COMMUNITY ENERGY TRANSFORMATIONS: FORT COLLINS AS A CASE STUDY

AMAN CHITKARA – ROCKY MOUNTAIN INSTITUTE
COLORADO RENEWABLE ENERGY SOCIETY
AUGUST 11TH, 2015
Rocky Mountain Institute works across industries on challenging energy issues to drive the efficient and restorative use of resources with market-based approaches.
REINVENTING FIRE

TRANSPORTATION
2050 AUTO FUEL CONSUMPTION

BUSINESS AS USUAL
11.1 Mbbl per day

REINVENTING FIRE
0.4 Mbbl* per day

*Oil free, biofuels only

ELECTRICITY
2050 TRANSFORMATION

2010 - 86% OF ELECTRICITY FROM fossil fuels & nuclear

2050 - 80% OF ELECTRICITY FROM resilient, half distributed renewables

solar, hydro & wind

BUILDINGS
2050 TRANSFORMATION

BUSINESS AS USUAL
52.6 quadrillion BTUs per year

REINVENTING FIRE
16.2–24.3 quadrillion BTUs per year

INDUSTRY
2050 TRANSFORMATION

BUSINESS AS USUAL
30.5 quadrillion BTUs per year

REINVENTING FIRE
21.2 quadrillion BTUs per year
1 Community sustainability goals
2 Supporting community goals through new utility offerings
3 Assessing the economic potential of a new utility business model
4 Other communities taking action
FORT COLLINS

- Highly educated, environmentally aware customers
- Home to Colorado State University and is famous for its breweries including New Belgium and Odell
- Citizen-owned, electric utility established in 1935, ~68,000 customers
FORT COLLINS FIRST SOUGHT TO UNDERSTAND THE BENEFITS OF ACCELERATING ITS GREENHOUSE GAS EMISSIONS REDUCTION GOALS

- **Accelerate carbon goals** (80% below 2005 levels) **20 years**
- **Net benefit of $265 million** for the community
- **Reduce annual cash outflows** from the community to pay for coal and natural gas fuel by close to $50 million
- **Increase local investment** by $30 million per year
- **400–500 jobs**
ACCELERATING ITS CARBON GOALS REQUIRES AN ENERGY SYSTEM TRANSFORMATION
ACROSS THE BOARD, CONSULTATION WITH EXTERNAL EXPERTS UNCONVERED THE FOLLOWING FUNDAMENTALS TO SCALING

- Identify and target biggest users
- Leverage the few who influence the many
- Target expected growth and development; build it right the first time
- Piggyback on planned events
- Make it feel like a requirement
- Take advantage of economies of scale
- Reduce acquisition costs and simplify the customer experience
- Promote benefits the community already seeks
- Build a sense of community
- Create a sense of urgency to “act now”
A COMPREHENSIVE STRATEGY WAS CREATED FOR EACH ENERGY SUBSECTOR

A new utility business model will be critical for more than 60% of emission reductions.
ON MARCH 3\textsuperscript{RD}, 2015 THE FORT COLLINS CITY COUNCIL UNANIMOUSLY ADOPTED SOME OF THE MOST AGGRESSIVE GHG REDUCTION GOALS IN THE COUNTRY:

• 20\% reduction by 2020
• 80\% reduction by 2030, and
• carbon neutrality by 2050
• By 2050 the community stands to net roughly $6 billion in savings.
SUPPORTING COMMUNITY GOALS THROUGH NEW UTILITY OFFERINGS

FORT COLLINS AS A CASE STUDY
INCREASED DISTRIBUTED ENERGY RESOURCE (DER) ADOPTION IS OFTEN VIEWED AS A THREAT

“The threat to the centralized utility service model is likely to come from new technologies or customer behavioral changes that reduce load…

…the longer-term threat of fully exiting the grid raises the potential for irreparable damages to revenues and growth prospects.”
THIRD PARTIES ARE RAPIDLY DEVELOPING NEW APPROACHES TO CAPTURE DER VALUE AND MEET CHANGING CUSTOMER PREFERENCES

MEET THE NEW NEIGHBOR: SOLAR + STORAGE

With energy storage capability, homeowners in the U.S. with solar power systems and home system monitoring can control their electricity costs and have the security of knowing they’ll have power during an outage. In the near future, the energy storage category is expected to experience substantial growth while adding additional benefits like home energy management.

