Local Power in Boulder, Colorado

Ann Arbor Energy Commission

Jonathan Koehn, Climate Initiatives Director
October 12, 2021

Local Power

- Local Power is the city's effort to bring clean, local, affordable and reliable electricity to the community by developing a community-owned local electric utility.
- Local power has been a key component of the city’s climate strategy.

The choices

Franchise, No Franchise or something else.

Stay with Xcel under “status quo” (no franchise)

- Continue to focus on demand-side management
- Pursue options as they become available
- Potentially create new Franchise agreement with Xcel

OR

Create a municipal utility that owns and operates the distribution system

Local Utility- the Big Picture

Municipalization

Process of a city acquiring ownership and assuming responsibility for operation of the electric utility system

- Locally-Run Electric Utility
- Fee for service vs. profit-based entity
- 29 in Colorado, 2000 nationally (14% of consumers)

Municipalization Goals

Decarbonize	Decentralize	Democratize
Rates	Reliability	Renewables

Municipalization Timeline

2006

Voters pass nation's first carbon tax. Contract negotiations with Xcel Energy begin.

2010

Boulder decides not to renew 20-year contract with Xcel.

2011

Voters fund evaluation of, and set requirements for, a clean energy utility.

2013

Third-party evaluation confirms city can meet requirements.

2014

City creates transition plan for operating local utility; begins legal process in district court.

2015

Boulder starts regulatory process at Colorado Public Utilities Commission (PUC).

2017

City Council rejects two settlement proposals from Xcel Energy.

2017

PUC will issue ruling on Phase I of the city's separation application.

2017

Voters will consider municipalization-related ballot measure(s).

Votes

2010

- Utility Occupation Tax to replace Franchise Fee Revenue
  - **68% YES**

2011

- Additional Utility Occupation Tax to fund exploration of municipalization
  - **50.4% YES**
- Form Boulder Light and Power Utility in the city charter
  - **51.9% YES**

2013

- Cap on one-time debt to acquire assets
  - **66% YES**
- Voter approval of debt limits (Xcel-funded item)
  - **69% NO**

2014

- Allow executive sessions to discuss municipalization legal strategy
  - **56% YES**

2015

- Extension of portion of the Utility Occupation Tax that replaces the Franchise Fee Revenue
  - **71% YES**

2017

- Extension and raise of portion of the Utility Occupation Tax that funds municipalization
  - **51.7% YES**
- Vote required before city issues construction debt
  - **82.8% YES**
- Allow executive sessions to discuss municipalization legal strategy
  - **56.5% NO**

GIVE BOULDER

THE POWER

Boulder Municipalization: A Roadmap

What does Boulder do next to municpalize successfully the electric distribution system in the city?

1. **Regulatory filings:** The next step is for the city to file a separation plan with the Colorado Public Utilities Commission (PUC). The PUC proceeding will be filed in summer 2015 and take 12 to 18 months to complete. The city will also file with the Federal Energy Regulatory Commission (FERC) for its blessing of acquiring the transmission loop running around the city.

2. **Planning:** An ongoing process being done by the city staff, started in 2013 and continuing until the muni is up and running is creating and fine tuning the Transition Plan. The transition plan covers all the steps needed to get the new utility up and running.

3. **Acquisition:** Since Xcel has stated that they are not interested in selling the Boulder distribution system to the city, this step will likely involve the city filing a condemnation action in Boulder District Court to require the sale of the system. The action will likely be filed as soon as the PUC rules on the separation plan. The court proceedings might take 12 to 18 months.

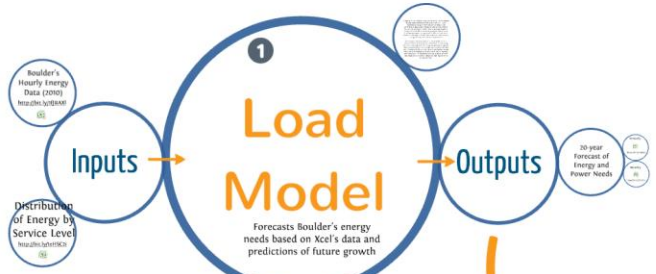
4. **Separation/Integration:** Construction of facilities to allow the city to run the distribution system independently from Xcel will likely begin at the conclusion of the condemnation action– and take another 12 to 24 months. Hopefully the PUC in its separation decision will clarify how Xcel will cooperate with the city for a smooth transition.

