

Energy Efficiency at Fort Collins Utilities: A Role Model for Publicly-Owned Utilities



“Fort Collins Utilities has demonstrated that a small publicly-owned utility can implement highly effective energy efficiency programs that benefit its customers. Other publicly-owned utilities in Colorado should replicate what this utility has done.”

--Howard Geller, Executive Director, Southwest Energy Efficiency Project

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About SWEEP: The Southwest Energy Efficiency Project is a public interest organization that promotes energy efficiency in Arizona, Colorado, Nevada, New Mexico, Utah and Wyoming. For more information, visit www.swenergy.org.

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Executive Summary

Fort Collins Utilities is the leader in energy efficiency programs among municipal utilities in Colorado. Its highly successful efficiency portfolio has created the lowest cost electricity resource for the city over the last several years, and it has become a role model for other publicly-owned utilities in the state.

Located 60 miles north of Denver along the northern Front Range of the Rocky Mountains, Fort Collins is the fourth most populous city in Colorado. It is home to Colorado State University's main campus and a diverse group of businesses including some sizable high-tech manufacturers. Fort Collins Utilities (FCU) provides electricity, water, wastewater, stormwater and financing services to about 66,200 residential and business customers.

As of 2011, FCU's average electric rates are 8.6 cents per kWh for residential customers, 6.8 cents per kWh for commercial customers, and 5.1 cents per kWh for industrial customers. These rates are significantly below the state's averages and those of Xcel Energy, a large investor-owned utility serving the metro Denver area. In spite of its relatively low electric rates, FCU has made substantial progress in building a strong portfolio of energy efficiency programs resulting in significant savings over the last several years.

The utility's net savings from programs implemented during 2002-2011 total more than 83,000 MWh per year, nearly six percent of 2011 sales. As of 2011, the utility was helping its customers lower their electricity use by about 20,400 MWh per year, an amount that translates to 1.4 percent per year of its retail electric sales.¹ Net savings from programs FCU implemented over three years (2009-2011) were equal to three percent of sales as of 2011, while gross savings were closer to four percent of sales. FCU has achieved savings from its electric efficiency programs at an average cost of 3.8 cents per kWh over the last two years, significantly less than the average electricity price for any of its customer classes.

FCU's first formal efficiency plan (called demand-side management or DSM) budget was approved for 2004 after the City Council adopted an energy policy that included explicit

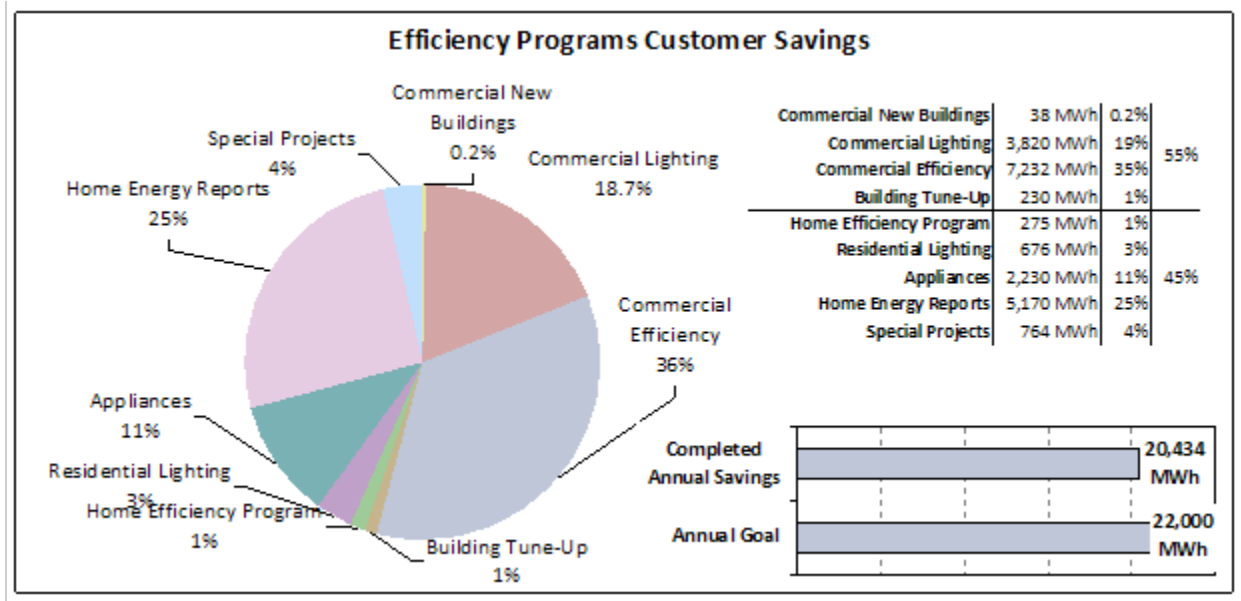
¹ Estimate is based on gross energy savings. Net savings were 1.0 percent per year, taking into consideration adjustments for estimated program free ridership (City of Fort Collins. 2012. Energy Policy – 2011 Annual Update). http://www.fcgov.com/utilities/img/site_specific/uploads/Energy_Policy_Annual_Update.pdf

efficiency goals. In 2009, the City Council adopted a revised energy policy that includes a goal of 1.5 percent savings from energy efficiency and conservation programs annually.² FCU is still working up to this goal.

