DEVELOPING AN IMPLEMENTATION STRATEGY FOR NEDERLAND, COLORADO’S 100% RENEWABLE ENERGY PLEDGE

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Delivered to the Nederland Sustainability Advisory Board - November 2018
In 2017, the Town of Nederland, Colorado passed Resolution 2017-10: A Resolution of the Board of Trustees and Mayor of the Town of Nederland To Ensure the Transition to 100% Renewable Energy for the Town of Nederland’s Community Electricity Supply by 2025. The authors of this document were engaged by the Nederland Sustainability Advisory Board to provide background, expertise, and advice to the town on how to implement this resolution. This report documents the research, analysis, and findings of the authors with respect to three central questions:

1. How should the town define “100% renewable electricity”?
2. How should town decision makers evaluate and select potential strategies for achieving 100% renewable electricity, considering priorities defined by the community?
3. Given the current regulatory, political, and technological landscape in Colorado, is it possible for Nederland to achieve 100% renewable electricity by 2025?

DEFINITION OF 100% RENEWABLE ELECTRICITY

Nederland’s community-wide electricity consumption – including municipal, residential, and commercial sources – establishes a benchmark against which progress towards 100% renewable electricity is measured. In order to advance towards the goal of 100%, for every unit of electricity consumed by the community, the town must also be able to identify an equivalent Renewable Energy Credit (REC) within the community.

With community-wide consumption of electricity at about 12 million kilowatt-hours in 2017, achieving 100% renewable electricity would require identifying the equivalent 12 million kilowatt-hours in RECs. For a REC to be counted towards Nederland’s progress, it must have been retired on behalf of an electricity consumer within the community or generated within the community and not sold or traded away.

Energy efficiency upgrades factor into this methodology by decreasing the total consumption benchmark that RECs are measured against, thereby reducing the need to account for more RECs. For example, if energy efficiency measures decrease the town’s consumption by one million kWh, the town would then need to account for the equivalent 11 million kWh in RECs.

RESEARCH, ANALYSIS, AND RESULTS

In order to achieve progress towards the 100% goal, Nederland residents, businesses, and the municipality will need to voluntarily act to increase the renewable content of their electricity consumption. Actions that community members can take include
collaborating with partners to decrease legislative and regulatory barriers to achieving 100% renewable electricity; participating in renewable electricity programs; and leveraging rebates, grants, and incentives for technology upgrades and installations.

The authors evaluated dozens of potential actions suggested by community members and industry experts and vetted them through research and by soliciting expert opinions. To ensure that potential actions aligned with community priorities, the authors further evaluated potential actions against decision making criteria developed by the Nederland Sustainability Advisory Board.

From this analysis, the authors constructed two scenarios of the future:

- Under the Base Case Scenario, no actions are taken on the part of Nederland residents, businesses, or the municipality and progress towards 100% renewable electricity results from the implementation of Xcel Energy’s Colorado Energy Plan. Under these conditions, 66% of Nederland’s electricity consumption comes from renewable sources in 2025.

- In the Action Scenario, the Nederland community voluntarily engages in key actions identified during the evaluation process in addition to Xcel Energy implementing the Colorado Energy Plan. Under these conditions, the town achieves 100% renewable electricity consumption in 2025.

CONCLUSION

Based on this report’s methodology for measuring renewable electricity and analysis of potential actions, Nederland can achieve its goal of consuming 100% renewable electricity by 2025.

This outcome will require extensive efforts on the part of Nederland residents, businesses, and the municipality. The report includes recommendations of 14 actions for the community to pursue and suggested levels of participation for each action that would result in meaningful progress towards the town’s goal.

Only a minority of actions can be unilaterally pursued by the municipality. Others will require a resident or business to commit time, and in some cases money, to succeed. For these actions, the municipality must provide education, marketing, and support to ensure that the suggested levels of participation are reached.

CAVEATS

Resolutions like Nederland’s are a relatively new phenomenon, and there is little research or documented experience on how to implement a 100% renewable electricity goal. This report is a first step and intended to provide more clarity to the Nederland Sustainability Advisory Board as they pursue this goal.
The tools within this report for measuring progress towards 100% can help the Sustainability Advisory Board conceptualize the relative impact of specific actions; however, soliciting further research, analysis, and expert input would be advisable before committing to any one course of action. Additionally, as the politics, regulations, and technology in this space evolve, many of the ideas or actions within this report may require updates, and new opportunities could arise.
We would like to acknowledge a number of people who have provided advice, guidance, time, and clarity to us throughout this project and without whose help we would not have been able to complete this work:

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## ACRONYMS AND DEFINITIONS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>BoT</td>
<td>Nederland Board of Trustees</td>
</tr>
<tr>
<td>CCA</td>
<td>Community Choice Aggregation</td>
</tr>
<tr>
<td>CC4CA</td>
<td>Colorado Communities for Climate Action</td>
</tr>
<tr>
<td>CEP</td>
<td>Colorado Energy Plan</td>
</tr>
<tr>
<td>CSG</td>
<td>Community Solar Garden</td>
</tr>
<tr>
<td>Co-ops</td>
<td>Cooperative Electric Associations</td>
</tr>
<tr>
<td>CWRPDA</td>
<td>Colorado Water Resources &amp; Power Development Authority</td>
</tr>
<tr>
<td>FERC</td>
<td>Federal Energy Regulatory Commission</td>
</tr>
<tr>
<td>FTC</td>
<td>Federal Trade Commission</td>
</tr>
<tr>
<td>GHG</td>
<td>Greenhouse Gases</td>
</tr>
<tr>
<td>IOU</td>
<td>Investor Owned Utility</td>
</tr>
<tr>
<td>kWh</td>
<td>Kilowatt Hours (unit of production/consumption of energy)</td>
</tr>
<tr>
<td>kW</td>
<td>Kilowatt (unit of capacity measurement)</td>
</tr>
<tr>
<td>MCE</td>
<td>Marin Clean Energy</td>
</tr>
<tr>
<td>MWh</td>
<td>Megawatt Hours</td>
</tr>
<tr>
<td>MW</td>
<td>Megawatts</td>
</tr>
<tr>
<td>MOU</td>
<td>Memorandum of Understanding</td>
</tr>
<tr>
<td>PG&amp;E</td>
<td>Pacific Gas and Electric</td>
</tr>
<tr>
<td>PV</td>
<td>Photovoltaic</td>
</tr>
<tr>
<td>PPA</td>
<td>Power Purchase Agreement</td>
</tr>
<tr>
<td>PSCo</td>
<td>Public Service Company of Colorado, which does business as Xcel Energy</td>
</tr>
<tr>
<td>PUC</td>
<td>Colorado Public Utilities Commission</td>
</tr>
<tr>
<td>RECs</td>
<td>Renewable Energy Credits</td>
</tr>
<tr>
<td>RFP</td>
<td>Request for Proposals</td>
</tr>
<tr>
<td>SAB</td>
<td>Sustainability Advisory Board of Nederland</td>
</tr>
<tr>
<td>WREGIS</td>
<td>Western Renewable Energy Generation Information System</td>
</tr>
</tbody>
</table>

"Town of Nederland" or "Nederland" - will refer to the community of Nederland, Colorado at large, while references to the municipality and/or its governing bodies (i.e. The Board of Trustees or the Sustainability Advisory Board) will be referenced specifically as appropriate.

**Xcel Energy** is the commonly-used name of the **Public Service Company of Colorado** (PSCo), which is the Investor Owned Utility for Nederland and much of Colorado.

