

BULLETIN

The energy and planning resource for Western utilities

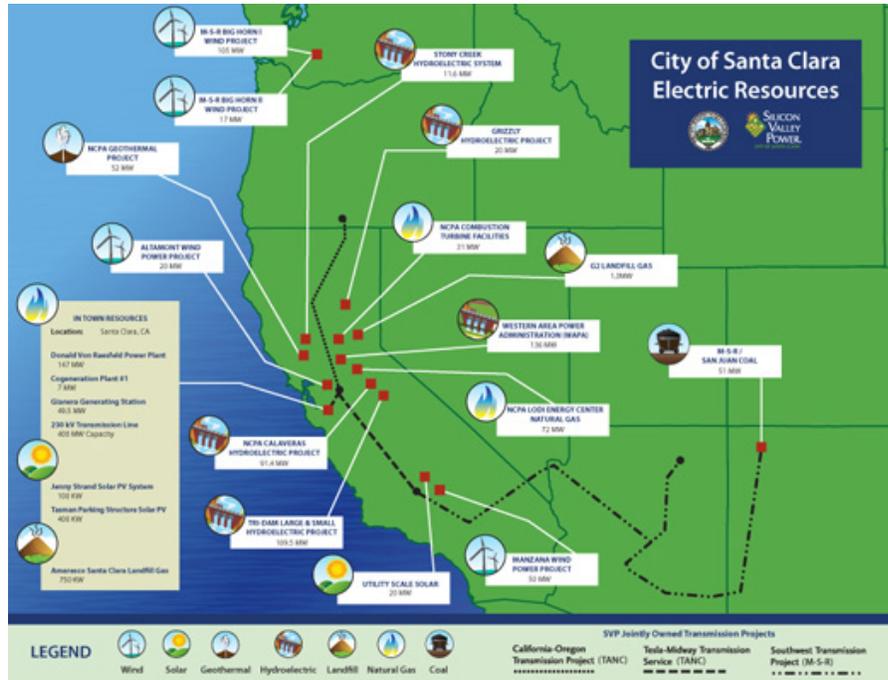
DIVERSE POWER PORTFOLIO KEEPS SILICON VALLEY POWER'S ELECTRICITY RATES LOW

As many California utilities scramble to replace hydro-power megawatts drying up in the ongoing drought—and raise their rates sharply to pay for that electricity—Silicon Valley Power's (SVP) more moderate increases keep their rates among the lowest in the state, thanks to a diverse portfolio.

"For utilities with more than 5,000 customers, Silicon Valley Power's average system rate is the lowest in California [EIA – form 861, 2013 data]," stated Larry Owens, SVP customer services manager.

SVP's decades-long investment in a diverse mix of resources saved its customers more than \$100 million last year, compared to the rates paid in neighboring communities. The city of Santa Clara municipal electric utility credits the "whole portfolio" approach with its ability to maintain a rate advantage over surrounding communities during historic drought.

For 2014, more than 36 percent of SVP's electricity came from renewable resources including geothermal, solar, landfill gas, wind and eligible



Generation resources located across a broad geographical area help to create a stable platform for SVP rates. (Artwork by Silicon Valley Power)

hydropower. Natural gas and large hydropower from Western make up the bulk of the conventional generation, rounded out with a small amount of coal and other resources.

Diversify three ways

Fuel sources are not the only thing about SVP's portfolio that is diverse, but it is primary to their approach. Power comes from wind turbines in the state of Washington, geothermal and small hydro from all over northern California and a utility-scale solar plant in Kern County, California. In-town resources include a 147-megawatt (MW) combined-cycle plant, a 7-MW co-generation

plant, 750 kilowatts (kW) of landfill gas power and 500 kW of solar.

Geographic diversity—when power resources are spread over a wide territory—helps reduce single-point-of-failure risk from extreme weather, transmission congestion and even earthquakes.