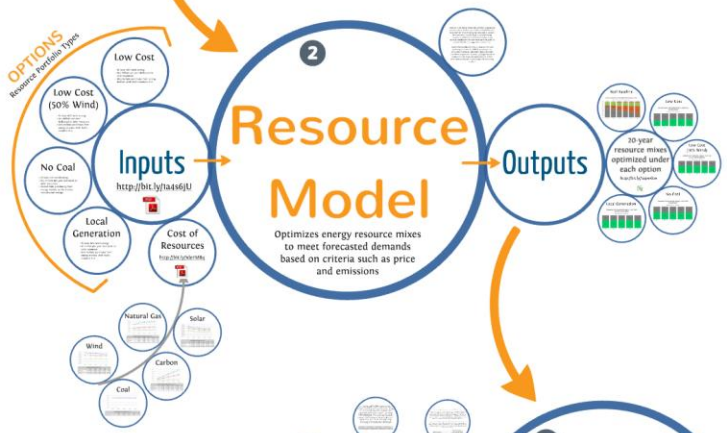
5. **The Utility of the Future:** After the city is successfully running the electric utility then begins the process of implementing innovative ways to transition from fossil fuels, invest in the local economy, and creating a marketplace for energy services.

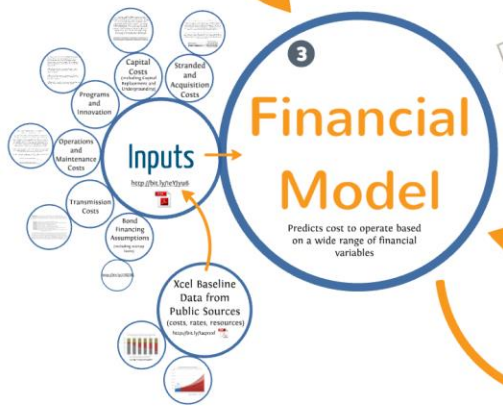
Modeling Boulder's Energy Future

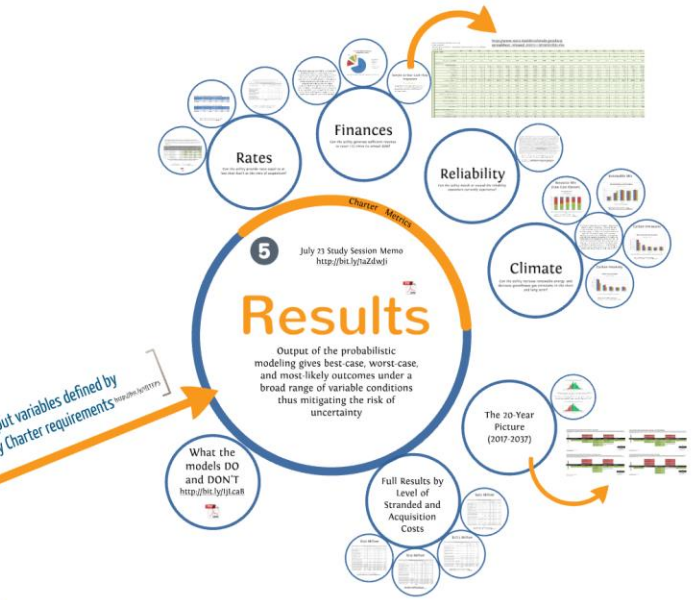
Last updated 3/2/2015

CLEAN LOCAL ENERGY reliable low-cost possible









More Information on Modeling

Modeling Q&A (January 2015)
https://www-static.bouldercolorado.gov/docs/FINAL_modeling_and_cash-flow_spreadsheet_Q_and_A_with_FERC-1-201501121724.pdf

Staff Responses to Chamber Questions (May 2013)
https://www-static.bouldercolorado.gov/docs/Staff_Responses_to_Chamber_Qs_050713-1-201503031044.pdf

City Council Study Session (April 16, 2013)
https://documents.bouldercolorado.gov/WebLink8/0/doc/123366/Page1.aspx

CITY OF BOULDER

http://www.BoulderEnergyFuture.com

4

Decision Analysis

Iteratively interacts with financial model to predict statistical outcomes under different best-case and worst-case conditions

Influence Diagram

https://www-static.bouldercolorado.gov/docs/WhatisDecisionAnalysis-1-20130515161l.pdf

How did we model uncertainty?

It sounds more complicated than it is. Six of the highest-impact uncertainties were identified:

| Natural Gas Price | Wind Price | Interest Rates on Debt |
| Operations and Maintenance Costs | Carbon Price | Debt Service Coverage |

Each of the six uncertainties were modeled with 3 prices: a high, a low, and a median. The median price is the one where 50% of the sample population comes in lower and 50% is higher. With this many variations, 729, or 3^6, model runs were required for each municipalization option that was modeled.

A software program called DPL was used to perform this task. DPL links to cells in the financial model and changes the values in them in a particular order. Each time it programs a particular run, it collects the results - such as total costs or carbon intensity. DPL populates the financial model with different uncertainties using a decision tree like this one:

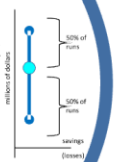
https://www-static.bouldercolorado.gov/docs/WhatisDecisionAnalysis-1-20130515161l.pdf

What do the results mean?

