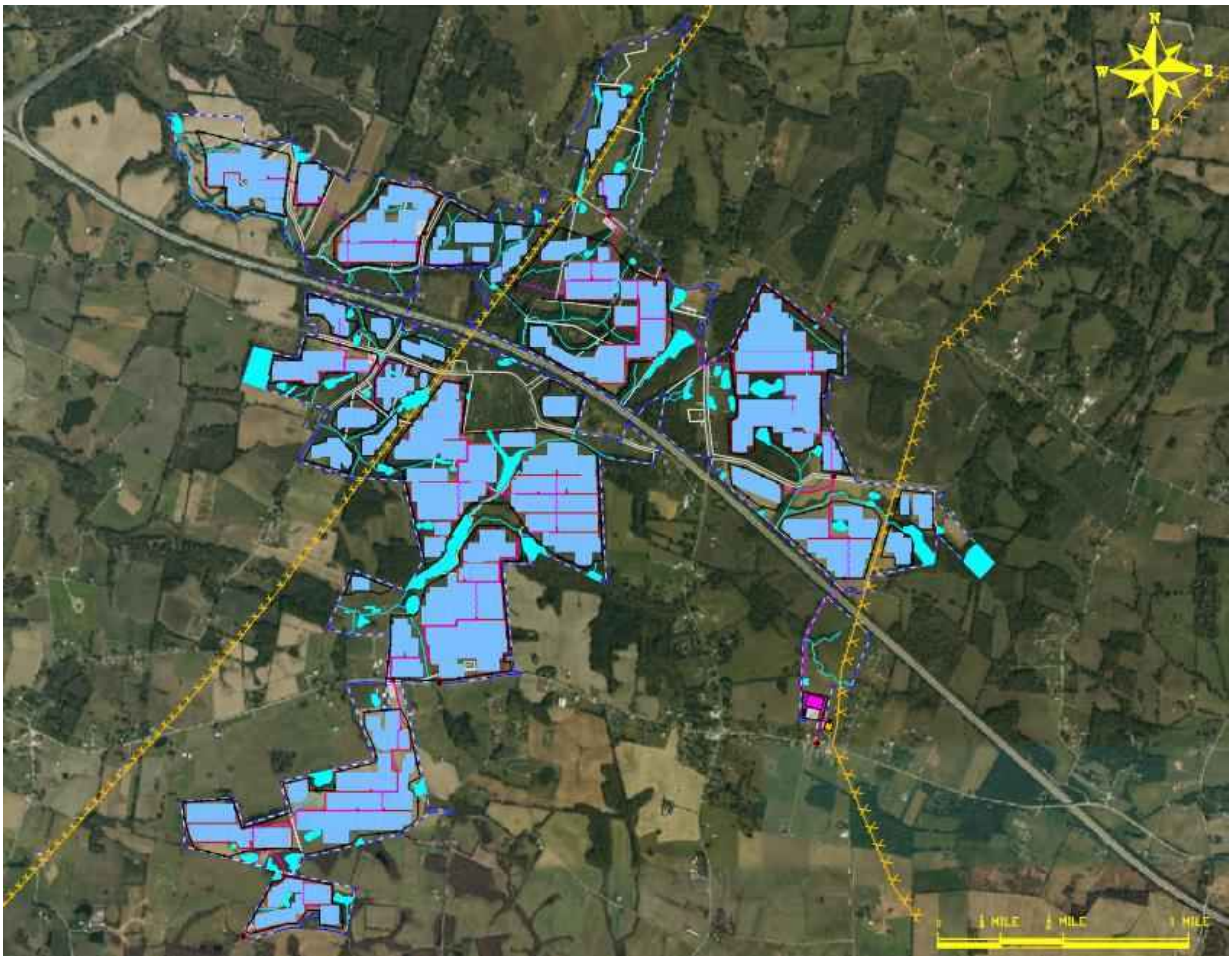

EXHIBIT J

Joint City-County Planning Commission
of
Barren County, Kentucky

December 18, 2023

The Joint City-County Planning Commission of Barren County, Kentucky met in regular session on Monday, December 18, 2023, at 7:00 PM in the Council Chambers of the Glasgow City Hall.