The "Tax District" of the Town of Nederland locally refers to residents, businesses, and municipal facilities located within town borders. This does not include all within Nederland’s zip code, which is locally referred to as the “Library District” and includes more residents and businesses within the Wildland-Urban Interface. Xcel Energy produces Community Energy Reports for the Tax District, and the Town’s 100% goal only applies to the Tax District.
PART I
BACKGROUND, SCOPE, AND PROJECT
METHODOLOGY
I. BACKGROUND

A. ABOUT NEDERLAND

The Town of Nederland is a mountain community located within Boulder County, Colorado. It has a population of 1,541 people living in 780 households. Almost 50% of households make under $50,000 per year, about 25% make between $50-100,000 per year, and about 25% make above $100,000 per year. According to the 2010 census, almost 50% of registered votes are Democrats, with just about 7% of the population registered as Republicans and a variety of Green Party, Libertarian, and unaffiliated persons making up the rest.

Colorado has a regulated electricity market, and Xcel Energy is the largest Investor Owned Utility (IOU) in the state. The Town of Nederland’s Tax District is wholly served by Xcel Energy, and in 2017 the town consumed 12,254,593 kilowatt-hours (kWh) of electricity. By comparison, Denver consumed over 550 times more electricity in the same year.

According to Boulder County 2016 Greenhouse Gas Emissions Inventory and Modeling Report, electricity accounted for over 50% of the town’s emissions in 2016. The largest consumer segment of electricity in Nederland is the residential sector, which accounts for about 2/3 of total consumption. Businesses and municipal facilities account for the last 1/3 of electric consumption.

On August 15th, 2017, the town’s Board of Trustees unanimously passed a resolution committing to the consumption of 100% renewable electricity by municipal facilities in 2020 and by the community at large in 2025. With this resolution, Nederland joined a growing number of communities across the United States making similar pledges: as of November 2018, the Sierra Club identified 93 cities, 11 counties, and two states that had also made “100% renewable” commitments. To date, only six cities have successfully

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a See Appendix C for the 2017 Xcel Energy Community Energy Report
b See Appendix A for full resolution text
executed their pledges, and none have done so in a way that could be directly transferable to a town like Nederland. 10

Nederland’s resolution was made with the intent of reducing the community’s greenhouse gas emissions footprint and with the hope that Nederland’s leadership would spur other Colorado communities to take similar action.

i. MUNICIPAL GOVERNMENT IN NEDERLAND

Nederland is a statutory town. Under Colorado law, the town government and elected officials may only exercise powers that are granted by, and subject to the provisions and limitations imposed by, the state legislature. 11 The head of Nederland’s town government is an elected mayor, who together with six elected town residents make up the Board of Trustees (BoT). The BoT is responsible for the town’s budgetary process and also sets the town’s legislative priorities, which are then executed by town staff and volunteer advisory boards.

The main body overseeing Nederland’s 100% renewable electricity goal is the Sustainability Advisory Board (SAB). The charter of the Sustainability Advisory Board is to:

“The Sustainability Advisory Board is an appointed board that advises the Board of Trustees to effectuate improvements to Town codes, operations and facilities on matters regarding sustainable practices, resource conservation, renewable energy, waste reduction, public outreach and education. SAB members serve for three-year terms.” 12

While the Board of Trustees passed the renewable electricity resolution, the SAB is responsible for the planning, implementation, and success of the goal.

B. ABOUT XCEL ENERGY AND REGULATED ELECTRICITY MARKETS

The State of Colorado operates within a traditionally regulated electricity market. Regulated markets are characterized by a vertically integrated structure in which private Investor Owned Utilities (IOUs) receive government-granted monopolies over every stage of the energy market from generation to the distribution and retail of electricity.

In Colorado, IOUs are overseen by the Colorado Public Utilities Commission (PUC) to ensure that they operate within the parameters of the so-called “regulatory compact.” The regulatory compact is the term for the bargain that IOUs make in exchange for their government-granted monopolies over a service territory. Broadly, IOUs must set rates at the cost of service; they have an obligation to serve all customers without discrimination within their territory; and they must submit to the oversight and authority of the PUC. 13
All activities of the PUC and of Colorado IOUs are overseen at the national level by the Federal Energy Regulatory Commission (FERC).\textsuperscript{14}

IOUs - specifically Xcel Energy - are the predominant electricity service providers in Colorado in terms of load served, however municipal utilities and cooperative electric associations (co-ops) exist in many rural areas. For the purposes of this document, the scope of research and recommendations assumes that all customers and any actions they take occur within Xcel Energy service territory.

Xcel Energy is the commonly-used name for the Public Service Company of Colorado (PSCo). PSCo is a subsidiary of utility holding company Xcel Energy, headquartered in Minnesota, and for the purposes of this document the name “Xcel Energy” will refer to PSCo.

Nederland and Xcel Energy are currently operating under a 20-year franchise agreement that expires in November 2027.\textsuperscript{15} Franchise agreements are characterized by the following:

“A franchise agreement grants permission to operate and maintain public utilities in the local government’s right-of-way. Through the agreement, the City allows the utility to use the City’s right-of-way to upgrade its equipment, install new power and natural gas lines, move its facilities to make way for new buildings or developments, excavate and replace streets and alleys, and bury pipes and lines. The City is compensated for the use of its right-of-way by a franchise fee, collected from customers, on whose behalf Xcel is operating, maintaining and improving its system.”\textsuperscript{16}

Due to the nature of the relationship between Xcel Energy and Nederland, it is important to recognize that the Town of Nederland does not have the ability to act unilaterally and autonomously. Collaboration and cooperation between Nederland and Xcel Energy will be a key success factor for achieving Nederland’s energy goals.

\section*{II. PROJECT OVERVIEW AND METHODOLOGY}

\section*{A. SCOPE OF PROJECT}

The resolution passed by the Board of Trustees specified parameters that helped to define the scope of work for this report.

The motivation behind the resolution is identified as a town-wide reduction in greenhouse gas emissions, however, the resolution focuses exclusively on Nederland’s
consumption of electricity, excluding other sectors like thermal energy, transportation, and other contributors to greenhouse gas emissions. Therefore, this report and the strategies explored herein are restricted to the electricity sector. The resolution specifies Nederland’s goal as achieving 100% community-wide electricity from renewable resources by 2025.

Therefore, the central questions of the report are:

1) How should the town define “100% renewable electricity”?
2) How should town decision makers evaluate and select potential strategies for achieving 100% renewable electricity, considering priorities defined by the community?
3) Given the current regulatory, political, and technological landscape in Colorado, is it possible for Nederland to achieve 100% renewable electricity by 2025?

The resolution identified many factors to be considered as the town pursued its goal, including low cost solutions, attaining energy justice, regional collaboration, and cost-benefit projections. The priority of this research focused on answering the central questions listed above, and future research and additional information would be required to fully evaluate all of the factors included in the resolution.

It is the intention of the authors to share this document with other organizations and towns in Colorado that are seeking answers to the same questions Nederland has been wrestling with. While further discussion and collaboration will be up to representatives of the town to initiate, it is the hope of the authors that freely sharing this document may help to answer some questions about pursuing a 100% renewable electricity goal.

B. METHODOLOGY

There were two parts to this project, which were at times conducted simultaneously and iteratively:

1. Stakeholder engagement
2. Research and analysis

i. STAKEHOLDER ENGAGEMENT

Research for this report was informed by continuous stakeholder engagement efforts.

Nederland’s Sustainability Advisory Board holds monthly meetings, which were attended regularly by the authors from early Spring 2018 through early Fall 2018. These meetings were regular opportunities to engage with Nederland residents and SAB members, hear topics of general concern to the community and of specific concern to this project, present updates on this work, and receive feedback. A key contribution of the SAB was
the list of decision-making criteria that were deemed most important to the Nederland community. These criteria informed the authors analysis of potential actions.

Additional weekly meetings were held between the authors and three key stakeholders: Jennifer Morse and Eryka Thorley of the Sustainability Advisory Board and David Hatchimonji of the Boulder County Sustainability Office. These meetings were used to review project details, plan future work, ideate, and refine project strategy.

