



Bringing Solar to Low-Wealth Neighborhoods

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Abstract. Norfolk Solar LLC and Sun Spots LLC are LLCs devoted to developing solar in marginalized and low-wealth neighborhoods in Hampton Roads Virginia. Their efforts have installed over \$1M in solar in these communities. The financing methods and outreach process will be described, as well as the unique feature of hiring residents of these neighborhoods to be trained as full-time solar installers. These same methods could be used elsewhere to bring solar installations and jobs to disadvantaged communities. See <https://www.norfolksolar.org> for additional info and press links.

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1 Introduction

Our feeling is that two of the most critical issues of our time are climate change and economic/racial inequity. One way to address both of these simultaneously is to install solar in disadvantaged, heavily-minority neighborhoods. An additional benefit can be gained by offering job training in solar to residents of the communities, as part of these installations.

1.1 Background

In 2017, Congress passed the Tax Cut and Jobs Act. Embedded in the Act were two new IRS sections known as 1400Z-1 and 1400Z-2. Commonly referred to as the Opportunity Zone legislation, 1400Z-2 introduced a unique capital gain tax incentive. Specifically, it offered a tax reduction, deferral of taxes, and tax exemption, for investments made in Qualified Opportunity Zones (QOZ). This tax code is one of the only vehicles that specifically incentivizes wealthy Americans to invest in low-wealth neighborhoods. As such, it has a huge potential for helping to heal the divide in this country between the rich and the poor, the haves and the have-nots.

Norfolk Solar QOZ Fund uses the tax benefits of QOZ investing coupled with the tax incentives for renewables to create an investment that has both a guaranteed return and a maximized tax benefit. With the originally enacted legislation, the timing was as follows: if an investment was made into a fund by December 31, 2019 and remains in the fund for seven years, the federal tax on the original investment is based upon 85% of the capital gain invested (i.e. \$1.0 million is taxed at \$850,000). In addition, the tax is not due until

the end of the seven-year period; consequently, the time value of money has a valuation benefit for the taxpayer. If an investment was made after December 31, 2019 but before December 31, 2021 and is held for five years, the original capital gain investment is taxed at 90% (i.e. \$1.0 million is taxed at \$900,000). There is a final financial benefit for QOZ investments, but this one is not useful for a solar install; any capital gain in the QOZ investment is tax-free (e.g., if \$1.0 million is invested and divested for \$1.5 million, the \$500,000 gain is not taxed). Since solar does not appreciate in value, this is not normally of use for a solar install. There is currently pending legislation that would extend these tax timelines to make current investments in QOZs financially advantageous.

2 Logistics

2.1 Creation of the Norfolk Solar QOZ Fund

Ruth Amundsen was the creator of the Norfolk Solar QOZ Fund. It came about through a confluence of three factors. First, at the end of 2018 Ms. Amundsen had just led a group of parents at an independent school to form an LLC and install solar on the school, paid for by the parents. The parents recouped the investment through tax credits and a 7-year Power Purchase Agreement (PPA) with the school, with no out-of-pocket costs for the school. Thus, she was intimately familiar with LLC formation, and tax incentives for renewables. Second, as a government employee, Ms. Amundsen was subject to the government-wide furlough in early 2019, meaning she had five weeks off work. During that time, she gave numerous presentations about methods to finance solar, and a suggestion at one such presentation was to consider Opportunity Zones. Third, it happened that at the same time she and her two sons received some unexpected capital gains connected to the sale of a family business. These three factors together, combined with the wish for the family to do more for the disadvantaged, led to the idea of creating a QOZ Fund dedicated to installation of solar.