Ownership is the third aspect of the "triple diversity" strategy SVP uses to balance its portfolio. Most of the electricity is purchased through power purchase agreements and joint power agency contracts, but SVP owns or co-owns a natural gas power plant, some hydropower facilities and photovoltaic arrays. In addition to the

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Diverse power portfolio from page 1

SVP-owned local arrays at Jenny Strand Research Park and the Tasman Parking Structure at Levi's Stadium, business and residential customers contributed 11.4 MW of installed capacity in 2014. "By not relying too much on one particular provider or one type of contract, SVP has created a very stable platform to keep rates affordable," explained Owens.

Playing long game

That was the scenario that originally motivated SVP to pursue diversification in the 1980s when it was still a full-service taker from Pacific Gas & Electric (PG&E). "The first energy embargo was a wake-up call for our city leaders. They realized that moving away from a profit-motivated, sole source provider and seeking freedom from volatile fuel prices was key to providing affordable, reliable electricity to its customers," Owens said. "Renewable energy in particular could help SVP achieve its environmental goals."

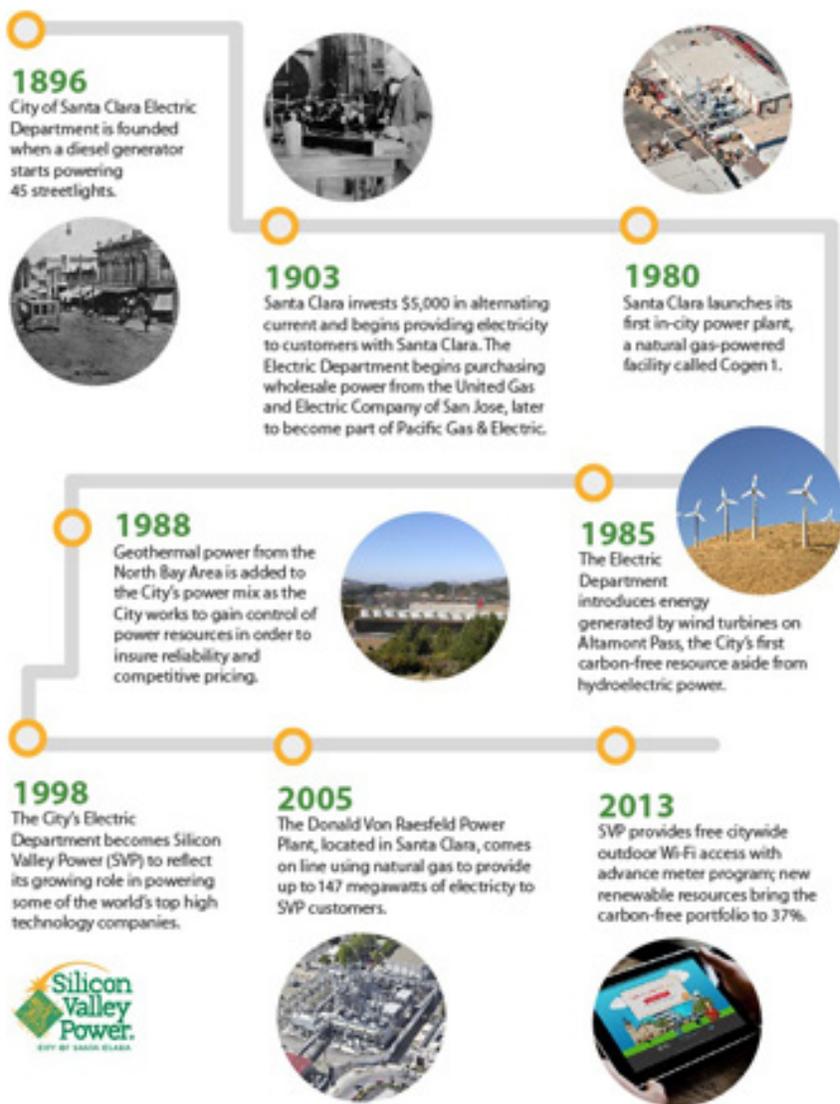
Hydropower from Western and wind from the Altamont Pass wind turbines were the first carbon-free resources into SVP's (power) pool in 1985, followed by geothermal power from the North Bay Area in 1988. "Geothermal is a great fit for our needs," said Owens said. "It is such a reliable base-load resource for our customers."

