



## Research Need Statement 530

<b>Date:</b>	<b>7/31/2018</b>
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<b>Idea Submitted by:</b>	<b>Daniel Gullickson / Peter Wasko</b> <b>Office of Environmental Services</b>
<b>Idea Originated from:</b>	<b>Office of Environmental Services</b>

**Select Program:**

X MnDOT    OR     Local Road Research Board (LRRB)

X Research    OR     Implementation

**Need Statement Title:**

Highway Renewable Energy: Harnessing the Sun's Energy through Noise Barriers and Structural Snow Fencing

**Need Statement:** Describe the problem or the opportunity. Include background and objective.

Currently Noise Barriers and Structural Snow Fencing each serve their intended purpose of reducing noise and blowing snow but tend to be one dimensional. This project would explore the feasibility of using both existing solar panel technology as well as new materials and construction methods for Noise Barriers and Structural Snow Fencing to harness the sun's energy to create renewable energy to be used on MnDOT facilities or even potentially to generate revenue for MnDOT. Through this research project we hope to learn if these structures can be modified to provide the added value and functionality of capturing solar energy without compromising their intended transportation purposes and provide multiple year-round benefits. This research project would quantify if adding a solar component to these structures can provide enhanced environmental protection, economic viability, and social acceptance.

Some specific questions to be explored in this research include, but are not limited to:

- Do state or federal regulations affect or limit the ability to generate and/or sell power on state and locally owned rights-of-way?
- Will Minnesota's utilities accept power generated from solar energy on Noise Barriers and Structural Snow Fencing?
- Does Minnesota's utilities have criteria and do they vary between utilities for accepting solar energy from these sources?
- Does Minnesota's large number of utilities make it more difficult to install solar energy on Noise Barriers and Structural Snow Fencing?



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- Does adding solar technology change the design requirements of Noise Barriers and Structural Snow Fencing? Can solar technology be added to existing structures?
- Does adding solar technology impact the ability of Noise Barriers and Structural Snow Fencing to meet their original intended purpose?
- Are there potential impacts or hazards to drivers or surrounding land, such as due to reflections and distractions? Are there aesthetic considerations?
- What characteristics of Noise Barrier or Structural Snow Fencing would be best suited to solar installations?
- Is this socially, environmentally, economically feasible to engineer?
- What types of emerging solar technology might be suited to application on Noise Barriers and Structural Snow Fence?
- Is it socially acceptable to see noise barriers and structural snow fencing produce solar energy?
- Are safety measures needed to protect people from electrocution?
- What is the expected cost-benefit analysis to MnDOT of installing solar generation on Noise Barriers or Structural Snow Fencing?

### Provide a summary of the potential benefits:

This project could increase the generation of renewable energy, provide additional revenue for MnDOT, and allow the right-of-way to serve multiple purposes for the citizens of Minnesota.

### How does this project build upon previous research (include title or reference to a completed research effort)?

Highway Renewable Energy: Photovoltaic Noise Barriers (FHWA-HEP-17-088)  
Renewable Energy Generation in the Highway Right-of-Way (FHWA-HEP-16-052)

### Provide names to consider for a technical advisory panel:

Dan Gullickson  
Pete Wasko  
Department of Administration (solar energy)  
Right-of-Way