HOW IT WORKS TOGETHER

- **SOLAR PANELS**: Solar panels generate clean, reliable power during the day.
- **MONITORING**: Homeowners can monitor their solar system’s production and their family’s energy usage online. Monitoring encourages energy saving behavior, increasing financial savings.
- **BATTERY**: Today, batteries store power for use during an outage caused by a natural disaster or other issues. They potentially may be used at any time to manage and reduce electricity costs.

**NRG Home** – full range of services

**Comcast Energy Rewards** – Monitoring, efficiency, and free HBO

**AT&T, Vivint, Google**, and others

“The battleground over the next five years in electricity will be at the house,”

-David Crane, CEO of NRG Energy
FORT COLLINS UTILITIES WANTS TO TAKE ADVANTAGE OF THIS OPPORTUNITY WHILE BALANCING COMMUNITY INTERESTS

Customer Interests
- Feel happy and confident in the results of services provided
- Access affordable energy and value-added services
- Experience a streamlined purchase process
- Experience enhanced customer service

Utility Interests
- Stabilize business model
- Ensure savings for customers
- Accelerate levels of renewable and energy efficiency adoption to support City’s Climate Action Plan goals

City Interests
- Reach Climate Action Plan goals
- Stimulate economic development
- Ensure equitable access to energy

Business Interests
- Minimize complexity and operational risk
- Improve business climate

Core Design Principles
- Increase distributed energy resource adoption – supports ambitious GHG reduction goals, is attractive to customers
- Simplicity – simple to operate, administer, and purchase
- Customizable – appropriate for various building and customer types
- Resilient – viable at multiple scales, adaptable to user feedback, capital light
- Economically viable – improves customer and utility finances
- Equitable – accessible to lower and middle income, customers without crowding out private sector
Fort Collins Utilities is considering a hybrid approach when evaluating new business models.

<table>
<thead>
<tr>
<th>Utility Procurement</th>
<th>Hybrid Approach</th>
<th>Open Platform</th>
</tr>
</thead>
<tbody>
<tr>
<td>(no customer choice)</td>
<td>(customer choice with utility screen)</td>
<td>(unlimited customer choice)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DIVERSITY</th>
<th># OF PROVIDERS</th>
<th>CUSTOMER INTERFACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>OF OPTIONS</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Fort Collins is exploring a hybrid approach that can:

- Maintain utility relationship with the customer
- Leverage utility price, scale, and speed
- Allow more market innovation and customer choice
INTEGRATED UTILITY SERVICE (IUS) MODEL

Key Program Features

• Opt-out basic package
• On-bill tariff
• Bundled delivery of services
• Lower cost central procurement

Easy, Customer-Centric Delivery

• Present small number of services
• Address home needs comprehensively
• Minimize touch points with customer
• Eliminate need for up-front payments
• Make savings very transparent on energy bills
• Build momentum through delivery at a neighborhood scale
ASSESSING THE ECONOMIC POTENTIAL OF A NEW UTILITY BUSINESS MODEL

FORT COLLINS AS A CASE STUDY
Financing funds

REQUIRES UTILITY TO TAKE ON CERTAIN BANKING FUNCTIONS WHILE COORDINATING A DIVERSE ECOSYSTEM OF SERVICE PROVIDERS

Home Performance Contractor

Energy concierge service

Solar and energy efficiency measures

Subcontractors

Home Owner

New package financing less energy savings

Provides customer with less electricity

Utility

Financing interest

Program capital

Private Investors

IUS ENERGY AND CASH FLOWS
IUS WILL PROVIDE CUSTOMER SAVINGS THAT INCREASE OVER TIME

AVERAGE ANNUAL ENERGY BILL VS IUS BASIC PACKAGE
FOR PRE-1945 SINGLE FAMILY HOME

**Financing:**
- 6% cost of capital
- 15 year term

**Package Measures:**
- Audit
- LEDs
- Smart Thermo
- Smart Pw Strip
- Air Leakage Seal
- Roof Insulation
- Furnace
- Water Heater

Companies receive lower bills, protection from future price increases while receiving investments in efficiency, and the value and comfort over time.
### Off Balance Sheet