ENERGY SERVICES BULLETIN

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Silicon Valley Power began to acquire renewable resources in the 1980s with the purchase of hydropower from Western and wind power. (Artwork by Silicon Valley Power)

The solar power portion of SVP's portfolio has been growing rapidly in the last few years, thanks to dropping equipment prices, the utility's generous support for customer systems and California's renewable portfolio standard. The state must get 33 percent of its retail electricity sales from renewables by 2020.

SVP has already met the state's 33-percent goal, but the utility will continue to evaluate new renewable resources to meet its continued growth in retail sales and to address the expectation of even higher renewable requirements. Currently, SVP has more capacity than load, "So we can shop around for the options that best meet our 'triple diversity' criteria," observed Owens. "Even though we

are in a severe drought now, equipping existing small hydro dams with high-efficiency turbines is an approach that still has some potential opportunities," he added. "With a surplus of both capacity and renewable energy, SVP has many opportunities to sell into the renewable and non-renewable markets available in California."

Recognizing opportunity and knowing when to seize it has given Silicon Valley Power a drought-resistant portfolio, brag-worthy rates and a solid foundation for meeting future challenges. Because keeping rates low, complying with regulation and protecting the community's resources for the next generation is simply too big a job for one resource alone. ⚡

PROACTIVE INFRARED INSPECTIONS KEEP ED2 CUSTOMERS COOL IN DESERT SUMMER

Keeping the lights on is a year-round responsibility for power providers, one that sometimes means braving extreme weather to make sure the distribution system can handle the strain of a peak. Whether it is January in central Minnesota or July in Arizona, you will find Western customers inspecting their lines with infrared (IR) cameras borrowed from our Equipment Loan Program to protect their customers from potential power outages.

Electrical District No. 2 (ED2) in Phoenix, Arizona, is as “summer-peaking” a utility as they come, and each year since 2001, the maintenance department has borrowed an IR camera. “The loans probably go back further to the ‘pre-database’ times,” observed Equipment Loan Manager Gary Hoffmann. “Some of our customers are as consistent as the seasons when it comes to scheduling loans, and ED2 is one of those utilities.”



(Artwork by Electrical District No. 2)



The linemen of Electrical District No. 2 in Pinal County, Arizona, are dedicated to the thorough inspection of their electrical system. (Photo by Electrical District No. 2)

“Yearly inspections keep the malfunctions from piling up,” acknowledged Lineman Steve Heet, who recently took over inspections from Lineman Dewayne Hill.

Heet borrowed the Mikron 7550 thermal camera to inspect all of ED2’s overhead lines. “We pay special attention to the capacitor banks, regulator banks and switches, but basically, we are looking at everything,” he explained. “Underground transformers and bushings are on our schedule this year, too,” Heet added.

Crews take out the camera at night and inspect the line from a service truck, recording hot spots to be repaired during the day. And how hot do hot spots get in the desert in the summer? “I think 340 degrees is our record,” said Heet. “Typical hot spots are around 180 degrees and above.”

A recent inspection uncovered a couple very hot substation blades that could have resulted in 1,000 customers losing power. “A short, scheduled outage for repairs—even in the summer—is much easier for customers to manage than an unexpected event,” Heet stated.

Avoiding surprises is, after all, the whole point of a proactive maintenance program. Don’t wait for the next hot summer day to find out if your system is cooking up an unpleasant surprise. Contact the Equipment Loan Program at 720-9627420 to borrow an infrared camera. A few minutes of quick inspection can save hours of headaches for you and your customers. ⚡

WATER CONSERVATION STRATEGIES TOPIC OF CALIFORNIA SEMINAR SERIES

In response to the historic mandatory restrictions on potable water use enacted by the California State Water Resources Control Board, the nonprofit Green Technology initiative is presenting seminars throughout the state for utility and construction industry professionals.

