Modeling Solar Panel Finances for Non-Profit Organizations

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Executive Summary

Systems of solar panels allow all types of buildings to harness the power of the sun, a major source of renewable energy. Companies who install solar panels on their buildings receive substantial tax benefits, but non-profit organizations do not. The Clean-Energy Co-op has shown that the most economical financing option for a non-profit's solar installation involves partnering with an equity investor (e.g., a company) who can receive tax benefits. Our task was to model the finances of one such partnership between the CEC and an equity investor for a potential solar system installation at Lynnewood Elementary School in Havertown. Once we had a spreadsheet which showed the complex cash and tax benefit flows over time, we adjusted several parameters in order to meet two requirements: the equity investor's internal rate of return needed to be at least 8% and the CEC had to have full ownership of the solar panel system before 24 years passed. We concluded that it was possible to fulfill these requirements if the Clean Energy Co-op provided 45% of the capital cost (while the equity investor provided the remaining 55%) and the CEC received 30% of the income from the electricity produced (with the remaining 70% going to the equity investor).

Before we created the spreadsheet model, we learned about solar panel installations by doing some preliminary calculations for possible solar panel sites, Haverford Library and Lynnewood Elementary School. We used online resources to gather data on the amount of sunlight the roofs receive, roof size, solar system size, and solar system production. These resources included Google Project Sunroof, Google Maps, and PVWatts Calculator. Other information such as tax benefits, power purchase agreement pricing, and installation cost per kilowatt was found during our research or provided by Joy Baxter and the Clean Energy Co-op. We calculated values for possible solar panel systems at Haverford Library and Lynnewood Elementary School: the size (kW) and production (kWh/year) of a possible solar system, the installation cost, and the time it would take to pay off the installation cost using only income from electricity produced by the solar panels.

For Haverford Library, we calculated the maximum size of the solar system to be 82 kW. The installation cost for this would be $182,000, and it would produce 112,000 kWh of energy per year. Using only income from the energy produced, the system would pay for itself after 23 years. For Lynnewood Elementary School, we knew from meeting with the facilities liaison group that they were considering using the roof above the gymnasium for a solar panel system. That portion of the roof could fit a 67 kW solar panel system, which would cost $145,000 to be installed. It would produce 88,000 kWh per year and pay for itself after 24 years. Once we completed these estimates, we moved on to modeling the finances for the Lynnewood Elementary School system as was discussed above.

Overall, the LLC method is a good option for non-profits that want to save money on electricity with solar panels in the long term. We found that our end goal of creating a model is

more complicated than we initially believed, however, this model and others like it will be beneficial for the future and sustainability of the planet.