Chairman Gumm called the meeting to order and called for a roll call of Members. The following Commission Members were present:

Eddie Atnip	Ricky Houchens
Joe Austin	Joan Norris
Lewis Bauer (Zoom)	David Rutherford
Bobby Bunnell	Janis Turner
Thomas Grubbs (Zoom)	Maria Westcott
Tommy Gumm	Candy Wethington
	Forrest Wise

I. GENERAL BUSINESS:

Agenda Item # 1 – ***Approval of Minutes***

A motion was made by Forrest Wise and seconded by Candy Wethington to approve the November 20, 2023, meeting minutes as amended. Motion unanimously carried.

Agenda Item # 2 – ***Approval of Invoices***

The invoices for December were presented for payment.

A motion was made by Eddie Atnip and seconded by Maria Westcott to approve the invoices as presented. Motion unanimously carried.

Agenda Item # 3 – ***Committee Report***

Chairman Gumm appointed a Land Use Committee for informational purposes for Barren County with Eddie Atnip, Chairman, Thomas Grubbs and Bobby Bunnell.

Chairman Gumm appointed a Barren County Subdivision Regulation Review Committee with Lewis Bauer, Chairman, Candy Wethington and Joe Austin.

<u>Agenda Item # 4</u> – *Treasurer's Report*

Janis Turner, Treasurer, presented the Treasurer's Reports for the period ending November 31, 2023.

<u>Agenda Item # 5</u> – *Director's Report*

Kevin Myatt, Planning Director, reported that there will be training at the beginning of February 2024 in Eizabethtown that will be a free training open to all members, planners and elected officials and is put on by KAPA.

Mr. Myatt also explained that to meet the Kentucky 100 Statutes, specifically the SPGE requirements, the Planning Commission will have to preform an audit of the 2022-23 fiscal year and that the cost is approximately $5,000 dollars from Campbell, Myers and Rutledge CPA firm. The Planning Commission decided to wait one month to discuss further.

<u>II. SUBDIVISION:</u>

1. **121823-01-B – Subdivision Regulations Setback Encroachment Variance Application –** *Geenex Solar LLC, Applicant – Waller Road (PVA Parcel #20-12), New Bowling Green Road (PVA Parcel #20-2BB, 20-5, 19-31, 19-22, 33-7A), Oak Grove Church (PVA Parcel #19-19, 32-21F, 19-10, 32-20B), Millstown Road (PVA Parcel #19-17B, 19-18, 19-5, 19-6E, 32-16A, 32-16B, 19-17A), Apple Grove Road (PVA Parcel #19-8, 32-16), Park City Bon Ayr Road (PVA Parcel #32-17, 32-17A, 32-21), Disman Road (PVA Parcel #32-41C), Mayhew Road (PVA Parcel #32-39), R. Crump Road (PVA Parcel #19-2, 19-3), Dripping Springs Road (PVA Parcel #32-22) – Twenty (20') foot Variance to the Twenty (20') foot Rear Yard Setback and Ten (10') foot to the Ten (10') foot Side Yard Setback Requirement – Article 503.1.5 of the Barren County Subdivision Regulations – Barren County*

Staff Findings:

1. The applicant has filed a Subdivision Regulations Encroachment Variance Application in the appropriate time and has explained the proposed request, see Attachment A. Attachment E of the Applicants submittal are the sheets signed by the individual property owners.

2. The Applicant is requesting a twenty (20') foot variance to the twenty (20') foot Rear Yard Setback requirement and a ten (10') foot variance to the ten (10') foot Side Yard Setback requirement, Article 503.1.5 of the Barren County Subdivision Regulations. The variance request is only to the interior lot/tract lines of the participating properties and not to the adjacent non-participating property and landowners.