In order to engage the broader community, the authors attended the Nederland Farmer’s Market during the summer months, wrote bi-weekly columns for the local newspaper The Mountain Ear, shared information on Nederland-specific social media groups, and distributed an online survey through all of these channels. The online survey was used to gauge the community’s familiarity and excitement about the 100% renewable electricity goal, understand willingness-to-pay for actions taken towards the goal, and gather general comments and concerns. Survey results helped inform the early-summer marketing campaign for Xcel Energy’s Renewable*Connect, understand community priorities better, and recommend actions to pursue.

In September 2018, a one-hour workshop was held for the BoT and open to the public. It was attended by BoT members, SAB representatives, a Boulder County employee, and an Xcel Energy representative among members of the community. This workshop presented the research and initial findings of the project and gathered feedback from BoT members and others present at the meeting.

**ii. RESEARCH AND ANALYSIS**

The direction of the project’s research and analysis was largely informed by the outcomes of the stakeholder engagement process. Stakeholders produced a long list of possible actions for the town to take towards its 100% renewable electricity goal, which was further contributed to by project authors.

Research conducted by authors provided an initial “filter” to the list of actions. Subsequently, a number of experts were consulted to provide perspective on the legal, regulatory, technical, and financial considerations of each action. The input of these experts further filtered the actions, which were then evaluated according to the criteria established by the SAB.

Concurrently with these efforts, the project authors collected electricity usage and programmatic data from the Town of Nederland Public Works Department, Xcel Energy, Boulder County EnergySmart, and Boulder County Partners for a Clean Environment.

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*c See page 18 for an in-depth discussion about the criteria established by the SAB
*d See Appendix H for survey results
*e See Appendix G for a list of experts consulted during this project
*f See Section 2-1 of this report for a discussion of the SAB evaluation criteria
The data provided the means to establish a baseline of electricity consumption and program participation for the community of Nederland, thus allowing for the creation of a simple model to understand what conditions would need to be in place for Nederland to achieve its 2025 energy goal.

The model relies on renewable energy credits (REC) to account for progress towards the 100% goal. The 100% goal is measured against the town’s 2017 electricity consumption of about 12 million kWh and is defined as Nederland residents, businesses, and the municipality “holding” the equivalent of 12 million kWh in RECs or reducing electricity consumption through energy efficiency measures. The nuances of this methodology are discussed in detail later in the document.

The assumptions and caveats that specifically apply to the author’s use of data are discussed throughout the report where applicable.

C. DELIVERABLES

There are two deliverables associated with this project:

1. This report, which contains all of the research, background information, analysis, and discussion pertinent to answering the central questions of the project.
2. A model that will allow the town to track their progress towards 100% electricity from renewable resources by 2025.

These deliverables were completed in Fall 2018 and will be held by the Sustainability Advisory Board.

D. MAJOR ASSUMPTIONS AND CAVEATS

The body of work around community strategies for 100% renewable energy or electricity is entirely new and constantly changing. The aim of this project is to provide useful analysis on potential strategies that were available at the time of publication. Thus, the strategies included in this analysis are not exhaustive. A parallel goal of this project was to provide a framework through which decision markers in Nederland could evaluate the impact of potential actions.

Given the rapidly changing nature of this field, it is recommended that Nederland continues to utilize resources at its disposal to advise the town on future energy decisions.
Assumptions are discussed throughout the document where applicable. The major caveats of this report are as follows:

<table>
<thead>
<tr>
<th>Assumption</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dependence on third-party data</strong></td>
<td>Data used in this project was provided by a number of third-party sources, and not validated independently by project authors.</td>
</tr>
<tr>
<td><strong>Dynamic nature of energy industry</strong></td>
<td>Findings and information in this report reflect the legislative, regulatory, or technological realities of Colorado in 2018, and may be invalidated by changes to any of these areas.</td>
</tr>
<tr>
<td><strong>Applicable to Xcel Energy territory within Colorado</strong></td>
<td>Strategies are limited to a regulated electricity market with Xcel Energy as a service provider in the state of Colorado.</td>
</tr>
<tr>
<td><strong>Project scope</strong></td>
<td>The project scope is limited to electricity and therefore excludes other pertinent areas of discussion and analysis.</td>
</tr>
</tbody>
</table>
PART 2
DISCUSSION OF POTENTIAL ACTIONS
I. CRITERIA FOR EVALUATING POSSIBLE ACTIONS

As described in the project methodology, a key component of the action analysis were the criteria selected by the Sustainability Advisory Board at the June 2018 meeting. These criteria describe factors important to Nederland and were used as a lens to further evaluate actions that met basic feasibility standards.

The criteria are inclusive of a wide range of concerns. Given that, actions for the town to consider pursuing were not expected to meet all of the criteria, but, rather, satisfy a subset. The definition of each criterion is shown below:

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost Effective</td>
<td>preference is given to actions that are revenue positive or cost neutral for the customer, with little or no upfront investment</td>
</tr>
<tr>
<td>Efficiency Gains</td>
<td>preference is given to actions that decrease energy consumption</td>
</tr>
<tr>
<td>Emissions Reduction</td>
<td>preference is given to actions that reduce, or will lead to a reduction of greenhouse gas (GHG) emissions</td>
</tr>
<tr>
<td>Human Capital</td>
<td>preference is given to actions that can be executed by the volunteer members of the Sustainability Advisory Board</td>
</tr>
<tr>
<td>Justice</td>
<td>preference is given to actions that are affordable and accessible to all consumers within Nederland</td>
</tr>
<tr>
<td>Local</td>
<td>preference is given to actions that can be executed within Nederland, Boulder County, or an adjacent county</td>
</tr>
<tr>
<td>New Renewable Generation</td>
<td>preference is given to actions that can be taken by Nederland that would create meaningful positive change in the electricity generation mix</td>
</tr>
<tr>
<td>Regulatory Compliance</td>
<td>preference is given to actions that are sanctioned and can be executed under current regulation</td>
</tr>
<tr>
<td>Renewable Energy Credits</td>
<td>preference is given to actions that, for ease of measuring impact, have the associated RECs attached to the action</td>
</tr>
<tr>
<td>Replicability</td>
<td>preference is given to actions that can be piloted within Nederland and adopted by other communities across Colorado and beyond</td>
</tr>
<tr>
<td>Time</td>
<td>preference is given to actions that will produce outcomes for Nederland before or by 2025</td>
</tr>
</tbody>
</table>

Based on research, expert opinions, and consideration of these criteria, each action received a recommendation for the town to either pursue or to not pursue further at this time.
A summary chart of the actions evaluated in this document and the criteria that each action met is displayed on the following pages. A checkmark indicates that the action satisfies the criterion; an X indicates that the action fails the criterion; and “not applicable” is used where required.

<table>
<thead>
<tr>
<th>ADVOCACY AND COLLABORATION</th>
<th>Cost</th>
<th>Effectiveness</th>
<th>Efficiency</th>
<th>Gaits</th>
<th>Emissions Reductions</th>
<th>Human Capital</th>
<th>Justice</th>
<th>Local</th>
<th>New Renewable Generation</th>
<th>Regulatory Compliance</th>
<th>RECS</th>
<th>Replicability</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advocacy in Nederland</td>
<td>✓</td>
<td>N/A</td>
<td>✓</td>
<td>N/A</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercommunity Collaboration</td>
<td>✓</td>
<td>N/A</td>
<td>✓</td>
<td>N/A</td>
<td>✓</td>
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<td>N/A</td>
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II. ACTION DISCUSSION AND EVALUATION

This section discusses and analyzes actions considered over the course of the project. Information provided for each action was derived from research and interviews with industry experts.

Actions are grouped within five overarching categories: advocacy and collaboration, government actions and policy options, energy product purchasing decisions and opportunities, energy efficiency actions, and emerging technology opportunities.

