



# **Project Update**

**March 19, 2018**

## **Feasibility Study for Community Photovoltaic Solar Generation System**

**MDARD Grant 791N770467**

**Brad Barnett, Regional Planner – Western U.P. Planning & Development Region**

# Road Map

- **Project Overview**
- **Project Goals**
- **Methodology**
- **Findings**
- **Questions**

# Project Team

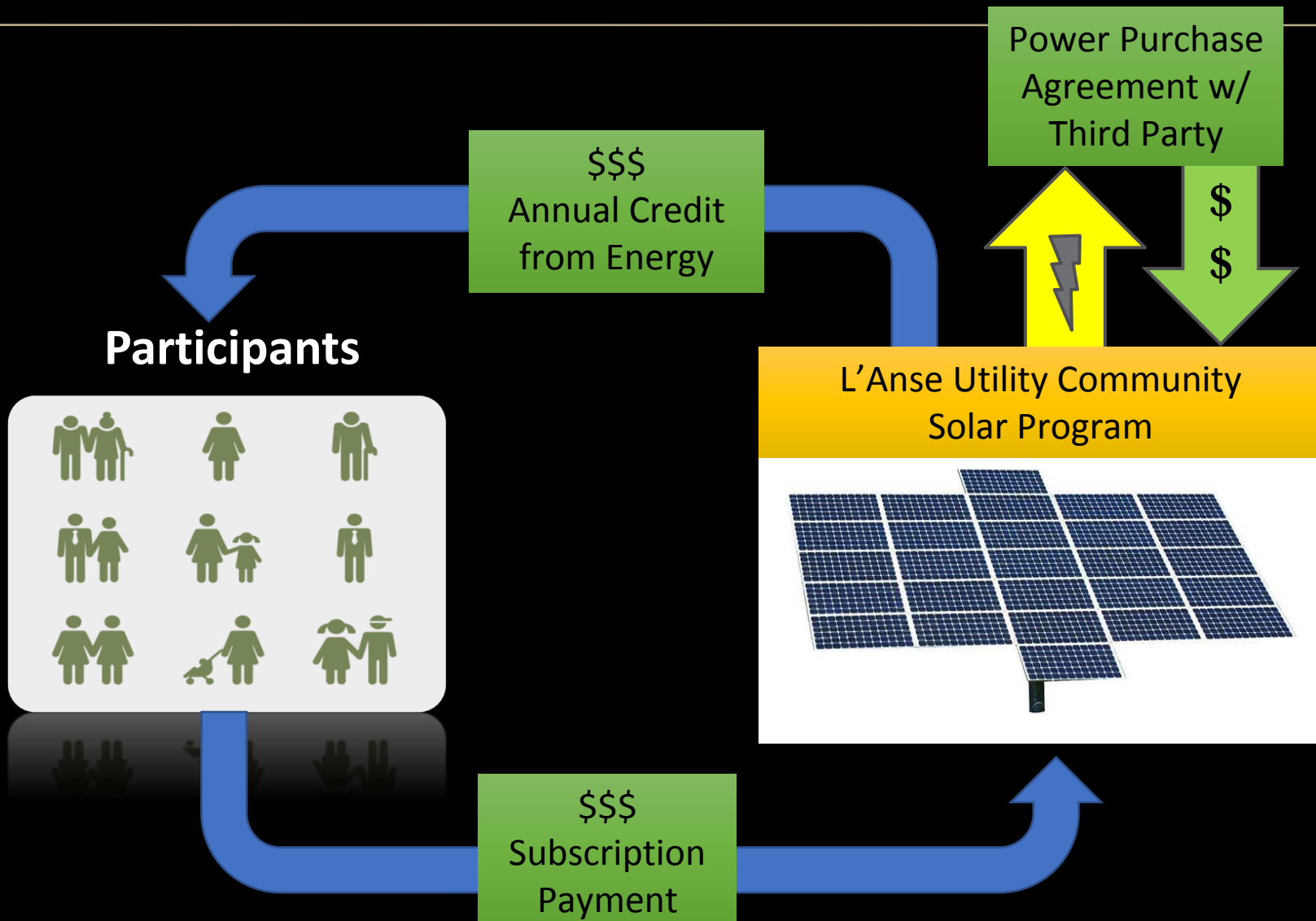
- **Village of L'Anse**
- **Michigan Technological University**
  - Keweenaw Research Center
  - Energy & Environmental Policy Program
- **WPPI Energy**
- **Western U.P. Planning & Development Region**

