



# Pioneering a Path for Community Solar in Haverford Township



Haverford Township, Haverford, PA

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## Abstract

*Working with Professor of Mathematics Victor Donnay and Liwei Yang '21, our Summer 2020 project centered around developing a model to structure, finance, and ultimately install a Haverford resident-owned solar array on the roof of the Haverford Community Recreation and Environmental Center – a Haverford Township building. In developing our unique model, we sought to transform the singular action of installing a solar array into a community-empowering initiative whereby town members could feel a stronger connection to the array and its greater purpose. At the same time, we worked to ensure that our model made financial and logistical sense for both the Township and the community members owning the array by leveraging the solar incentives already in place at the State and Federal level. Ultimately, Our research found that the path to achieving a community solar project in Haverford is complex and riddled with roadblocks, but not impassable. With strong community and Township buy-in, a community solar project predicated on our model can be achieved, and if enacted, could serve as a model for other Townships and Municipalities across the country.*

## Introduction

Solar arrays have and will continue to be one of the most proactive ways for smaller institutions and individuals to positively contribute to our climate crisis. By harnessing the solar potential of their roofs, institutions can lessen or even eliminate their reliance on typically pollutant-intensive grid electricity and instead produce their own renewable energy onsite drastically lessening their overall carbon footprint. In fact, *Project Drawdown*, a climatologist-generated compilation of the top 100 actions we can take today to address climate change, placed rooftop solar installations as the 10<sup>th</sup> most impactful action on their list.



Fig. 1 Bryn Mawr's very own solar array located in front of Cambrian Row

One of the most exciting approaches to installing solar arrays are community solar projects. These projects allow groups of people to funnel their resources to install a larger solar array with an even greater impact. This community solar approach served as the inspiration for our project and has become the norm in places such as Germany where nearly one third of all installed renewable energy capacity is owned by private citizens often participating in these sorts of community-centered solar projects (see figure 2). Our model sought to transfer and implement this approach for a Community Solar array in Haverford Township. With the German case study serving as our point of reference, we began constructing a model to allow for this sort of community involvement and excitement while ensuring the project still made financial and logistical sense for all parties involved.