A. ADVOCACY AND COLLABORATION

Grassroots campaigns facilitate information sharing across communities, galvanize participation from residents and business owners, create community mandates for local government, and help sustain momentum in a movement over time. Collaboration between advocacy groups amplifies impact. The actions described in this section explore ways that Nederland has already achieved success through advocacy and collaboration and can continue to do so while making progress towards its goal.

i. ADVOCACY IN NEDERLAND

**Action:** Advocacy in Nederland  
**Summary:** Grassroots advocacy in Nederland is a strong agent of change. Advocacy is a tool for educating the community and growing and sustaining momentum in the 100% renewable electricity goal  
**Status:** Ongoing  
**Recommendation:** Pursue

Years of community-led sustainability advocacy resulted in the passage of Nederland’s 100% renewable electricity resolution.

In 2011, a steering document entitled “Envision Nederland 2020” was jointly written by the town government and community advocates.\textsuperscript{18} The document outlined the community’s priorities and reflected the desire to move towards a sustainable Nederland by 2020.

Since 2011, about a dozen sustainability-focused resolutions have been passed by the BoT, including adoption of a zero-waste action plan, the Mayor’s signature to the Paris Climate Accord, and declaration of the Board of Trustees’ position against fracking.\textsuperscript{19}
Additionally, large solar projects have been approved by the Board of Trustees and bid to Xcel Energy, but never won or developed.\textsuperscript{20}

Nederland’s citizen-advocate group Climate Together Nederland (CTN) is responsible for the town’s 100% renewable electricity resolution. The group was established in late 2016 and became active in “100% renewable energy” advocacy after attending a conference held in March 2017 sponsored by the Climate Reality Project.\textsuperscript{21} Following the conference, CTN members approached the Nederland SAB with the idea of sponsoring a 100% renewable energy resolution. Soon after, several members of CTN were voted in to join the SAB.\textsuperscript{22}

After a campaign effort which won over 500 signatures in support of the 100% resolution from Nederland residents and multiple presentations to the Nederland Board of Trustees, the 100% renewable electricity resolution was unanimously passed by the BoT on August 15, 2017.\textsuperscript{23}

The clear community mandate in support of the resolution and government championship for the resolution is a point of pride and asset to Nederland’s ongoing process to achieve 100% renewable electricity.

While the initial campaign was a success that culminated in the unanimous passage of the 100% renewable electricity resolution, it is crucial that Nederland maintain and increase this support over the next seven years in order for the town to achieve its goal of community-wide consumption of 100% renewable electricity by 2025. Having a strong and persistent presence keeps the initiative at the forefront of the community’s agenda.

The Sustainability Advisory Board has achieved community outreach through various avenues such as the town Farmer’s Market, the local newspaper, social media, and a community engagement survey.\textsuperscript{24} These efforts, perhaps in conjunction with groups like CTN, should be continued and expanded.

\textit{Evaluation Based on SAB Criteria}

- Cost Effective: Advocacy leading to the passage of the resolution did not require any upfront capital.
- Human Capital: Large number of persons were needed to pass the 100% resolution. CTN members held weekly strategy meetings in addition to campaigning activities.
- Justice: CTN members wrote language into the resolution to ensure “that the Town will create structured mechanisms to include low-income citizens in the benefits to be derived from affordable clean energy” and “low-income community solar...offer the opportunity to equitable distribute [sic] resources, address poverty, stimulate new economic activity in Nederland, and ease financial burden on those most impacted by high energy costs.”\textsuperscript{25} Achieving these goals will require sustained advocacy.
• Local: Nederland’s BoT set this goal for both the municipality, as well as the community at large.
• Replicability: Over 80 communities across the country have made a similar pledge to 100% renewable.
• Time: Passage of the resolution took five months of advocacy efforts starting in March 2017.

**Recommendation**

Ongoing community advocacy will continue to maintain widespread support for the 100% electricity goal and provide elected officials with a mandate to support and pursue actions that advance Nederland towards the goal. *It is recommended that Nederland pursue this action.*

### ii. INTERCOMMUNITY COLLABORATION

| **Action:** Intercommunity Collaboration |
| **Summary:** Nederland participation in regional collaboration initiatives like Colorado Communities for Climate Action (CC4CA) will amplify the town’s voice at the regional and state levels |
| **Status:** Ongoing |
| **Recommendation:** Pursue |

The creation of collaborative intercommunity groups is vital to the success of a goal like 100% renewable electricity. Colorado Communities for Climate Action (CC4CA) and the Mountain Sustainability Alliance Summit are prime examples of intercommunity collaboration groups.

Climate goals will not be achieved on a broad scale with parties acting on an individual basis. Through inter-community collaboration there is an opportunity to be part of the bigger picture and affect long term policy change across the State of Colorado. Collaborative community efforts provide a platform for inter-community knowledge sharing and give small communities more seats at the table and a louder voice to elevate their priorities and concerns at the legislative and regulatory level. In the example of CC4CA, the organization sets annual policy priorities and uses member dues to retain public affairs and strategy support from outside firms to better lobby the Colorado legislature to achieve these aims. The Nederland BoT voted to join CC4CA on July 17, 2018.

As communities pursue 100% renewable energy goals, there are long-term strategies that could create meaningful change, but require legislation to enable new statutory authority. Inter-community collaboration is an opportunity to demonstrate leadership in the fight against climate change.
Evaluation Based on SAB Criteria

- **Cost Effective:** Annual membership fees for CC4CA are typically $2,500, but Nederland was able to secure a membership level below that due to their size and socio-economic makeup.
- **Human Capital:** Active membership in CC4CA will require monthly engagement from a BoT liaison with staff support from SAB, as well as additional committee and working group engagement.
- **Local:** CC4CA’s mission is to amplify local voices into state and federal policymaking processes, reversing the typical flow of decision making and goal setting from top-down to bottom-up.
- **Replicability:** Nederland is the 18th community to join CC4CA, which represents over 1/8th of Colorado’s population.\(^{28}\)
- **Time:** It is the hope that intercommunity collaboration will produce results by or before 2025.

**Recommendation**

Intercommunity collaboration can provide leverage resources and knowledge from small communities to affect legislative and regulatory change advancing renewable electricity goals. **It is recommended that Nederland continue to pursue this action.**

**iii. LEVERAGING THE ENERGY FUTURE COLLABORATION INITIATIVE**

<table>
<thead>
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<th><strong>Action:</strong></th>
<th>Leveraging the Energy Future Collaboration Initiative</th>
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<tbody>
<tr>
<td><strong>Summary:</strong></td>
<td>Leverage the Memorandum of Understanding signed with Xcel Energy to advance Nederland’s goals</td>
</tr>
<tr>
<td><strong>Status:</strong></td>
<td>Proposed</td>
</tr>
<tr>
<td><strong>Recommendation:</strong></td>
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In May 2018, the Nederland Board of Trustees signed a Memorandum of Understanding (MOU) with Xcel Energy entitled the Energy Future Collaboration.\(^{29}\) Nederland is the seventh community in Colorado to sign this MOU with Xcel Energy, along with the cities of Alamosa, Breckenridge, Denver, Lakewood, Lonetree, and Windsor. Additionally, Louisville is expected to sign an MOU by the end of 2018.\(^{30} \)\(^{31}\) The MOU states that the community has a goal of pursuing 100% renewable energy, and that Xcel Energy and the community will work together towards this goal.\(^{8}\)

Collectively, the communities that have signed the MOU represent almost 900,000 people, or about 16% of Colorado’s population and approximately 60% of Xcel Energy’s

\(^{8}\) Please see Appendix D for MOU text
customers. Under the aegis of the MOU, and with additional legislative and regulatory recognition of the relationship it represents, it is possible that the MOU could provide a way for Nederland and similar communities to more quickly advance their goals.

In 2018, State Representative KC Becker introduced HB18-1428 “Authorize Utility Community Collaboration Contract.” While the bill did not pass, it would have codified the relationship between the utility and the community established by the MOU and required the PUC to approve and oversee of the relationship. Because this bill would likely have given more weight to the Energy Future Collaboration partnership and opened up the possibility of collaborating on preferential products or programs that advanced communities’ 100% renewable goals, Nederland should support this or similar legislation if reintroduced in the future.