The reports provided to City Council include expected values and whisker charts.

Expected values are weighted averages. For each of the 6 uncertainties shown above, the high and low prices were each 30% likely to occur and the median price was 40% likely to occur. This is based on an accepted statistical probability theory. These underlying likelihoods were used to weight the overall likelihood of a particular model outcome occurring. The results of all 729 model runs were combined, weighted according to likelihood, and then averaged--producing "expected value" results for cost per kWh, carbon intensity, and other metrics.

Whisker charts, like the one to the right, show the likelihood of any single run being within a certain range. All 729 runs are plotted on a distribution curve. The blue dot at the center is the median run, where half of the 729 runs produce higher outcomes and half produce lower outcomes. The dots on either end show where 10% and 90% of the runs fall below. This was used to show an 80% range for where cost savings could fall when the municipalization options were compared against Xcel.



https://www-static.bouldercolorado.gov/docs/WhatisDecisionAnalysis-1-20130515161l.pdf

Decision Analysis Process

http://bit.ly/IhpTXw

Charter Metrics

5

July 23 Study Session Memo
http://bit.ly/1aZdwJi

Results

Output of the probabilistic modeling gives best-case, worst-case, and most-likely outcomes under a broad range of variable conditions thus mitigating the risk of uncertainty

ariables defined by
rter requirements http://bit.ly/1fJTEP5

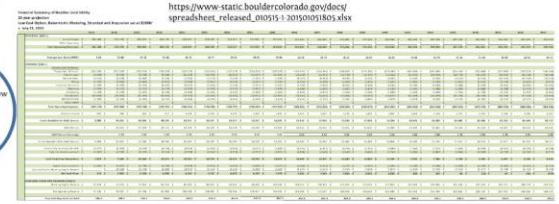
Rates

Can the utility provide rates equal to or less than Xcel's at the time of acquisition?

Finances

Can the utility generate sufficient revenue to cover 1.25 times its annual debt?

Sample 20-Year Cash Flow Projection



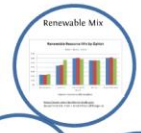
https://www-static.bouldercolorado.gov/docs/spreadsheet_released_010515-1-20150105180S.xlsx

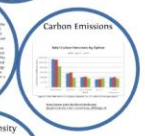
Reliability

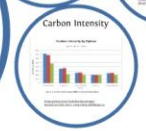
Can the utility match or exceed the reliability customers currently experience?

Climate

Can the utility increase renewable energy, and decrease greenhouse gas emissions, in the short and long term?





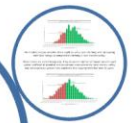


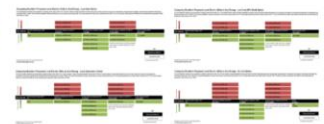
What the models DO and DON'T

http://bit.ly/1jLcaB

Full Results by Level of Stranded and Acquisition Costs

The 20-Year Picture (2017-2037)





01

Developed—with community participation— a clear set of metrics to support a final decision; these metrics serve as important guideposts as analysis continues

The city and the community have developed a series of metrics, codified in the city charter, to guide the creation of a locally-owned electric utility.

These metrics relate to rates, utility operation, renewable energy, carbon reduction and costs to create the utility. In addition to making the community's aspirations clear, they provide significant boundaries to ensure the city is acting prudently.

The city continues to evaluate feasibility according to these metrics.

02

Established a robust financial modeling tool, analyzed potential scenarios and identified cost points for the feasible operation of a city-owned utility

To determine whether it is financially and technically feasible for the city to form a locally-owned electric utility, the city and consultants developed detailed models related to Boulder's electricity needs and the management of the local electric grid projected over 20 years.

