



## Energy Equity Solutions for UP & Rural Communities

### GLOBAL IMPACT ARTICLE SERIES

The Upper Peninsula of Michigan is a quiet, rural area where you can escape the busyness of urban cities. Population density is low in the Upper Peninsula (UP), making energy transmission costs high and causing electricity rates to be among the highest in the United States. In Baraga, 33.2% of residents live below the poverty line, and a reduction in electricity rates would make a significant difference to them.

Enter the Western Upper Peninsula Planning and Development Region (WUPPDR), a local government organization that provides general planning and support for six western counties in the UP. Community leaders in Baraga and L'Anse areas of the UP view community solar as a solution to the cost and reliability issues surrounding electricity in the Keweenaw Bay region by bringing generation facilities closer to home. Community solar may help residents mitigate high prices and help neighboring communities toward self-sufficiency with their energy needs. To assist in determining the feasibility of community solar in Baraga, MI, a University of Michigan (U-M) Dow Sustainability Fellows team conducted a cost-benefit analysis in 2018. Based on this analysis, the team developed several interactive dashboards to aid the community. This cost-benefit analysis was a requirement of grant funding through WPPI Energy, a not-for-profit, regional power company serving 51 locally-owned electric utilities.

#### COMMUNITY ENGAGEMENT

The team traveled to the UP to meet with WUPPDR leaders and engage with relevant stakeholders. They wanted to understand the current state of the project and develop an appropriate scope of work. "We met with a few key stakeholders and met regularly with members of the organizations [project partners]," says Kevin Dunn, an engineering student and member of the U-M team. "Within the Village of Baraga, 62% of the population are members of Keweenaw Bay Indian Community. We met with a member of this community to see what their energy needs were."

#### INTERACTIVE DASHBOARDS

The team assessed the costs, benefits, and the overall impact of community solar to ensure the dashboards would be as effective as possible. The analysis involved community residents, and included three objectives:

1. Develop user-friendly dashboards for WPPI Energy to analyze community solar projects;
2. Provide the community residents with an online dashboard to estimate their own costs; and returns of buying into a community solar project; and
3. Tailor the dashboards in a way that the tools could be applied to future projects.

Three different dashboards were designed to allow WUPPDR to gauge the feasibility of community solar programs in the region, assist WPPI with analysis of the proposed Baraga community solar project, and help customers understand the impact of their participation on their households, including the estimated costs and returns. Two of the three dashboards include a *Cost-Benefit Analysis of Solar Array*, which captures the net present value of the system; and the *Aggregate Community Impact of Solar Array* dashboard, which shows the net current value of the combined community impact of the system. The third dashboard was created specifically for community members to better understand their buy-in options and the potential energy savings with community solar.

## PLANNING FOR THE FUTURE

The dashboards allow individuals to fully appreciate the costs and benefits of buying into this type of solar program, similar to a member-owned cooperative. They allow users to determine an estimated payback time period and the amount of payback.

The dashboard tools were designed so they could be easily adapted for use in other communities. The team hopes that additional community engagement can be explored in the future and that the dashboard tools can be widely circulated among many communities.

The potential for these types of community-owned utility organizations using solar and wind energy to alleviate poverty for rural and urban communities is promising. Approximately 16% of households are rural, but distributed across 72% of land in the nation. With the help of tools like the dashboards, community-owned solar programs can help alleviate some of the unique energy-cost challenges of rural areas, where transmission lines run for miles over varied terrain, reducing reliability, with little population to share the overhead cost.



## PROJECT TEAM

- Kevin Dunn, College of Engineering
- Krutarth Jhaveri, College of Engineering and School for Environment and Sustainability (SEAS)
- Lauryn Lin, School of Public Health
- Julie Michalski, Law School
- Benjamin Rego, Gerald R. Ford School of Public Policy and SEAS

## FACULTY ADVISOR

- Margaret Wooldridge, College of Engineering

## CLIENT

- Western Upper Peninsula Planning and Development Region

## READ MORE

- [Full Project Report](#)
- [WUPPDR](#)
- [WPPI Energy](#)
- [Dow Sustainability Fellows Program](#)
- [Dow Global Impact Series](#)

Note: All 2018 project reports are online and searchable from the Distinguished Award and Masters Fellows project pages, see:

- [DDA projects page](#)
- [Masters projects page](#)

## SUSTAINABLE DEVELOPMENT GOALS



This project addresses the following United Nations Sustainable Development Goals.

The Dow Sustainability Fellows Program at the University of Michigan (U-M), made possible by Dow and U-M, supports graduate students and scholars committed to finding interdisciplinary, actionable, and meaningful sustainability solutions on local-to-global scales. The program prepares future sustainability leaders to make a positive difference in organizations worldwide. We believe that diversity, equity, and inclusion are key to empowerment, and the advancement of sustainability knowledge, learning, and leadership. See: <http://sustainability.umich.edu/dow>