Patience is a Virtue:
Incorporating Solar as a Measure of Weatherization

In 2019, the Minnesota Department of Commerce filed to include solar photovoltaics (PV) as an eligible technology within the Minnesota Weatherization Assistance Program (WAP) and constructed and implemented a pilot program to install PV systems on WAP households. This narrative chronicles the process under which the technology and the pilot program were approved by the U.S. DOE, relays broad details about Minnesota's *Solar into WAP* pilot program, and recaps lessons learned as Minnesota WAP implemented the program. This information may be useful to other states thinking of including renewable energy technologies as eligible measures in their state's listing of WAP improvements.

Model

Small residential Solar PV installed under the U.S. DOE Weatherization Assistance Program for income-qualified households

Attributes

Individual installations project managed by WAP Service Providers, not residents

Complicated regulatory environment (Federal and State WAP-related regulations apply)

Requires additional leveraged funds, above allowed USDOE contribution

Braiding utility solar rebate programs with USDOE funds result in complexity

Background

For over 44 years, the United States Department of Energy's Weatherization Assistance Program (WAP) has provided free home energy upgrades to income-eligible homeowners and renters to improve the energy efficiency of a household, improve the health and safety of the residents, and lower the residents' energy burden. WAP is funded through the US Department of Energy, administered by the state, and implemented on the local level by weatherization service providers. This program has continually evolved in the decades since its introduction. The Energy Policy Act of 2005 enabled renewable energy technologies such as solar photovoltaics (PV) to be eligible for inclusion in WAP, though implementing these technologies into WAP at the state and local level requires U.S. Department of Energy (U.S. DOE) approval. Solar PV was cost-prohibitive in the years following the passage of the Energy Policy Act and Minnesota did not move to incorporate the technology into use for the low-income residential arena until 2019.

Initial Application

Minnesota's WAP program is overseen by the Minnesota Department of Commerce (Department). The Department is continuously pursuing every tool possible to reduce high energy burdens of low-income Minnesotans. With the drastic decreases in the cost of solar panels over the last decade and the advent of a utility solar program focused on low-income households, solar PV has become a potentially cost-effective option for approximately half of Minnesota's income-eligible electricity customers. As a result, in 2019 the Department began exploring the inclusion of solar into Minnesota's WAP. A critical component to constructing the *Solar into WAP* pilot program was Xcel Energy's Income-Qualified Solar*Rewards program. The program, developed in 2017 in collaboration with the Department and implemented in 2018, pairs a $2.00 per-watt-installed front-end incentive with a back end performance-based incentive (PBI) of $.07 per kWh generated by the system over the first ten years of operation.

In spring of 2019, the Department began undertaking the steps necessary to gain U.S. DOE approval to add solar to the list of eligible WAP measures. The intent to pursue solar was written into the State Plan for WAP Program Year 2020 (July 1st, 2019 – June 30th, 2020). A filing to the U.S. DOE asking for approval to include solar PV technology as an eligible WAP technology was completed following the instructions in Weatherization Program Notice 19-4. Finally, the required plan for launching a solar PV pilot program was submitted to the U.S. DOE for approval. These three required items were approved by the U.S. DOE between June and September 2019.

The U.S. DOE approval of the *Solar into WAP* pilot program included a requirement for the first five installations under the program that all stages of the project be approved by the U.S. DOE before proceeding to the next step. In addition, the Department required that the first five solar projects each participating Service Provider undertook would go through a similar approval process with the Department.

Pre-Implementation

WAP maintains a reputation for high quality installations undertaken by knowledgeable and responsible workers. In part, the quality is assured by federal and state statutory rules, regulations, licenses and certifications. The Department recognized *Solar into WAP* as a complicated program, one requiring explanation and buy-in from all stakeholders and therefore allowed time for pre-launch educational efforts to be completed for both WAP Service Providers and solar installers. As solar PV had not been previously used on WAP as an ongoing measure, it was important that Service Providers understood the technology and how solar could work hand-in-hand with weatherization measures to lower energy costs for WAP clients. Given the regulatory environment under which WAP exists, it was important that any solar installers participating in the pilot program understood the requirements and stipulations which were in play on every WAP project.

WAP weatherization work is accomplished using 23 Service Providers across the state, most[1] of whom are Community Action Partnership (CAP) agencies. WAP Service Providers are very dedicated to improving WAP clients' lives through the use of energy efficiency and weatherization. Initial efforts to educate the WAP Service Provider network on solar PV were part of a state-funded[2] low-income solar project in 2017. Communication and education efforts around solar were re-initiated in late 2018, months before Minnesota filed with the U.S. DOE to add the technology and worked to lay the foundation for adding solar into WAP.