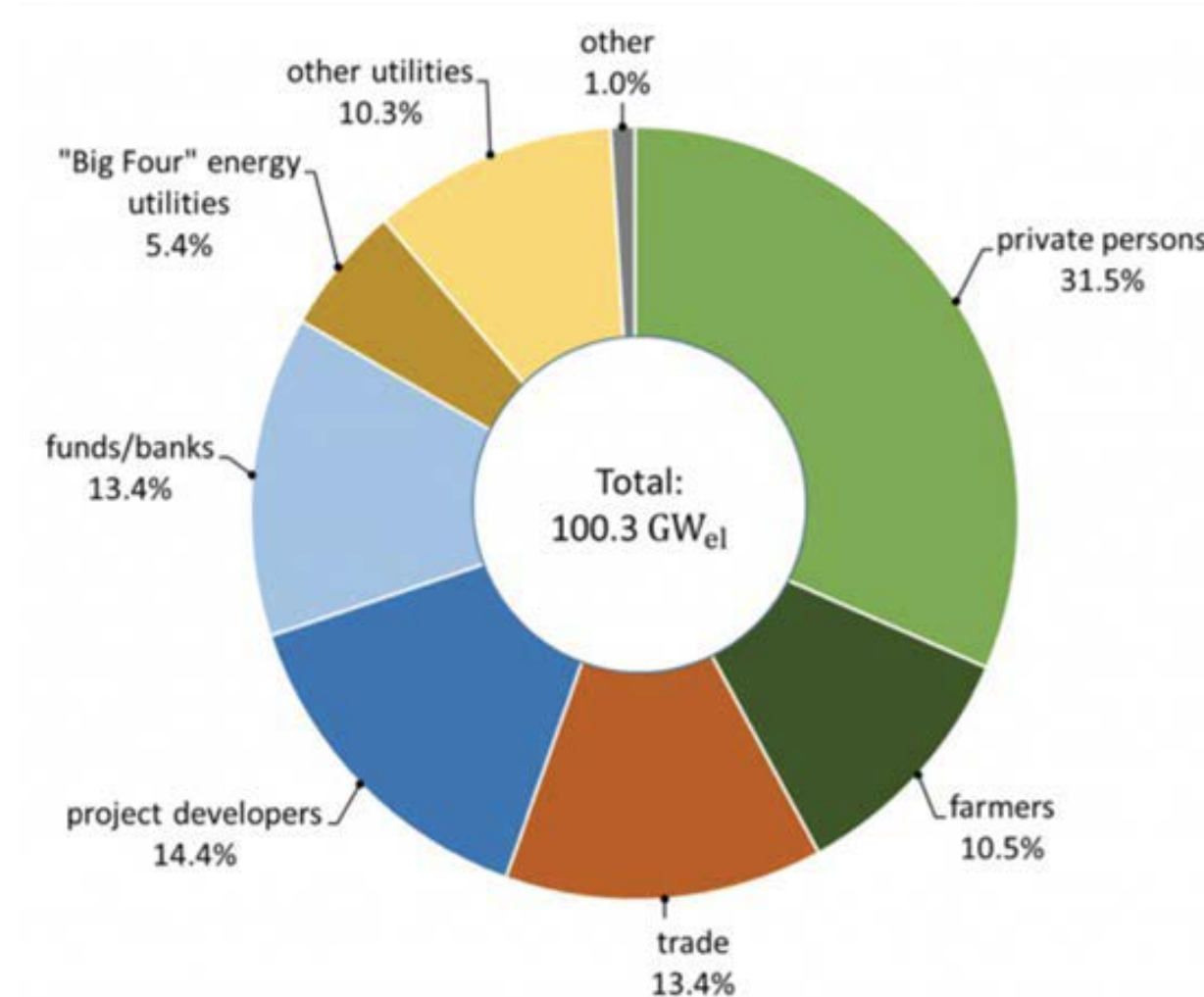


Fig. 2 Ownership structure of installed renewable energy generation capacity in Germany 2016  
Source: Clean Energy Wire

## Method

### 1. Establishing Project Scope

We began our project by first establishing our project location and securing interest from Township officials. In selecting a location, we searched for a site that had both good solar potential (south facing roof with minimal shading and a flat surface) and was an already established site of community gatherings to reinforce the community building focus of the project. We located this ideal spot in the **Haverford Community Recreation and Environmental Education Center (CREC)**. The building had been designed with solar in mind with an ideal roof for a solar project and the building's mission statement focuses on environmental education and community building.



Fig. 3 Rooftop solar potential of the CREC  
The roof has an overall Solar access rating of 98.8%  
Courtesy of independence Solar

