

The time and effort involved in satisfying local permitting, inspection and interconnection (PII) requirements can add significant cost to a typical rooftop solar installation. According to recent estimates by the U.S. Department of Energy, PII costs for the average solar PV system in the U.S. can be as high as \$0.24/watt installed.ⁱ As a result, these costs could add an additional \$2,400 for a 10kW residential rooftop system.

Local governments with municipal utilities are uniquely positioned to perform PII reviews in an efficient and cost-effective manner. Since the entire process is managed by different departments of the same entity, there is an excellent opportunity to coordinate the permitting, inspection and interconnection process, thereby reducing the impact of commonplace inefficiencies.

Nevertheless, most cities with a municipal utility have not optimized their PII processes to grant appropriate permits and determine whether the system can be connected to the grid in an efficient and timely manner. This case study will focus on the City of Santa Clara, CA's streamlined approach to addressing PII costs, where installers can get over-the-counter permitting and interconnection review for residential solar installations under 10kW.

Santa Clara and Silicon Valley Power: Overview and Experience with Solar PV

The City of Santa Clara, adjacent to San Jose, CA, has a population of 119,311.ⁱⁱ It is the home

of several major technology companies. Silicon Valley Power (SVP), its municipal utility, serves 52,000 customers within a 19 square mile service territory. Unlike many electric utilities, 88% of its sales are to its largest industrial customers.ⁱⁱⁱ Combined, its residential and commercial customers only encompass 12% of its load.^{iv}

While SVP has had a solar incentive program since the late 1990s, the program did not originally assist many customers in purchasing a solar PV system. Between 2001 and 2007, no more than 7 residential customers took advantage of SVP's rebates in a given year.^v

According to Leslie Brown, Business Analyst at SVP, the pace of solar PV development in their service territory was originally relatively sluggish due to comparatively low residential rates, which are (as of this writing) 46% lower than residential rates offered by Pacific Gas and Electric, its neighboring investor-owned utility.^{vi}

2008-Present: Pace of Third-Party Leasing and Ownership Increases Dramatically

In the late 2000s, third-party leasing and ownership of solar PV systems began to expand the rooftop solar PV market in California. As a result, the popularity of leasing led to "a much larger influx of applications for solar pouring in."^{vii} While SVP only processed interconnection requests and rebates for 10 residential systems in 2008, 37 were received in 2009.^{viii}

ⁱ Seel, et al. "Why Are Residential PV Prices So Much Lower in Germany than in the United States?: A Scoping Analysis". February 2013. Available at: <http://emp.lbl.gov/sites/all/files/german-us-pv-price-ppt.pdf>

ⁱⁱ U.S. Census Bureau QuickFacts Estimate for 2013. Available at: <http://quickfacts.census.gov/qfd/states/06/0669084.html>

ⁱⁱⁱ U.S. Energy Information Administration. EIA Form 861.

^{iv} Ibid.

^v Conversation with Leslie Brown, SVP, 28 August 2013.

^{vi} Ibid. Information about SVP's rates is available at:

<http://siliconvalleypower.com/index.aspx?page=2023>

^{vii} Conversation with Leslie Brown, SVP, 28 August 2013.

^{viii} Ibid.

In addition to this rapid growth in residential installations, there was also simultaneous growth in commercial solar installations. SVP's data shows that commercial installations grew at an even more rapid rate through 2009. While the capacity associated with residential requests increased at a 29% compound annual rate between 2007 and 2009, capacity associated with commercial systems also grew at a 59% compound annual rate.^{ix} Typically, commercial solar PV arrays are larger and can have a greater impact on the grid.

2008-2009: PII Inefficiencies Revealed

During this initial uptick in solar development, the City and SVP did not have a streamlined process in place for processing permits and interconnection requests and, ultimately, rebates. According to Leslie Brown of SVP, "customers would go to the City's permit center for a permit, then down to SVP for interconnection." In addition, SVP's review process did not appropriately separate larger commercial-scale and smaller residential-scale PV interconnection applications.