# Village of L'Anse

- Population
- **>2,000 (2016)**
- Median Age:
- **49.6 (2016)**
- Median Household Income:
- **\$39,194 (2016)**
- Utility
- **Municipal utility**



# Community Solar



# Goals

## Immediate

- Data for Village Utility
- Establish regional model

## Long-Term

- Enhance rural access to renewable infrastructure
- Reduce long-term energy costs
- Increase rural resilience to economic shifts
- Reduce carbon intensity

# Methodology

## Technical Feasibility

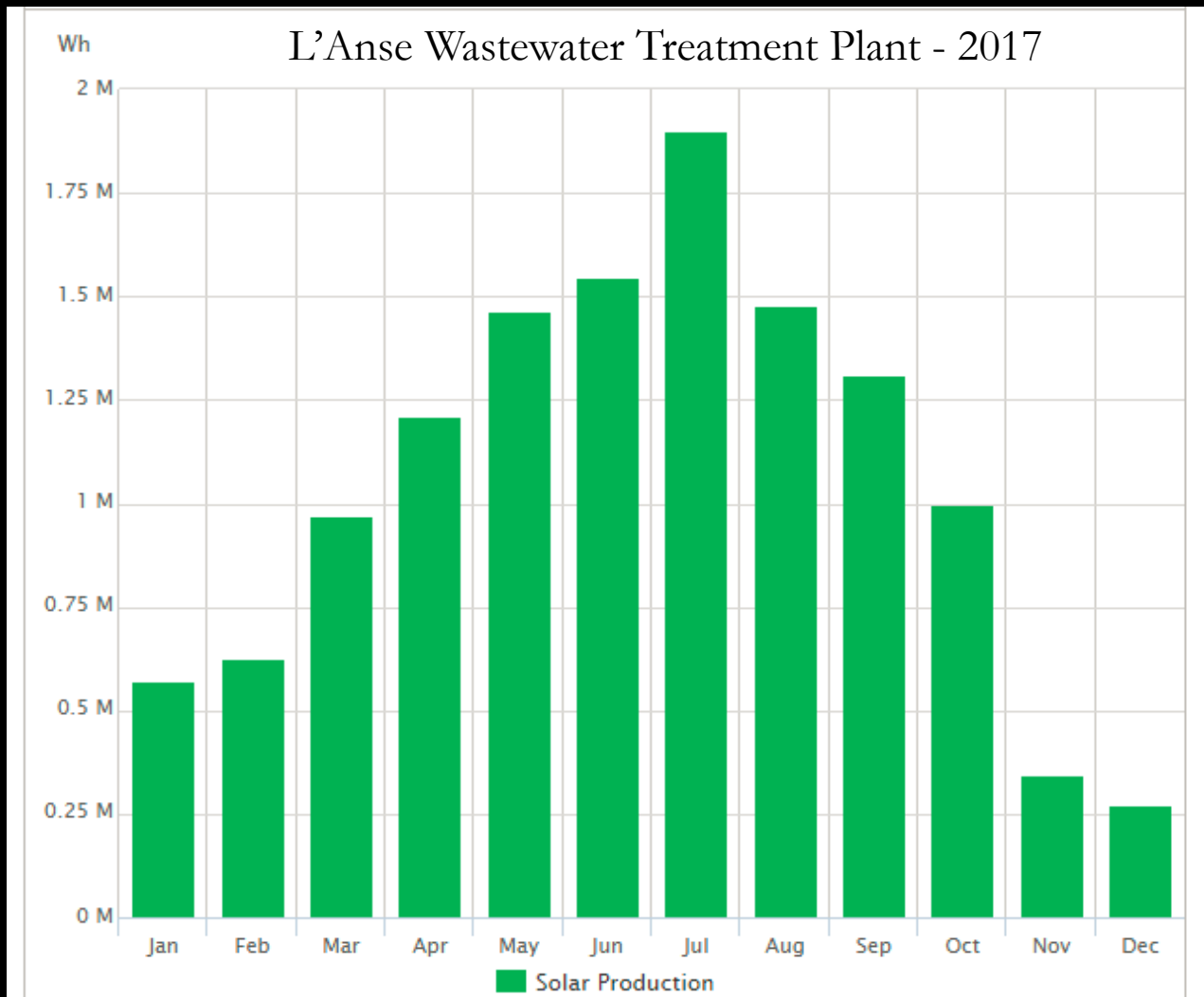
- Solar resource assessment
- Site assessment
- System Design