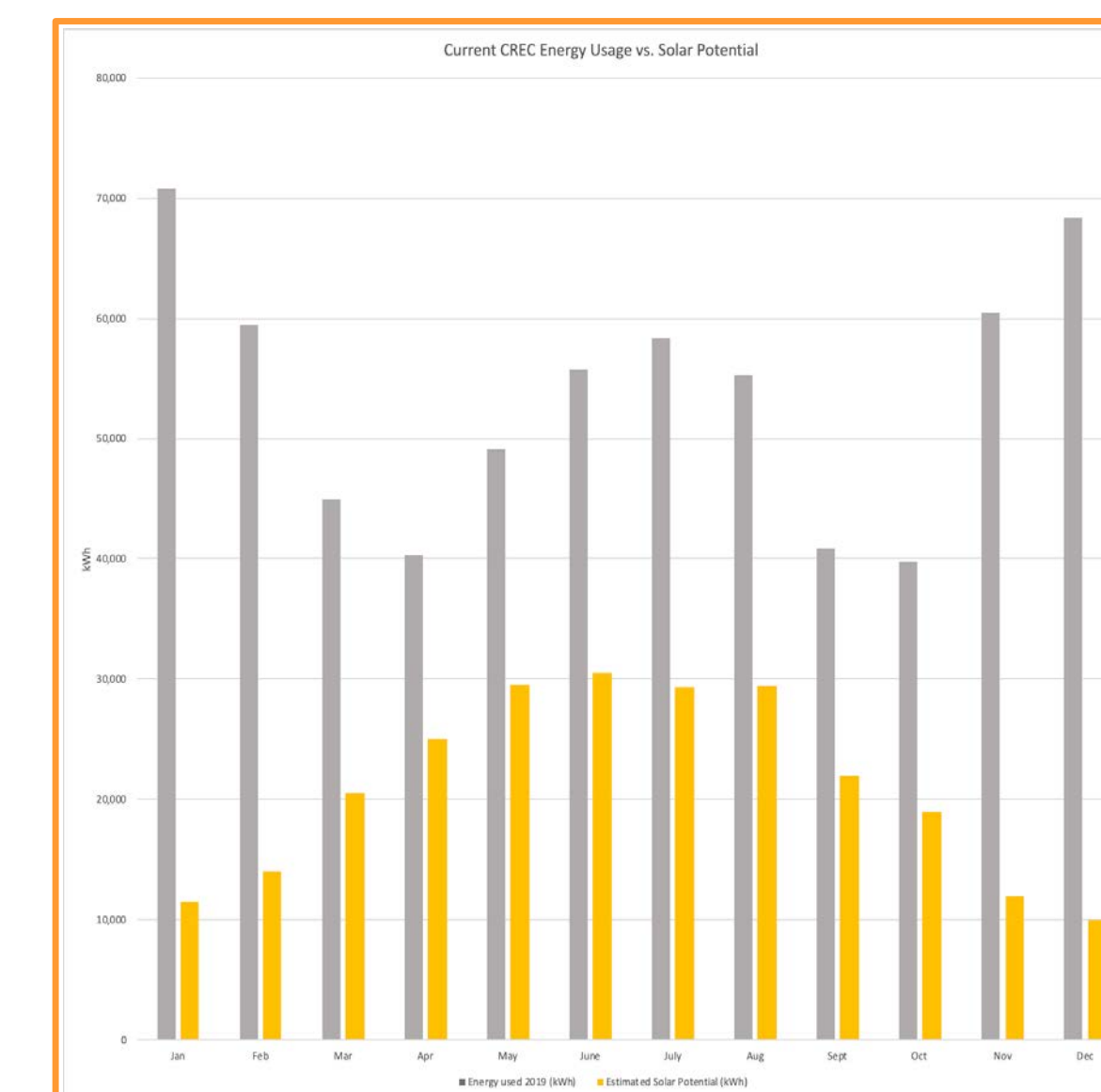


Fig. 4 Projected CREC Solar Production vs. CREC Energy Use  
A 200-300 kW array on the CREC roof would generate enough electricity to meet about half of the CREC's yearly energy demands (or about 23 residential homes)

### 2. Building our Models:

With a site located, we then shifted our attention towards building the unique financial model needed for our non-traditional approach to solar. Our primary challenges were finding a way to ensure the project received the State and Federal financial incentives afforded to traditional solar projects and how to distribute these incentives amongst the dozens if not hundreds of individual owners of the panels. We also needed this financial model to handle the transactions between the Township and the owners of the array when the township began to purchase the electricity generated by the array. Ultimately, we found two potential models to achieve our community solar project (See figure 5 & 6).

