

11/18/15

To: University of Minnesota Solar University (SUN) Delegation Team

From: Jared Schoch, Principal, TurningPoint Energy

Re: Initial Solar Project Analysis and Recommendation

Following is a summary and recommendations resulting from our meetings held Monday, November 17 and Tuesday, November 18, 2015 at NREL in Golden and the Embassy Suites in Denver, Colorado as part of the Department of Energy Solar Market Pathways grant project process and specific project your University of Minnesota team is focusing in on as we move forward through your solar project roadmap process.

During these meetings, your team presented your solar project roadmap, allowed for questions and answers to the roadmap, drilled into a specific project your team is evaluating as the best opportunity for success to continue development towards the ultimate goal of a 1MW project roadmap and potential actualization of an initial project within that roadmap.

Stakeholder Process Summary:

- Complex stakeholder buy-in process not yet fully vetted.
- There have been several “no” answers to community solar projects as proposed by third party solar developers thus far but the UM team does not know “why” or what it would take to turn the “no” into a “yes.”
- Not completely firmed up on the site and type of solar that is the best project. Team is working to document all possibilities and vet through a decision matrix prior to getting to that decision point.
- Solar project will likely be third party owned via traditional third party solar PPA financing vehicle.
- Solar project needs to be an acceptable energy generation hedge for the University to move forward with the project.
- A committed course on this will begin in the spring which should provide the UM team additional focus and muscle which should help with the project development / roadmap process forward.

Project Summary Modeled Using TurningPoint Energy Commercial Financial Modeling Tool:

- 1,000kW single axis tracking ground mounted solar array on university property
- 1548 kWh/kW solar irradiance assumption
- Third party PPA project structure
- \$0.9 – 0.11 / kWh with 30% ITC
- \$0.10 – 0.012 / kWh with 10% ITC
- 20 year term with 0% annual escalation
- \$0 / SREC value assumed

- 2017 installation
- \$1.70 / watt dc installed cost of the project
- \$0 year one personal property tax cost assumed
- Model assumes target 6.5 – 7.5% pre-tax internal rate of return (IRR) which is roughly 10-12% levered post tax IRR.

Recommendations:

- UM team must confirm the stakeholder buy-in process and how to get to a “yes” from the consistent “no’s” demonstrated thus far on previous and similar project opportunities.
- Select the one project to focus the team on for full financial vetting.
- Further vet the 1MW community solar option as this appears to be the UM’s best option to save money and engage in a solar project:
 - Your team is in a unique situation in that the community solar garden economics should allow for less than the \$0.14 / kWh tariff. Your team should vet the tariff and the hedge price and escalator to ensure you’re getting a good deal. Per the pricing provided, that’s substantively below \$0.14 / kWh fixed for 20 years in my view. However, the market of community solar developers has so much demand that it’s not providing the competitive pricing UM could gain ideally. This creates an interesting timing issue about waiting for the market to come to UM versus taking advantage of the moment in time today for this solar energy hedge of a portion of electricity.
 - Personal property tax is not assumed and needs to be verified this is allowed in MN.
 - Work with MREA, NREL and developers to gain price sensitivity analysis overall and gain comfort with it.
- The only issue with the third party sited community solar gardens is that it lends little to no visibility on-campus. An alternative for this that we discussed was converting an existing university-owned parking lot into a solar canopy lot to maximize visibility of the project for the campus. We found the following in this financial model exploratory process as well (I found an error in my model which has been updated for this summary). Note that all assumptions above provided apply except the following exceptions:
 - 1250 kWh / kW irradiance (fixed tilt)
 - Fixed tilt canopies with a 10 degree south-facing tilt
 - \$0.14 - \$0.16 / kWh with 30% ITC
 - \$0.15– 0.17/ kWh with 10% ITC
 - \$2.75 / watt dc installed cost
 - 2.5% escalator applied annually over term
 - NO parking lot revenue value assumed (which would off-set the solar PPA rate materially if included)
- Only after the above items are complete would I suggest you are ready to start evaluating internal discussions with university administration and leadership about project viability and next steps.