There were a few unexpected complications. First, although the original desire was to help disadvantaged residents in QOZs directly, the laws in Virginia at that time precluded the third-party financing of solar on homes. Second, one of the tax incentives is the ability to take depreciation on renewable energy equipment. If the solar was purchased directly by the QOZ Fund itself, it would be purchased using ‘untaxed’ money, and thus depreciation could not be taken. The solution to the first issue was to install solar initially on businesses and non-profits that were in QOZs. The solution to the second issue was to create two levels of entities. At the top level would be the QOZ Fund and a second investment fund consisting of already-taxed money. These two would feed together into a second-tier entity, a QOZ Business, which would be the LLC to actually purchase the solar. Since taxed funds were included in the purchase, depreciation could then be taken.

Another aspect of the Fund structure grew out of the desire to be of more direct benefit to those living in disadvantaged areas. The fund could not install solar on the homes, but one way to be of direct benefit to the residents is to help with local employment. To that end, the fund decided to require in the solar installer contract to hire and train residents of the QOZs as solar installers. That effort was successful, and had led to at least 8 residents of the QOZs being hired and trained as solar installers. These individuals have

been the first American Americans in the solar installation workforce in Hampton Roads Virginia.

The contract with the solar installer was somewhat unique, in that not only did the installer guarantee the hiring and training described, they also contracted for a single price for exclusive rights to installation of the entire amount of the Fund. The Fund totaled \$750K, and the price agreed to was \$1.68/W installed, with 10 years of maintenance and warranty service included. The contractor was taking a risk since they made no specifications of the number or type of roofs, so the fund could have requested any number of installs for that same total installation value. This single price made sizing and pricing of installs very simple for the fund.

2.2 Operation of the Norfolk Solar QOZ Fund

The Norfolk Solar QOZ Business has installed solar on the roofs of four family-owned businesses, two non-profits (an African American church and the boys and girls club next door) and a residence. The residence was made possible because in 2019, the state of Virginia passed the Virginia Clean Economy Act, and as part of that an addition of just a few words in the code meant that a PPA could be used for third-party financing of solar on a residence, if the resident was low-income by the Virginia definition (less than 80% of local median income). For Virginia that means roughly less than \$70K annual income for a family of four.

Some of the installations and QOZ employees are shown in Fig. 1 and Fig. 2. These locations were found through a combination of searching online, in person outreach, and word of mouth. One of the first actions in outreach to sites was to create a website stating the purpose of the fund, allowing people to sign up to get solar, or to apply for a job as a resident of a QOZ. Norfolk Solar worked with numerous environmental and social justice groups to get the word out. One such group was Mothers Out Front, and due to their outreach, an African American church was one of the first signups on the site, and ended up having 70 kW of solar installed. Another site that signed up early was JD Miles Roofing, who happened to be one of the roofers that had worked on the independent school that Ms. Amundsen had installed solar on in 2018. This roofer was taking a lot of actions in their business to be more environmental, including transitioning to an all-electric fleet, installing EV chargers, and changing to higher efficiency HVAC. Installing solar fit right in, and as roofers who had already worked with a large solar install, there was no hesitancy about the safety of a solar installation on their roof. This early install got a lot of press, including the front page of the local paper [1], which helped get more signups and more installs in the pipeline.

To search online for suitable sites, satellite view maps were looked at in tandem with the maps of QOZ boundaries, to identify sites with suitable roofs within QOZs. One additional complication in Virginia was that PPAs would not be done with a commercial business for less than 50 kW, although non-profits could be smaller. That meant that not only did the roof need to have good solar exposure, it had to be over a certain minimum to be a viable site. A spreadsheet of likely sites was created, and outreach was done via social media, as well as phone calls and direct contact. Because these are disadvantaged and low-wealth neighborhoods, many of the buildings are in need of maintenance, and

thus many of the roofs need substantial renovation before installation of solar. The ratio of potentials pursued to suitable sites was more than 10 to 1.



Fig. 1. Solar installations by Norfolk Solar QOZ Business.