_Evaluation Based on SAB Criteria_

- **Cost Effective:** The Energy Future Collaboration MOU was reviewed by Nederland’s attorney, but otherwise required no upfront costs. Future collaboration efforts could likely require additional legal review.
- **Human Capital:** Substantial hours from SAB volunteers were required to put together and approve the MOU, and more hours will be required to create and approve the work plan phase of the MOU. Through these efforts, a strong working relationship has developed between Nederland and Xcel Energy, but this action is time intensive and will require additional input, discussion, drafting, and revision from SAB members, town legal counsel, and the BoT.
- **Local:** The signed MOU enshrines a working relationship between the parties of Xcel Energy and Nederland, and directly reflects the concerns and priorities of the town.
- **Regulatory Compliance:** The MOU is currently an independent relationship between the town and the utility, but legislation like HB18-1428 that enshrines this relationship in statute should be supported and pursued.
- **Replicability:** To the extent that other communities within Xcel Energy territory can also develop MOUs with the utility, this option is replicable. To replicate the MOU outside of Xcel Energy territory would depend on the incumbent regulated utility.
- **Time:** Xcel Energy engaged Nederland in December 2017 to present the opportunity of an MOU between parties. Nederland signed the MOU on May 15, 2018 making it an approximate 6-month process for adequate discussion, review, and revision. The work plan will likely require a similar time frame and leveraging this relationship towards results will likely take 3-5 years.

_**Recommendation**_
Nederland is actively engaged in developing the work plan with Xcel Energy as the next phase in the MOU process and will likely benefit from this relationship in various ways. *It is recommended that Nederland continue to pursue this action.*

### B. GOVERNMENT ACTIONS AND POLICY OPTIONS

Nederland’s elected government - the Board of Trustees and Mayor - are key actors in achieving 100% renewable electricity. At the Nederland municipal level and Boulder County government level, several actions have already been undertaken that support progress towards the 100% goal and there are several additional actions to consider.

#### i. MUNICIPAL CODES, POLICIES, AND ACTIONS

**Action:** Municipal Codes, Policies, and Actions  
**Summary:** Continue to pass improvements in building codes and zoning that support the town’s goals. Advocate for these goals at the state level  
**Status:** Ongoing  
**Recommendation:** Pursue

The Town of Nederland has passed various measures to lower barriers to renewable energy and energy efficiency adoption. The town could take further action by advocating for support from the state PUC.

- Building codes: Nederland is governed under 2012 International Code Council building codes and 2014 electrical codes. This helps ensure that new buildings meet basic energy efficiency standards.  
- Solar Friendly Community: Nederland is recognized as a “Solar Friendly Community” by the Colorado Solar Energy Industries Association (COSEIA), meaning the town follows best practices in lowering barriers to solar development as outlined by COSEIA.  
- Colorado Public Utilities Commission Engagement: Direct engagement with the Colorado Public Utilities Commission (PUC) can prove to be another worthwhile avenue of action. The PUC will schedule back-to-back, half-hour meetings with town representatives and the three appointed commissioners to give public officials the opportunity to share pain points and needs of Colorado communities. This is an important opportunity for Nederland’s mayor to approach the PUC, share Nederland’s electricity goals, and ask for support from the PUC to achieve these goals.

*Evaluation Based on SAB Criteria*
• Cost effective: Changing regulatory codes or engaging in activism within Nederland does not incur immediate costs.
• Efficiency Gains: Updating the building codes adopted by the Town will lead to a higher standard of efficiency in new buildings.
• Emissions Reductions: Additional solar PV development is facilitated by the lowering of barriers as outlined by COSEIA.
• Human capital: These actions will require time and attention from Nederland’s mayor, BoT, and members of the Sustainability Advisory Board. However, outside lawyers or experts are likely not required.
• Local: These actions would be enacted by elected Nederland officials or volunteers serving on the Sustainability Advisory Board.
• Replicability: Changing municipal codes and lobbying the PUC is easily replicable among other communities.
• Time: The actions recommended here are short-term actions.

Recommendation
Continuing to ensure that codes and zoning regulations lower barriers to renewable energy and energy efficiency adoption and advocating for Nederland’s electricity goals at the state level are relatively easy and immediate ways to act. It is recommended that Nederland continue to pursue these actions.

ii. COUNTY GOVERNMENT SUPPORT FOR 100% RENEWABLE ELECTRICITY

Boulder County pursued or passed several measures which provide support to the SAB in its efforts to realize 100% renewable electricity.

• Grant funding: The SAB has won several rounds of an annual $15,000 sustainability matching grant from Boulder County, and in recent rounds a portion of these funds were earmarked to support Nederland’s energy goals. The grant requires a match of volunteer hours, which are fulfilled by members of the SAB and in 2018 were also contributed to by the authors of this report.
• Dedicated sustainability tax: In 2016 Boulder County passed a countywide sustainability tax. This tax will go into effect in 2020 and guarantees that 0.125% of the County’s existing 0.25% sales tax will be earmarked to fund sustainability projects undertaken by communities within the county. The tax will be levied
for 15 years and provides another opportunity for Nederland to tap into funding for 100% renewable electricity actions.38

**Evaluation Based on SAB Criteria**

- **Cost Effective:** Nederland’s pursuit of 100% renewable electricity benefits from Boulder County’s support. Grants and future tax revenue provide the opportunity to fund projects and give small stipends to volunteers.
- **Human Capital:** This will require time and attention from members of the Sustainability Advisory Board. However, outside resources are not required.
- **Justice:** County financial support further enables Nederland to ensure that actions benefit all citizens regardless of citizen ability to pay.
- **Local:** County support for town activities, and town support for resident initiatives is inherently local dollars returning to support local priorities.
- **Replicability:** Boulder County is uniquely positioned to be able to support Nederland’s goals financially through dedicated sustainability funding and with technical support through programs like Partners for a Clean Environment or EnergySmart.
- **Time:** Grant funding and tax revenues are either already occurring, or scheduled to occur before 2025.

**Recommendation**

Nederland should continue to fully pursue grant funding opportunities from Boulder County and consider earmarking funds from the sustainability tax towards the 100% renewable electricity initiative. **It is recommended that Nederland pursue these actions.**

### iii. COMMUNITY CHOICE AGGREGATION POLICIES

**Action:** Community Choice Aggregation (CCA) Policies  
**Summary:** CCA is a mechanism that allows towns or regions to purchase their own electricity generation, rather than rely on an IOU to supply  
**Status:** Not recommended  
**Recommendation:** Not recommended to pursue at this time

Community Choice Aggregation (CCA) is a mechanism that allows communities in regulated states to pool their collective energy demand and purchase their electricity supply from the producer of their choice. As of 2018, Massachusetts, Ohio, New Jersey, Illinois, Rhode Island, New York, and California all have statutory language that permits CCAs to form and operate. Under a CCA model, the incumbent utility still provides transmission and distribution of electricity, as well as general administration, billing, and emergency outage services.
The success of CCAs in California is partially attributed to the “opt-out” provision defined in statute.\textsuperscript{41} Within CCA territories in California, consumers are automatically served by the CCA, and must choose to opt-out if they prefer to be served wholly by the utility.\textsuperscript{42} This provision takes advantage of consumers general tendency to go with the default choice.

Marin Clean Energy (MCE) is the first operating CCA in the United States. Its basic product for all consumers within its territory offers electricity sourced from 50% renewable resources (“Light Green”), and its premium opt-in product offers consumers electricity sourced from 100% renewable resources (“Deep Green”).\textsuperscript{43} Justin Kudo, Deputy Director of Account Services at Marin Clean Energy (MCE) estimates that MCE’s opt-out rate for its Light Green product is 13.8% of meters within MCE territory, and opt-in levels for the premium Deep Green product are 2% of meters.\textsuperscript{44} The area’s incumbent utility, PG&E, offers a similar product (“Solar Choice”) to that of MCE’s Light Green, yet participation in this opt-in program only stands at 0.15%.\textsuperscript{45} The lesson illustrated by this comparison is that it had been easier for MCE to increase the amount of electricity from renewable resources consumed within its territory by virtue of customers automatically being enrolled into the product than it has been for PG&E to convince customers to elect for a higher-renewable content mix.