<table>
<thead>
<tr>
<th></th>
<th>BAU</th>
<th>IUS</th>
<th>CHANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Energy Consumption (kWh/yr)</td>
<td>344,988,297</td>
<td>271,637,757</td>
<td>-73,350,540</td>
</tr>
<tr>
<td>Participating Meters</td>
<td>55,772</td>
<td>39,040</td>
<td></td>
</tr>
</tbody>
</table>

#### FCU Single-Family Home Annual Revenue

<table>
<thead>
<tr>
<th></th>
<th>BAU</th>
<th>IUS</th>
<th>CHANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional Electricity Revenue</td>
<td>$30,798,744</td>
<td>$24,887,885</td>
<td>-$5,910,860</td>
</tr>
<tr>
<td>IUS Package Fee Revenues</td>
<td>NA</td>
<td>$1,874,001</td>
<td>$1,874,001</td>
</tr>
<tr>
<td>IUS Coverage Charges</td>
<td>NA</td>
<td>$1,940,308</td>
<td>$1,940,308</td>
</tr>
<tr>
<td>Total Annual Revenue</td>
<td>$30,798,744</td>
<td>$28,702,194</td>
<td>-$2,096,550</td>
</tr>
</tbody>
</table>

#### FCU Single-Family Home Costs

<table>
<thead>
<tr>
<th></th>
<th>BAU</th>
<th>IUS</th>
<th>CHANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed Costs</td>
<td>-$9,030,426</td>
<td>-$9,030,426</td>
<td>$0</td>
</tr>
<tr>
<td>PRPA Energy Charge</td>
<td>-$12,272,191</td>
<td>-$9,662,909</td>
<td>$2,609,282</td>
</tr>
<tr>
<td>PRPA Demand Charge Proxy</td>
<td>-$5,095,321</td>
<td>-$4,011,967</td>
<td>$1,083,354</td>
</tr>
<tr>
<td>Additional IUS Overhead Cost</td>
<td>NA</td>
<td>-$775,697</td>
<td>-$775,697</td>
</tr>
<tr>
<td>Interest Payments+</td>
<td>NA</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Taxes and Equivalents</td>
<td>-$1,847,925</td>
<td>-$1,722,132</td>
<td>$0</td>
</tr>
<tr>
<td>Total Annual Cost</td>
<td>-$28,245,863</td>
<td>-$25,203,130</td>
<td>$3,042,733</td>
</tr>
</tbody>
</table>

#### Adjusted Income

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Income from IUS</td>
<td>NA</td>
<td>$2,809,754</td>
<td></td>
</tr>
<tr>
<td>Income from Traditional Electricity</td>
<td>$2,552,882</td>
<td>$689,310</td>
<td></td>
</tr>
<tr>
<td>Percentage from IUS</td>
<td>NA</td>
<td>80%</td>
<td></td>
</tr>
<tr>
<td>Percentage from Traditional Electricity</td>
<td>100%</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>Adjusted Income/Revenue</td>
<td>8%</td>
<td>12%</td>
<td></td>
</tr>
</tbody>
</table>

- Traditional revenue falls but is offset by package processing fee revenues and additional charges to cover additional costs.
- Fixed costs are the same.
- Energy and demand charges fall.
- New programs cost money.
<table>
<thead>
<tr>
<th></th>
<th>NYSERDA</th>
<th>Hawaii</th>
<th>How$mart</th>
<th>FCU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meters</td>
<td>7 NY state utilities</td>
<td>390,000</td>
<td>90,000</td>
<td>61,000</td>
</tr>
<tr>
<td>Launch date</td>
<td>2013</td>
<td>2014</td>
<td>2007</td>
<td>2015</td>
</tr>
<tr>
<td>Annual adoption</td>
<td>473 (2012). Regulated to 0.5% of each utilities’ customers</td>
<td>0.5 to 1% (predicted)</td>
<td>128 (2012) 0.24%</td>
<td>4% (desired through 2030)</td>
</tr>
<tr>
<td>Total funds disbursed</td>
<td>$11.5M (2 years)</td>
<td>TBD</td>
<td>$5M (7 years)</td>
<td>$223M needed (by 2030)</td>
</tr>
<tr>
<td>Annual funds disbursed</td>
<td>$4.9M (2013)</td>
<td>$7M (predicted)</td>
<td>$950K (2013)</td>
<td>$15M needed</td>
</tr>
<tr>
<td>Capital Sources</td>
<td>$24M revolving loan fund (QECB revenue bonds)</td>
<td>$150M green infrastructure fee rate buy down ($2/mo for resi) (green infrastructure bonds)</td>
<td>• USDA Rural Economic Development Loan/Grant funds • Utility funds</td>
<td>TBD</td>
</tr>
<tr>
<td>Average loan</td>
<td>$10,500</td>
<td>$5500 (predicted)</td>
<td>$6000</td>
<td>$5000 (predicted)</td>
</tr>
<tr>
<td>Term</td>
<td>5, 10, 15 years</td>
<td>12 year max (recommended)</td>
<td>15 years, or ¾ of expected life. Geothermal loop 30 yr</td>
<td>20 years</td>
</tr>
<tr>
<td>Renters?</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Transferability</td>
<td>Yes, tariff attached to meter</td>
<td>Yes, tariff attached to meter.</td>
<td>Yes, tariff attached to meter.</td>
<td>Automatic transfer desired. Tariff to be attached to the meter.</td>
</tr>
</tbody>
</table>