Once a site was found to be suitable, the solar design was done and the payoff calculated. As a family investment fund that was more interested in social good than pure profit, the profit percentage necessary was very small, just enough to recoup the investment and pay legal and accounting fees. Most sites could have a term of 8 years at the current utility rate and still show positive return for the investor. A simple (one-page) template PPA was developed and used with tailoring for each site. Once a site signed the PPA, the install was scheduled. Once the install was complete, the site would be saving on their utility bill and using that to make regular payments to Norfolk Solar QOZ Business for the solar. In order to allow the site to build up enough savings to pay that bill, and to facilitate billing, the bills were sent on a quarterly schedule. Solar generation at the site was determined from the stored data on the inverter site.



Fig. 2. The first residence in Virginia with solar installed via a PPA.

3 Impact

3.1 Benefits

There are many benefits for the organizations that received these solar installations. After the installation they have a utility bill the same or less than before, but now the solar portion of that bill is fixed, and not subject to potential rate increases from the local utility. After the end of term, the organization can look forward to having a near-zero, or much lower, utility bill for the foreseeable future. Because the solar covers a good portion of the roof, the air conditioning costs are reduced since the solar is soaking up the sun rather than the roof. The protection of the roof from UV and also from extreme temperature changes extends the lifetime of the roof. For some of the sites, the press and notoriety from being a solar site was helpful – for example for JD Miles, being in the paper for the solar install and their efforts to be sustainable brought offers from an electric vehicle dealer for free trials of EV trucks and other benefits. Sometimes, the focus on energy generation due to watching the solar production can spark interest in energy efficiency, since the site has increased incentive to strive toward being net-zero energy. Often, many members of the organization will benefit by becoming more knowledgeable about renewable energy and associated effects like net metering. And, the emotional impact of being a community leader by being one of the first to move to renewable energy, can improve and inspire the morale of the organization.

3.2 Barriers

The disadvantaged communities in the Opportunity Zones have spent decades receiving less benefits from our society than the more well-off communities. Books like *The*

Color of Law lay out the tragic history in this country of why minority communities have ended up with less wealth, fewer homes, and lower paying jobs. In addition, many times promises were made to these communities by local and state governments, that have then been betrayed. Thus the trust in these communities is very low toward anyone coming to them telling how they are going to give them something good for free. As a well-off white person going into these communities, gaining the trust of the residents and organizations was the first and hardest barrier. Being in the paper helped to overcome it, as did leveraging the existing organizations such as Mothers Out Front that already do outreach in these communities. Going to civic league and community meetings, and laying out the case for solar, while acknowledging honestly the reasons people may feel suspicious, was a good way to start. At several community meetings, the discussion would start with how high people's utility bills were, and progress to giving out supplies for weatherizing their own home as well as educating on subjects such as why LED lights are beneficial, and basic methods of caulking. This helped build trust so that the discussion of solar could be a natural extension.

Another barrier, as already discussed, was the condition of the roofs in these areas. At least half of the candidate sites were unsuccessful due to roof condition. Lack of operating funds in the organizations led to two different barriers. One was that since many of these organizations are operating close to financial failure, there was a strong desire for the solar installation to be of financial benefit to them from day 1. This could only be accomplished by lowering the rate that the organization would pay for the solar on the PPA, which made the install less profitable for the investor, and stretched out the term making the investment less attractive. The other effect of lack of institutional funds had to do with the transfer of the system at the end of term. In a normal PPA, the sale of the solar system at the end of term is for Fair Market Value, FMV. Because this is a nebulous term with many possible methods for calculation, this would leave the organization looking at signing a PPA that could require them to purchase the solar system at the end of term for an unknown amount, likely many thousands of dollars, which would not be feasible for them. In some cases, these fears could be assuaged by a companion document to the PPA, that gave the organization a maximum that would be charged for FMV.

4 Outcomes

4.1 Solar Installations

Norfolk QOZ Business has directly installed over 400 kW of solar, with an annual production over 510 MWh, and thus over 360 tons of CO₂ production avoided every year. Additionally, many businesses have been educated and inspired by solar due to this effort, learned they could self-finance solar and use the tax credit have it fully pay off in 4 to 5 years, and decided to install solar on their own.

