

Fort Collins Utilities: A Municipal Utility Leading Innovation

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ABSTRACT

Fort Collins Utilities (FCU) has proven itself a clean energy role model and bellwether among public utilities over the last decade, demonstrating that a small community-based utility can implement comprehensive energy efficiency programs that generate significant economic and environmental benefits. FCU has a history of innovative planning, creative partnering and effective execution, and recent initiatives put FCU at the leading edge of policy implementation.

In 2012, FCU began a collaboration with the Rocky Mountain Institute (RMI), leading to the development of a pilot business model that will offer opt-out efficiency and renewable energy choices at scale within the City. The pilot is scheduled to roll out in early 2015. Other recent initiatives include advanced metering, performance-based incentives for new construction and deep retrofits, a solar feed-in-tariff, integration of marketing segmentation and targeting tools, and the FortZED initiative, a smart energy test bed that aims to dramatically scale participation and results within the City.

FCU provides efficiency solutions for nearly every facet of energy and water use across all customer classes, and has built a strong portfolio of efficiency programs, resulting in net utility savings from 2002-2013 of more than 101,000 MWh per year. Its 2013 annual savings represented 2.2 percent of its retail electric sales on a gross customer basis, or 1.9 percent on a net utility basis, achieved at an average cost of 2.0 cents per kWh.

History of Energy Efficiency at Fort Collins Utilities

Located sixty 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 high-tech manufacturers and a thriving brewing hub. Fort Collins Utilities provides electricity, water, wastewater, storm water and financing services to about 58,600 residential customers and 7,600 businesses, generating \$114 million in revenue from electricity sales in 2013.

FCU's average electric rates are 9.5 cents per kWh for residential customers, 7.7 cents per kWh for commercial customers, and 6.0 cents per kWh for industrial customers. FCU has made substantial progress in building a strong portfolio of efficiency programs resulting in significant savings over the last several years, even with a history of relatively low electric rates.

Utility-sponsored energy efficiency programs in Fort Collins date back to 1982, when FCU launched education and load management programs. Official action to incorporate efficiency as a clean electricity supply began in 2003, when the City adopted the Electric Energy Supply Policy (City of Fort Collins 2009). FCU staff, the citizens' electric board, and members of the City Council all wanted to pursue clean energy goals for their city. The policy resulted in a

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commitment to fund demand side management (DSM) customer rebates, and FCU's first formal DSM plan budget was approved for 2004.

Fort Collins is graced with a confluence of favorable circumstances that has created a nearly ideal environment for energy efficiency to flourish. The leaders in the City and FCU recognize that efficiency should be a cornerstone of a long-term energy policy that incorporates a carbon framework and a commitment to reduce greenhouse gas emissions. The city's policies have enabled FCU to develop electric and gas programs based on building science and best practices, and to continue innovating around business models, infrastructure investments and market adoption. At an operational level, FCU staff members work to integrate energy and water services, such as providing comprehensive residential and business assessments that cover electric, gas, water and renewable energy opportunities. The residents of Fort Collins can also be credited with a high level of environmental and quality-of-life consciousness, which helps the utility attract participants to its efficiency programs (Quaid, Pletcher, and Geller 2013).

As a result of these favorable conditions, Fort Collins has made significant progress. In 2009, the City Council adopted a revised energy policy that aligned the City's goals with Colorado's greenhouse gas reduction goals of 20 percent below 2005 emission levels by 2020, and 80 percent by 2050 (City of Fort Collins 2010). The policy also established DSM portfolio customer gross savings goals of 1.5 percent of the community's electricity use annually (as a fraction of total retail sales). FCU met this goal as of 2012. Total expenditures for FCU's energy efficiency programs grew from \$921,000 in 2004 to \$3.8 million in 2013.

One hundred percent of the City's electricity is purchased from Platte River Power Authority (Platte River). FCU collaborates closely with Platte River, a joint action agency that provides generation and transmission services to Fort Collins and three other Front Range communities. While 68 percent of Platte River's electricity comes from coal-fired power plants, the agency has installed advanced scrubbing technologies to curtail emissions, and has also provided funding and program administration support for FCU's efficiency programs since 2002. Numerous program models have migrated from Fort Collins pilots to full implementation by FCU and then to Platte River implementation across the region (Platte River Power Authority 2011).