Reducing Potable Water Use: Understanding Opportunities in Recent Plumbing Code Changes will explore how changes to the California Plumbing code can help to reduce potable water use. The new codes open the door to establishing standards and guidelines for greywater systems, on-site water recycling and rainwater catchment systems.

Low-flow fixtures and other common water-saving measures cannot reduce water consumption enough to meet the required reductions. This five-hour seminar will introduce building owners and water utility employees to the non-potable water strategies that will take conservation programs to the next level.

Featured speaker Greg Mahoney has more than 25 years of experience in building code enforcement, and is currently the chief building official for the city of Davis, California. In addition to being a certified combination inspector and plans examiner, he is a certified building official, certified access specialist, Leadership Energy Efficient Design accredited professional, Building Performance Institute building analyst and certified Home Energy Rating System rater.

Get an in-depth look at the code



specifications and learn how to successfully navigate the design, permitting and inspection process. Mahoney will also cover emergency water conservation regulations found in CALGreen that were approved May 29 and went into effect June 1.

Facility managers and design and construction professionals who attend can earn five continuing education units, or CEUs, from the American Institute of Architects. Sessions will also offer renewal points for Build it Green (one credit per hour) and Construction Management Association of America (one per hour).

To make it easier for busy professionals to attend the seminar, Green Technology is presenting it at five different locations in California:

- July 17 – San Jose
- Aug. 14 – Sacramento
- Aug. 28 – San Diego
- Sept. 11 – Orange County
- Sept. 25 – South San Francisco

The \$265 registration fee includes lunch, and discounts are available for groups of four or more. Please call 626-577-5700 if you have any questions. ⚡

USE USDA FUNDING TO START ON-BILL FINANCING PROGRAM FOR EFFICIENCY UPGRADES

A new loan program from the Department of Agriculture (USDA) Rural Utilities Service (RUS) can make energy-efficiency and conservation projects affordable for more consumers, including the hard-to-reach rental market.

The Energy Efficiency Conservation Loan Program (EECLP) makes investment in efficiency or renewables as easy as paying the electric bill. Utilities that are eligible for the RUS electric program, such as electric cooperatives and public power authorities, can borrow money at or near Treasury rates to relend to customers to make energy-efficiency upgrades on their properties. The loan repayment becomes part of the customer's monthly utility bill like any other essential utility service. The measure and its benefits stay with the property, and the payments may be transferred along with the meter to the next owner or tenant.

Good for everyone

"EECLP is a win on many levels," said Emily Stark, executive director of Clean Energy Ambassadors (CEA). "The people who are most likely to need help with their utility bills—low-income customers and renters—are able to make building improvements without up-front costs. Building owners get more desirable properties and the community gets a more sustainable building stock. For utilities, it can help them gain more control over their load and make customers happy."

On-bill financing is such a good idea it is no surprise that many utilities—including some Western customers—have adopted versions of it on occasion to meet load-management goals. Public power providers across the country offer residential on-bill financing programs, some going back more than three decades. Newer programs like Help My House, the South Carolina pilot program



The Energy Efficiency Conservation Loan Program helps utility customers finance energy-saving home improvements, like efficient cooling systems, with no upfront costs. (Photo by Environmental and Energy Study Institute)

that served as a model for EECLP, are reinvigorating the on-bill financing market.

Getting started

More than \$6 billion per year in low-cost financing is available to eligible electric utilities—those serving rural areas and operating at-cost—similar to the financing RUS offers for power plants, poles and wires. Projects eligible for EECLP funding include renewable energy systems, building energy upgrades, smart grid technologies, combined heat and power, demand response and more.

RUS accepts EECLP applications on a rolling basis, so there are no deadlines. The two-stage application process involves RUS and the utility board of directors first approving the utility's plan for each proposed program, then considering the

application to fund the program. Utilities may confirm their eligibility for EECLP and submit plans for programs they want to offer customers without having to commit to applying for a loan. To get a quick start, consider modeling programs on successful programs other utilities have implemented.

