Research Need Statement 651

I. Need Statement Champions and Information

I.A. Need Statement Champion Information

I.A.1. First and Last Name of Research Champion: Susan Zarling
I.A.2. Research Champion's Office: Traffic Engineering
I.A.3. Research Champion's Phone Number: 651-234-7052
I.A.4. Research Champion's Email: susan.zarling@state.mn.us

I.B. Research Co-Champion

I.A.1. First and Last Name of Research Co-Champion:
I.A.2. Research Co-Champion's Office:
I.A.3. Research Co-Champion's Phone Number:
I.A.4. Research Co-Champion's Email:

I.C. Research Needs Title (115 Characters): Solar Roadway Lighting

I.D. Project Sponsor: Joint MnDOT and Local Road Research Board

II. Research Need Background and Description

II.A. Research Need Background

II.A.1. Describe the problem or opportunity.

Getting power to an isolated intersection can be very costly, at times running in the tens of thousands of dollars. In these instances, it might be more cost effective to install solar power at those intersections. In the past this was not feasible, but it is now becoming more so. There are still some unknowns regarding ability for the solar to power roadway luminaires at all times at full power, additional maintenance needs, and installation costs and requirements. Monitoring needs should also be addressed. While a handful of intersections with solar lighting have been installed in Minnesota the majority of these have not been done taking breakaway standards into account or National Electrical or Safety Code Standards (NEC, NESC) into consideration. Nor has any monitoring or research been done to know if the luminaires are working at any given time.

II.A.2. If applicable, describe how this project will build on previous research.

II.A.3. If applicable, include the title/s or previous research.

II.A.4. What is the **objective** of the proposed research?

Roadway lighting has been proven to have a safety benefit. There has been a recent desire to install more rural (isolated) intersection lighting and while we believe it is desirable to use a hardwired system for these installations there are times when this cost can be so high that it is not practical. If it can be proven that solar power for intersection lighting is feasible, reliable, and has minimal maintenance this would be a good option for allowing lighting in the instances when getting power to the intersection is difficult.

III. Strategic Priorities, Benefits, and Expected Outcomes

Section III. is for MnDOT sponsored and co-sponsored projects only; all LRRB projects proceed to section IV.

III.A. MnDOT Strategic Priorities

Instructions: Briefly describe how the project aligns with the following MnDOT Research Strategic Priorities. Complete all that apply.

III.A.1. Innovation & Future Needs:
Solar power can have a benefit at locations where it is difficult or extremely expensive to get power to a location. There can also be long term energy savings with solar installations

IIIA.2. Advancing Equity:
Rural intersection lighting has been found to have a safety benefit. In some areas it is difficult to get power to intersections. Solar lighting would allow for an equity in providing the lighting to those areas.

III.A.3. Asset Management: Solar powered roadway lighting may be a cost-effective option at rural isolated intersections.

III.A.4. Safety:
Rural intersection has been found to have a safety benefit. Solar lighting may allow MnDOT to install this lighting in areas that may otherwise have been cost prohibitive.

III.A.5 Climate Change & Environment:
Solar lighting uses a renewable energy to power the luminaires.

III.B. Expected Outcomes

Instructions: Check all expected direct outcomes of this research.

- ☒ New or improved technical standard, plan, or specification
- ☐ New or improved manual, handbook, guidelines, or training
- ☐ New or improved policy, rules, or regulations
- ☐ New or improved business practices, procedure, or process
- ☒ New or improved tool or equipment
- ☐ New or improved decision support tool, simulation, or model/algorithm (software)
- ☐ Evaluation of a new commercial product
- ☒ New or improved technical standard, plan, or specification
- ☐ Other. Please specify below:

III.C. Expected Benefits

Instructions: Select all expected benefits that may be realized if the findings and recommendations from this research is adopted or implemented

III.C.1. Construction Savings Other Construction Savings. Please describe below

At some locations the cost of getting power to the intersection can be extremely high. In these locations the option of solar power may be less expensive.

III.C.2.Decrease Engineering/Administrative Costs Choose an item.

III.C.3. Environmental Aspects Other environmental impact. Please describe below.

Solar power is a renewable energy

III.C.4. MnDOT Policy Choose an item.

III.C.5. Lifecycle Choose an item.

III.C.6. Operations and Maintenance Savings Other operationa dn maintenance savings. Please describe below.

Ongoing energy costs are eliminated when using solar energy

III.C.7. Reduce Risk Choose an item.

III.C.8. Reduce Road User Cost Choose an item.

III.C.9. Safety Other safety benefit. Please describe below.

Lighting itself has a safety benefit. The use of solar power could allow us to put intersection lighting to a location that we previously may not have been able to.

III.C.10. Technology New method of using technology

Study of whether solar powered lighting is a feasible and reliable option for rural isolated intersections.

III.C.11. Other, please describe below:

IV. Technical Advisory Panel

Instructions: Please list the name and affiliation of individuals to consider for the Technical Advisory Panel.

MnDOT OTE – Kevin Chan

MnDOT District 7 – Nick Ollrich

Your assigned Project Advisor is available to answer questions and provide guidance (assigned by the Office of Research & Innovation).
Your Project Advisor is: Choose an item.