A customer in a regulated territory without a CCA – like a Nederland resident – generally has two choices: be served by the incumbent utility or opt to go off-grid.\textsuperscript{8} Without the benefit of aggregation, the consumer’s ability to influence purchasing decisions of a utility are dependent on the consumer’s purchasing power, the utility’s dialogue with its stakeholders, and limited other variables. At present, without enabling CCA legislation, a community like Nederland could levy a tax and then use that revenue to offset the cost of a resident or businesses enrolling in a program that would offer a higher renewable content mix in electricity generation.\textsuperscript{i}

Legislation is required at the state level in order for CCAs to exist, therefore it is possible that CCAs may come to Colorado but not without effort and the resolution of the legacy asset issue. CCAs create customer base defections from utilities that change the financial pro formas on long-term generating assets like coal or natural gas plants. There is a fierce debate over what party should be responsible for paying for legacy assets that are no longer needed in a market where CCAs allow consumers to purchase electricity from solar or wind plants instead.

\textsuperscript{h} In some states or cities, living off-grid can be technically illegal depending on local codes. Read the story of residents in Costilla County, CO clashing with county officials over this issue: Minor, Nathaniel. “Off-Grid Residents Claim Victory as Costilla County Backs Off Proposal.” Colorado Public Radio, 15 Aug. 2013, www.cpr.org/news/story/grid-residents-claim-victory-costilla-county-backs-proposal

\textsuperscript{i} See page 38 for a discussion about Xcel Energy’s product Renewable*Connect
Evaluation Based on SAB Criteria

- Emissions Reduction: Aggregation would allow Nederland to purchase its own generation from a source selected for its renewable content. Arguably, if followed by Xcel Energy retiring an equivalent amount of legacy resources, this would lead to a reduction in emissions resulting from generating electricity.
- Justice: CCA legislation would provide equal access to all for renewable electricity. In California, this has been achieved at rates lower than incumbent utility generation prices.
- New Renewable Generation: Nederland could choose to support new renewable generation by entering into a PPA for a new wind or solar resource.
- Regulatory Compliance: Currently not compliant with Colorado statute, and absent a comprehensive, expensive, and massive effort, CCA legislation is not likely to pass the legislature.
- Renewable Energy Credits: If CCA legislation passed and a CCA was set up in Nederland or Boulder County, a decision would have to be made to not use unbundled voluntary RECs to meet renewable content goals. CCAs like Marin Clean Energy have made this distinction clear.
- Replicability: Seven states currently have CCA legislation on the books; this number may increase in the coming years.

Recommendation

A major issue with CCA design exists around legacy assets and what party - the customer or the IOU - will pay for them if they are no longer needed. To resolve this and other issues, discussions between energy and legal experts from Xcel Energy, the PUC, and the state need to take place. Therefore, it is not recommended that Nederland pursue at this time.

C. OPPORTUNITIES FOR PURCHASING RENEWABLE ELECTRICITY

While the Nederland Board of Trustees’ 100% renewable electricity pledge was made on behalf of all residents, businesses, and municipal consumers of electricity within town limits, the Nederland government municipal load only accounts for approximately 1/12th of the total community’s load. Therefore, of the electricity products available for the town to pursue, direct influence can only be exercised on this portion. The following section describes purchasing decisions made by the town during 2018, as well as electricity products available to consumers that the Board of Trustees and Sustainability Advisory Board could support through marketing campaigns or incentives to encourage adoption by residents and businesses.

\[\text{See Appendix B}\]
i. COMMUNITY SOLAR GARDENS

A community solar garden (CSG) is an electricity product that resembles a community garden and is intended to serve an analogous segment of consumers: for consumers who do not have yard space to grow a garden, or rooftop space and capital to install solar PV, CSGs - like community gardens - offer a solution.

CSGs are developed, owned, and operated by an Independent Power Producer (IPP). In Colorado, customers enter into fixed-term, typically fixed-price contracts with the IPP, which then sells the electricity produced by the CSG and associated RECs to Xcel Energy. Xcel Energy, in turn, credits the customer for the electricity that their “share” of the CSG produces each month. Like a typical PPA mechanism, the customer enters the contract as a hedge against volatility in electricity prices or to support the development of solar.\(^\text{k}\)

CSG systems are designed to serve multiple customers both in residential and business sectors; no one subscriber may subscribe to more than 40% of the CSG’s generated output, preventing a large company from monopolizing CSG subscription opportunities.\(^\text{l}\) Incentives exist for CSG operators to sign up low or middle-income customers, even though in Colorado this has proved difficult to achieve.\(^\text{46}\) Customers must subscribe to a CSG located within their county or a directly adjacent county.\(^\text{1}\) Xcel Energy runs an annual Request for Proposal (RFP) process for IPP solar developers, who may apply to win development rights for community solar systems up to 2 MW in size.\(^\text{49}\) In 2017, 27 MW were available for developers to win.\(^\text{50}\)

Because CSGs in Colorado must sell the RECs they produce to the IOU and cannot retire them on behalf of the individual subscriber, subscriptions to CSGs do not factor directly into the methodology created to measure Nederland’s progress towards 100% renewable electricity. Regardless, a subscription to a solar garden is a way for a consumer to put their dollars towards new renewable generation, and therefore remains an attractive option to many customers. If considering CSGs, there are several actions open to Nederland.

a. Municipal Subscription

**Action:** Community Solar Gardens – Municipal Subscription  
**Summary:** Nederland subscribed 100% of its municipal facility load – the electricity consumed by town facilities – to a community solar garden in 2018  
**Status:** Completed  
**Recommendation:** Not applicable

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\(^k\) Ibid.  
\(^l\) Ibid.
On May 15, 2018, the Nederland Board of Trustees voted unanimously to accept the recommendation of the SAB and signed a 20-year Power Purchase Agreement (PPA) subscribing municipal load to a CSG. The town will pay $0.06690, escalated annually, per kWh for 25% of the electricity produced by Oak Leaf Energy Partners’ CSG in Weld County, Colorado.\textsuperscript{51} On an annual basis, 25% of the CSG output is estimated to cover 100% of the town’s 2017 load (plus an expected increase from a new wastewater treatment plant), or about 950,000 kWh.\textsuperscript{52}

Although this decision would not yield RECs for the town to count towards its electricity goal, the SAB’s recommendation to the BoT took the position that the financial cost-savings projected by the PPA contract coupled with the support of new renewable generation made this decision relatively low-risk and advanced the spirit of Nederland’s 100% goal.\textsuperscript{55}

\textit{Evaluation Based on SAB Criteria}

- \textbf{Cost Effective:} The subscription of the municipal electricity load to the CSG provides the town with guaranteed price stability over the 20-year term of the PPA and likely cost savings.
- \textbf{Emissions Reduction:} According to estimates given by Oak Leaf, 13,598 metric tons of carbon dioxide will be eliminated over the course of the 20-year contract.\textsuperscript{54}
- \textbf{Local:} Siting for the 2 MW solar array will be located in adjacent Weld County.
- \textbf{New Renewable Generation:} Construction of the CSG will add 2 MW solar to the grid.
- \textbf{Regulatory Compliance:} This project is occurring under Xcel Energy’s annual RFP for CSG and follows Colorado statutes regarding CSG development.
- \textbf{Renewable Energy Credits:} RECs from this and all CSGs in Colorado contribute towards Xcel Energy’s RPS compliance and factor into the IOU’s baseline renewable generation content. Therefore, the town’s decision cannot directly contribute towards the 100% goal.
- \textbf{Replicability:} For states with CSG legislation, this is a feasible option for communities to explore, understanding that without RECs retired on the subscriber’s behalf it cannot advance the metrics tracking electricity goals.