FCU now implements a comprehensive set of programs to serve its residential, commercial and industrial customers. These programs provide solutions, such as technical assistance and incentives, that relate to every facet of energy use, including retrofit and remodel, new construction, equipment replacement, consumer products, and behavior change. FCU’s energy efficiency programs are shown in Figure 1 below and are described the report.

According to John Phelan, Energy Services Manager at FCU, Fort Collins is a role model in energy efficiency because of the leadership provided at many levels: an involved city council, a history of progressive public policies, and a well-educated community. The structure of the utility is another factor – a municipal utility can respond to the desires of the community more adeptly than an investor-owned utility.

Figure 1: FCU’s Energy Efficiency Programs and Energy Savings as of 2011³



² Ibid.

³ Savings are gross savings including estimated free riders. Source: Presentation by John Phelan at the SWEEP Annual Southwest Regional Energy Efficiency Workshop, November 2012. Available at: <http://swenergy.org/events/annual/2012/presentations/15%20Phelan.pdf>

Fort Collins Utilities has continued to enhance programs over the last decade to increase their effectiveness and reach in the community. The city's current portfolio offers most of the "best practice" programs recommended in SWEEP's recent report, *The \$20 Billion Bonanza: Best Practice Electric Utility Energy Efficiency Programs and Their Benefits in the Southwest*.⁴ As of 2010, the leading programs in terms of producing cost-effective energy savings were: 1) rebates for energy efficiency upgrades by businesses; 2) home energy reports; and 3) rebates for purchase of ENERGY STAR® appliances.

In addition to the existing offerings, FCU is developing several new initiatives:

- The utility is replacing all customer meters (electric and water) with **advanced meters** (also called "Smart Meters") by the second quarter of 2013 and creating more flexible demand response opportunities for residential, commercial and industrial customers. These new tools will help customers manage their home energy use via near real-time feedback to home computers and smart phones from advanced electric meters.
- A **pre-pay billing** option linked to the advanced meters, estimated to provide five to 15 percent electricity savings among households that voluntarily select this payment option. Studies have shown that customers save energy when they anticipate their rate of energy use, as is the case with pre-pay billing.⁵
- **Performance-based incentives for new commercial buildings**, founded on the Architecture 2030 Challenge targets, which apply the principles of high-performance design to achieve deep energy savings in new buildings.
- Streamlined **consumer product incentives**, in collaboration with other public utilities and major retailers.
- **Home energy reports** expanded beyond a successful pilot program to all residential customers of the utility.
- A **multi-family program** that will directly install low-cost energy and water efficiency measures and also provide incentives for a wide range of energy-saving measures in apartment buildings.

⁴ Geller, H. *The \$20 Billion Bonanza: Best Practice Utility Energy Efficiency Programs and Their Benefits for the Southwest*. Available at: <http://swenergy.org/programs/utilities/20BBonanza.htm>

⁵ S. Moore. "Prepaid Metering in North America." Itron White Paper, 2008.

http://www.metering.com/i/100925WP-01_Prepaid%20Metering_in_North%20America.pdf

See also, B. Neenan. "Paying Upfront: A Review of Salt River Project's M-Power Prepaid Program, EPRI Technical Update, October 2010. http://www.srpnet.com/environment/earthwise/pdfx/spp/EPRI_MPower.pdf

Energy Efficiency at Fort Collins Utilities: A Role Model for Publicly Owned Utilities

1. Background

Fort Collins Utilities (FCU) has demonstrated that a small community-based utility can implement effective energy efficiency initiatives and pass along significant benefits to its residents and businesses.

How has the city been so successful in achieving results from its efficiency programs? According to John Phelan, energy services manager at FCU, the effort has profited from leadership at many levels, including the city council, utility management, and favorable public policies such as the city's commitment to reduce greenhouse gas emissions. There is also a high level of environmental and quality-of-life consciousness among the residents of Fort Collins, which helps the utility attract participants to its efficiency programs.



*John Phelan, FCU Energy
Services Manager*

The city's leadership has evolved over time with a steady approach to implementing plans and programs for its customers. At the operational level, FCU staff members work hard to integrate energy efficiency services so customers have a seamless experience, such as encouraging customers interested in installing solar PV systems to also invest in cost-effective energy efficiency upgrades.

As of 2011, FCU served 58,600 residential customers and 7,600 businesses, generating \$99.7 million in revenues from electricity sales. In addition to providing electricity, FCU also provides, water, waste water, stormwater and financing services to its customers.

The utility's policies are determined by its general manager, Brian Janonis, and its governing board, the Fort Collins City Council. The Council, along with City and Utility leadership, recognizes that efficiency should be a cornerstone of long-term energy policy, including a carbon framework that enables the electric utility to develop programs based on best practices that also support natural gas efficiency.

History of Energy Efficiency at FCU

Utility-sponsored energy efficiency programs in the community date back to 1982, when the utility launched education and load management programs. Those early efforts led to modest results until 2004, when the city adopted its first formal budget for efficiency programs.

Official action to incorporate clean energy into Fort Collins' electricity supply began in 2003, when the City first adopted the Electric Energy Supply Policy.⁶ FCU staff, representatives on the citizens' electric board, and members of the City Council all wanted to pursue clean energy goals for their city. The policy resulted in the first explicit DSM funding for customer rebates. Total expenditures for FCU's energy efficiency programs grew from \$921,000 in 2004 to \$2.8 million as of 2011,⁷ including both FCU and Platte River Power Authority (PRPA) funding.