## Economic Feasibility

- System cost analysis
- Demand study & willingness to pay analysis
- Program design recommendations

# Technical Feasibility: Solar Resources



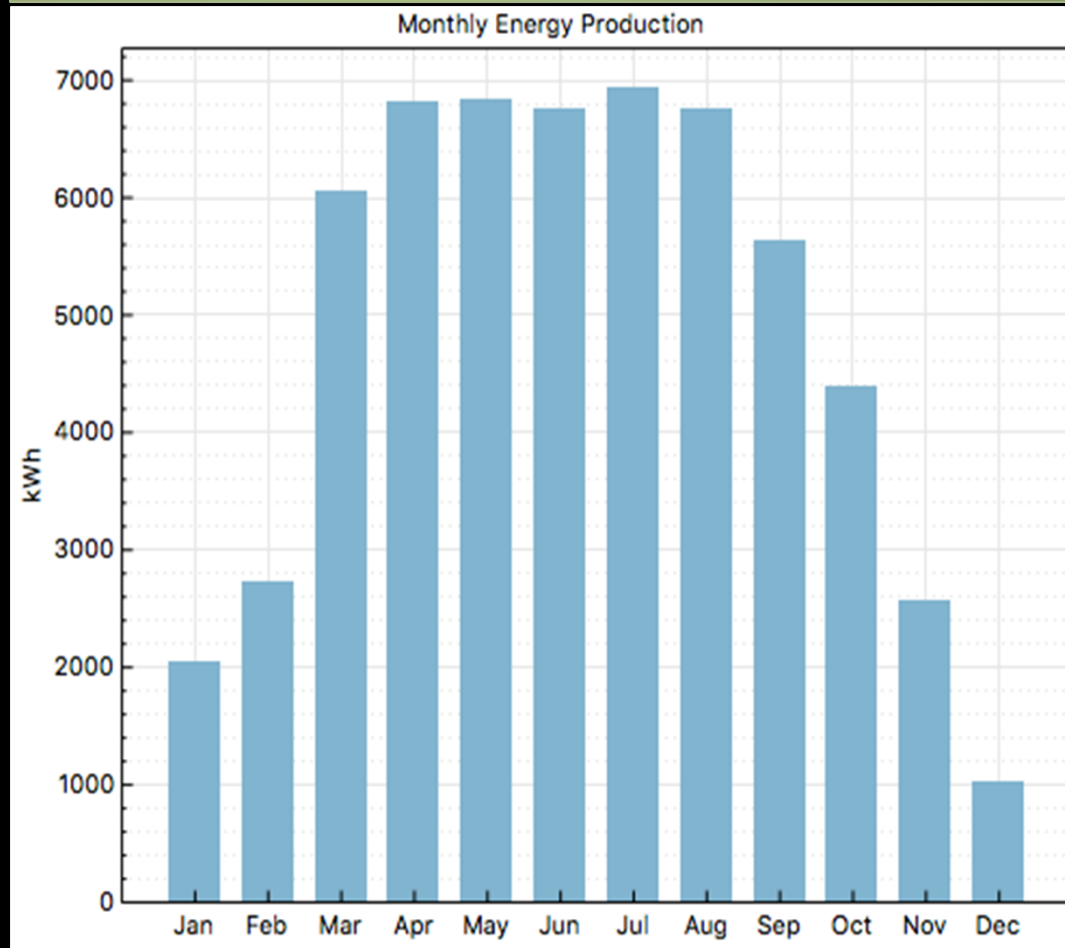
**System:  
11.4 kW**

**Produced:  
12.7 MWh**



# Technical Feasibility: Solar Resources

**50 kW System – Estimated Energy Production**



# Technical Feasibility: Site Assessment

## L'Anse Industrial Park

Potential location for community solar array

**Legend**

- Industrial Park
- L'Anse
- Transmission Access



# Technical Feasibility: System Design

## Key considerations

- System size: 25 kW & **50 kW** system
