

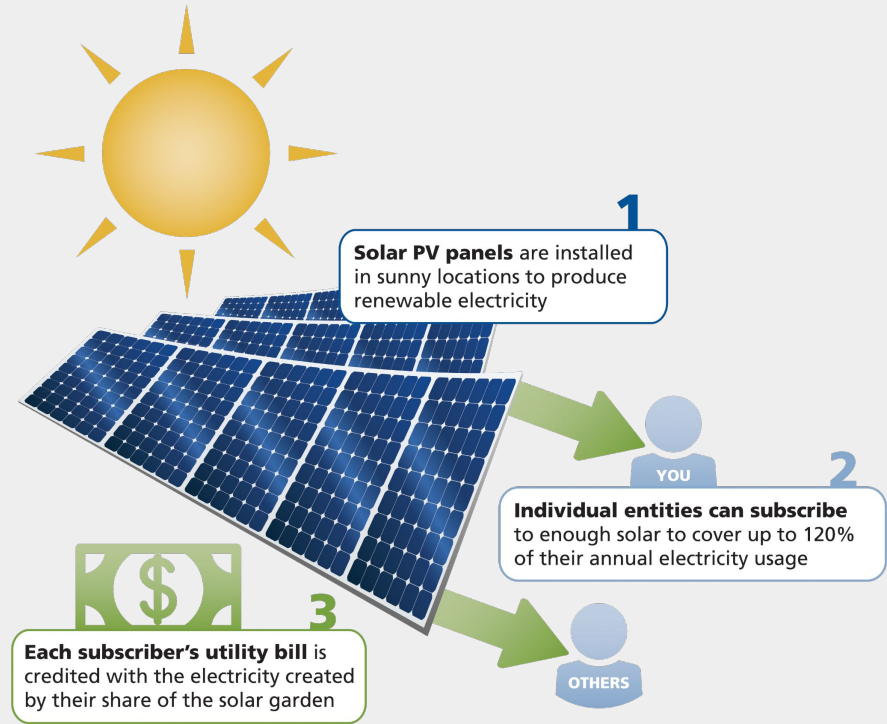
# UMD's Community Solar Garden Subscription



UNIVERSITY OF MINNESOTA DULUTH

Driven to Discover<sup>SM</sup>

# What is a community solar garden?



# Minnesota Power's Community Solar Garden

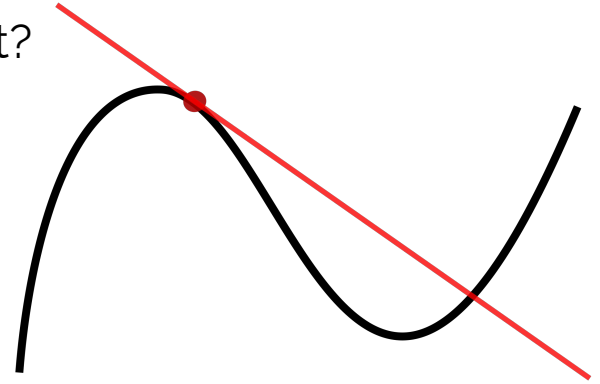
- 1 mW array in Wrenshall plus 40 kW array on the corner of Arrowhead Road and Rice Lake Road
- UMD subscribed to 10.4% of the total capacity of the solar garden, so “earns” 10.4% of the total production each month in kWh bill credits
- Minnesota Power estimated that each block would produce an average of 1,600 kWh per year; at that rate, UMD's 100 blocks would generate 160,000 kWh per year
- Three UMD departments subscribed to 100 blocks total in 2018 at a cost of \$213,215
- 25 year agreement includes all repairs and maintenance

# Students, faculty and staff celebrating the launch



# Evaluating potential solar investments

- What is the initial subscription or installation cost?
- How realistic is the projected production?
- What are the potential ongoing costs?
  - Regular maintenance
  - Major and minor repairs
  - Periodic subscription costs
  - Insurance
- What will the dollar value of the generated energy be?
  - Solar installations will generate kWh that will need to be “converted” to dollars
  - Subscription models may credit in either dollars or kWh
  - Electricity costs will continue to increase, so the dollar value of credits will continue to increase. The faster rates go up, the more quickly a project breaks even
- All of these factor into a basic breakeven or NPV analysis - money spent now generates money in the future