3. Attachment B is a general vicinity map of the subject property provided by the applicant. The requested variance takes place over Twenty-Seven (27) Tracts along Waller Road, New Bowling Green Road, Oak Grove Church Road, Millstown Road, Apple Grove Road, Park City Bon Ayr Road, Siman Road, Mayhew Road, R. Crump Road, and Dripping Springs Road. Article 201.52 of the Barren County Subdivision Regulations states that solar production facilities are a solar energy system whose sole or primary function is the production, distribution and sale of solar generated electricity. Solar production farms may include multiple landowners, lessee's, and/or properties.

4. The proposed site development, see Attachment C, extends on both the north and south side of Cumberland Parkway and is conveyed over 2,334.61 +/- total acres and is for informational purposes on this agenda item.

5. Attachment D, (which is Attachment B and Attachment D of the Applicants submittal), Explanation of Requests, states that the Setbacks would unnecessarily reduce the area where solar panels and related project infrastructure can be installed.

6. The Explanation of Request also states that the strict adherence to the Setbacks would impose a particular hardship on the project as well as the participating Property Owners.

Mr. Greg Dutton, Applicant Counsel of Frost, Brown & Todd, spoke on behalf of the applicants and presented additional facts and information to support the proposed request in a PowerPoint presentation, which was submitted as an exhibit.

There was some discussion by the Planning Commission members in regard to the pylons being movable or replaceable and not similar to usual stick-built structures that require poured concrete footers and that there would not be an expansion of the project after the variance agenda item.

A motion was made by Bobby Bunnell and seconded by Eddie Atnip to approve the Setback Encroachment Variance Application for Geenex Solar, LLC, Applicant, for the properties located along Waller Road, New Bowling Green Road, Oak Grove Church Road, Millstown Road, Apple Grove Road, Bon Ayr Road, Disman Road, Mayhew Road, R. Crump Road and Dripping Springs Road because granting of the variance would not adversely affect the public health, safety and welfare and will not cause a hazard or nuisance to the public and due to the fact the variance sought is to the internal lot lines of the development and that all structures could be removed as opposed to a structure which would have a poured concrete footer for a typical variance request. Motion unanimously carried.

III. DEVELOPMENT PLAN:

1. **121823-02-B – Development Plan** – *Wood Duck Solar Farm Site Construction – Geenex Solar LLC, Applicant – Property located along Waller Road (PVA Parcel #20-12), New Bowling Green Road (PVA Parcel #20-2BB, 20-5, 19-31, 19-22, 33-7A), Oak Grove Church (PVA Parcel #19-19, 32-21F, 19-10, 32-20B), Millstown Road (PVA Parcel #19-17B, 19-18, 19-5, 19-6E, 32-16A, 32-16B, 19-17A), Apple Grove Road (PVA Parcel #19-8, 32-16), Park City Bon Ayr Road (PVA Parcel #32-17, 32-17A, 32-21), Disman Road (PVA Parcel #32-41C), Mayhew Road (PVA Parcel #32-39), R. Crump Road (PVA Parcel #19-2, 19-3), Dripping Springs Road (PVA Parcel #32-22) – 28 Tracts – 2,334.61 +/- Total Acres – Glasgow – Plans Prepared by Geenex Solar LLC*

Staff Findings:

1. Article 201.52 of the Barren County Subdivision Regulations states that solar production facilities is a solar energy system whose sole or primary function is the production, distribution and sale of solar generated electricity. Solar production farms may include multiple landowners, lessee's, and/or properties.

2. The proposed development is taking place in the Unincorporated area of Barren County, which has no Land Use Plan ordinance. However, Article 511.1 of the Barren County Subdivision Regulations states that a development plan shall be submitted to the Joint-City County Planning Commission for review to verify that all structures proposed are in accordance with Section 503.1.5. The name of the proposed Solar Farm is the Wood Duck Solar Development.

3. The applicant has sought a Variance to the ten (10') foot side yard and twenty (20') foot rear yard building setback requirements found in Article 503.1.5.

4. The development will contain approximately 2,334.61 total acres and lies on the north and south side of the Cumberland Parkway.