The Environmental and Energy Study Institute (EESI) provides free assistance to rural cooperatives and public utilities interested in applying for EECLP loans. The EESI project team can perform a needs assessment to determine if the program is a good fit for the utility and help the utility navigate the application process. Utilities might also get help identifying additional resources to get projects off the ground, customizing project plans and implementing and troubleshooting projects.

See EFFICIENCY UPGRADES, page 6

CONSULTANT PREDICTS HOME BATTERIES WILL CAUSE LOAD CHANGE, NOT GRID DEPARTURE

In the barrage of reactions from the power industry to Tesla's Powerwall home battery, a few clear-headed observers presented plausible scenarios and possible strategies for dealing with the potentially game-changing technology.

One of the more thoughtful opinions came from a speaker at the pre-conference seminar held at American Public Power Association's 2015 National Conference and Public Power Expo in Minneapolis. Charles Janecek, senior utilities consultant at Leidos Engineering, declared that all the talk about grid defection missed

the point, which is how the battery will change energy consumption patterns. "It's not about sort of the extreme solution but understanding what it's going to do before you get to that extreme solution," he said.

Janecek was one of several executives from Leidos who led the seminar discussion about the strategic planning implications of distributed generation. In his view, batteries are more likely, at least initially, to turn a utility's traditional load on its head. Janecek imagined consumers relying on PV systems and battery storage throughout the summer, and buying power

from their utilities in the winter. "That customer's not leaving the grid, they're not going away from you, but they're almost leaving your grid for some months out of the year, and that type of operational pattern is something that is very different than any of us have really seen before," he said.

That change in load shape, he added, has the potential to cause utilities lots of planning problems they aren't expecting.

Leidos recently completed a distributed generation guidebook for public power utilities, copies of which were provided to seminar attendees. ⚡

Efficiency upgrades from page 5

Contact John-Michael Cross at 202-662-1883 or Miguel Yanez at 202-662-1882 for more information. Also, the USDA has a toolkit and PowerPoint presentation with more details on the application process.

Clean Energy Works, another CEA partner, also offers assistance to rural cooperatives and public utilities. The nonprofit pioneered the Pay as You Save (PAYS) tariff, a voluntary, on-bill financing system. Roanoake Electric Cooperative in North Carolina recently piloted the program and other utilities are adopting PAYS as a model for future projects.

Spreading the word

CEA is eager to alert utilities serving the plains and western states to the opportunity EECLP represents. "This program is relatively new, so eligible utilities may not be aware yet that they have access to this great new tool for helping customers," Stark said. "We are working with EESI and Clean Energy Works to educate co-ops in this region on these and other upcoming opportunities."

The USDA presented a webinar on January 2015 giving an overview of the program. CEA and EESI followed up in April with a webinar on federal funding opportunities featuring

speakers from EESI and from the USDA Rural Energy for America Program.

Stark added that CEA is interested in partnering with generation-and-transmission cooperatives to let their member systems know about EECLP. "This is a great opportunity for rural co-ops to take member services to a whole new level," she declared.

Contact Clean Energy Ambassadors at 406-969-1040 to learn more about the Energy Efficiency Conservation Loan Program and how you or your member systems can get involved. ⚡

CUSTOMER NEEDS POINT WAY TO UTILITIES' FUTURE

In a serendipitous case of cyber call and response, an energy industry blog recently posed a question that should be nagging all power providers, and another offered an answer that could give utilities hope.

At the Solar Electric Power Association's Utility Solar Conference in May, Energy Efficiency Consultant Suzanne Shelton posted an essay titled "So why do I need my utility, exactly?". Discussions among conference attendees about how best to build, integrate and price solar power seemed to leave the customer's wishes entirely out of the equation. Coming on the heels of SolarCity/Tesla unveiling its Powerwall battery storage system, that approach struck Shelton as dangerously short-sighted. She conjectured that solar panel/battery storage combinations could become efficient and affordable enough in as little as five years to lead utility customers to ask themselves the question of her title.