- Panel size and manufacturers
  - **335 kW**
- Inverters
  - Micro vs **Central**
- Racking system
  - **Optimize for snowfall**

# Economic Feasibility: System Costs

<b>50 kW System – Estimated Costs</b>	
<b>Component</b>	<b>Cost</b>
Modules	\$32,780
Inverters	\$5,001
Racking & other hardware	\$23,909
Installation labor	\$27,475
Developer margin & overhead	\$38,423
Contingency fund (4%)	\$5,104
Permitting	\$2,495
Sale tax	\$4,445
Total Installation Cost	\$139,632
<b>Cost/capacity</b>	<b>\$2.80/Wdc</b>

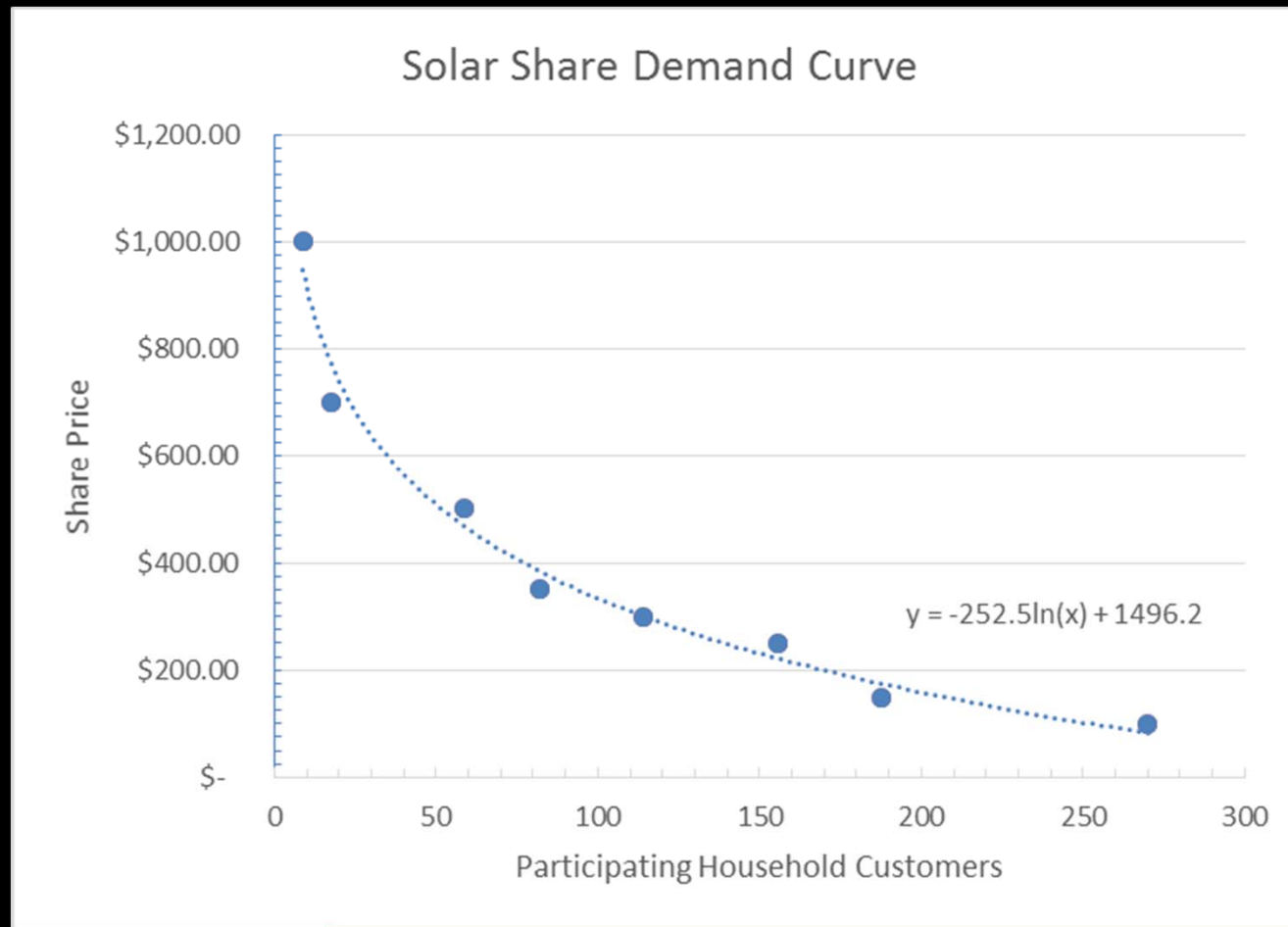
**100 kW System Estimated Costs: 2.00-2.20/Wdc**