5. Attachment B is the proposed Site Plan provided by the Applicant.

    a. As indicated on the Site Plan the development will consist of rows of solar modules for the majority of the development.

    b. A fence is proposed around all the modules.

    c. The development will include an electrical substation for the site as well as a new EKPC substation. An operations and maintenance building is also proposed.

   d. Roadways within the site are shown in red. Material storage and parking areas during construction are shown in the gray hatched squares.

   e. Wetlands and karst areas are also indicated on the site map. No construction is proposed to take place within these areas.

6. Parcels included in the proposed solar farm are shown on Attachment C. The project will include development on Parcels located on Waller Road, New Bowling Green Road, Oak Grove Church Road, Millstown Road, Apple Grove Road, Park City Bon Ayr Road, Disman Road, Mayhew Road, R. Crump Road and Dripping Springs Road.

7. A Sound Study conducted by Stantec has been presented by the applicant in Attachment D. Page 9 of this study states that sound produced during normal operation of the solar farm will produce sounds heard at 47 decibels. Decibels produced during the construction phase of this project will range from 69 to 74.

   a. These decibels as they relate to both indoor and outdoor activity are shown on the "Noise Scale" chart included in the portion of the study.

8. Stantec has also prepared a Traffic Impact Study for the proposed site, an excerpt is shown in Attachment E. Per the study, any increased traffic, both during construction and during use will be negligible with no measurable impact on the traffic and/or transportation infrastructure.

9. An estimated economic impact for Barren County due to this project compiled by Consulting Economist Paul A. Coomes, Ph.D. surmises that approximately $2.4 million dollars in revenues for Barren County will occur due to "Payment in Lieu of Taxes" over four (4) decades. It is also estimated that during the construction phase, approximately 323 new jobs with compensation exceeding $20 million dollars will occur. See Attachment F.

10. The conclusion of Kirkland Appraisals, LLC, Attachment G, states that according to their analysis there is "no impact on home values due to abutting or adjoining a solar farm as well as no impact to abutting or adjacent vacant residential or agricultural land where the solar farm is properly screened and buffered".

11. A "Visual Resource Assessment" was also performed by Stantec. The conclusions page of this inclusion is shown in Attachment H. As noted in the Attachment: "Results of this viewshed analysis indicate that the proposed solar arrays associated with the Project will be screened from view in approximately 98.5% of the 5-mile radius VSA".

12. The applicant proposes landscaping the site to visually shield the development. Attachment I is a landscaping plan provided by the applicant.

   a. The plan includes trees proposed for the bordering areas of the solar modules, spacing of the proposed trees and examples of existing project(s).

   b. C202, Attachment I, indicates the screening areas in pink on the aerial mapping.

13. The "Glare Hazard Analysis" Conclusion, Attachment J, states that based on the current design, glare is not predicted from the Project for pilots approaching the runway at the Glasgow Municipal Airport or for helicopters hovering over the helipad at TJ Samson Community Hospital.

   a. Green glare from the Project is predicted to occur for drivers along one segment of Oak Grove Church Road and for four (4) of one hundred forty-seven (147) residents for twenty (20) minutes per day in the late fall and winter months.

   b. "Overall, glare predicted from the project is very minimal and should not prove bothersome to area residents" as stated within the Glare Hazard Analysis.

14. Using the "Notice Criteria Tool" provided by the Federal Aviation Administration (FAA) to determine if the FAA should be notified of construction intent produced a "negative criteria" result meaning that the FAA does not consider this Solar Farm to impede air traffic.

15. Stantec also provided a "Critical Issues Analysis" of the solar farm development. The conclusion of their study is shown in Attachment K. According to their findings two (2) federally endangered species, seventeen (17) state-endangered species, twenty (20) state threatened species, and one (1) federal candidate species potentially reside in the project area. The Project is located wholly within critical habitat for the Indiana Bat.

   a. It is also determined that streams associated with the Project would be classified as Waters Of The United States (WOTUS) and would be under the jurisdiction of the United States Army Corps of Engineers.

   b. Correspondence from the United States Department of the Interior, Fish and Wildlife Service, has also been furnished as an attachment within the study which indicates possible species which may be encountered during the Project as well as potential mitigation measures.

   c. A "Permit Matrix" has been attached to these findings detailing the appropriate regulatory agency as well as permitting requirements for each potential "Critical Issue".