[1] Minnesota WAP also contracts directly with three tribes, one non-profit agency and a county community development organization.
2 The State of Minnesota made $150,000 in funding available under the Renewable Energy Equipment Grant Program (REEGP), to add solar PV and solar thermal systems on WAP households between January 1, 2016 and June 30, 2017.

To explain the Department's strategic decision to expand WAP to solar PV, a series of half-day meetings was held beginning in 2018 for the Service Provider network and the WAP Policy Advisory Council[3]. The goal of these meetings was to ensure both the network and the Advisory Council understood the benefits solar energy could bring to a WAP client, as well as ensure Service Providers would support offering solar PV as a measure. Many providers were initially skeptical of the value of solar as a measure, but the Department was able to point to the Colorado model where the solar installations yielded over $400 a year in energy savings to the households. As the project managers for all WAP work going into a household, it was critical that this group of professionals not only understood the economic benefits solar could bring WAP clients, but also bought-in to adding the technology as an eligible WAP measure.

Energy Auditors from the Service Providers operating in Xcel Energy's service territory were also trained on the components of a solar site assessment in order to add this preliminary step into their home energy audits. This addition allowed auditors to identify WAP households with solar potential and begin building a database of "solar possible" households.

Educational efforts were again undertaken once the solar pilot program was approved for implementation, this time with efforts focused on both the Service Provider network and the solar installers who may participate in the pilot program. A webinar focused on the pilot program details was conducted for the Service Providers, followed by two subsequent Q&A sessions. The webinar and Q&A sessions were recorded and placed on the Department's Learning Management System for the Service Providers to review as desired.

To educate potential solar installers, a Request for Qualifications (RFQ) was issued by the Department, primarily as a communications tool, to accomplish four things:

1. Explain the structure of the program to the solar industry;
2. Ensure potential solar installers understood WAP requirements;
3. Allow the Department to find out how many installers were interested in participating in the pilot;
4. Gather (non-binding) per-watt-installed bid prices from the interested installers, for the Department to understand and assess if the program as structured was going to work.

Leveraged Funding and Program Design

To assure the cost-effectiveness of adding solar PV as a WAP measure, the Department needed to leverage funding to apply towards installation costs. While the Xcel Energy Solar*Rewards Income Qualified program's front-end incentive combines with U. S. DOE funds[4] to pay a significant portion of installation costs, those two sources of funds were not expected to fully cover the installation costs for some of the projects, at least not while allowing the WAP Service Provider to maintain the U. S. DOE stipulated target for solar average-cost-per-unit. Monetizing the value of the utility back-end production-based incentive would have helped cover the full installation cost, but no effective way was identified to monetize and leverage these back-end utility payments for application towards the upfront installation costs. For the economics of the projects to work, the solar installers would need to offer aggressive bidding on install prices for these small residential roof-top systems.

The Department also set a goal of protecting WAP clients from unexpected and off-warranty operations and maintenance (O&M) costs after installation. Minnesota's *Solar into WAP* was constructed to leverage the utility

[3] The WAP Policy Advisory Council is made up of ~20 in-network and out-of-network advisors who work with the Department staff on setting the strategic direction of the program for the coming year.

[4] In Program Year 2019 (July 1, 2019 – June 30, 2020), the USDOE allowed $3,689 as the "average solar cost per unit" that could be funded by U.S. DOE funds. In Program Year 2020 (July 1, 2020 – June 30, 2021), the U.S. DOE amount has increased to $3,762.

back-end PBI payments as a "safety net" to protect the households from O&M costs during the first ten years of operations. In addition to requiring the client to assign the front-end utility incentive to the installer to cover some of the installation costs, the program required the client to assign the back end PBI to an escrow account. The escrow account, held jointly by the WAP Service Provider and the installer for the term of the back-end incentive pay-out, was to be used solely to cover O&M costs. Any withdrawals from the account during the ten-year period would require the agreement of both the Service Provider and the installer, but at the end of the incentive pay-out term, any funds remaining in the account would go directly to the solar installer of record.

Three goals were met by structuring the program this way:

1. Accrue and maintain funds to pay for O&M expenses, if any;
2. Ensure installer involvement, during the first ten years of operation, to ensure system operation and effectiveness; and
3. Use the existence of the "remaining funds" pay-out after ten years to motivate potential installers to offer bids at lower-than-retail rates.