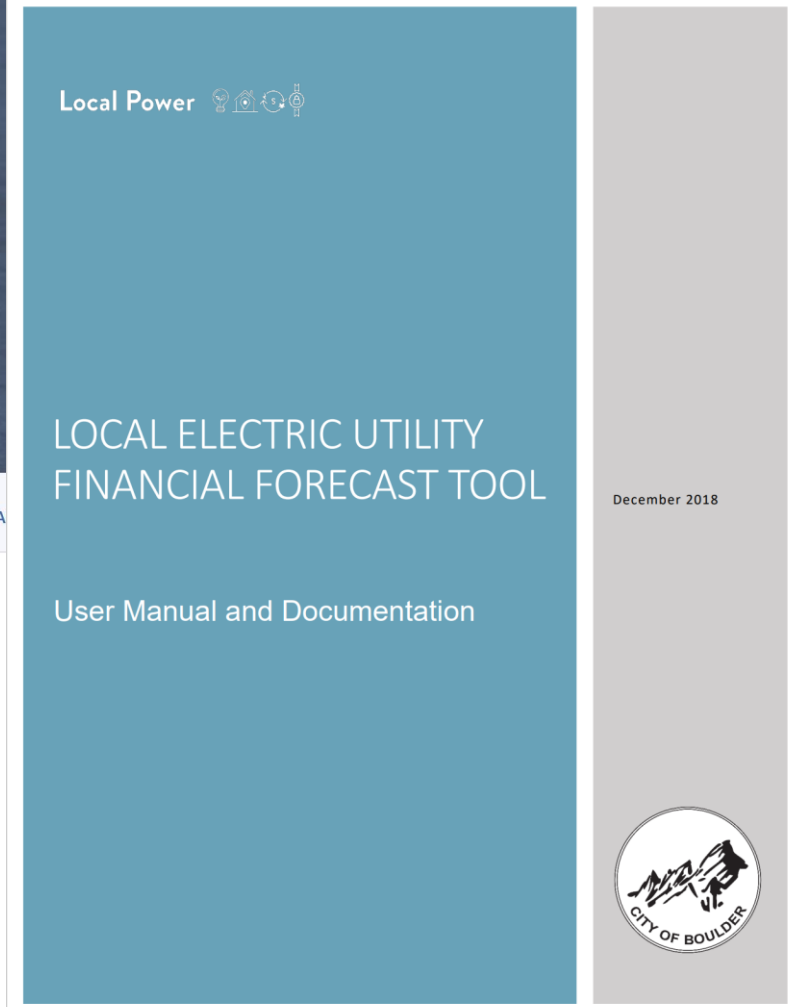
Working groups comprised of community volunteers and industry experts reviewed massive amounts of information to verify the assumptions and inputs that went into these models. A third-party review confirmed the modeling results.

The city also developed a Financial Forecast tool to continually evaluate the financial feasibility of the electric utility as circumstances change.

COMMUNITY ENGAGEMENT

Boulder finds, again, that creating its own utility would be cost effective

November 8, 2016 Jeannine Anderson



RFP - Summary of Power Supply Bids

- 10 individual bidders
  - 2 full requirements offers with innovative financing to support municipalization.
  - 5 partial requirement offers of utility-scale solar and wind as well as community-scale solar projects.
  - 1 offer of a local battery energy storage system.
  - 2 non-power supply proposals.
- Utility-scale bid prices were comparable to the 2018 RFIP and as modeled in the FFT
  - Both full requirements offers achieve 100% renewables by 2030.
  - 1 full requirements offer included up to 55 MW of local generation.
- Some proposals may be appropriate for the City-Xcel partnership projects (e.g. to close emissions gap).
- Staff performing due diligence and follow-up with bidders.

Power Supply: Boulder will have 100% RE by 2030

Power Supply Scenario	10-year Average Energy + Capacity Cost ($/MWh)	% Renewables (Year)	Average Annual Cost for Power Supply
100% Xcel Energy	$68.28	53% (2024)	$123.6M
3-year Xcel then High Renewables	$51.40	53% (2024)	$94.1M
Day 1 High Renewables	$45.54	89% (2024)	$83.9M
100% Renewable Electricity	$51.00	100% (2030)	$93.3M

Summary

The last tool update (Dec 2018) demonstrates that operating a local electric utility shows promising financial feasibility

Three of four scenarios analyzed result in long-term cost savings and increased renewables for customers. **Savings could be used to build reserves, mitigate unanticipated costs, increase innovation, accelerate undergrounding, lower rates, etc.**

The most expensive of the four scenarios would occur if the municipal electric utility bought 100% of its power from Xcel Energy for 10 years.

This scenario would also not achieve Climate Commitment targets of 100% renewable electricity and 100 MW of local generation by 2030.

03

Navigated challenging legal and regulatory ground, resulting in a Colorado Public Utilities Commission ruling that provides clear separation direction and a path forward

Over the past five years, the city has filed and responded to litigation in a variety of venues including the Public Utilities Commission, Boulder County District Court, the Federal Energy Regulatory Commission, the Colorado Court of Appeals and the Colorado Supreme Court.

The most notable of these rulings was the 2017 Colorado Public Utilities Order. Based on that order, the city is now proceeding with its plans to prepare to acquire the equipment and facilities it needs, separate other parts of the system from that owned by Xcel Energy and potentially operate its own community-owned electric utility, pending a final community vote in 2020. Part of this continued work will include a new condemnation filing in district court.

04

Launched communications and engagement strategies designed to keep the community informed about important steps in the process; recently recommitted to even more updates and public participation opportunities

The city relies on a variety of communications tools to ensure that the community has easy, frequent access to key project updates and analysis.

These tools include the project website, a bi-weekly email newsletter with 1,500 subscribers, social media, mailings and frequent press releases.

Community engagement has always been an important component of the city's effort to create a locally-owned electric utility.