Just two weeks later, "Listening for what matters to residential utility customers" appeared in *Intelligent Utility*. The article focused on motivating customers to make energy-efficiency upgrades, but its underlying theme applies equally to the threat of grid defection. To get a customer to replace an inefficient furnace or stay connected to the grid, you must listen to their concerns and offer solutions that address their needs.

Doing business in brave new world

Broadcast television and landline phones tied to homes and offices were once life-changing services that quickly became viewed as necessities. For the most part, people were satisfied with those services and trusted the few—sometimes, sole—providers. Although utilities still enjoy that kind of marketplace (for now), consumers live in a world that offers myriad options and custom plans for other services, and they are starting to cast a skeptical

eye toward their power providers.

A Shelton Group study found that 55 percent of consumers are less than satisfied with their utility, and would be open to other options. Tesla is only one of the private companies working on creating those options, and there are plenty of innovators in the energy-efficiency sector, too. It would take only a couple of breakthroughs to turn the much-discussed "utility death spiral" from a distant cloud on the horizon to a looming thunderhead.

The good news is that utilities still have time to get in front of the change curve. Both articles were optimistic about the new business opportunities awaiting utilities that are ready to look beyond the status quo of selling kilowatt-hours (kWh).

New model built on listening

Instead of seeing new technologies that save or generate energy as competition, utilities might consider how these systems meet customers' specific needs. The *Intelligent Utility* article offers insight on how to talk to residential customers about saving energy, drawn from a poll by energy and sustainability marketing firm KSV. Researchers found that different demographics have different motives for making home improvements, a point Shelton frequently makes. Whether it is saving money, controlling home systems, freedom from time-of-use rates or something else, the utility of the future may be one that designs and markets customized equipment and service packages that speak to customers' values.

All the points in the article are worth



taking time to read, but Point 5, where researchers asked people where they get advice on home improvements, has particular resonance. Only 1 percent turned to their electric utility company, and this is where Shelton sees the greatest opportunity.

Despite sometimes bumpy relations with their power providers, people are still confident that when they flip the switch, the light will come on and when they open the refrigerator, the food will be cold. She suggests that by combining their established reputation for reliability with a new menu of customized products and programs, utilities will be able to keep customers even when leaving the grid becomes easier.

According to KSV, listening for what matters among utility customers is the best way to figure out how to connect homeowners with the right messages to get them to make efficiency upgrades. It is also the key to building the trust necessary to long-term customer loyalty, something no technology can duplicate or replace. ⚡

FREE MANUAL LAYS OUT STEPS FOR SMART GRID IMPLEMENTATION

The International Energy Agency (IEA) has compiled a step-by-step guide to help transmission system stakeholders realize the benefits of the cutting-edge monitoring and management technologies collectively known as the smart grid. The *How2Guide for Smart Grids in Distribution Networks* is available, free of charge, from the IEA.

With meticulous planning, design and deployment, smart grids promise greater efficiency, increased integration of renewable energy sources and a resilient, flexible and secure electrical system, to name just a few substantial benefits. The new publication offers industry and government decision makers a roadmap for successful smart grid development based on case studies and specific experience gleaned from IEA workshops.

Despite their potential to address energy system challenges, smart grids are not quickly or easily developed. The guide shows how to avoid missteps by outlining four specific but adaptable phases:

- Planning and preparation
- Visioning
- Preparing the roadmap
- Implementation and monitoring

Each phase is divided into steps, both necessary and optional ones, for optimal deployment.

The manual also includes recommendations and frameworks for identifying stakeholders, conducting baseline research, determining drivers and appropriate projects to meet needs, identifying barriers and solutions and setting timelines and milestones for deployment.

According to IEA, smart grids can play a fundamental role in global efforts to move toward a more secure, sustainable and innovative energy future. The new *How2Guide* is one small part of IEA efforts to support that transition. ⚡



HOW²GUIDE
for

Smart Grids
*Roadmap Development
and Implementation*

 International Energy Agency
INTERNATIONAL LOW-CARBON ENERGY TECHNOLOGY PLATFORM