# Economic Feasibility: General Demand Findings

## Key findings

- 60% of respondents supported community solar
- 55% of respondents willing to pay something to participate in program
  - 28% willing to pay \$350 per share
  - Estimated cost \$500-\$550 per share
- **Upfront cost** a major issue for many households

# Economic Feasibility: Demand & Share Price



# Economic Feasibility: Other considerations

## Key findings

- Anchor tenants are available
- “Pay as you go” option increases participation from households
- Energy credit (0.08/kWh) may be too low
- Share transferability a concern
- Community pride matters
- Churches, schools, nonprofits

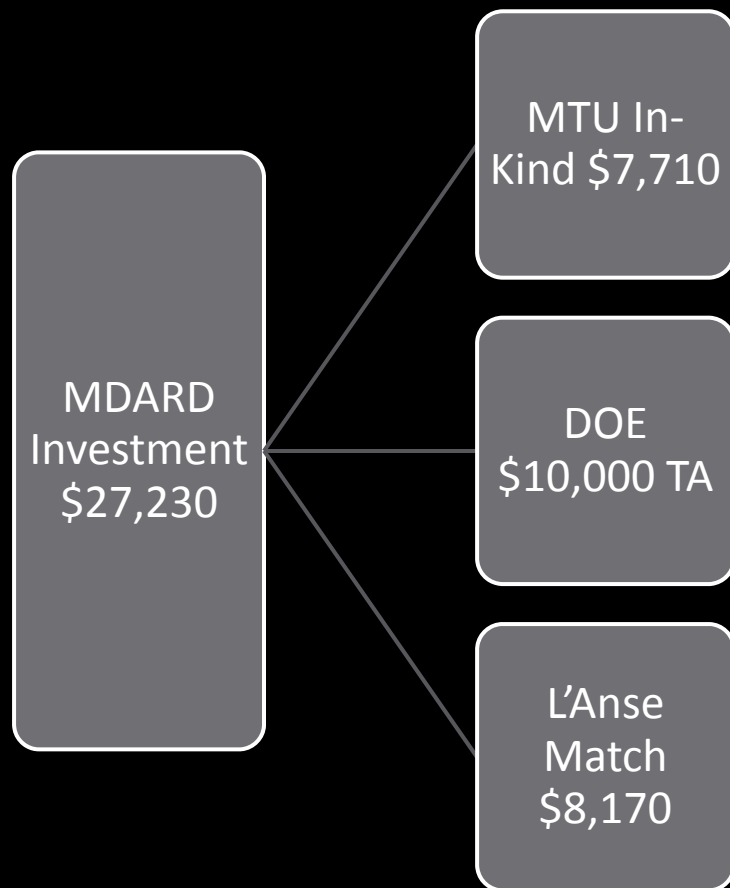
# Study recommendations

- Sufficient infrastructure
- 100 kW system achieves best entry price
- But upfront price still a barrier for households – **Lower cost**
- Explore ownership models to facilitate equity investment
- Variety of program options needed