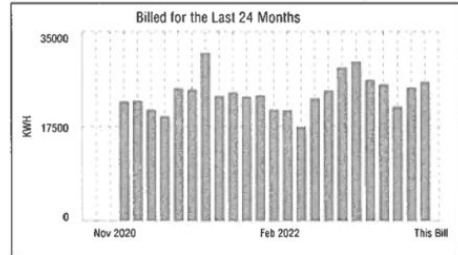
# Non-financial considerations

- For rooftop solar, building must be able structurally able to support weight of installation
- Visibility of solar panels
  - Installation on roof of CAMS is too short to see over edge of roof
- These don't come into play for a community project, unless you're considering one sited near campus vs far from campus

# Challenges in financial accounting for solar credits

- UMD has lots of meters across its properties, and we pay a variety of rates per kWh
- Since credits post as kWh, we chose to take the credits on meters that are charged higher rates per kWh. These meters are NOT charged to the departments that paid for the subscription
  - The largest group of meters was charged \$0.0916 per kWh in Jan 23
  - The group of meters that receives the credits was charged \$0.117 per kWh in Jan 23
- How do we properly credit the investing departments?

Meter #	Start Date	Start Read	Read Code	End Date	End Read	Read Code	Measured	Reg Const	Usage	Total Usage
571092	01/29/23	9724.058	Regular	03/01/23	9838.599	Regular	114.541	240	27489.84	27,489.84 kWh used
571092	01/29/23	2388.027	Regular	03/01/23	2410.718	Regular	22.691	240	5445.84	5,445.84 KRH used



Measured Demand 65  
Billed Demand 65  
Power Factor 98.0937

Community Solar Garden Upfront Subscription	0.00
Service Charge	12.00
Demand Charge 65 kW @ \$8.56	422.50
Energy Charge 25,629.84 kWh @ \$0.0654	1,551.63
Resource Adjustment	921.19
Interim Rate Adjustment 14.23%	387.30
Low-Income Affordability Program Surcharge	1.55
Renewable Adjustment 2,480.307097 kWh @ \$0.00178	4.41
Renewable Adjustment 23,149.532903 kWh @ \$0.00164	37.97
Transmission Adjustment 25,629.84 kWh @ \$0.00586	150.19
Solar Energy Adjustment 25,629.84 kWh @ \$-0.00005	-1.28
Solar Renewable Adjustment 25,629.84 kWh @ \$0.00179	45.88
Duluth Franchise Fee 3%	106.00
<b>Total charge this period</b>	<b>3,639.34</b>

Community Solar Garden: 20 block(s)  
Community Solar Garden Credit: -1,860 kWh  
Last Bill Balance Rolled Forward: 0 kWh  
Current Usage: 27,490 kWh  
Total kWh Charged This Bill: 25,630 kWh  
Credit Rolling to Next Bill: 0 kWh

Name FM Chester Park  
Address 31 W College St  
Meter # EMP571092

- Each month, we use a template to calculate what the cost would have been without the credit
- The full value of the credit is posted to one department and the full cost of the electricity used is posted to another department

Total Meter Charge	\$3,639.34
kWh used	27489.84
Cost per kWh billed	\$0.13238855
CSG Credit (+)	1860
Beg Rollover (+)	0
End Rollover (+)	0
Value of credit	-\$246.24
Gross cost	\$3,885.58



# Return on investment

Since the University is effectively a cash environment, we do not use NPV tools to discount cash flows