\textit{Other Considerations}

Subscription to a CSG supports the spirit of Nederland’s 100% renewable electricity resolution, in that it supports new, local renewable generation in a low-cost, accessible manner. However, because RECs produced by CSGs flow back to Xcel Energy under Colorado regulation, subscriptions to CSGs cannot be accounted for in the progress tracking methodology for Nederland’s journey towards 100% renewable electricity. As Xcel Energy’s baseline renewable generation content is already factored into the

\textsuperscript{51} For reference, the Town of Nederland’s municipal electric consumption in 2017 was 866,505 kWh. See Appendix B for more data
tracking methodology, counting the RECs produced by a CSG directly towards the
town’s goals would be double counting the renewable electricity added onto the grid.

Recommendation
A recommendation for this action is not applicable as it has already been
completed by Nederland.

b. Individual Subscriptions to Community Solar Gardens

Action: Community Solar Gardens – Individual Subscriptions to CSGs
Summary: Businesses and residents can individually pursue and subscribe
loads to eligible CSGs, although without receiving the RECs this will not
advance the town towards its goals
Status: Proposed
Recommendation: Not recommended to pursue at this time

Businesses and residents have the ability to individually and independently subscribe to
a community solar garden within or adjacent to their county of residence. Subscription
and billing credits are handled in the same fashion as described in the community solar
garden introduction section. A portal exists on the Xcel Energy website titled Solar
Rewards Community for businesses and residents to find and subscribe to current CSG
opportunities. In Colorado, CSG customers do not keep RECs generated by solar gardens.

Evaluation Based on SAB Criteria

- Cost effective: Typically, the long-term fixed price of a CSG PPA will provide cost
  savings to a customer as electricity prices otherwise fluctuate depending on fuel
  prices and market conditions.
- Emissions reduction: Community Solar Gardens generate electricity with zero
  greenhouse gas emissions.
- Human capital: Businesses and residents are free to pursue CSG opportunities
  individually, but a large-scale wave of individual CSG sign-ups in Nederland
  would require a marketing and educational push by the town.
- Justice: With carve-outs for low and middle-income customers, the CSG program
  is designed to provide affordable access to all customers.
- Local: Businesses and residents must subscribe to CSGs within their county or an
  adjacent county.
- New renewable generation: New CSGs represent new solar arrays in Colorado.
- Regulatory compliance: CSGs are enshrined in Colorado statute.
Renewable Energy Credits: RECs from all CSGs in Colorado will contribute towards Xcel Energy’s RPS compliance and factor into the IOU’s baseline renewable generation content.

Replicability: All Xcel Energy customers are eligible to subscribe to CSGs if capacity is available.

Time: New CSGs are built annually in Colorado, representing new opportunities each year for customers.

Other Considerations
Same considerations under “Municipal Subscription” apply.

Recommendation
Due to the statutory language that mandates that RECs generated by CSGs are sold to the IOU and not retired on behalf of the subscriber, a CSG subscription cannot technically advance the town’s progress towards its electricity goals. Therefore, it is not recommended that Nederland pursue the action at this time.

c. Municipal Ownership and Operation of a Community Solar Garden

Action: Community Solar Gardens – Municipal Ownership and Operation of a CSG
Summary: In partnership with a solar developer, Nederland could secure land and win a capacity allotment from Xcel Energy to build a hometown CSG and operate it as a non-profit
Status: Proposed
Recommendation: Not recommended to pursue at this time

The City of Golden, Colorado is exploring how a CSG could be developed under municipal control for the benefit of the citizens of Golden. Golden is in the process of evaluating options, including how the city might submit a CSG bid in a future round of Xcel Energy Requests for Proposals, or build a behind-the-meter system offsetting the price of electricity for a large town facility and then pass these savings along to citizens via some other method, like a municipal water bill. A CSG operated as a non-profit or cooperative is an interesting idea for increasing the amount of local renewable energy directly available to residents.

Nederland could apply to Xcel Energy’s annual Community Solar Garden RFP process to win an up-to 2 MW allotment. In partnership with a developer, Nederland could own and operate a CSG as a non-profit entity, offering Nederland residents and businesses preference and filling up unsubscribed energy with a Boulder County-wide or County-adjacent offering. The PPA price would be set to recover costs of administration, construction, interconnection, and operation & maintenance, without requiring additional margins.
Evaluation Based on SAB Criteria

- Cost effective: This is a particularly expensive action for Nederland to pursue. The costs of an interconnection study and control of land - basic prerequisites for pursuing a solar development project - would likely be in the millions before a deal could be structured, ground broken, and a PV system operational.
- Justice: This option would allow the Town of Nederland to design a product that specifically serves low and middle-income residents.
- Local: This action would ideally site a new CSG within the town limits of Nederland but identifying and purchasing or leasing the approximate ten acres of land required to build a 2 MW project is a significant barrier.
- Regulatory Compliance: Projects occur under Xcel Energy’s annual RFP for CSG development and follows Colorado statutes regarding CSG development.
- Renewable Energy Credits: RECs from all CSGs in Colorado will contribute towards Xcel Energy’s RPS compliance and factor into the IOU’s baseline renewable generation content.
- Replicability: A municipal non-profit CSG could be attractive to other Colorado communities. A partnership with a developer that demonstrates success in pioneering this model could lead to additional opportunities for the developer and other communities.
- Time: This option would likely take at least three to five years.

Other Considerations
Same considerations under “Municipal Subscription” apply.

Recommendation
The main challenges to this action lie in identifying suitable and affordable land (approximately 10 acres within Nederland or Boulder County), structuring financing, and identifying an appropriate expert to lead this process. It would provide town residents and businesses with an extremely affordable renewable energy option, but the economics of pursuing this project make it one of the most expensive actions discussed in this report. Due to these reasons and the inability to retain the associated RECs produced by the CSG and therefore advance the town’s 100% goal, **it is not recommended that Nederland pursue this action at this time.**
ii. OFFSETS THROUGH VOLUNTARY RENEWABLE ENERGY CREDITS

**Action:** Offsets through Voluntary Renewable Energy Credits  
**Summary:** Purchasing voluntary RECs is a way to quickly advance towards energy goals through acquiring the environmental attributes of renewable generation without building or financing new wind or solar  
**Status:** Not recommended  
**Recommendation:** Not recommended to pursue at this time

Renewable Energy Credits (RECs) are a mechanism that represent the rights to the environmental, social, and non-power attributes of renewable electricity generation. One REC is created when one megawatt-hour of electricity is generated and delivered to the electrical grid via a renewable energy resource, like a wind or solar plant.\(^{59}\)

RECs were established as an accounting mechanism in the United States based on preexisting legal infrastructure to solve the problem of tracking utility progress towards mandatory Renewable Portfolio Standards and are mostly used for this function. However, they are by themselves a commodity that can be traded, sold, or bought.

As whoever possesses a REC is the legal consumer of the one megawatt-hour of renewable electricity that generated the REC, and not necessarily the owner of the solar PV system or wind turbine farm, RECs add an additional level of complexity to all discussions around renewable energy. RECs can create tension between the spirit of a goal - reducing greenhouse gas emissions through renewable energy sources - and the letter of a goal - achieving 100% consumption of electricity generated by renewable resources. Just as an individual cannot own a car or house without holding the deed or title, no one can consume or have consumed renewable energy without holding the REC or having the REC retired on their behalf.\(^{n}\)

There are several different ways of referring to RECs:

- **Compliance RECs** are used to track a utility’s progress towards mandatory renewable electricity goals, typically set by a state Renewable Portfolio Standard.
- **Voluntary RECs** are used for purposes outside of tracking utility goals, like tracking the sustainability goal of a company, and are typically unbundled.
- **Bundled RECs** are “attached” to the electricity they represent and sold together, REC + MWh.
- **Unbundled RECs** are decoupled from the electricity they represent and sold, bought, or traded separately.

