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Citizens of Boulder, Colorado, in collaboration with city government, have been engaged in local climate action activities for more than a decade, and in 2014 adopted a Climate Commitment to achieve an 80% reduction in greenhouse gas emissions by 2050.

COMMUNITY SOLAR: The Utility of the Future

A Colorado community is developing a community-based clean energy economy.

by Timothy Schoechle



Boulder, Colorado, sits at the foot of the Rocky Mountains a half-hour drive northwest of Denver. It is a city, but still small enough to be a coherent community. It is the home of a major university and many government and entrepreneurial scientific, academic, and technical enterprises. The residents share an appreciation for the natural beauty of the mountains and plains environment, and many settled here for that reason.

Today, Boulder's city government is in a major legal struggle to municipalize its electricity grid. To accomplish that, it must wrest control from the incumbent monopoly investor-owned utility, Xcel Energy of Minneapolis, Minnesota, which acquired Public Service Company of Colorado 20 years ago.

The motivation for this struggle is not reliability or the quality or cost of service, but rather decarbonization—cleaner, local energy and global climate change mitigation. Xcel runs mostly on coal and has long-term commitments to fossil fuels. The Boulder community, in collaboration with its city government, has been engaged in significant local climate action activities for more than a decade, and last year adopted a Climate Commitment to achieve an 80% reduction in greenhouse gas emissions by 2050.

Boulder is inventing a new model for a “utility of the future.” Although a few other small cities such as Gainesville and Winter Park, Florida, and others have formed municipal utilities in recent years, they did so for financial, service-related, or other reasons. Boulder, on the other hand, is motivated by the desire for clean energy.

The city's timing is excellent. The rapidly advancing technological revolution in electricity makes it more likely it will achieve its goals. Boulder's municipal utility will take

advantage of this revolution, making it fundamentally different from conventional munis.

Nearly 30 munis already exist in Colorado, including the neighboring cities of Fort Collins, Longmont, Colorado Springs, and others. However, these have been in existence for many decades and their structure, infrastructure, and business models are similar to conventional utilities. Some, like Fort Collins, are working to bring in more renewable energy, but this is a formidable challenge given its long legacy, infrastructure, and obligations around conventional generation. Other innovative established munis face a similar challenge, notably Austin Energy and the Sacramento Municipal Utility District (SMUD).

The Existing Paradigm

About 60% of the electricity in the United States is provided by investor-owned utilities. They operate on a century-old regulated monopoly business model based on cost recovery and return on capital assets. State regulators guarantee them a profit on the commodity sale of kilowatt-hours of electricity and a 10% to 12% return on capital assets. As a result, their profits depend on building and

maintaining centralized generation and transmission infrastructure.

Renewables—particularly solar photovoltaics—are inherently distributed resources. There is essentially no economy of scale in building large generation and transmission infrastructure because it cannot compete long term with rooftop solar-plus-storage and other small-scale distributed renewable sources. As distributed renewables, especially when paired with energy storage, become more widespread, utilities, even traditional municipals and co-ops, will be left with large investments and/or long-term commitments in the centralized big grid paradigm. The conventional centralized utility infrastructure will become increasingly expensive and eventually obsolete. (See the March/April 2015 issue of *SOLAR TODAY* at bit.ly/1dgJaby for current examples of cost-effective distributed solar and storage.)

Buying the Wires and Poles

Although it must start by buying the existing wires and poles, the concept behind the Boulder muni is not to run a conventional electric utility that generates or purchases electricity. Rather, the idea is to

provide energy services—health, comfort, safety, and economic vitality—to its customers, at the best price and with the least environmental impact.

In a sense, however, Boulder first must pay the “ransom” to get out from under what many perceive as a dysfunctional and inaccessible Public Utilities Commission-based regulatory regime. That is, the city must buy the right to govern its own local electricity grid.

Once this is achieved, an entirely new electricity paradigm can be implemented—one that is based on distributed renewable energy and in which the users generate most of the power. This will likely take the form of community solar microgrids based on solar-plus-storage at scales ranging from single homes to community solar gardens to commercial and industrial buildings. It will also likely include more small-scale hydro, because Boulder already generates a significant amount of local hydroelectric power.

Buying the “old wires and poles” is not an alternative to innovation but rather it is the price of the right to innovate. Also, the wires and poles will be needed to operate the local distribution grid as a service to the community.



Residents of Boulder, Colorado, share an appreciation for the natural beauty of their local environment.

CITY OF BOULDER OPEN SPACE AND MOUNTAIN PARKS

Although the voter-approved maximum authorized acquisition figure was \$214 million, it is important to remember that whether the price is “expensive” or not is a calculation based on what Boulder would be paying out to a monopoly grid operator over time. In fact, it may turn out to be a bargain in the long run, especially if the city can achieve its clean energy goals.

Citizen-Driven Collaboration

Why not launch a statewide policy overhaul rather than a muni? The short answer is because local action is what works.

It’s increasingly true in the United States that effective action is only possible on the local community level. State and federal institutions have become so politicized, captured, and co-opted by corporate power and money that they are less and less accessible to citizens. The fracking confrontation and state preemption of local regulation is one example.