Examples include 14 community working groups, the city-Xcel Task force, open houses, pop-up events and workshops.

05

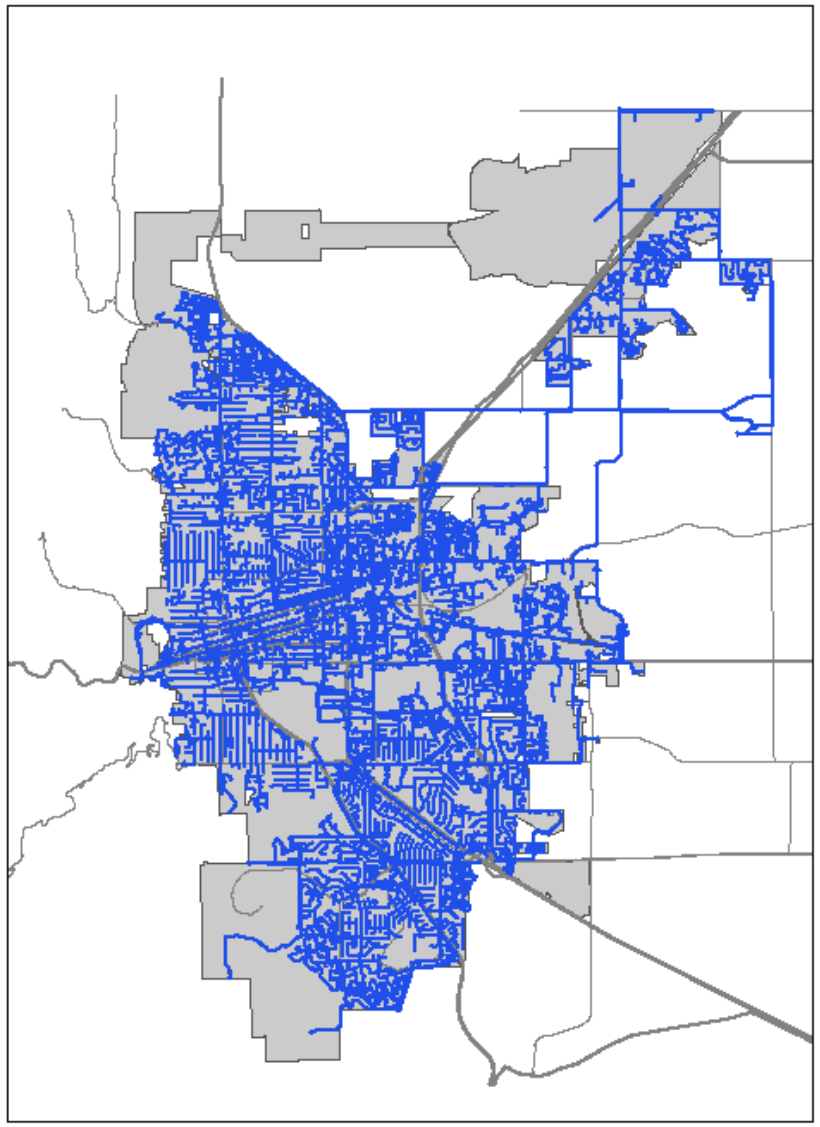
Kicked off complex start-up and transition planning to ensure that a city-operated electric utility could get off on the right foot and be sustainable over time