When City Manager Darin Atteberry came on board in 2004, he felt the city—and its utility—needed to be more visionary about aligning its sustainability goals with the community's desires and the reality of a world of diminishing resources. Dedicated to performance measurement, Atteberry championed what turned out to be a five-year process of carefully defining the city's sustainability future and goals. Over the next several years, efficiency programs flourished.

The City now has a set of efficiency goals using both a top-down inventory approach based on carbon emissions and a more traditional approach that estimates utility DSM savings. The carbon goals are to reduce electricity-related greenhouse gas emissions to 20 percent below 2005 levels by 2020. The DSM goals are to achieve savings from the portfolio of efficiency programs of 1.5 percent of the community's electricity use annually. Savings have increased substantially in recent years, and while FCU had not achieved this ambitious goal through 2012, Phelan expects that FCU will meet the goal in 2013 and in future years.

Today, FCU's Energy Services group of 10 employees oversees services and incentive processing to residential and business electric customers for energy efficiency, load management, renewable energy programs, and green building codes.

Platte River Power Authority Role

Fort Collins Utilities buys 100 percent of its electric power from PRPA, of which it is part-owner along with municipal utilities in Estes Park, Longmont and Loveland. In 2011, PRPA's supply was 68 percent coal, 26 percent hydropower, about four percent other renewable energy (mainly

⁶ City of Fort Collins Utilities, 2009 Energy Policy. Available at: http://www.fcgov.com/utilities/img/site_specific/uploads/energy-policy.pdf

⁷ Expenditures include FCU staff. Expenditures without staff were \$698,000 in 2004 and \$2.2 million in 2011.

wind), with the remainder coming from natural gas and open market purchases. While coal makes up the highest proportion of PRPA's fuel mix, its Rawhide power plant in nearby Wellington uses state-of-the-art scrubbing technologies and is currently ahead of federal emissions regulations.

PRPA began offering energy efficiency programs to customers of its member utilities in 2002. Since then, the efficiency program goals and budgets have grown considerably, and each of the municipalities assists to varying degrees with marketing, administering, and funding them. The municipalities also provide additional programs as directed by their city councils. The efficiency programs implemented by FCU are co-funded by PRPA and FCU, and this partnership is critical to the success of the programs.

Fort Collins Greenhouse Gas and Renewable Energy Goals

As part of its 2009 Energy Policy, the City of Fort Collins adopted Colorado's greenhouse gas reduction goals of 20 percent below 2005 emission levels by 2020 and 80 percent by 2050. The state also mandated that 10 percent of FCU's power supply must come from renewable energy sources by 2020. In 2009, the City updated its Energy Policy with a clear focus and explicit objectives related to energy efficiency and the previously adopted climate goals.

Greenhouse gas reduction was a particularly challenging goal because 100 percent of the city's power is purchased from Platte River Power Authority, and 68 percent of PRPA's electricity is sourced from coal-fired power plants. Coal fired power plants emit significant amounts of climate-warming carbon and even though PRPA's coal plants use advanced scrubbing technologies to curtail emissions, Fort Collins leaders knew the City would have to minimize its reliance upon fossil fueled power if it was to achieve its long-term greenhouse gas goals.

Fort Collins does not control its supplier's source of power but it held one ace: It owned its electric utility (the Fort Collins city council serves as the board of directors). A 2008 initiative, A Utility for the 21st Century, addressed the internal cultural shift required to fully align utility staff with the city's Energy and Climate Action Policies. Together, the initiative and policies drive the city's efforts for efficiency, conservation, and renewable and smart grid technologies, all of which will help meet the greenhouse gas reduction goals. Annual progress reports are shared with the community on the utility's website.

FCU first needed to transform its internal culture to align with the City's vision and goals. FCU hired an energy services manager in 2003 to develop and implement this vision. Energy efficiency programs and their impacts have grown steadily since then, and today the utility is far more innovative, customer service-oriented, and environmentally friendly than it was a decade ago.

Relationship with other Municipal Utilities

FCU has developed cooperative relationships with the other utilities that get their power from PRPA, most notably Loveland Water & Power, which has aligned its DSM program structure and incentives with FCU's. The two municipal utilities communicate regularly about what's working in their efficiency programs on issues related to design, planning and evaluation.

Both utilities co-sponsored the Net Zero Cities conference in October 2012, a two-day event highlighting the role that businesses and governments can play in lowering emissions. Both municipal utilities are also participating in Drive Electric Northern Colorado. This partnership, forged between the cities of Fort Collins and Loveland and Colorado State University, is supported by the Electrification Coalition, a not-for-profit organization that promotes the mass deployment of electric vehicles.⁸ The project will receive Coalition support for deployment of an electrified transportation system and help these communities to scale up adoption of electric vehicles.⁹

2. Energy Efficiency Programs for Residential Customers

FCU offers its residential customers a comprehensive set of services and incentives to encourage investments in energy efficient homes and consumer products. In addition to its flagship Home Efficiency program, FCU has also developed other innovative solutions – such as home energy reports and on-bill financing – that help customers make informed decisions and finance larger purchases.

Home Efficiency

In 2010, FCU launched the Home Efficiency Program, a comprehensive residential efficiency program for existing homes. In addition to offering incentives for efficiency upgrades,¹⁰ the utility developed a set of “best practice” installation standards, and provides training and mentoring for contractors as well as quality assurance for project installations. About 45 contractors are participating in the program, conducting 50-60 audits per month and completing 20-30 projects per month. At the current rate of market penetration, FCU will help complete about 600 audits, reaching about one percent of residential customers.