Implementation

Project work began on the first household chosen for solar in early 2020 and was proceeding well until the advent of COVID-19 in March of 2020, when all in-home work by WAP was curtailed for four months. While WAP in-home work was again authorized in late summer of 2020, the additional restrictions and processes in place to ensure the health of all involved parties meant that in-home work now proceeded at a much slower pace than pre-COVID. Increased workloads, limited staff time, and competing demands layered onto the network due to new COVID-19 Safe-Work processes and procedures all played a factor in a decreased Service Provider appetite to add in a new technology offering and effected the speed in which on-going projects were completed. The *Solar into WAP* pilot program, originally filed as a Program Year 2019 pilot (July 1, 2019 – June 30, 2020) was extended to continue into Program Year 2020 (July 1, 2020 – June 30, 2021). Given the on-going pandemic, the pilot is expected to continue into Program Year 2021 (July 1, 2021 – June 30, 2022), albeit it with solar installations occurring at a faster pace.

Lessons Learned

Pilot programs exist to allow programs, no matter how carefully designed and well-thought out, the chance to evolve as needed prior to a larger roll-out. Unforeseen challenges are expected, and implementers should accept that adherence to previously planned timelines may not be possible.

Some of the challenges faced, lessons learned, and recommendations from Minnesota's ongoing *Solar into WAP* pilot program are high-lighted below:

1) Complicated programs require mission-driven partnerships.

a) Braiding together WAP with a utility program is complicated as both programs have significant regulatory requirements and deadlines;
b) Service Providers, installers and state staff must expect evolution, remaining flexible and committed to the project to absorb new processes or requirements on an on-going basis; and,
c) Projects walk a very thin economic line to be able to move forward, highlighting the need to have committed partners.

2) Stakeholder education and communication is key.

a) Recognize the need to acquire mission-driven partners. All stakeholders must understand what the goals of the program are and why this tool works to accomplish those goals;
   i) This is especially true when the tool (solar) being added is outside of the normal range of tools (weatherization / energy efficiency) and may be seen as diverting funds and focus from the tools that have long been relied on;
b) Encourage stakeholder feedback and input through-out the process. Buy-in doesn't happen without all concerns being freely expressed and addressed;
   i) Listen to what's being conveyed and change the project timeline accordingly to allow additional stakeholder Q&A or feedback sessions.

3) Allow much more time for each step than originally estimated.

Pad the original implementation timeline. Certain steps will take longer than expected, un-expected hurdles will arise, and new components/steps will be added into the program to address new realities.

4) The devil is in the details.

Don't skip investigating or spelling out the smallest detail or assume everyone is on the same page about a process or a methodology. A few examples:

a) Xcel Energy requires verification of income-eligibility of the household to qualify for the enhanced Income-Qualified Solar*Rewards, even when the household is a WAP client and by definition, income-eligible. As incentive applications are generally handled by the solar installer, not the household, the income verification step had the potential of adding client-involvement to a primarily electronic application filing process, a process routinely handled by the installer without client involvement. In addition to complicating the process by adding client involvement, the Department also recognized that some WAP clients have limited electronic access. The Department consulted with Xcel and developed an income-eligibility determination form which can be supplied by the Service Provider to the installer for use as the installer handles the utility incentive paperwork, erasing the need for client involvement.
b) As mentioned, the U.S. DOE approval process for each house is a three-phase process, with each phase of the project reviewed by two Program Officers at the U.S. DOE (one technical and one administrative) as well as an external solar expert consultant. U.S. DOE has been very responsive in reviewing each Phase package (generally responding within 24-72 hours). However, delays (while minimal), resulted when the Department did not completely spell out information to U.S. DOE, such as that the kWh produced by the solar install would earn BOTH the PBI and a net-metering payment. Providing clear and concise information has been instrumental to avoiding time delays.

5) Don't bite off more than you can chew.

Set goals that are realistic, not idealistic. The Department originally wanted to have 50 households receive solar under this pilot program; the target has now been decreased to 10-15 installations completed by the end of program year 2020 (June 30th, 2021). It is better to take the time to get bugs worked out on a small-scale, rather than having an expanded installation effort bogged down because of un-addressed issues. Don't worry about making a "big splash", just figure out all the "ins-and-outs" so when the program expands, it runs smoothly, and new adopters don't run into problems or get frustrated and stop using solar as a measure.

6) Constantly look for improvement and evolution possibilities. Find another way. Perseverance is key.

The world changed in 2020. Competing demands and staffing issues brought on by COVID-19 meant neither the Department nor Service Providers were able to dedicate the time and energy the pilot deserved. Under a state hiring freeze, the Department brought on a part-time consultant to work directly with Service Providers. The Solar Technical Assistance Liaison (STAL) is tasked with working closely with WAP Service Providers to provide any assistance, clarification, suggestions and guidance on solar PV projects. STAL responsibilities include working with Service Providers who are under-taking solar projects to assist the Service Providers and ease the path to installation. In addition, the STAL works with Service Providers who have not undertaken solar pilot projects as of yet to help them successfully add solar PV as a WAP measure. Since contracting the STAL in mid-December 2019, the STAL has worked with two additional WAP Service Providers who are now in-process to on-load 7-8 additional households as WAP Solar pilot projects.

