Property Value Impact Estimation for Headland Solar

A Proposal Submitted to Conway and Cohoctah Townships, MI

PI: Zhenshan Chen, Assistant Professor
Senior Personnel: Anna Carroll, Ph.D. Student
Department of Agricultural and Applied Economics, Virginia Tech

COLLEGE OF AGRICULTURE AND LIFE SCIENCES
AGRICULTURAL AND APPLIED ECONOMICS
VIRGINIA TECH

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY
An equal opportunity employer

VIRGINIA TECH

Department of Agricultural and Applied Economics
250 Drillfield Dr.,
Hutcheson Hall,
Blacksburg, Virginia 24061
zhenshanchen@vt.edu

1. Scope of Work

We propose a comprehensive property value and agricultural production impact study for the Headland Solar Project located in Conway and Cohoctah Townships, Livingston County, Michigan.

Properties located in proximity to a solar facility are designated as "treated properties" following site installation. We do not observe treated properties for the Headland Solar Project, which is why we need to find comparative sites, investigate the treated properties around them, and infer the potential property value impact of the Headland Solar Project. The geographic extent of the impact (i.e., treatment proximity) will also be decided in this process.

The following objectives and tasks will be conducted within this project.

Objective 1. Comparative Site Analysis

- Identify and evaluate solar energy facilities comparable to the Headland Solar Project
- Develop similarity criteria and scoring methodology

Objective 2. Spatial Impact Assessment

- Determine the geographic extent of property value impacts - varying treatment and control sample proximity criteria and investigate the pattern of results
- Evaluate impact variation by proximity to the solar facility
- Map affected areas within study radius

Objective 3. Average Impact Analysis

- Calculate mean property value impacts across all affected properties
- Establish proximity-based property groupings and estimate impact per group

Objective 4. Temporal Impact Analysis

- Assess property value impact trends over time
- Determine if impacts diminish, persist, or change following project operation

Objective 5. Agricultural Production Impact Analysis

- Assess impacts on agricultural production in the surrounding area, including changes to land acreage in farms
- Evaluate effects on total market value of farm products
- Calculate impacts on total gross farm revenue
- Estimate changes to total net farm revenue

2. Deliverables

The project shall provide Conway and Cohoctah Townships with a Final Report containing the following elements:

- *Comparative Sites Summary Table*: A table including site names, locations, similarity score, number of sales within 1-mi radius and 6-mi radius, and methodology notes

Department of Agricultural and Applied Economics
250 Drillfield Dr.,
Hutcheson Hall,
Blacksburg, Virginia 24061
zhenshanchen@vt.edu

- *Spatial Extent Analysis Graphics*: Figures showing the spatial extent of the impact and how impact changes across site proximity, with methodology notes
- *Impact Summary Table*: A table showing an average impact for all properties impacted, and stratified impacts by proximity-based property groups, with written interpretation of findings
- *Temporal Dynamics Figure*: A graphical representation of projected impact changes over time, showing whether, and if yes, when, the impact disappears over time
- *Agricultural Impacts Table*: A table summarizing projected impacts on land acreage in farms, total market value of farm products, total gross farm revenue, and total net farm revenue, with methodology notes and written interpretation
- *Technical Appendix*: A technical appendix detailing the data source, the methodology, and practical considerations.

3. Improvements from Existing Analysis

The proposed project will provide rigorous, evidence-based insights into potential property value impacts, advancing beyond typical analyses of this type. Key features include:

- *Spatial Scope of Impact*: We detect how far the impact can go, rather than assuming the solar sites only impact adjacent properties
- *Comprehensive Data Coverage*: We will provide statistical evidence based on the majority of market transactions in the neighborhood of the solar site. The analysis will include all sales unless their exclusion is warranted by data quality or methodological considerations
- *Statistical Evidence*: We develop an estimate showing the average impacts and confidence intervals rather than coming to a binary answer based on selected evidence
- *Methodological Transparency*: All procedures, including the site selection, the sample selection, observation screening, and analytical details, are systematic and fully transparent in our technical appendix, code will be uploaded to a public datahub if approved by the townships
- *Agricultural Focus*: Explicit assessment of production metrics, addressing the project's location on privately-owned land with agricultural uses as noted in project maps.

4. Budget

Budget Amount: $9,586

Budget Justification: The PI, Zhenshan Chen, will contribute 1.2 weeks of faculty time at a rate of $2,835 per week, totaling $3,402. The faculty fringe cost is $247. A graduate student from the

Department of Agricultural and Applied Economics
250 Drillfield Dr.,
Hutcheson Hall,
Blacksburg, Virginia 24061
zhenshanchen@vt.edu

Department of Agricultural and Applied Economics @ VT will assist in data cleaning, data analysis, and report drafting, which is expected to take four weeks to complete. The student stipend cost is $2,920 at a rate of $730/week. The student fringe cost is $278. The total direct cost sums up to $6,847. Indirect cost is $2,739 (40% of direct costs) based on VT OSP. The total is $9,586 (i.e., direct $6,847+ indirect $2,739).

5. Timeline

1. *Data Cleaning and Site Selection (Week 1. May 27th – June 2nd, 2026):* Assemble datasets, conduct preliminary data cleaning, and develop site selection procedure (Objective 1).
2. *Property Value Impact Analysis (Week 2. June 3rd – June 9th, 2026):* Run econometric models for spatial extent analysis, property value impact analysis, and produce relevant tables and figures (Objectives 2, 3, and 4).
3. *Agricultural Production Impact Analysis (Week 3. June 10th – June 16th, 2026):* Conduct agricultural production impact analysis (Objective 5) and produce relevant tables.
4. *Report Drafting and Revision (Week 4. June 17th – June 23rd, 2026):* Finish drafting report and revise based on feedback.
5. *Report Submission and Follow-up (June 24th – December 31st, 2026):* Submit the report on June 24th, and provide follow-up services, including answering questions and presenting results as needed, through December 31.