Fort Collins Utilities leadership recognized that a strong focus on efficiency would require building internal support and understanding. A 2008 initiative, Utilities for the 21st Century (City of Fort Collins 2009), addressed the internal cultural shift required to fully align utility staff with the city's energy and climate action policies. Most recently, Fort Collins City Council directed staff to bring a revised Climate Action Plan for consideration based on accelerating the community goals by two decades, an 80% reduction below 2005 by 2030. Together, the initiative and policies have helped to drive the city's efforts for efficiency, conservation, renewable and smart grid technologies, all of which will contribute to meeting the ambitious greenhouse gas reduction goals.

Fort Collins Utilities' DSM Portfolio

As of 2013, the utility was helping its customers lower their electricity use by about 32,500 MWh per year, an amount that translates to 2.2 percent per year of FCU's retail electric sales. Net utility savings from programs implemented from 2002 to 2013 were equal to 8.8 percent of sales. FCU has achieved savings from its electric efficiency programs at an average

cost of 3.0 cents per kWh over the last five years, significantly less than the wholesale electricity price.

FCU administers a comprehensive set of programs to serve its residential, commercial and industrial customers. These programs provide technical assistance and incentives for retrofit and remodel, new construction, equipment replacement, consumer products, and behavior change. Fort Collins Utilities strives for continuous enhancement of programs to increase their effectiveness and reach in the community. The city's current portfolio offers nearly all of the programs recommended in a report by the Southwest Energy Efficiency Project on DSM program best practices in the southwestern U.S. (Geller 2012).

Households and businesses in Fort Collins will save over \$11.2 million on their electric bills this year as a result of energy efficiency programs implemented by FCU during 2002-2013. FCU has served over 40% of its business customers through efficiency projects, driving over 55% of the total savings. Residential audit and improvement programs have reached over 6% of the customer base so far, while appliance and lighting programs have served approximately one third of households and Home Energy Reports nearly 90% of households. These savings also drive annual emissions reductions of over 120,000 metric tons of carbon dioxide while generating over \$31 million in local economic benefits in 2014 through reduced utility bills, incentives, leveraged investment, and indirect activity (City of Fort Collins 2009; 2010; 2011; 2012b).

FCU's 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 programs to encourage participation and enhance outcomes. In January 2014, Fort Collins helped launch a regional program for business efficiency with Platte River Power Authority and the three other member cities. Called Efficiency Works, it brings together a comprehensive set of business efficiency programs and services under one brand, making it easier for customers and trade allies to participate. Efficiency Works offers the following services and incentives:

Assessments. FCU offers free technical assessments and recommendations for energy and water efficiency upgrades that are prioritized for cost-effectiveness.

Incentives. Rebates are available for efficiency improvements to existing buildings and facilities for both energy and water that cover lighting, HVAC systems, office equipment, information technology, food service, and custom options.

Building tune-ups. FCU provides 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. FCU offers technical and financial support for new construction, additions, large-scale renovations and deep retrofits. FCU modified the structure of this program in late 2012 to align the design targets with the Architecture 2030 Challenge and to provide

performance-based incentives. With separate incentives for the design team and owner at three stages, design, construction and operation, this program rewards actual performance of the occupied and operational building.

Efficiency challenge. This program engages employees at local businesses to inspire behavioral changes resulting in energy and water efficiency.

FCU's Energy Efficiency Programs for Residential Customers

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, 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, doing 50-60 audits and completing 20-30 projects per month. At the current rate of market penetration, FCU will reach about one percent of its residential customers and complete 600 audits each year.

FCU's Home Efficiency Program started from a premise of "what houses need", best practices and carbon emissions reductions. As a result, it is fuel neutral and targets natural gas as well as electricity. Most residential customers have gas space heat, and FCU has been able to measure both electric and gas savings from improving the house shell. Rebates even extend to gas water heating, both as a savings measure and to help mitigate potential health and safety issues with combustion safety testing. Program savings are measured using weather-normalized pre and post billing data analysis, with the project data updated quarterly.² In late 2014, this program will be shifting to a regional approach with Platte River and the other member cities under the Efficiency Works brand.

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 is flexible, with customers able to choose five, seven or ten years. The loans have interest rates of 5 or 6 percent depending on credit score, are secured by being recorded with Larimer County, and are due when the house is sold if not paid off before that time. Participation has been slow in the first sixteen months, with nine closed loans and several pending. FCU intends to revise the interest rate lower for implementation in 2015.