16. Attachment L is a Karst Survey and Assessment Report provided by Terracon. It details Karst areas which may be encountered as well as counter measures and construction

restraints for those areas. As indicated on Page 16 of this study the preferred approach to Karst areas is avoidance and initiating a twenty-five (25') foot setback from all Karst features encountered.

17. The "Water Delineation Report" Conclusion and Recommendations, Attachment M, says that Stantec identified eighty-three (83) wetlands and seventy-two (72) streams within the Project Area. A total of 86.66 acres (4.28 %) of the Project Area is within the 100-year floodplain. If the Project were to potentially impact jurisdictional waters, it is recommended to obtain a jurisdictional determination from the United States Army Corp of Engineers.

18. Modules and appurtenances are not proposed within the Flood Hazard Area.

19. As shown in Attachment N, Geenex has made several attempts at Community Engagement including a quarter mile "Door Knocking" campaign in June of 2023 for adjacent property owners of the Wood Duck Solar project footprint.

20. In accordance with Article 511.0 of the Barren County Subdivision Regulations the following criteria must be met:

    a. Any entity proposing a Solar Energy System (SES) for a Solar Production Farm must meet KRS 278.704 regulations prior to submittal to the Joint City-County Planning Commission.

    b. Plans are submitted to the Planning Commission; this submittal does meet the requirement.

    c. No building site shall be constructed to create or increase flooding.

    d. A Decommission Plan Agreement submitted with the declaration of which current responsible party (or parties) shall remove ALL components and accessories, not to exceed twelve (12) months in length of removal, signed by all party and/or parties with ownership interest and recorded within the Barren County Clerk's Office, see Attachment O.

Staff Recommendation:

It is the Staff's recommendation of approval of the Development Plan subject to the following conditions:

a. The Decommission Plan Agreement be recorded in the Clerk's Office.

Mr. Greg Dutton, Applicant Counsel of Frost, Brown & Todd, spoke on behalf of the applicants and presented additional facts and information to support the proposed development in a PowerPoint presentation, which was submitted as an exhibit. Mr. Dutton answered questions posed by the Planning Commission Members.

Commission Member Eddie Atnip asked about the financial part of the decommission plan and of whom would be responsible for the regulation.

Mr. Dutton responded that the decommission plan would be recorded in the local Clerk's office and would be incorporated into every lease on record via a memorandum of leases.

Commission Member Maria Westcott asked about the endangered or threatened species that would be affected by the development and if there were any mitigation measures implemented into the proposal.

Mr. Dutton referenced the exhibit to which they submitted and stated that the study has not verified that the species exist on this property but that they may be there in that region. Kentucky Fish and Wildlife will be discussed at the State level when this is presented to the Public Service Commission of Kentucky and at that time, they will have construction and mitigation measures implemented when KY Game & Fish lets them know.

Member Westcott asked if this would affect bird migration patterns.

Mr. Dutton said there is no evidence that the migration patterns of birds are affected by solar panels or by this type of development. It was referenced that the applicants are not affecting the wetlands areas of the development and in addition are extending their setbacks to fifty (50') feet from all wetlands within the development.

Chairman Gumm asked to verify that Kentucky Game and Fish will be engaged and consulted in regard to all endangered/threatened species and bird migration issues.

Kelly Pope, Manager of Project Development with Geenex, said that they would have to be included at the State PSC meeting and that Geenex would abide by all requirements pertaining to the endangered/threatened species list.

A motion was made by Eddie Atnip and seconded by Bobby Bunnell to approve the Development Plan for the Wood Duck Solar Project, Geenex Solar, LLC, Applicants, because the proposed Development does meet the minimum standards set forth in the Barren County Subdivision Regulations Article 511.1 and subject to Staff Findings and Recommendations of approval of the proposed Development with conditions that the Decommissioning Plan be recorded within the Barren County Clerk's office. Motion unanimously carried.