Even worse, according to Ms. Brown, SVP was unable to tell if a PV system had actually been installed until a utility rebate request had been received from a customer, at which time the utility would inspect the customer's system. However, a work order for a bi-directional meter necessary for measuring net excess electricity generation was not being processed until this rebate request was received. Thus, these customers only had access to a one-way meter to measure two-way flows of power. This meant that they were unable to receive net metering credits for the electricity that they

exported back to Silicon Valley Power until they requested a rebate from the utility.^x

The situation was little better for the City of Santa Clara's Building Inspection Division, ("Building Division") which is responsible for issuing building and electrical permits (hereinafter collectively referred to as just a building permit). According to Sheila Lee, Building Official, permitting review was handled separately from interconnection review, requiring two Building Division staff members to review plans in addition to the engineer from SVP responsible for the interconnection review. Ms. Lee also indicated that permitting could take two weeks, if not longer, particularly if "the quality of submission was poor."^{xi}

Recognizing the Need for Reform: Creating a "One-Stop Shop" for PII Review

In the late 2000s, the City of Santa Clara redesigned all of its permitting processes around several key principles:

- Maximizing the number of "over the counter" permit reviews;
- Reducing as many steps in the process as possible;
- Requiring customers to visit only a single office for obtaining a permit; and
- Operating under the principle of "Single Point Contact" for complex projects with multiple required approvals.^{xii}

In addition, near the end of 2009, the solar company SolarCity approached SVP to inform them that they planned to offer a promotion in Santa Clara. Knowing that this would create

^x Ibid.

^{xi} Conversation with Sheila Lee, City of Santa Clara Buildings Department, 13 August 2013.

^{xii} City of Santa Clara Permit Center. Available at: <http://santaclaraca.gov/index.aspx?page=2447>

^{ix} Analysis of data from obtained from Leslie Brown, SVP.

added strain on the City and SVP's PII process, officials from both SVP and the Building Inspection Division determined that residential systems 10kW and under would not require supplemental engineering by SVP.^{xiii} Thus Santa Clara's "one-stop" process for all residential PV systems under 10kW was born.

Understanding the Reform

Under this new system, all systems under 10kW seeking a building permit and permission to interconnect with Silicon Valley Power's distribution system are only required to submit basic information about the planned array, including structural calculations, the point of interconnection, a one-line drawing and a system wiring diagram.^{xiv} If all of these items are included in the application, the permitting and interconnection review can be done "over the counter" in a single visit to Santa Clara's city hall. The review is undertaken by a member of the Building Division's staff. Systems larger than 10kW must still go through Silicon Valley Power separately for interconnection review.

Benefits for Customers, Installers, SVP and the City

The streamlining of these previously unrelated processes for systems under 10kW have resulted in significant benefits for customers interested in installing solar, solar installers, SVP and the City Building Inspection Division.

Benefits for Customers Installing Solar: For customers, the benefits of reform are clear. While customers were previously required to wait for weeks, if not months for both permit and interconnection review, the permitting and interconnection review can now be completed

in a single visit to the City's permit center. According to Sheila Lee of the Building Division, customers can now avoid making the multiple trips to the permit center that were once required under the previous system, saving customers significant time and hassle.^{xv} In addition, as Leslie Brown notes, SVP's customers are better positioned to begin enjoying the financial benefits of solar more quickly than before.^{xvi}

Benefits for Rooftop Solar Installers: As Dustin Albanese of SolarCity noted, the main positive impact of the reform for installers is the reduction in the time from the customer's initial contact with their company to the ultimate installation of the rooftop PV system. This helps customers to feel confident that a rooftop solar PV system is a worthwhile investment. Overall, processes like Santa Clara's that "help reduce the total time from beginning to end (are) an outstanding process for our company."^{xvii}

Benefits for SVP: According to Leslie Brown of SVP, allowing the Buildings Division to assume responsibility for the interconnection review "simplified the process - and it frees up time for our Engineering Department." Moreover, the streamlined process for smaller systems also helped SVP address the long-standing inefficiency of ordering a bi-directional meter after the system began operating. Now, the inspection by the Building Division triggers a service order for a bi-directional meter. The reformed approach to PV systems under 10kW helps SVP to avoid a follow-up inspection of the interconnected system, and has reduced the

^{xiii} Conversation with Leslie Brown, SVP, 28 August 2013.

^{xiv} A link to the application form can be found [here](#).

^{xv} Conversation with Sheila Lee, City of Santa Clara, 13 August 2013.

^{xvi} Conversation with Leslie Brown, SVP, 23 September 2013.