Home energy reports. Since 2009, FCU has been working with OPower, a software company that partners with utilities to provide homeowners periodic home energy reports that compare their energy use with nearby homes of similar heat type and square footage. 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 (Alcott 2011; DNV-KEMA 2012). While the resulting average savings of 2.5 percent may seem modest, the program reaches a large number of customers, so the resulting outcome is

² Measurement and evaluation methodology is based on the International Performance Measurement and Verification Protocol, Option C (IPMVP 2002).

significant and cost-effective with a cost of conserved energy of 3.0 cents per kilowatt-hour. The utility started with 25,000 participants (and a control group of 15,000 customers used to measure the net impacts of the home energy reports). Based on the results of the first three years, FCU decided to move to a “reports for all” model and send reports to all residential customers in 2013. Savings estimates are now derived from a regression model based on results from the first three years of program operations (Phelan 2012).

Consumer products. Since 2005, FCU has been working with local and national retailers to provide incentives for the purchase of efficient consumer products. Incentives have primarily been mail-in rebates for larger purchase price products and reduced pricing for lighting products. In 2005, FCU was able to piggyback on the Northeast ENERGY STAR® Products Initiative (U.S. EPA 2014), resulting in the ability to provide register mark-downs for a wide range of compact fluorescent light bulbs. While many utilities continue to support standard CFL lighting with DSM funds, FCU decided to eliminate rebates for standard CFLs in 2010 based on the availability, quality and pricing of products without subsidies. Current consumer products with incentives include clothes washers, dish washers, LED bulbs and fixtures, specialty CFL bulbs, and lighting controls. FCU has provided a refrigerator and freezer recycling program since 2004. The program model varied in the first few years as FCU sought a balance between providing in-house implementation versus using a third party. Since the beginning of the program, FCU has recycled over 7,000 units in compliance with the Environmental Protection Agency (EPA) Responsible Appliance Disposal program.

Other Residential Programs

- Support for NoCO ENERGY STAR® Homes, a northern Colorado collaborative supporting the ENERGY STAR standard for new homes.
- As an integrated 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 \$4 monthly bill credit for control of electric water heaters and air conditioning units during system peak periods.
- A low-income direct install program, which is a collaboration with the Larimer County Conservation Corp, Platte River and a neighboring community. The program directly installs low-cost energy and water efficiency measures while providing job training and experience to young adults in the energy efficiency field.
- A multi-family program that directly installs low-cost energy and water efficiency measures in individual apartments (efficient lighting, low-flush toilets, low-flow showerheads, faucet aerators, and programmable thermostats); and also provides incentives for comprehensive energy-saving measures in common areas (insulation, window replacements and HVAC upgrades).

Table 1. Fort Collins Utilities DSM Programs, Budgets, and Outcomes (2013)

Program	2013 incentive budget (\$1,000)	Participation (projects)	First year customer gross electric savings (MWh)	Natural gas savings (therms)	Water savings (Tgal)	Carbon savings (CO2 tons)	Cost of saved energy (\$ per MWh levelized)
Business Efficiency	\$1,781	697	12592	4,348	7,495	10,347	\$21
Home Energy Reports	\$232	38,918	9361	ND	ND	7,677	\$19
ClimateWise	ND	15	4374	ND	ND	3,587	\$4
Consumer Products	\$188	3,400	1211	14,645	12,851	1,095	\$48
Residential Lighting	\$179	5,845	1576	NA	NA	1,292	\$26
Special Projects	\$12	6,991	1655	ND	ND	1,358	\$7
Home Efficiency	\$352	1,003	304	41,300	ND	520	\$107
Conservation Corps	\$33	272	123	2,205	1,995	92	\$5
Design Assistance	\$71	3	1,465	ND	ND	1,237	\$8
Total	\$2,848	57,144	32,661	62,498	22,340	27,205	\$20 (average)