2. 121823-01-G – Preliminary & Final Development Plan – *NexAir – NexAir LLC, Applicant / Owner(s) – Property located at 102 Carroll Knicely Drive – 1 Tract – 2.30 +/- Total Acres – Glasgow – Plans Prepared by American Engineers, Inc.*

Staff Findings:

1. Attachment A is an application signed by the owner/applicant.

2. Currently the subject property is zoned I-2 (Heavy Industrial District). It is located along Carroll Knicely Drive, a local city street.

3. There is an existing, unoccupied, shell/spec building located on the lot with a gravel parking lot.

4. The entire development contains approximately 2.66 total acres with the entirety of the site being disturbed for this development. The majority of the existing site slopes from south to the north, see Sheet C-100.

5. Sheet C-200 shows detailed drawings with dimensions, etc., for the proposed parking layout and building addition.

    a. A 45.5' X 60.3' expansion of the existing building is proposed which accommodates a proposed truck dock.

    b. Drive aisle widths within the public parking areas meet all Glasgow Zoning Ordinance requirements, see Sheet C-200. The passenger vehicle parking area is proposed to be light duty bituminous pavement, while the truck / tank storage area is proposed to be heavy duty.

6. The landscaping requirements of 158.028 (B) do apply with the following exceptions:

    a. The open VUA (Vehicle Usage Area) requirements of Section 158.028 (2) do not apply to loading, unloading, and storage areas within an industrial zone.

    b. The screening for service structures required by Section 158.028(3) does not apply to industrial zones.

    c. The parcel does not meet the requirements of a landscape buffer area (LBA) since it is not adjacent to a residential district.

    d. Proposed tree and planting details are shown on Sheet L-100.

7. The plans propose six (6) proposed public parking spaces. This does adhere to Section 158.400(9) and (19) of the Zoning Ordinance, parking schedule.

8. The proposed drainage layout is shown on Sheet C-300.

    a. As shown on the plans, stormwater is proposed to drain to a proposed basin on the northwest corner of the development by sheet flowing and ditching, see Sheet C-300.

    b. The basin is proposed to empty from a pipe structure onto the adjacent property. As shown by the drainage calculations the runoff coefficient does increase, but the pond is designed to discharge water at the same rate as pre-development.

    c. Grading is proposed on the adjacent property. Attachment C is an approval letter from the adjacent property owner allowing this work to take place.

    d. Any grading work done in the right-of-way will require approval from the Glasgow Street Department.

9. Proposed erosion control measures are shown on Sheet C-400.

    a. Silt fence is proposed along the perimeter of the site at the toe of all slopes.

    b. The existing entrance is to be used as the construction entrance.

    c. Erosion control blankets are proposed on the slopes of the proposed ditch along Carroll Knicely Drive and leading to the proposed basin.

    d. Channel lining is proposed on both the inlet and outlet of the basin piping.

10. Sheet C-500 shows the proposed utility connections for the site.

    a. The applicant is proposing attachment to the existing force main along Carroll Knicely Drive. A grinder pump and lift station are also proposed. See detail on sheet C-500.

    b. The development is to be served by an existing fire hydrant across Carroll Knicely Drive from the southwest corner of the property.

    c. Water service is available at an existing tap adjacent to the subject property. Boring and tapping to be coordinated with Glasgow Water Company.

    d. Electrical service is available at a pole on the southwest corner of the development.

11. Construction details are shown on Sheets C-600 – C-602.

Staff Recommendation:

It is the Staff's recommendation of approval of the Final Development Plan subject to the following conditions: adequate soil erosion and sedimentation control measures, shown on the approved plans, be implemented during and after site construction in order to reduce soil erosion and to minimize water runoff to the surrounding developments.

A motion was made by David Rutherford and seconded by Joe Austin to approve the Preliminary and Final Development Plan for NexAir, LLC, Applicants, because the proposed Development does meet the minimum standards set forth in the Glasgow Development Plan Ordinance and subject to Staff Findings and Recommendations of approval. Motion unanimously carried.