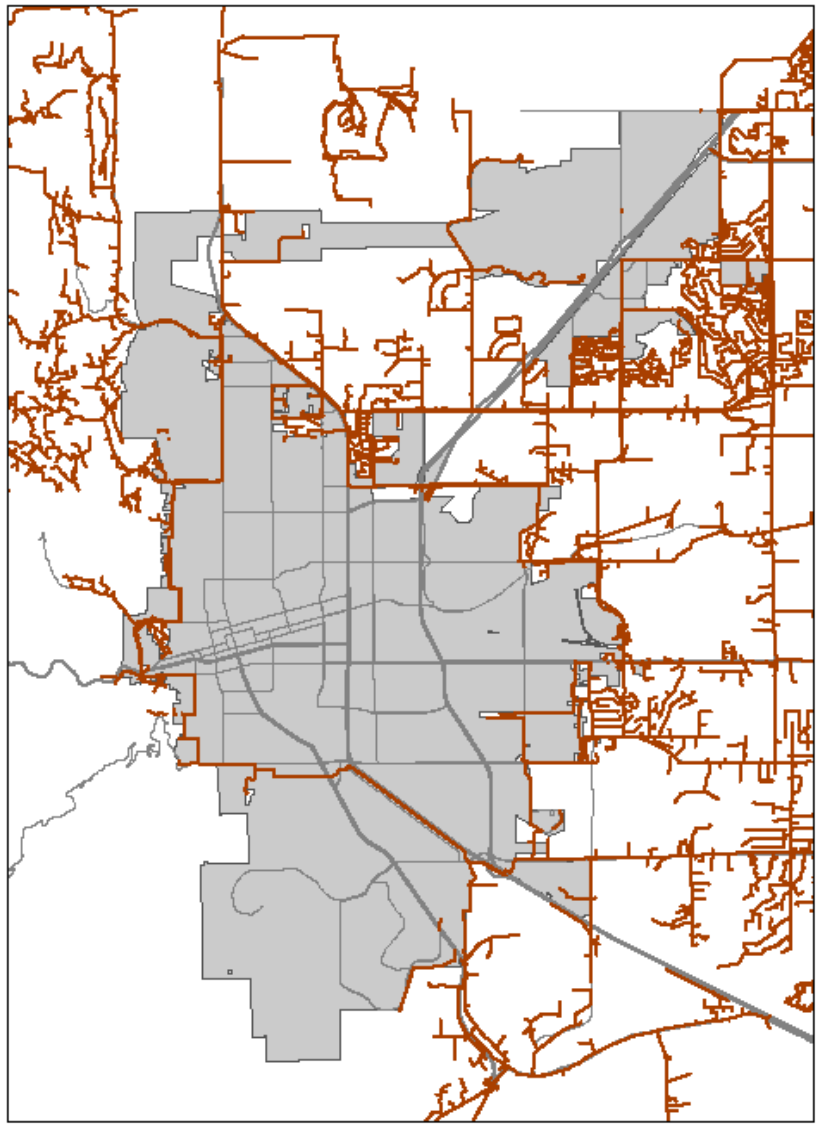
Creating a locally-owned electric utility takes a lot of planning. The city has developed detailed plans to establish the new utility, from lists of assets to purchase to hiring and financial plans.

Other aspects of this work include engineering plans and schematics that will guide the design of the future electric distribution system.

Tracking Worksheet Electric Utility Development 4/15/2020 Category	2019 Revised Annual Budget	2019 Expenditures	2019 Percent Expended	Estimated Progress	2018 Goals				2019 Goals				2020 Goals				2021 Goals			
					O Completed Milestone Δ Anticipated Milestone on schedule # Anticipated Milestone behind schedule															
					QTR1	QTR2	QTR3	QTR4	QTR1	QTR2	QTR3	QTR4	QTR1	QTR2	QTR3	QTR4	QTR1	QTR2	QTR3	QTR4
Electric Utility Development Administration	$ 1,631,530	$ 1,464,521	90%																	
City Council Meeting and Public Hearing regarding proposed agreements with Xcel Energy				100%			O													
File Xcel agreements and updated asset list with the Colorado PUC				100%				O												
Update to City Council on Load Interconnection Agreement and Separation Engineering (Information Packet)				100%					O											
Boulder files notice regarding proposed process to resolve outstanding issues with the Colorado PUC				100%						O										
Boulder files additional documents with the Colorado PUC as outlined in the notice				100%						O										
PUC Decision and Order				100%							O									
Communications and Engagement	$ 136,491	$ 90,512	66%																	
Communications and Engagement Working Group				100%		O														
Develop 2018-2019 Communications and Engagement Strategic Plan				100%			O													
Separation Engineering - Distribution and Substation Interconnection	$ 7,377,558	$ 3,095,053	42%																	
Load Interconnection Application Submitted to Xcel Energy				100%	O															
City Agrees to Load Interconnection Study Scope, Cost and Schedule				100%		O														
Load Interconnection Study Completed				100%				O												
FERC Interconnection Application				100%									O							
FERC Decision and Order				0%											#					
Execute Vendor Support Contracts for Boulder Substation Work				100%					O											
Complete Boulder Substation Separation Design, Cost Estimate, Construction Timeline and Bidding Work				20%														#		
Negotiate Agreement for Xcel Energy Substation Separation Design				100%						O										
Xcel Energy Completes Substation Separation Design, Cost Estimate, Construction Timeline and Bidding Work				50%														#		
Complete Work Plan for Xcel Energy Distribution Separation Scope of Work				100%	O															
Negotiate Scope of Work and other Terms of Distribution Separation Design, Cost Estimate, Construction Timeline and Bidding				100%			O													
Xcel Energy Completes Distribution Separation Design, Cost Estimate, Construction Timeline and Bidding Work				90%										Δ						
Execute Vendor Support Contracts for Boulder Distribution Separation Work				100%			O													
Complete Boulder Distribution System Separation Design, Cost Estimate, Construction Timeline and Bidding Work				80%										Δ						
Acquisition and Condemnation	$ 2,471,591	$ 408,814	17%																	
Appraisals				100%					O											
Condemnation Ordinance Adopted by City Council				100%				O												
Good Faith Negotiations				100%						O										
File Condemnation Case in District Court - Court Dismissed				100%							O									
Re-file Condemnation Case in District Court				100%								O								
Xcel Energy Motion to Dismiss Re-filed Condemnation Case and Boulder Response				100%									O							
District Court Consideration of Motion to Dismiss Re-filed Condemnation Case				0%										O						
District Court Case Management Order for Re-filed Condemnation Case				0%											#					
Condemnation Trial and Verdict				0%														#		
Integrated Power Supply and Transmission Service	$ 130,000	$ -	0%																	
Advertise Request for Indicative Pricing				100%			O													
Receive Vendor Provided Indicative Pricing				100%				O												
Analyze Integrated Power Supply and Transmission Options and Develop Strategy				75%										#						
Integrated Power Supply and Transmission Request for Proposals				0%										#						
Integrated Power Supply and Transmission Proposals Submitted				0%											#					
Negotiate Integrated Power Supply and Transmission Service				0%												#				
Network Integrated Transmission Service Application				0%													#			
Network Integrated Transmission Service Agreement				0%														#		
Transition Planning - Startup and Ongoing O&M	$ 309,601	$ 136,508	44%																	
Refine Future Utility Operations Vision/ Plan				40%										#						
Issue Requests for Information, Qualifications and Pricing for Utility Startup and Operations Services				20%											#					
Information, Qualifications and Pricing for Utility Startup and Operations Services Responses				20%												#				
Evaluate and Negotiate Startup and Utility Operations Services				0%													#			