## Results

### 3. Potential Financial and Structural Models

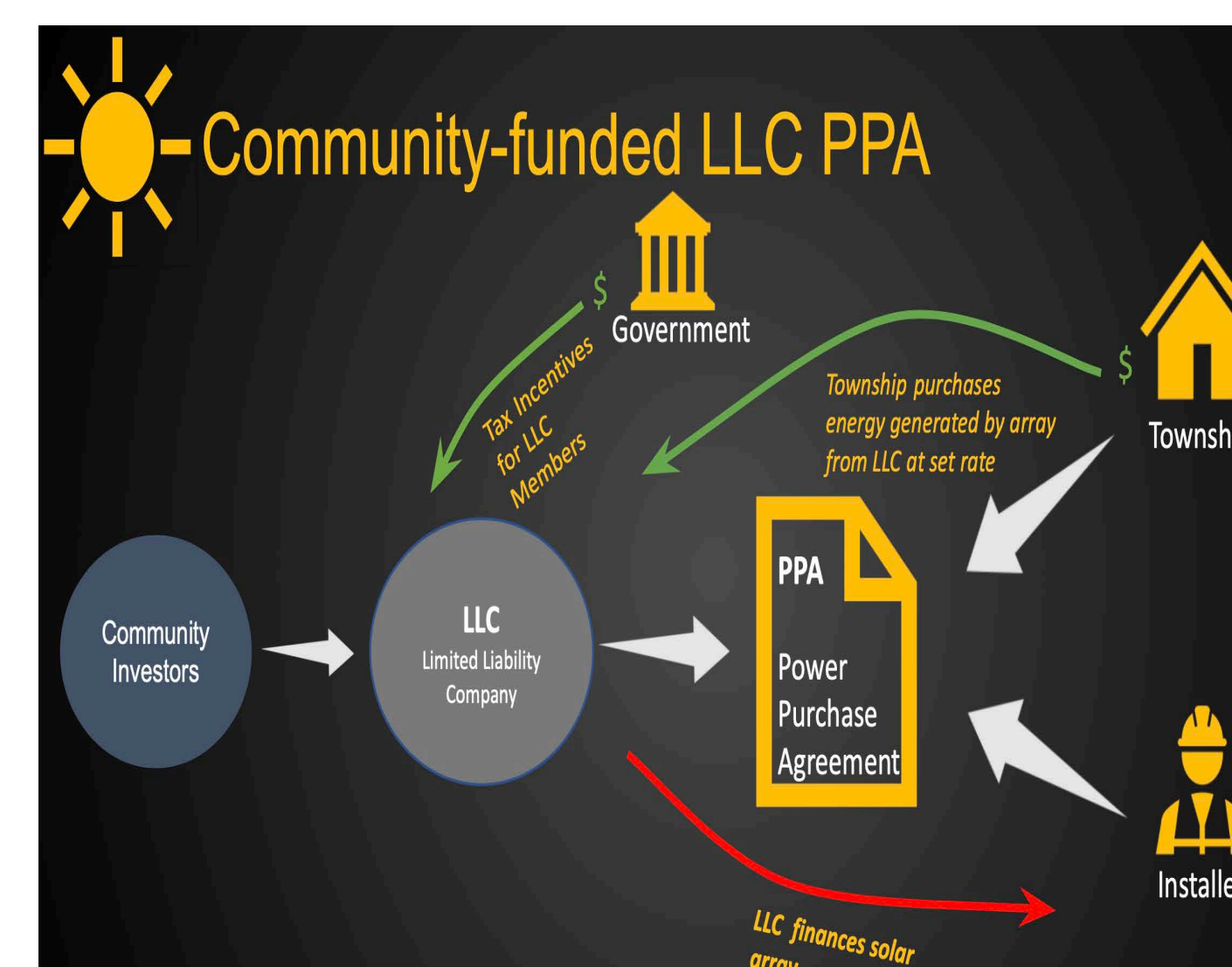


Fig. 5 Community Funded Limited Liability Company (LLC) – Power Purchase Agreement (PPA) Model