Note: ND = no data; NA = not applicable

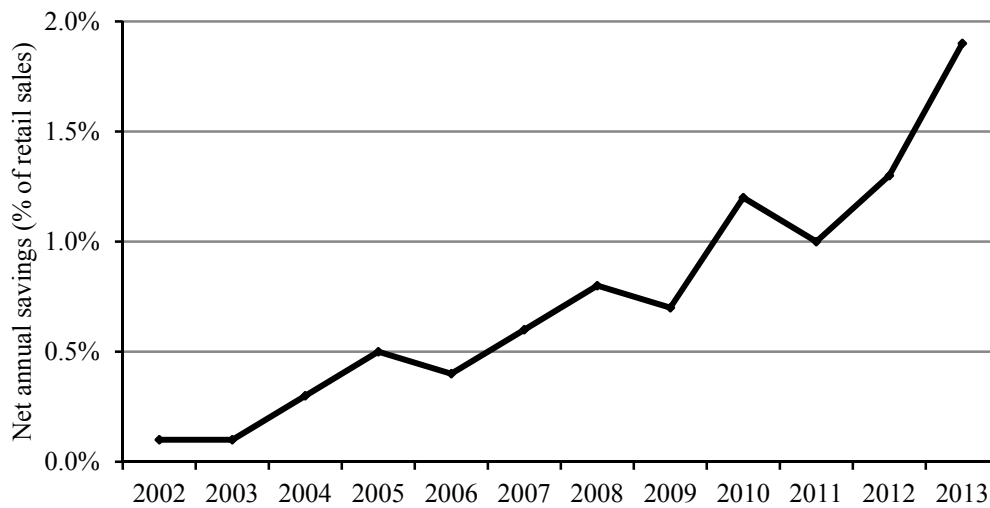


Figure 1. FCU net utility annual energy efficiency savings (percent of retail sales in kWh).

Other Clean Energy Initiatives

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. The stakeholder group reviewed standards, decided on basic requirements for all buildings and developed specific amendments to local building codes. 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 adopted the 2012 International Codes in early 2014. FCU collaborates with the City Building Department in the implementation of code requirements with a focus on building performance issues. This is done through training, technical assistance, quality assurance and quality control regarding specific topics such as residential HVAC design and testing and commercial building air leakage (City of Fort Collins 2012a).

ClimateWise. The City of Fort Collins developed ClimateWise, an award-winning program that supports more than 350 local 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.

Solar photovoltaic systems. Incentives are available for 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 allows customers to balance usage with generation on a monthly basis.

The City has also developed two new solar initiatives. A feed-in tariff type program was rolled out in September 2013. With two application periods, the utility is entering into long-term agreements with third parties to purchase electricity at a fixed price from large-scale, customer-sited photovoltaic systems totaling over 4 MW. Also, a Community Solar Garden will be completed in 2014 that will allow residents to buy a share in an off-site solar facility. The energy output of the shares will result in a direct credit on participants' bills.

Electric vehicles. Fort Collins has been selected as a deployment community for mass-scale electric vehicles by the Electrification Coalition (EC).³ FCU and Loveland Water & Power are participating in the Drive Electric Northern Colorado project as part of the EC initiative. These two communities, selected because of their demonstrated alignment of policy and community leadership in support of electric vehicles, will receive dedicated support for increasing awareness and acceptance of electric vehicles. Fort Collins seeks to develop all aspects of the electric vehicle infrastructure in a coordinated effort to increase adoption of electric vehicles by consumers and commercial fleets in the region within the next few years.

New Efficiency Initiatives

Strategic partnership of utilities and retailers. FCU has joined the Strategic Partnership of Utilities and Retailers (SPUR), an initiative of the Large Public Power Council (LPPC) that aims to consolidate public power's collective bargaining power to reduce administrative costs in offering efficient products to its customers. This initiative supports market transformation through increased market leverage and adoption of downstream, midstream and upstream approaches that create program and market efficiencies. FCU hopes to leverage this partnership in its service model, and to create cost competitive offerings of energy efficient durable and electronic goods.

Advanced metering. Advanced electric and water meters (also called Smart Meters) have been installed throughout Fort Collins as of mid-2013. The advanced metering infrastructure (AMI) integrates hardware, software and communications in a flexible system that enables automated meter reading, and also provide opportunities for the utility to consider time-of-use rates, pre-paid metering, expanded demand response offerings, and enhanced information available to customers on the web or their mobile devices.

Demand response. FCU is overhauling its legacy load management program with a new demand response portfolio. Leveraging the new advanced metering system described above, the new demand response management system will coordinate a new set of programs targeting electric hot water heaters, residential wi-fi thermostats and commercial opportunities via the Open ADR protocol (Open ADR Alliance 2009).

Targeting and segmentation. With a wide range of programs in place, FCU is increasingly focusing on how to expand and maximize customer participation. The utility has adopted an

³ The Electrification Coalition is a Washington, D.C. nonpartisan, nonprofit group of business leaders committed to the deployment of electric vehicles on a mass scale.

integrated database that combines utility billing records, property records, GIS locational data, 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.