3. 121823-02-G – Preliminary Development Plan – *South Cooper Industrial Park Lot #1 Speculative Building – Barren County Economic Authority, Applicant / Owner(s) – Property located along Beltline Boulevard – Lot 1 – 1 Tract – 21.812 +/- Total Acres – Glasgow – Plans Prepared by Scott and Murphy, Inc.*

Staff Findings:

1. Currently the subject property is located within an I-2 (Heavy Industrial) District.

2. The existing tract of land contains 21.812 total acres with approximately 4.86 total acres being disturbed during the speculative phase of construction. The majority of the existing site slopes to the south and west, away from New Bowling Green Road (US 68 / KY 80) sheet C-0.5.

3. As shown on Sheet C-1.0 the Applicant is proposing the construction of a 50,750 ft^2 industrial speculative building. There is no immediate tenant for the building.

4. For the speculative phase of development, the applicant is proposing that initially only one gravel driveway provides access to the building and ten (10) gravel parking spaces. Once possession of the development has been taken over by future tenants, another development plan approval by the Planning Commission will be required to ensure that the development plan ordinance regulations are met.

5. Sheet C-2.0 through C-2.2 are the detailed proposed grading sheets for the development.

    a. The storm water runoff generated by the building and site work is to drain via ditches to the south of the building, to a proposed retention pond near the southwestern most property line. The outlet for the pond directs water to a reducer that restricts water flow rates more than the undeveloped rate before leaving the site.

i. This sheet also serves as the proposed erosion control measures:

1) Silt fencing is proposed around the perimeter of the north side of the site.

2) A temporary construction entrance is proposed off Beltline Boulevard to the east of the proposed structure. The entrance will be removed once the proposed parking lot is completed.

3) Rock check dams are proposed within the ditch along Beltline Boulevard.

4) Rip-rap is proposed at the ends of all ditch lines.

5) Inlet protection is proposed at the inlets of all structures.

b. As shown on the plans, storm water runoff on the north and south side of the building is to drain via guttering/storm drains to the existing detention pond.

c. Further explanation of the existing detention pond is shown on Sheet C-2.1 as well as the Pre-Development run-off and Post-Development run-off coefficient for the site. The proposed detention area is designed to accommodate the additional storm water runoff.

d. Sheet C-2.2 includes detention calculations for future expansion of the building, including additional paved parking areas. As shown on the plans the existing detention pond will also accommodate the future development.

6. A storm water maintenance agreement must be signed with the City of Glasgow Stormwater Coordinator before Final Approval can be given.

7. Sheet C-3.0 shows the site utilities. Coordination with the fire department is required for the placement of the hydrant and also designating that area for a fire pit prior to final approval or the submission of building/electrical permits. Electricity to the building is to be supplied from an overhead line coming from the southwest corner of the site.

8. Details for the erosion control as well as details for the stone and concrete paving are shown on Sheet C-4.0.

Staff Recommendation:

It is the Staff's recommendation of approval of the Preliminary Development Plan subject to the following conditions: adequate soil erosion and sedimentation control measures, shown on the approved plans, be implemented during and after site construction in order to reduce soil erosion and to minimize water runoff to the surrounding developments. Should the applicant seek Final approval to obtain a building permit it is noted that building occupancy cannot occur other than for the purposes of marketing the building to potential tenants without a separate development plan approval and that the stormwater maintenance agreement be signed and submitted and that the fire hydrants and FDC pit be agreed upon by the Glasgow Fire Department.

A motion was made by Eddie Atnip and seconded by Forrest Wise to approve the Preliminary Development Plan for Barren County Economic Authority, Applicant/Owner, because the proposed Development does meet the minimum standards set forth in the Glasgow Development Plan Ordinance and subject to Staff Findings and Recommendations of approval. Motion unanimously carried.

There being no further business to come before the Commission, upon the motion of Forrest Wise, seconded by Candy Wethington, and unanimously carried, the meeting was adjourned at 8:30 PM.

JOINT CITY-COUNTY PLANNING COMMISSION

OF

BARREN COUNTY, KENTUCKY

By: ______________________________
Tommy Gumm, Chairman

ATTEST:

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Janis Turner, Secretary-Treasurer