As another example, major challenges arose when trying to set-up escrow accounts to leverage the utility back-end incentive payments as coverage of unexpected O&M costs. As assignment of the back-end incentive is required prior to requesting Phase III U.S. DOE approval ("authorization to pay contractor invoice"), the escrow account challenges were holding up contractor payments on the first two jobs completed in late fall of 2020. The challenges faced in trying to utilize escrow accounts included:

- the cost and complication of setting up escrow (which would require a separate escrow account for each individual WAP solar project); and,
- the timing of account set-up (when the first payment is received at end of year 1) vs. when the account needs to be stipulated on the assignment forms (during initial application process for the utility rebate).

To address these challenges while continuing to leverage the utility back-end payments to benefit WAP clients, the Department proposed to replace the escrow account approach with a requirement that participating solar installers provide a ten-year installation warranty covering labor, miscellaneous repair materials and workmanship. In exchange for the ten-year installation warranty, the utility back-end PBI incentive payments would be leveraged along with the front-end incentives and assigned directly to the installer. All solar installers participating in the pilot program were supportive of making this change, and the U.S. DOE has given provisional approval to use this approach on for the first 15 houses receiving solar under the S*olar into WAP* pilot.

A pilot program approach expects and welcomes problems, so program evolution can occur. The list of challenges that could present themselves is broad - over-looked minor details crop up and need to be addressed, directions that were thought to be clear prove to be un-clear during implementation, paperwork processes prove un-workable or cumbersome, etc. A pilot program success is generally thought of as the number of projects accomplished during the program, but program evolution should also be considered a success. Recognize from the beginning that a critical role of pilot programs is as a tool to allow for discovery of potential problem areas and to allow time to research, re-group, and address each challenge. In the long run, the resulting program adaptations will strengthen and streamline the program before it gets expanded to a fuller network implementation.

The Path Forward

Under difficult conditions, in an unprecedented environment, Minnesota has continued to move forward with layering solar PV into the Minnesota WAP program offerings. Progress has been slower than originally

anticipated, but progress steadily continues. The addition of a part-time STAL, combined with WAP Service Providers acclimating to operating the program in a world in which a pandemic is still an over-arching reality, has combined to increase Service Provider awareness of and interest in pursuing solar as a WAP measure. Two additional Service Providers are currently being brought into the program (within Xcel territory) and two other Service Providers, outside of Xcel Energy territory, desire to have a similar program be offered in their areas. The Department will continue to focus efforts on increasing solar utilization within Xcel Energy's territory, and on supporting these Service Providers while they learn the ins and outs of the solar-measure process. However, the broader interest in solar by WAP clients and Service Providers in other utilities' territories and the interest of these other utilities themselves, dictates that the Department will soon need to have discussions with other utilities as to what leveraged funding options they may be able to offer to support solar on WAP households in their communities.

As geographic expansion is considered and explored, consideration is also being given to streamlining the process for Service Providers to identify and assess prime solar suitable households. Software development has been requested to layer information gathered under the Solar Resource Assessment Project[5] into the software used by the network to manage and track WAP projects. Access to previously acquired solar suitability information will stream-line the on-loading of potential solar-WAP houses by Service Providers. Options are also being explored to find ways to re-start the Solar Resource Assessment Project, terminated when WAP in-home work was able to start-up again in July 2020, in order to grow the database of prime solar suitable WAP households. Lastly, the Department has also received requests to pursue U.S. DOE approval for solar thermal air furnaces as an eligible technology within WAP; this technology would be especially helpful to offset high energy costs of liquid fuels that are frequently utilized in Northern Minnesota and on tribal lands.

The Department expects to have solar PV systems installed on 15 houses by the end of Program Year 2020. In alignment with the Department's over-arching focus on reducing the high energy burden of low-income Minnesotans, solar PV is expected to continue to be offered, at an increasing rate, as an effective and efficient tool to reduce energy burdens for Minnesota's income-qualified households.

[5] The Solar Resource Assessment Project (SRAP) was a WAP network remote-working project implemented during April – late June 2020 when WAP in-home work was shut down under Minnesota Governor Tim Walz's "Stay-at-Home" directives. The SRAP attempted to assess the addresses of ~105,000 Energy Assistance Program eligible Minnesota households to determine the solar suitability of the site.