⁸ <http://www.electrificationcoalition.org/about>

⁹ Northern Colorado Business Report, February 18, 2013, <http://www.ncbr.com/article/20130218/NEWS/130219925>

¹⁰ Eligible measures include insulation, air sealing, duct sealing, high efficiency windows, and high-performance HVAC equipment.

FCU's Home Efficiency Program saves electricity as well as natural gas. Many residential customers have gas space and water heating, so treating the house shell leads to winter savings in gas. But summer electricity savings are possible if the customer has air conditioning. FCU has flipped from having peak electric demand in the winter to having peak demand in the summer, partly due to warmer summer temperatures and partly due to the increase in households with air conditioning. Twenty years ago, about 20 percent of customers had room or central air conditioning; today about 70 percent have it.

On-Bill Financing

In 2012, on-bill financing was added to FCU's suite of customer services, with loans up to \$15,000 for residential customers investing in efficiency or solar upgrades. The utility is working with a third party, Energy Smart Partners, to administer the loan program. The term depends on the loan amount: loans up to \$2,500 have a term of 5 years; loans between \$2,500 and \$7,500 have a 7-year term; and loans between \$7,500 and \$15,000 have a 10-year term. The loans offer interest rates of five to seven percent, are secured by being recorded with Larimer County, and are due when the house is sold if not paid off before that time.

Home Energy Reports

Since 2009, FCU has been working on a pilot program with OPower, a software company that partners with utilities to provide homeowners with periodic "home energy reports" that compare their energy use with nearby similar homes. The reports also provide energy saving tips that are tailored to each household. This type of program has resulted in average electricity savings between 1.5 and 3.5 percent across the country over the last several years.¹¹ While the resulting average savings of 2.5 percent may seem modest, the program reaches a large number of customers, so energy savings add up and are cost-effective. During the pilot, FCU compared 25,000 recipients of Opower reports with a control group of 15,000 customers. Based on excellent results so far, the utility is scaling up in 2013 to expand delivery of home energy reports to all of its residential customers.

¹¹ *Social Norms and Energy Conservation* by Hunt Alcott, issued in *Journal of Public Economics*, September 2011, http://opower.com/uploads/library/file/1/allcott_2011_jpubec_-_social_norms_and_energy_conservation.pdf
See also: *Puget Sound Energy's Home Energy Reports Program - 20 Month Impact Evaluation*, DNV-KEMA, October 2012, <https://conduitnw.org/layouts/Conduit/FileHandler.ashx?RID=849>

Other Residential Programs

Other residential programs in FCU's efficiency portfolio include support for water efficiency and renewable energy systems as well as energy efficiency:

- Residential customers can get in-store discounts on **new lighting** technologies (such as LEDs, specialty CFLs and dimmers) at participating national and local retailers.
- Support for **NoCO ENERGY STAR® Homes**, a northern Colorado collaborative supporting the ENERGY STAR standard for new homes.
- **Appliance rebates** are available for ENERGY STAR® qualified clothes washers and dishwashers.
- Through its **refrigerator and freezer recycling** program, the utility provides a rebate and will pick up and recycle working but older, inefficient refrigerators and freezers.
- As a dual electric/water utility, FCU also offers its customers **audits and rebates for water-saving equipment** for toilets and sprinkler systems, and provides community education on xeriscaping.
- A **load management** program for residential customers offers participants a four dollar monthly bill credit from May through September. The utility installs a control unit on water heaters and/or air conditioning units and limits use of those appliances during utility system peak periods (hot afternoons).

3. Energy Efficiency Programs for Commercial and Industrial Customers

FCU offers a comprehensive set of services and incentives for commercial and industrial customers, and the utility continues to adjust the program to encourage participation and enhance outcomes. Offerings include:

- **Business Efficiency Assessments** – technical assessments and recommendations for energy and water efficiency upgrades that are prioritized for cost-effectiveness
- **Business Efficiency Rebates** – rebates for efficiency improvements to existing buildings and facilities for both energy and water. Rebates cover lighting, HVAC systems, office equipment, information technology, food service, and custom options.
- **Building Tune-up** – technical and financial support to identify and implement low-cost energy and water efficiency improvements to existing equipment, such as adjusting

timers and other energy control systems. There are options for all sizes and types of commercial buildings.

- **Integrated Design Assistance** – technical and financial support for new construction, additions and large-scale renovations. FCU is modifying this program to standardize what has been a custom approach by providing design support and performance-based incentives based on energy saved per square foot per year for different types of buildings. FCU is currently piloting this new approach with the Poudre School District. The comprehensive approach includes diagnostic blower door tests on large high school buildings, as well as upgrades that help reduce energy loads and allow downsizing of HVAC equipment.
- **Efficiency Challenge** – FCU has developed the Efficiency Challenge to engage employees of local businesses (large and small) and inspire behavioral changes resulting in energy and water efficiency. So far, about 10 businesses have participated, and the program has gotten good reviews. The program is expected to expand, with a focus on measurement and verification of results.

Commercial Program Challenges

Since 2011, FCU's commercial program has faced a shortage of qualified contractors to promote and fulfill lighting retrofit projects in the Fort Collins area. This is due partly to a recession-induced trend towards smaller projects in the last few years and partly to competing programs with higher incentives (for example, Xcel's program includes a bonus for contractors who complete energy efficiency projects). The disparity in incentives impacted the local market and FCU's program results, and 2011 results for commercial programs are down compared to 2010. Since mid-2012, the utility now offers a competitive 50 percent lighting rebate bonus to contractors for commercial installations.