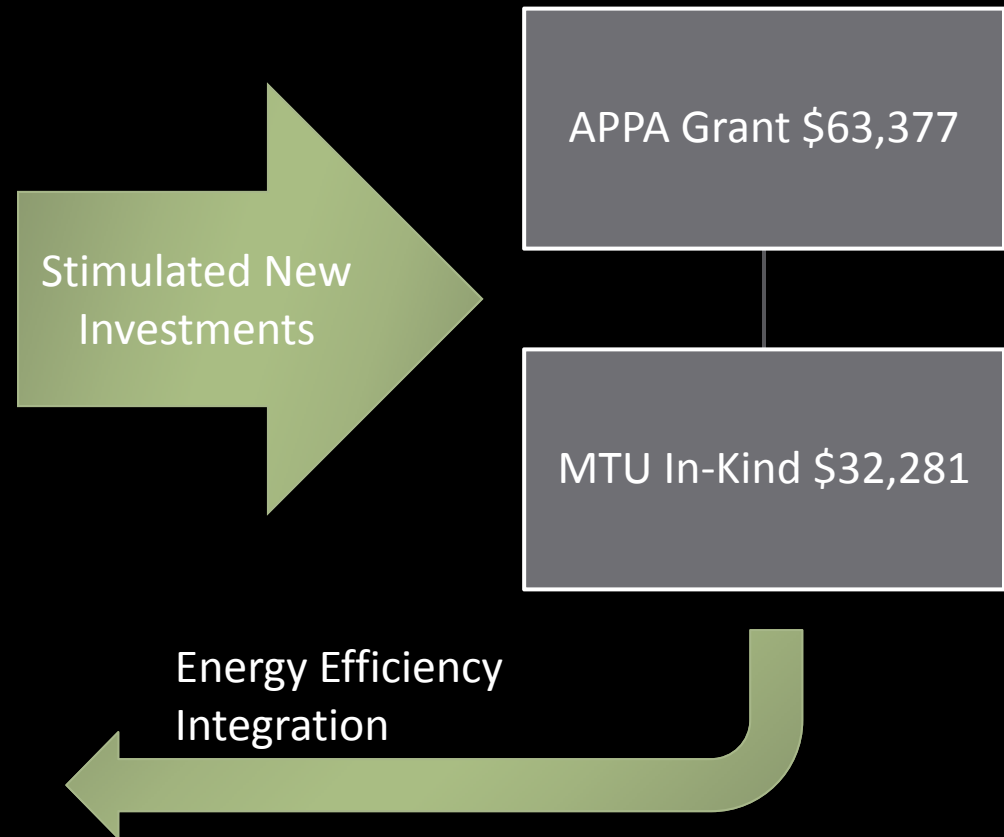


# MDARD Impact of ~\$150,000

## L'Anse Community Solar



## Baraga Community Solar





# Thank you!

## Contacts:

Brad Barnett, WUPPDR, [bbarnett@wuppdr.org](mailto:bbarnett@wuppdr.org)

Brett Niemi, WPPI Energy, [bniemi@wppienergy.org](mailto:bniemi@wppienergy.org)

Robert LaFave, Village of L'Anse, [manager@lansemi.org](mailto:manager@lansemi.org)

Richelle Winkler, Michigan Tech University, [rwinkler@mtu.edu](mailto:rwinkler@mtu.edu)

Jay Meldrum, Michigan Tech University, [jmeldrum@mtu.edu](mailto:jmeldrum@mtu.edu)

Emily Prehoda, Michigan Tech University, [ewprehod@mtu.edu](mailto:ewprehod@mtu.edu)

# Questions?



Image: New Richmond, WI Community Solar Groundbreaking  
Photo Credit: WPPI Energy