FortZED

FortZED is a collaboration of the City of Fort Collins, Colorado State University, the Colorado Clean Energy Cluster (CCEC) and the community. Its mission is to rapidly test new clean energy ideas, and if successful, to expand them to the entire Fort Collins community and to other communities around the world. FortZED was proposed in 2007 by the UniverCity Connections Sustainable Energy Taskforce, and launched the following year with about \$14 million smart grid project with \$6M in funding from the U.S. DOE. A key FortZED supporter was the CCEC, a non-profit launched to attract clean energy companies to Fort Collins, and then to incubate and grow those companies through collaborative initiatives.

Key accomplishments over the last six years include completion of the Renewable and Distributed System Integration (RDSI) grant project, a follow up DOE grant project that demonstrated a small micro-grid system, a grassroots community energy challenge and the on-going steering committee governance structure.

FortZED began as a district concept, with well-defined geographical boundaries in central Fort Collins. Over time, it has shifted its focus towards an approach of deploying specific demonstration projects that focus on pioneering new solutions for the local community and possibly the global community. For example, the Utility as a Service Provider project described below seeks to serve a wide range of home and business segments, not just the older homes that were within the original boundaries.

As a test bed for innovative solutions, the FortZED initiative has attracted interest and evolved into a broader collaboration of private sector, academic, municipal and community resources, including a diverse group of regional and international organizations, private enterprise, public organizations, and passionate individuals. Working together, this diverse partnership hopes to achieve greater results than any group can achieve individually.

Utility as a Service Provider Business Model

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 electricity sector. In 2013, FCU contracted Rocky Mountain Institute to create a detailed vision for Fort Collins' energy future. The resulting report examined the opportunity for accelerating Fort Collins' energy and climate goals to reflect the community's values, and capture economic, social, and environmental benefits. Titled "Stepping Up," the report demonstrates that Fort Collins can reduce CO₂ emissions by 80% by 2030, 20 years ahead of its existing 2050 greenhouse gas reduction target (Rocky Mountain Institute and Fort Collins Utilities 2013).

Three factors stand out in this acceleration: 1) reducing building energy use by 31% through efficiency; 2) achieving a carbon neutral electricity system by 2030, and 3) reducing transportation energy use by 48%.

FCU is working with RMI to develop a business model in which wide adoption of efficiency and renewable energy supports both customer and utility financial health. The new

approach, called Utility as a Service Provider (UaaS), creates an opt-out program where FCU provides customers with various offerings that integrate energy efficiency, demand response and renewable energy equipment and services.

Under UaaS, all residential customers, unless they opt out, will be given a basic package in which their utility bills will remain the same, while FCU delivers energy efficiency upgrades. Customers will also be able to choose premium options that range all the way up to achieving a net zero energy residence, with versatile ownership options such as leasing, financing or simple monthly charges, and with premiums paid through an on-bill mechanism.

Planning is ongoing through 2014, with launch expected in early 2015. The planning team is considering many issues and questions in designing the operational model for achieving such aggressive goals, including:

- The right technologies, and combinations of technologies for an opt-out model
- The best market segments for this approach (residential and small commercial are being considered)
- How to approach customers, and how to manage the ongoing relationship
- How to gain economies of scale in operations
- Targeting of services (e.g. based on market segmentation or energy use)
- Ownership terms and timelines
- Best sources of capital
- Financial impacts - on the utility and its customers
- Energy savings and cost-effectiveness

FCU is in the process of designing a UaaS FortZED pilot to test customer adoption of such offerings and to build the initial infrastructure necessary for installation and management of the energy efficiency and renewable energy services. FCU will establish and test financing, billing and monitoring systems in preparation for scaling up to a community-wide level. If Fort Collins can implement UaaS successfully, it will contribute substantially to the community's climate goals while stabilizing its revenue base.

Conclusion

Fort Collins Utilities (FCU) is a leader in energy efficiency and a role model among municipal utilities, with a history of leadership by an involved city council, progressive public policies, and a well-educated community. FCU demonstrates that under the appropriate conditions, a municipal public utility can design and implement a visionary plan to create a local clean energy economy using a holistic and integrated framework coupled with tried and true programs. FCU has secured a spot as one of the most innovative utilities in Colorado (and beyond) in its willingness to look deeply for solutions that meet ambitious environmental goals. 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 (Large Public Power Council 2012).

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