4. Other Clean Energy Initiatives

In addition to traditional programs that help customers reduce their energy use, the City of Fort Collins has branched out into other collaborations that are part of a larger clean energy framework. These innovative efforts are designed to help businesses become more sustainable, require efficient construction through local building codes, and support the development of solar energy systems for homes, businesses and the community.

Green Building Codes

FCU managed a stakeholder process for the “greening” of residential and commercial building codes that resulted in the city adopting a set of green building code amendments in 2011.¹² The stakeholder group reviewed standards, developed specific amendments to local building codes, decided on basic components for all buildings, and established which elements the city can enforce. As an example of innovation in the new codes, commissioning and prescriptive building air-leakage testing are now required for new commercial buildings of 15,000 square feet and larger.

The City of Fort Collins is now in the process of reviewing its building energy codes and is considering adopting the 2012 International Building Code (IBC) which includes the International Energy Conservation Code . FCU is providing support for this effort. The green building amendments adopted in 2011 will be reviewed and compared to the new IBC.

FCU also supports the construction industry by providing technical assistance on local building code requirements for homes and businesses. The utility trains builders and HVAC and insulation contractors. In collaboration with the Fort Collins building department, FCU supports design review and field-testing of new buildings.

Efficiency Supports Economic Development

In an innovative collaboration that marries incentives for energy efficiency with economic development, the City of Fort Collins and its utility are bringing new companies and jobs to the community. In 2010, Avago (formerly Agilent Technologies) faced either onsite expansion or relocation. Tiana Smith, FCU’s Commercial and Industrial Accounts Manager, helped to develop an overall economic incentive package that included targeted efficiency funding totaling \$170,000. The Avago expansion added more than 90 new local jobs. The company has since committed to additional expansion of its wafer fabrication facilities in Fort Collins, bringing those manufacturing processes and jobs back home from facilities that are currently in Asia.

In another example, Joanne Holmes, commercial property manager for Carrington Company, manages a 63,000 square foot office building in Fort Collins’ Oak Ridge Business Park. In 2012, she faced losing the building’s major tenant, a federal agency whose lease renewal was tied to federal requirements for building efficiency. With FCU’s technical assistance and rebates, Carrington embarked upon a \$1 million upgrade of lighting, heating and air conditioning, and plumbing that will transform the 1988 building to LEED Silver certification—and keep the federal tenant.

¹² “Fort Collins Building Code Green Amendments: Overview.” Available at: http://www.fcgov.com/utilities/img/site_specific/uploads/GBP_Overview_Summary_2011-03-29.pdf

ClimateWise

The City of Fort Collins also developed ClimateWise, an award-winning program that supports more than 350 businesses to voluntarily reduce greenhouse gas emissions through waste reduction, energy efficiency, water conservation, and transportation reduction. Business partners are recognized by partnership levels — bronze through platinum — based on the rigor of their environmental initiatives per specific goals and milestones. The program provides on-going support through technical assistance seminars, tools and resources, and employee education. Partners in the program have avoided 887,000 tons of CO₂ emissions and saved \$59 million cumulatively since the program's inception in 2000.¹³

Solar

Incentives are available for small-scale solar photovoltaic systems, which also qualify for on-bill financing. FCU offers net metering to customers who install small renewable energy systems at their homes or businesses. Net metering pays customers for excess renewable energy generated but not needed on site, which is fed back into the electric grid for use elsewhere. Customers can also buy Green-e certified renewable energy through the voluntary Green Energy program for an additional cost of 2.4 cents per kWh.

The City is also developing two new solar initiatives. A feed-in tariff will enable the utility to purchase electricity at a fixed price from large-scale, customer-sited photovoltaic systems totaling about five megawatts. Also, a community "Solar Garden" will allow residents to buy a share in an off-site solar facility. The energy output of the shares is credited to participants' accounts and reduces their electricity bills. Solar Gardens are a good option for renters, homeowners with shady lots, and open space landowners who can't build their own solar systems.

FortZED

FortZED (for "Zero Energy District") is a community-driven initiative to create in Fort Collins one of the world's largest net zero energy districts. FortZED offers many benefits to the community and region: It supports a progressive utility; fosters local innovation, entrepreneurship, economic health; supports climate change mitigation; and supports local energy technology companies.

FortZED was developed in 2007 by the UniverCity Connections (UCC) Sustainable Energy Taskforce. The FortZED initiative evolved from the UCC taskforce to become a three-way

¹³ For more information, visit: www.fcgov.com/climatewise.

collaboration between UCC, the City of Fort Collins and the Colorado Clean Energy Cluster from 2007-2012. The non-profit Colorado Clean Energy Cluster was launched to attract clean energy companies to Fort Collins and works to incubate and grow those companies through collaborative initiatives such as FortZED.

The mission of FortZED is to transform the downtown area of Fort Collins and the main campus of Colorado State University (CSU) into a net zero energy district by significantly reducing the amount of energy used and generating enough renewable energy locally to offset the remainder used on an annual basis. For FortZED, public and private cooperation is a key to success. The FortZED initiative has a long-standing history of collaboration and partnership with a diverse group of regional and international organizations, private enterprise, public organizations, and passionate individuals.

The FortZED district encompasses about two square miles that includes an historic commercial district in downtown Fort Collins and the CSU campus. While the district is a small portion of the city, it represents 10-15 percent of the electric distribution system, 45 Megawatts (MW) of peak demand, and includes about 7,200 residential and commercial customers.