4.2 Norfolk Solar LLC

Partly because of the extensive press on this effort, including podcasts on Fundviews and Climify, presentations at national QOZ conferences, and webinars [2], many investors

expressed interest in duplicating this work. One in particular, Rancho Solar LLC, was a QOZ fund that wanted to take the same actions and have the same impacts as Norfolk Solar QOZ Fund. The investor did not have local knowledge of sites and installers, and so asked Norfolk Solar QOZ Fund to deploy his funds in solar. The Norfolk Solar QOZ structure, as a family investment, was not set up to take in outside investors. Thus, Ms. Amundsen and her fund manager Alden Cleanthes decided to form a small woman-owned business, Norfolk Solar LLC, to help other investors duplicate this work. Norfolk Solar signed a three-way contract with their installer Convert Solar, and the Rancho Solar LLC QOZ Fund. This was a \$750K investment fund entirely directed to installation of solar in QOZs. To date, two solar installations are completed from this fund, and more are pending.

One of the installations by this fund has been particularly heart-warming. A small African American church, Wesley Union AME Zion church, in the heart of Norfolk, was put in touch with Norfolk Solar. The church was over 120 years old, with a roof in very poor condition that faced east-west. Due to these issues, the decision was made to install as a ground mount, since there was suitable land on a lot adjacent to the church. Issues having to do with city permitting arose because the church was so old that there were no city planning documents of the land. With the help of local city council members, all issues were worked through and a ground mount solar array was installed. Because the church was in a neighborhood that has in the past experienced vandalism, there was some concern that the array could be vandalized. As one way to mitigate that fear, the pastor



Fig. 3. Ribbon cutting for the AME Zion solar array.

of the church decided to have a ceremony to celebrate the array, to show the community what a good thing had come into their midst, and how they should care for it. As shown in Fig. 3, the ribbon cutting was highly successful, with many elected officials including the Norfolk mayor taking part, and neighborhood residents seeing how their church and their pastor were leading the way. The congregation felt a lot of pride in their church, and the pastor has made solar a key part of his message to the community.

4.3 Sun Spots LLC

The word of mouth from the first Virginia home to have solar installed via a PPA was immense, and in addition it was covered in the news media [3]. This meant that a number of people came forward requesting solar on their home, who did not happen to live in a QOZ, but were disadvantaged and could qualify as low-income per Virginia code. Thus, Ms. Amundsen started up an LLC (Sun Spots) to accomplish solar installations *not* in QOZs. This has resulted in one home solar install complete, and many more pending.

5 Opportunities

The fact that solar has come down in price so substantially over the last 10 years has meant that with tax incentives, a solar installation can pay off within 5–8 years depending on the organization. For institutions in low-wealth neighborhoods who often do not have the capital to do this themselves, and for non-profits such as churches who cannot take advantage of the tax incentives, this leads to a huge opportunity to leverage private wealth to improve the lives of those less fortunate. If every investor who was willing to trade a bit of their profit margin for the chance to support social, racial and environmental equity was aware of the possibilities inherent in solar, many more of these investments might be made. For many small investors, putting solar on just one or two low-income homes might be a very feasible part of their investment portfolio, and if this were widely replicated, thousands of low-wealth residents could benefit. Ways to spark this would be a national discourse on our current investment priorities, advertising widely the ease and profitability of solar investment, or establishing a federal framework that would facilitate this type of investment.

To address the training and employment piece, a federal guideline could be established that any large project in renewable energy must hire and train a certain percentage of their workforce from neighboring low-wealth communities.

All of this can be done without the QOZ legislation, which really adds little financial benefit but a host of tax and accounting complications. Investors can choose to invest in solar in disadvantaged neighborhoods without the umbrella of the QOZ legislation. Of course, if an investor has capital gains that they wish to shelter, this can obviously be used to advantage as was done by Norfolk Solar QOZ Fund.

Norfolk Solar is hopeful that the example they have set in terms of investment in these low-wealth communities, as well as providing jobs and training, will inspire others to similar efforts.

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