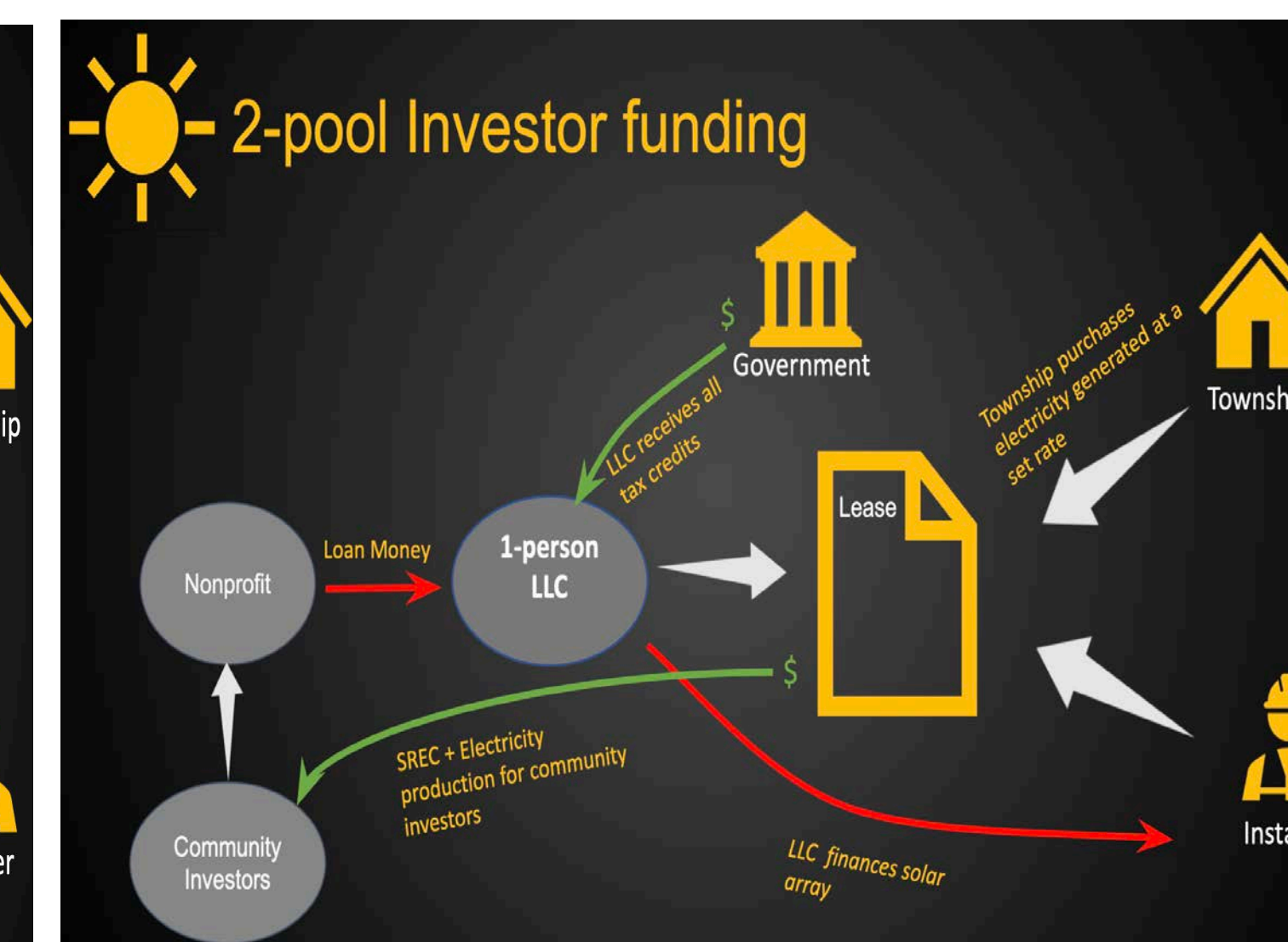


Fig. 6 2-pool Investor Funding Model with one person LLC and non-profit loan

## Discussion

### 4. Understanding the Models and Moving Forward

Our initial modeling (figure 5) centered around the creation of an LLC and PPA to serve as the financial arm of our project. The LLC would be formed of the community investors involved and would fund the array and receive and distribute the state and federal tax credits and electricity revenue generated by the array. The PPA would establish the terms of the Township's purchasing of the array's electricity. As we dug further into our research, we found that there were some legal and logistical roadblocks in establishing a multi-person LLC. We then revised our model with a one-person LLC at its core (figure 6). This LLC would be made up of one large investor who would purchase the array through a combination of their own funding and community member funding channeled through a non-profit loan. This more nuanced approach would allow us to realize the state and federal tax credits, circumvent the logistical hurdles of a larger LLC, and continue to ensure a community-centered focus for our project. Moving forward, we plan on presenting our final findings at the Haverford Township Board of Commissioners Meeting on September 8, 2020 and to continue our efforts based off the feedback we receive following that meeting.

## Looking to the Future



## Conclusion

*Our research found that the path to achieving a community solar project in Haverford is complex and riddled with roadblocks, but not impassable. With strong community and Township buy-in, a community solar project predicated on our model can be achieved, and if enacted, could serve as a model for other townships and municipalities across the country*

## References

- Hawken, Paul, ed. 2017. *Drawdown: The Most Comprehensive Plan Ever Proposed to Reverse Global Warming*. New York, New York: Penguin Books.
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