FortZED strategies and objectives support the Energy Policy and other related FCU programs and projects, as well as the City's Climate Action Plan. FortZED is referenced in Plan Fort Collins as a catalyst project. The public-private partnership between public and private organizations leverages research and development, piloting of new technology, community engagement and economic health.

The FortZED initiative received \$6.3 million in funding from the U. S. Department of Energy, along with local matching funds of \$5.1 million in 2009 to jump-start the demonstration of innovative smart grid technologies.

What developed is a cooperative system that works like this: On a hot summer day when air conditioners are sucking large amounts of electricity from the grid, the county courthouse will turn off its large courtyard fountain, the university may fire up its emergency natural gas generators (the generators are required to be fired up for 20-hour test runs every month anyway), and the city's iconic New Belgium Brewery will switch its bottling line to onsite renewable power. The project has demonstrated how these resources can operate seamlessly with the traditional utility grid.

One part of FortZED didn't work so well. Called the Community Energy Challenge, the initiative asked customers to pledge to reduce energy use with easy, medium and hard tactics by using

existing utility programs for energy efficiency and conservation. The grassroots effort included a neighborhood competition. Over two years, FortZED received more than 2,000 pledges, but without a robust data collection plan it could not document measurable savings. Organizers are working to ensure that pledges lead to demonstrable action and energy savings in the future.

FortZED led to an invitation to join Rocky Mountain Institute's eLab (Electricity Innovation Lab), which brings together a diverse group of innovators from throughout the electric utility sector. With eLab, Fort Collins now is part of a larger team of stakeholders who are in the race and learning together, piece by piece, how the "distributed" power generation system of the future will work. eLab will contribute to the next generation of innovation, dubbed FortZED 2.0, which will explore – beyond efficiency – how utilities will meet the remaining demand for electricity with a dynamic, integrated energy demand system. This visionary project will help prove the concepts, pathways and technologies to achieve both the carbon reduction and energy goals established by the City Council.

5. Programs under Development

FCU's energy efficiency planning group has adopted new technologies that open up opportunities for new programs:

- **Multifamily program** – Multifamily (apartment) buildings sit between residential and commercial markets, creating unique challenges. Most are master-metered for water but individually metered for electricity, which adds to the challenge of providing efficient and effective services and incentives. The split in costs and benefits between renters and owners is also a barrier. The utility is planning a program with comprehensive measures for common areas, including insulation, window replacements, and HVAC upgrades. It is also coordinating energy efficiency and water conservation efforts by supporting direct installation of low-cost measures such as efficient lighting, low-flush toilets, low-flow showerheads and faucet aerators, and programmable thermostats in individual apartments.
- FCU is using **new tools to improve program outreach and evaluation**. The utility is adopting an integrated database that combines utility billing records, property records, weather data and demographic information to create a powerful tool. It is being used to provide targeted outreach through market segmentation and automated, weather normalized program evaluation.

- **Advanced meters** (also called Smart Meters) are being installed throughout Fort Collins, with completion planned by June 2013. The new meters for both electricity and water will provide two-way communication between homeowners and the utility. Beyond the basics of automated meter reading, the system provides the infrastructure for new rate and payment options, customer feedback on the web and in the home, mobile applications, and expanded demand response opportunities. The U.S. Department of Energy provided half of the funds to support the meter conversions for electric meters. The city issued bonds to cover 50% of electric and the full cost of water meter conversions.



In the future, a customer will be able to receive an email or text from the utility on a hot summer day, offering discounts or incentives if the customer will adjust the temperature upward on their air conditioner or downward on their electric hot water heater. The utility saves money because it doesn't have to buy electricity at peak power prices. The new meters and integrated web tools will provide detailed electricity and water usage information, which will help customers manage both their use and bills.

Electric Vehicle (EV) Deployment Project

Fort Collins was selected in a national evaluation process by the Electrification Coalition as a deployment community for mass-scale electric vehicles. Based in Washington, D.C., the Electrification Coalition is a nonpartisan, nonprofit group of business leaders committed to the deployment of electric vehicles on a mass scale. As a selected community, Fort Collins will be one of the first in the country to develop all aspects of the electric vehicle infrastructure in a coordinated effort to increase adoption of electric vehicles by consumers and commercial fleet managers in the region within the next few years.

One critical piece of the project is ensuring that FCU has enough electric capacity to add EVs to the system. One EV uses 3,000 to 4,000 kWh per year, increasing the average electricity use of a household by up to 50 percent. But it will take very high adoption rates to challenge FCU's existing infrastructure, and if FCU sees those rates coming on, there will be enough time to adjust. On the flip side, an EV may feed electricity back into the power grid in the future.

Other pieces of the system that Fort Collins will develop include building code standards for public and home charging stations, marketing the benefits of EV ownership, and creating awareness of state and federal incentives that make the cars affordable.

6. Results

FCU achieved net energy savings of more than 83,000 MWh in 2011, nearly six percent of 2011 sales, as result of energy efficiency programs implemented during 2002-2011. This is equivalent to the electricity use of nearly 10,000 typical households in Fort Collins. As of 2011, the utility was helping its customers lower their electricity use by about 20,400 MWh per year based on gross savings, an amount that translates to 1.4 percent per year of its retail electric sales (see Table 1). Net savings from programs FCU implemented over three years (2009-2011) were equal to three percent of sales as of 2011, while gross savings were closer to four percent of sales. Net savings do not include efficiency measures that would likely have been installed in the absence of the utility's programs. Gross energy savings, counting all measures that were installed, are about 20-40 percent greater than net savings.