In Boulder, the muni project did not originate with the city government. The city only embraced the idea after years of committed grassroots efforts by many local citizens in passionate pursuit of cleaner energy. These Boulder residents talked through the issues among themselves, attended endless meetings and hearings, and did the legwork it took to inform the City Council and then bring the city management and staff around. In fact, previous city officials—including a mayor, a city attorney, and a city manager—were opposed or uninterested.

A consensus began to coalesce in the 2007 timeframe with spontaneous gatherings in homes and cafes of citizens concerned about “de-carbonization.” Boulder citizens had passed a carbon tax in 2006 to fund local energy efficiency programs. Between 2008 and 2010, members of the City Council, frustrated by years of intracta-



Distributed energy resources like these photovoltaic (PV) systems in a Boulder neighborhood—especially when they are paired with on-site storage—may eventually make large centralized power plants obsolete.

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Boulder’s new utility will likely include a number of community solar microgrids at scales ranging from single homes to larger PV installations. These arrays are part of an effort to achieve net zero energy at Fort Hunter Liggett in California. They provide shade for vehicles as well as produce electricity, and—when completed—this solar microgrid project will comprise 5 megawatts of PV generation and a 3-megawatt-hour battery energy storage system.

U.S. ARMY PHOTO BY JOHN PRETTYMAN, CREATIVECOMMONS.ORG/LICENSES/BY/2.0/LEGALCODE

ble and fruitless franchise renewal negotiations with Xcel and by the embarrassing \$30 million debacle of Xcel’s “SmartGridCity” project, began to reconsider and look for alternatives.

City staff supported the decarbonization effort by hosting community meetings and working groups. Volunteer working groups and paid consultants completed studies and models. Mobilized by major successful battles around ballot measures during two subsequent elections (2011 and 2013), the growing community support

matured and the city added more staff support. During 2013 and 2014, additional volunteer working groups were formed to study grid modeling, natural gas, solar, utility governance, collaboration with Xcel, and other technical and regulatory aspects of energy and electricity.

Boulder hired a muni director, Heather Bailey from Austin, Texas, with the title “executive director of energy strategy and electric utility development.” She is an experienced regulator, utility executive, and consultant with 30 years in the

utility industry. She and her Energy Future staff are currently pursuing the legal and regulatory action required to take over the local grid.

The City Council, city staff, muni director, and Energy Future staff all understand that the success of the municipalization effort depends on civic engagement and the community’s base of active volunteers. This is why the 2011 and 2013 muni ballot measures prevailed against heavily (10:1) financed opposition.

In parallel with the condemnation and acquisition effort by city

staff, several new volunteer working groups meet on a regular basis, research various problems, develop reports, and recommend policies. These groups focus on issues including resource acquisition, rates, and energy services.

Independent of city government efforts, some volunteer civic, business, and professional groups in town sponsor periodic events that feature guest speakers, seminars, fundraisers, or social gatherings to foster community understanding and encourage dialogue related to energy and environmental issues. Many of these events engage citizens with elected officials or city staff working on different aspects of municipalization and other clean energy activities.

Next Steps

City staff will move the muni forward by condemning and purchasing the local grid infrastructure during what will likely be a multi-year legal and regulatory battle. Another critical initiative will be developing ways to facilitate the financial investment needed to con-

vert the local grid to solar and other renewables. For example, the city might establish a municipal bond or secure investment bank financing to establish a city loan or grant fund for helping residents, government facilities, and businesses install solar and other renewable energy equipment. This could take the form of solar gardens, community microgrids, rooftop solar, distributed grid storage batteries, small-scale hydro, wind, LED lighting, and energy efficiency programs.

Planning is also in process to organize and manage the eventual transition from the present electricity system to the new system. This involves arranging to purchase electricity for a period of time while the muni starts up and developing demonstration projects to verify the viability of the technical solutions under consideration (rooftop solar plus batteries, electric vehicle charging stations, etc.). Boulder will also have to organize a “service utility” to maintain and operate the local grid by hiring the necessary professionals and identifying the existing inventory, new equipment,

and other resources required to operate its own utility.

Power to (and From) the People

As Boulder shapes its energy future, it has adopted an “energy localization framework.” This framework seeks to democratize energy decision making so customers have more direct control over and involvement in energy decisions. This includes opportunities to invest in their long-term energy needs and to have a say in energy investments made on their behalf.

Under the framework, energy would be generated locally or regionally whenever feasible, reducing reliance on external fuel sources. Customers would manage and reduce their energy use directly and effectively and energy service companies would compete and innovate within a diverse and robust local energy economy.

Renewable and clean fuel sources would be used whenever possible and would be brought into the energy mix as quickly as possible. This will have the effect of decarbonizing

the energy supply and minimizing both short- and long-term environmental impacts. It will also promote energy independence.

As Boulder works through the process of establishing its municipal utility, it’s hard to know precisely what the final outcome will be. The lessons learned may go far beyond providing electricity and energy services to local homes and businesses, however. This collaboration of citizens, elected officials, and city staff may prove to be an example of the purest kind of democracy in action.

To build a new, clean energy future, communities and citizens need to take back their power. In Boulder, at least, it appears that power really will come from the people. **ST**

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Schools provide excellent venues for solar installations, both because the electricity can reduce their utility costs and because the systems offer educational opportunities for students.



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