*FORT COLLINS UTILITIES WILL NEED TO DEPLOY MORE CAPITAL THAN ANY OTHER ONBILL PROGRAM HAS DONE TO DATE*
KEY TAKEAWAYS

• Utilities should consider service based business models
• Diversify; efficiency does not have to mean lost revenue
• Aggregating demand reduces costs while enabling large private investment
• Utilities have core advantages over their competition
• Taking a comprehensive approach to customer needs can increase adoption
SEVERAL COMMUNITIES ACROSS THE COUNTRY ARE BEGINNING TO EMPLOY THE REINVENTING FIRE FRAMEWORK TO THEIR OWN ENERGY SYSTEM PLANNING.
• **FortZED Charrette Report (2012):** Understand the convening process that developed Fort Collins' aspirations from a vision for a net zero energy district (FortZED) into a vision for a net zero city.

• **Stepping Up: Benefits and cost of accelerating Fort Collins' Energy and Climate Goals. (2014):** Learn about the technical and economic potential for Fort Collins to accelerate its energy and climate action while capturing economic, social, and environmental benefits. This report summarizes RMI’s findings in Fort Collins’ key energy sectors: building efficiency, transport, and the electricity supply system.

• **Stepping Up: Technical Appendix**
  Understand RMI’s assumptions and analytic method, which are grounded in the principles and approach of RMI’s national Reinventing Fire study.

• **Accelerated Emission Reductions Tactics: Findings from expert conversations and research (2014):** Consider the various programs your community could implement to enable accelerated emissions reductions. See the short list of tactic and strategies considered for Fort Collins, and review best in class existing programs and design considerations required to take programs to scale. Additional Info: CAP Tactics Descriptions.

• **Integrated Utility Services Report (2014):** Utilities can play a pivotal role in enabling communities to achieve their carbon emissions reduction goals. Consider a new replicable business model that integrates distributed energy resource offerings (e.g. building efficiency, onsite solar panels) that help communities achieve aggressive energy goals while keeping utilities competitive in a quickly evolving industry.

• **Fort Collins Climate Action Plan: Framework (2015):** Reference Fort Collins’ framework for action, organized around twelve strategic areas, to get Fort Collins on the path to accelerated climate goals.

For more information, please contact Coreina Chan (cchan@rmi.org), Martha Campbell (mcampbell@rmi.org), and Aman Chitkara (achitkara@rmi.org).

Available at: [http://www.rmi.org/elab_fort_collins_transforms_energy_use](http://www.rmi.org/elab_fort_collins_transforms_energy_use)
e-Lab Accelerator, a bootcamp for electricity innovation

Accelerator Objectives

- To accelerate high-potential projects and support them moving to the “next level”
- To share e-Lab insights and approaches
- To learn from a broad peer group working on related projects

Desired Outcomes

- An enhanced, content-informed perspective on the opportunities and challenges teams will encounter in their project work
- An increased capability to address problems with a creative, participative, systemic approach
- A support network of experts and practitioners that teams can leverage as they advance their work
QUESTIONS?

Transforming How Communities Use Energy: Learning From Fort Collins

http://www.rmi.org/elab_fort_collins_transforms_energy_use

Aman Chitkara
(303) 567.8582 || (224) 223-2730
achitkara@rmi.org
Creating a clean, prosperous, and secure energy future™