^{xvii} Conversation with Dustin Albanese, SolarCity, 9 September 2013.

failure rate associated with ordering a bi-directional meter in a timely way to only 5%.^{xviii}

Benefits for the City: As Sheila Lee notes, from the City’s perspective, the main benefit of the new process is the “reduced time and hassle for customers.” In addition, the Building Division is able to reduce the number of staff reviewing a given application from two down to one, thereby reducing the cost of review for both the city and for installers.^{xix}

The Result: Enhanced PII Review Efficiency Complements Greater Market Penetration

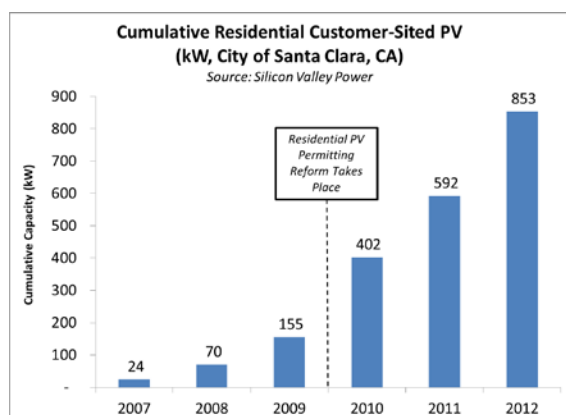


Figure 1: Cumulative Residential Rooftop PV Capacity in Santa Clara, CA

As data from SVP shows, PV capacity in its service territory increased very rapidly between 2007 and 2012. By the end of 2012, 265 of SVP’s residential customers had installed rooftop solar, for a total of nearly 900 kW of capacity.^{xx} Even more impressive, though, is that 82% of all residential capacity has been installed since the City and SVP’s permitting

reforms. Figure 1 above shows the amount of residential PV capacity installed before and after the reforms.^{xxi}

This data strongly suggests that these reforms to Santa Clara’s PII process have ensured that the municipal PII process has not hampered the growth of a robust rooftop solar PV market in Silicon Valley.

Key Lessons for Municipalities

The City of Santa Clara’s example provides municipalities with a municipal utility interested in streamlining their PII processes with four key lessons.

Integrating as many forms as possible into a single document simplifies the review process.

For applicants interested in installing a rooftop PV system, providing simple applications and descriptions of the PII process creates greater customer and developer confidence in the process. Perhaps most importantly, having a simple and easy to understand process reduces the number of customers who ultimately do not choose to install due to the perceived complexity of the process that installers are often attempting to navigate on their behalf.

There is no need to wait for a high volume of applications before enhancing PII operational efficiencies.

While Santa Clara chose to make changes to its process in response to specific information about a coming wave of new applications, cities and their municipal utilities can only benefit from reducing the number of staff and departments that “touch” a standard application for either a building permit or a standard interconnection. Reducing the number of “touches” for all PII applications will help installers save money and continue to

^{xviii} Conversation with Leslie Brown, SVP, 28 August 2013.

^{xix} Conversation with Sheila Lee, City of Santa Clara, 13 August 2013.

^{xx} Data from Silicon Valley Power, as provided for the 2013 *Silicon Valley Index*. Available at: <http://www.siliconvalleyindex.org/>

^{xxi} Ibid.

contribute to the economic vitality of a given community.

Ensure that the staff member undertaking the reviews is appropriately trained. The staff member responsible for undertaking the combined permitting and interconnection review must possess 1) knowledge about the building on which the rooftop PV system sits, as well as 2) an understanding of how most residences interconnect with and impact the grid. According to Leslie Brown, the senior Building Division staff members involved in the reviews for the City have many decades of experience in both permit review and electrical design, which positions them well to do the job and increases SVP's confidence in handing the task to a different department.^{xxii}

Spend enough time on follow-up and getting "buy-in" to get it right. According to both Leslie Brown and Sheila Lee, it is important for all partners in a reform of this nature and complexity to put in enough time to make sure the system functions well and serves all key constituencies. As Lee notes, "we spent almost a whole year to make this process work, and that's because we're willing to spend the time to ensure that it is implemented well."^{xxiii}

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^{xxii} Conversation with Leslie Brown, SVP, 28 August 2013.

^{xxiii} Ibid., and Conversation with Sheila Lee, City of Santa Clara, CA, 13 August 2013.

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