Post Separation Systems





06

Continued to demonstrate ongoing innovation and a commitment to clean energy, resilience and social equity through groundbreaking pilot projects

The Utility Occupation Tax also helped fund projects other than municipalization. These projects include efforts to build 46 publicly-owned electric vehicle charging stations, and a solar-plus-storage pilot to enhance the resilience at Boulder Housing Partners and Via Mobility Services.

Project Expenditures (2012-12/10/19)	2012-2018	2019 (12/10/19)	Total
Personnel	$5,298,896	$844,215	$6,143,111
Operating	$10,804,056	$3,228,859	$14,032,915
Total	$16,102,952	$4,073,074	$20,176,026

Indirect Staffing Resources Contributing to the Local Power Project (includes salaries & benefits)	2012-2018	2019 (Q3)	Total
Total	$4,317,403	$236,499	$4,553,902

The 2012 through Dec. 10, 2019 actual project expenditures ($20,176,026), along with the indirect staffing resources through Q3 2019 ($4,553,902), total $24,729,928.

Energy Partnership Agreement

Purpose:

- Provide a framework for collaborative distribution-level planning for local projects and initiatives that support a shared vision towards energy-related emissions reductions by increasing accessibility to local renewable energy, improving resilience and reliability and designing solutions that are accessible and equitable.

- Identify specific Partnership options that address the gap between Xcel's 80% GHG emissions reduction by 2030 and Boulder's 2030 goal of 100% renewable electricity serving Boulder.