<i>Dept</i>	<i>Original Investment</i>	<i>Amort Per Mo</i>	<i>Amort Amt 62 mo</i>	<i>Net Gain / (Loss)</i>	<i>Avg Per Mo (62)</i>
10484	\$85,286	\$284	\$17,626	\$26,709	\$431
10491	85,286	284	\$17,626	26,709	\$431
10501	42,643	142	\$8,813	13,355	\$215
<b>Total</b>	<b>\$213,215</b>	<b>\$711</b>	<b>\$44,064</b>	<b>\$66,772</b>	<b>\$1,077</b>
<b>Annual Rate of Return</b>				<b>6.5%</b>	<b>6.1%</b>

# Wait, what? -or- Good News!

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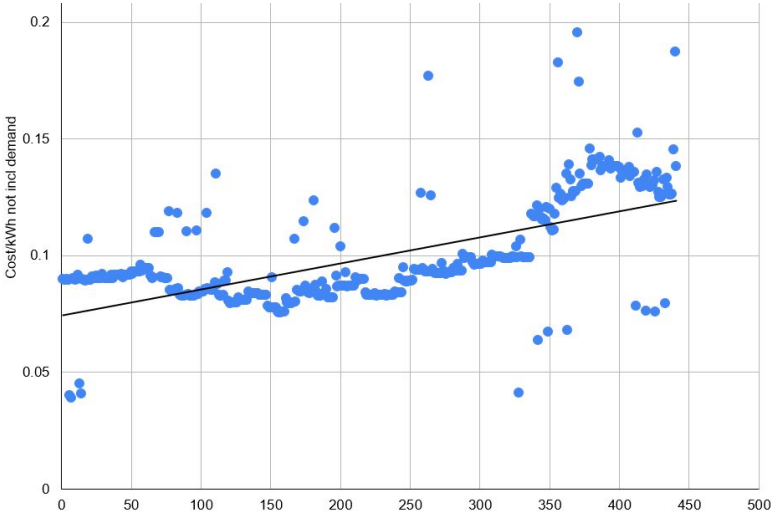
Returns to date have exceeded expectations. Why have returns been so high?

<i>Remaining investment to recoup</i>	\$102,378
<u><i>Low est kWh/yr</i></u>	157605
<u><i>Current effective rate/kWh</i></u>	\$0.115
<i>Est \$/yr</i>	\$18,124.58
 <i>Addl # yrs to break even at current rate</i>	 5.65

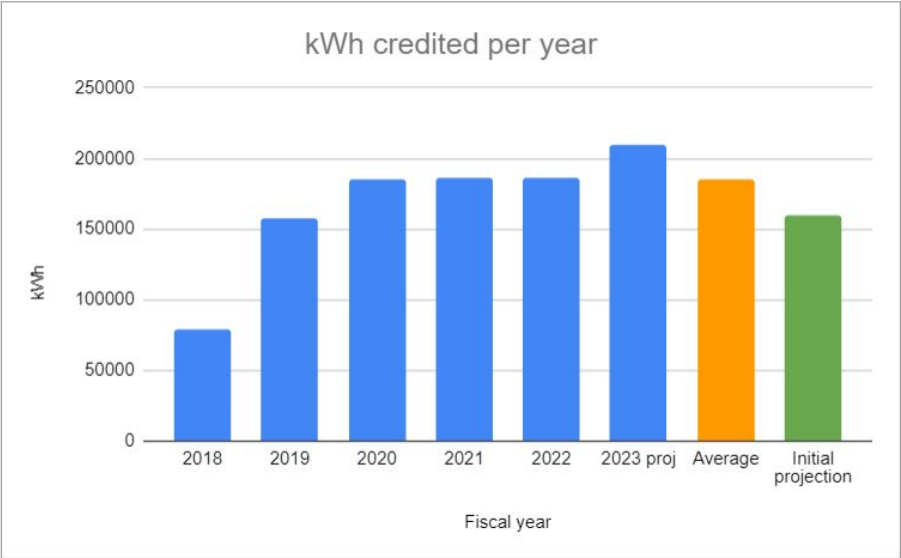
*Breakeven calendar 2028  
Agreement ends Dec 2042*

# Explaining these high returns

Rate per kWh increasing



Production higher than predicted



Questions?