Table 1: Fort Collins Utilities DSM Programs, Budgets, and Outcomes (2011)

Program	2011 Budget (\$1,000)¹⁴	First Year Customer Gross Energy Savings (MWh)	First Year Net Utility Savings (MWh)	Cost of Saved Energy (cents per kWh levelized)
Commercial Lighting	716	3,624	3,159	2.3
Commercial Efficiency	135	3,949	3,443	0.4
Commercial New Buildings	122	38	35	24.6
Building Tune-Up	92	230	201	4.7
ClimateWise	75	3,480	397	1.9
Home Efficiency	460	275	253	12.8
Home Energy Reports	250	5,170	5,303	4.7
Refrigerator Recycling	205	1,941	1,055	2.8
Residential Lighting	83	676	554	2.4
Appliance Rebates	65	288	237	1.9-6.5
Special Projects	52	764	627	1.3
TOTAL	2,128	20,434	15,264	3.8

Investing in energy efficiency is the least cost, safest and cleanest energy resource available to FCU and PRPA. In 2010-11, FCU achieved energy savings through its electric efficiency programs at an average cost of 3.8 cents per kWh. When compared to the utility's average retail price of 8.6 cents per kWh, it is clear that FCU's energy efficiency programs benefit all Fort Collins citizens by keeping electricity prices lower. Assuming energy efficiency measures have a 10 year lifetime on average, households and businesses in Fort Collins will save around \$57 million on their electric bills as a result of energy efficiency programs implemented by FCU during 2002-

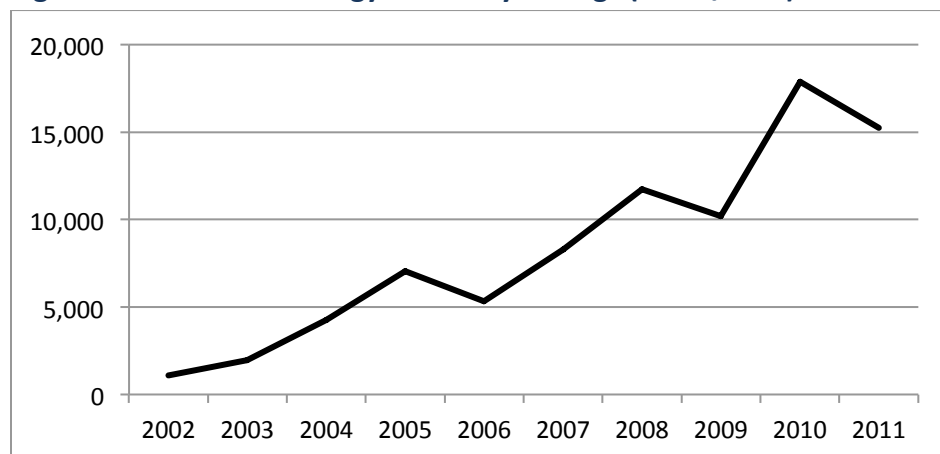
¹⁴ The totals include contributions from both FCU and PRPA.

2011.¹⁵ And the energy and cost savings increase every year as more households and businesses participate in FCU's programs.

In addition to the economic benefits, FCU's energy efficiency programs are reducing pollutant emissions by PRPA, the wholesale power provider to the utility. As of 2011, PRPA cut its cumulative greenhouse gas emissions by around 54,000 tons due to FCU's efficiency programs. In addition, PRPA is reducing emissions of sulfur dioxide, nitrogen oxides, mercury and other pollutants, thereby improving public health in the northern Colorado region.

Figures 2-4 below show the progress FCU has made over the last 10 years in terms of net annual savings (Figure 2), net cumulative savings (Figure 3) and net annual savings as a percentage of retail sales (Figure 4). Savings exclude estimated "free riders" (i.e., those customers who would have purchased and installed energy efficiency measures in the absence of the utility's programs). Net savings of 1.0-1.2 percent of total retail sales (in kWh) per year (Figure 4) is comparable to the performance of Xcel Energy's energy efficiency programs in Colorado. These savings drive annual emissions reductions of 54,000 tons of carbon dioxide. Efficiency programs generated more than \$15 million in local economic benefits in 2011 through reduced utility bills, incentives, leveraged investment, and indirect activity.¹⁶

Figure 2: Net Annual Energy Efficiency Savings (MWh/Year)



¹⁵ This estimate is based on the average retail electricity price in 2011, 6.89 cents per kWh.

¹⁶ This estimate includes savings from measures installed in prior years' programs that were realized in 2011, based on expected measure lifetimes.

Figure 3: Net Cumulative Energy Efficiency Savings (MWh)