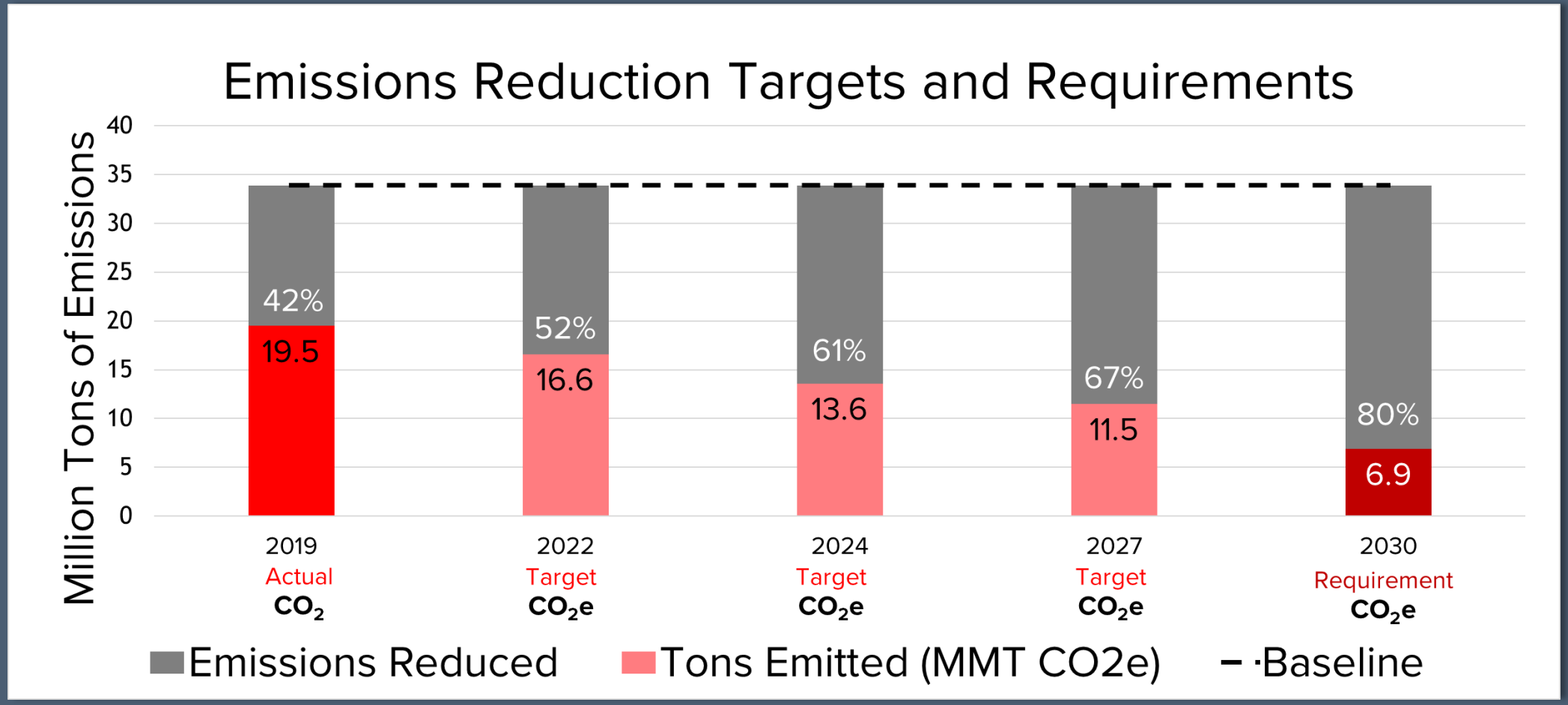
Topic	2017 Settlement Proposal	2020 Settlement
Carbon or GHG Reduction	• 80% carbon reduction for Boulder with city funding for generation improvements to meet the goal • No Xcel assurance	• Assurance of Xcel 80% GHG reduction by 2030 • In both contracts and state law
Partnership & Projects	Limited to a small number of projects, focused on 10 MW of community solar and 25 MW of Renewable Connect	Modern Grid Planning Partnership – Boulder 100% renewable electricity by 2030
Undergrounding Catch-Up	• Phased over the term of the 20-year franchise • Much of the catch-up done at higher rates toward the end of the franchise	• $33 million • Half in the first five years
Municipalization	Passage of a Franchise Ballot Measure and suspension of municipalization effort	Passage of a Franchise Ballot Measure and suspension of municipalization effort
Opt-Out of Franchise	At years 5, 10 and 15 for any reason	• At years 5, 10 and 15 years for any reason • At 2022, 2024 and 2027 if Xcel does not meet its GHG targets
Buyout/Acquisition Cap	Buyout offer: $500 million to $700 million	Damages cap for assets: $200 million for distribution system and the purchase of two substations
Going Concern	City to pay Xcel $255 million to $305 million based on time of separation	• Included in the $200 million cap described above • City reserves right to assert going concern is not a measure of damages
Power Purchase/ Stranded Cost	The city would purchase power for 10 years and decline thereafter in exchange for no stranded cost	• City has option to purchase power from Xcel to mitigate stranded costs • Issue preserved for future negotiation or litigation if the city chooses to municipalize
IBM	Allowed to stay with Xcel	Will be a customer of the city utility

Boulder-Xcel Settlement

- Assurance of 80% GHG Reduction by 2030 -
  - Emission check-in 2022, 2024, 2027.
- Energy Partnership Agreement – Facilitates Modern Grid Planning & Boulder's 100% Renewable Electricity goal by 2030.
- Maintains Feasibility of Municipalization in the Future.
- Undergrounding catch-up - $33 million – approximately half in first five years.
- Franchise Ballot Measure and Suspension of Municipalization Effort.

GHG Reduction Metrics - Statewide

2005: 33.9 million tons of CO_2 emitted = Baseline



CO_2e: Carbon Dioxide Equivalent – includes other greenhouse gases

Assurance of 80% GHG Reduction by 2030

- Boulder will have the ability to vote to end the franchise at will in 2026, 2031 and 2036.

- Boulder may also end the franchise in 2023, 2025 and 2028 if Xcel Energy – Colorado fails to meet agreed GHG reduction metrics by the end of the previous year.

Can the City still municipalize in the future?

- A $200 million cap on any condemnation award, including acquisition cost, real property interests, going concern, damages to the remainder and purchase of two existing substations

- Agreement on issues related to substations and commitments from Xcel that the company will pay the cost of any updates to the existing substation interconnection studies and design drawings

- Agreement that the PUC orders from Sept. 14, 2017 and Oct. 28 stand and apply to separation of the system if the city pursues municipalization in the future. The list of assets from the Oct. 28 decision may be used by the city.

THANK YOU!