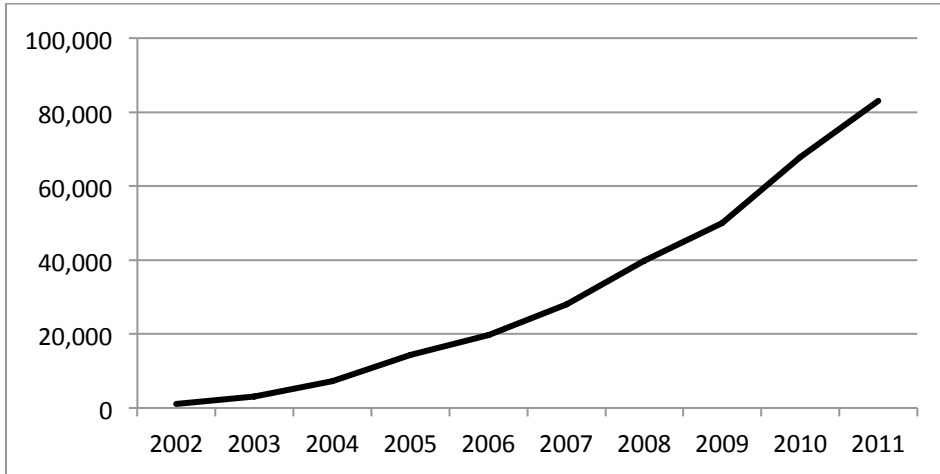
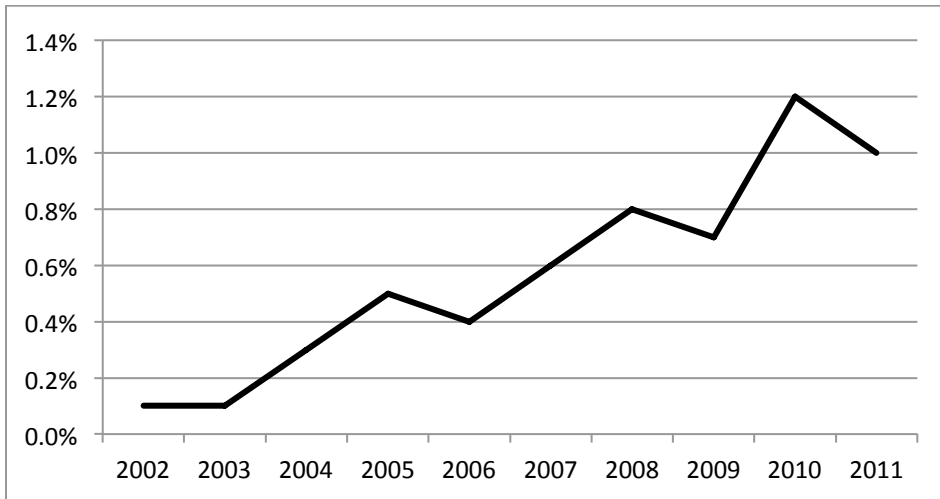


Figure 4: Net Annual Energy Efficiency Savings (% of Retail Sales)



7. Conclusion

Fort Collins Utilities has demonstrated that a small community-based utility can implement comprehensive and effective energy efficiency programs that generate significant economic and environmental benefits for the households and businesses served and for the community as a whole.

The Fort Collins City Council has established for its electric utility an ambitious goal of saving 1.5 percent per year (as a fraction of total kWh sold). FCU is well on its way towards meeting this goal, with cumulative net savings of three percent (and gross savings of over four percent) over the past three years. Total cumulative savings over the last decade exceed 83,000 MWh, which is enough energy to power nearly 10,000 homes in Fort Collins.

FCU is a leader in energy efficiency among municipal utilities. While the utility is small relative to others, its efficiency programs are outperforming most municipal and many investor-owned utilities in the Southwest and nationally.¹⁷ Throughout the history of its efficiency team, the utility has proven a dedication to innovative planning, creative partnering and effective implementation that has achieved substantial energy, environmental and social goals.

¹⁷ Inaugural Energy Efficiency Benchmarking Report, Large Public Power Council, Energy Efficiency Working Group, June 2012 shows that Fort Collins compares favorably to Colorado Springs Utilities and Salt River Project, two public utilities studied by the LPPC.

References

- City of Fort Collins. 2012. **Energy Policy – 2011 Annual Update**.
http://www.fcgov.com/utilities/img/site_specific/uploads/Energy_Policy_Annual_Update.pdf
- City of Fort Collins. 2011. **Energy Policy – 2010 Annual Update**.
- City of Fort Collins. 2010. **Energy Policy – 2009 Annual Update**.
- City of Fort Collins. 2008. **Utilities for the 21st Century and Energy Policy Annual Update**.
- Large Public Power Council, Energy Efficiency Working Group. 2012. **Inaugural Energy Efficiency Benchmarking Report**.
- Freischlag, K. 2012. **Municipal Utility Energy Efficiency Programs: Leading Lights**.
<http://www.swenergy.org/publications/documents/Municipal%20Utility%20Energy%20Efficiency%20Programs%20-%20Leading%20Lights.pdf>
- Geller, H. 2012. **The \$20 Billion Bonanza: Best Practice Utility Energy Efficiency Programs and Their Benefits for the Southwest**. <http://swenergy.org/programs/utilities/20BBonanza.htm>
- Martel, J.C. 2011. **A Review of Residential Retrofit Programs Offered in the Southwest**.
http://www.swenergy.org/publications/documents/Review_of_Residential_Retrofit_Programs_in_SW.pdf
- Moore, S. 2008. **Prepaid Metering in North America**. Itron White Paper.
http://www.metering.com/i/100925WP-01_Prepaid%20Metering_in_North%20America.pdf
- Neenan, B. 2010. **Paying Upfront: A Review of Salt River Project's M-Power Prepaid Program**, EPRI Technical Update.
http://www.srpnet.com/environment/earthwise/pdfx/spp/EPRI_MPower.pdf
- Phelan, J. 2012. **Next Generation Information Feedback and Behavior Change Programs**, Presentation at SWEEP 2012 Annual Workshop.
<http://swenergy.org/events/annual/2012/presentations/15%20Phelan.pdf>
- Platte River Power Authority. 2011. **2012 Integrated Resource Plan**.
<http://www.prpa.org/sources/i/irp.pdf>