\(^{n}\) This is a generalization. In fact, RECs cannot be held by private individual, so when we say “hold a REC,” at the private individual and business level we actually mean “not selling the REC.” For more information about RECs, which is an exceedingly complex issue, we recommend beginning here: [https://www.epa.gov/greenpower/renewable-energy-certificates-recs](https://www.epa.gov/greenpower/renewable-energy-certificates-recs)
In general, RECs are viewed by energy experts as an imperfect metric for measuring how much renewable electricity is consumed and added to the grid as there are significant challenges around validating and auditing RECs.\textsuperscript{60} In the future, emerging technologies like blockchain may be able to present an alternative way of quantifying and validating the amount and origination of renewable electricity, but at present RECs are the predominate mechanism for doing so.\textsuperscript{62}

Two voluntary REC quotes were solicited to estimate what the cost to purchase RECs would be for Nederland to claim “100% renewable” status for its municipal load – currently subscribed to a CSG – and for the town at large. A May 30 quote from Schneider Electric priced Green-e Certified RECs between $1.25-1.30/MWh, depending on volume purchased.\textsuperscript{63} This amounted to annual estimated costs of $1,235 to claim 100% renewable status for municipal buildings, and $15,875 to claim 100% renewable for the entire town.

*Evaluation Based on SAB Criteria*

- **Cost Effective:** This action fails this criterion due to the high and recurring costs of purchasing RECs annually, estimated at $1,235 - 15,875.\textsuperscript{64} While this action would provide Nederland with an immediate claim to having achieved “100% renewable electricity,” it does not do so in a fiscally sustainable manner for Nederland.
- **Local:** There is no guarantee that unbundled voluntary RECs would be generated locally.
- **New Renewable Generation:** Research is increasingly suggesting that “the voluntary sale of green electricity, and the associated Renewable Energy Certificate (REC) market, has a negligible influence on decisions to invest in renewable energy or on the economic feasibility of these facilities.”\textsuperscript{65} Given this, the purchase of voluntary RECs fails the criteria to support new renewable generation.

*Recommendation*

Voluntary RECs fail important criteria outlined by the SAB and do not embody the overall spirit of the town’s resolution, which seeks a substantive achievement of 100% renewable electricity and not one achieved via an accounting mechanism alone. **It is not recommended that Nederland pursue this action at this time.**

**iii. XCEL ENERGY RENEWABLE ELECTRICITY PROGRAMS**

At the time of publication, the renewable electricity programs listed below were available to customers within Xcel Energy’s territory.
a. Xcel Energy Green Tariff - Renewable*Connect

**Action:** Xcel Energy Green Tariff – Renewable*Connect

**Summary:** Renewable*Connect allowed residents and businesses to subscribe up to 100% of their load to a new Xcel Energy solar plant in southern Colorado. Xcel Energy retires the RECs generated by the plant on behalf of the subscriber.

**Status:** Completed with possibility of future capacity

**Recommendation:** Pursue

Xcel Energy’s pilot Renewable*Connect program in Colorado allowed residential and small business customers to subscribe to a new 50 MW solar PV plant in Deer Trail, Colorado. Customers are allowed to subscribe up to 100% of their electricity load based on historic consumption, and Xcel Energy retires the RECs generated by the solar PV plant on the subscriber’s behalf. Therefore, customers can legally claim that their electricity consumption is “100% renewable.”

Depending on the length of the contract that the customer selects (month-to-month, 5-year, or 10-year), the additional monthly cost of the program to the consumer was estimated to range from several cents to several dollars. Customers are charged a set per kilowatt-hour price and then credited back a per kilowatt-hour bill credit based on electricity production and several other factors. Xcel Energy is responsible for bearing the cost of all unsubscribed energy. Customers can also choose to terminate their contract early for a nominal fee.

Renewable*Connect was unique in its limited-time availability: in November 2016, the PUC approved a 50 megawatt initial solar project; in May 2018, the program opened to residential and small commercial (Rate Class C) customers for subscription; and in late July 2018, the remaining capacity opened to large industrial and manufacturing customers, which rapidly subscribed the remaining available capacity. When Renewable*Connect’s subscription period closed to residential and small business customers on July 18, approximately 10% or 93 Nederland accounts had been enrolled, accounting for an estimated 8% of the town’s total annual kilowatt-hour consumption.

Future capacity additions of Renewable*Connect could be available as soon as 2021, and Nederland should explore ways to take advantage of this anticipated opportunity. In 2018, over the course of a month, a concentrated effort by SAB members, CTN volunteers, Xcel Energy representatives, and the authors of this report resulted in a 10% town-wide subscription rate; with adequate planning, a structured marketing campaign, and additional collaboration between the town and Xcel Energy, this subscription rate could substantially increase.

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See Appendix F
A cooperative effort like this would fall squarely under the umbrella of the Energy Future Collaboration MOU and should be incorporated into the work plan under development.

**Evaluation Based on SAB Criteria**

- **Cost Effective:** The month-to-month contract undoubtedly comes at a cost premium; however, the 5-year and 10-year contract options may be either cost neutral or cost saving depending on Xcel Energy’s avoided fuel costs in future years. Renewable*Connect’s 10-year contract can effectively be seen as a hedge made against the potential of rising natural gas prices.

- **Emissions Reduction:** Renewable*Connect provides subscribers with the option to receive 25%, 50%, 75%, or 100% of their electricity from solar. This reduces the demand for traditional fuel resources and can directly reduce emissions.

- **Human Capital:** The outreach campaign for residential and business subscriptions - estimated at 60 person-hours - was handled entirely by the members of the SAB, volunteers, and the authors of this report.

- **Justice:** A 10-year Renewable*Connect contract costs substantially less than any other product on the market and allows a consumer to benefit from supporting renewable energy. However, it is recognized that not all customers can make a 10-year financial commitment and that the 5-year and month-to-month subscriptions come at a premium.

- **New Renewable Generation:** The Renewable*Connect program is directly tied to a new 50 MW solar installation in Deer Trail, CO.

- **Regulatory Compliance:** The original pilot of Renewable*Connect (initially named Solar*Connect) was rejected by the PUC on November 8th, 2014. In November 2016 the PUC approved Renewable*Connect and the construction of a 50 MW solar resource. PUC approval would be required to expand the capacity of this program.

- **Renewable Energy Credits:** Under Renewable*Connect, the RECs generated by the Deer Trail solar plant are retired on behalf of subscribers by Xcel Energy. This allows business and residents to claim that they are powered by Colorado solar.

- **Time:** PUC approval of Renewable*Connect took over two years. Programmatic rollout took under two years. The program’s subscription window was open to residential and small business (under 25 kW demand) customers between May 24th - July 18th. Remaining capacity was opened to large businesses (greater than 25 kW demand) on July 30th, 2018 for a 24-hour period. Customers that were not able to secure a share are now on a waitlist for future capacity that may be added to the program. It is estimated that a second round of Renewable*Connect offering would take at least two to three years to implement.

**Recommendation**

Renewable*Connect allowed Nederland businesses and residents to subscribe their electric consumption to a solar PV plant and receive the RECs generated by the plant. In short, it was one of the fastest, cost-effective, and just ways of advancing Nederland’s energy goals. Nederland advocacy to the PUC and through CC4CA could help Xcel Energy
speed up capacity additions to the program. **It is recommended that Nederland pursue this action.**

**b. Xcel Energy Green Power Program - Windsource**

**Action:** Xcel Energy Green Power Program - Windsource  
**Summary:** Windsource allows consumers to purchase RECs (up to 100% equivalent of their electricity load) at a premium price  
**Status:** Not recommended  
**Recommendation:** Not recommended to pursue at this time

Xcel Energy’s Windsource program is a premium program, where customers pay extra on their monthly energy bill for the RECs generated by Xcel Energy wind resources in Colorado. Xcel Energy then retires the RECs on the customer’s behalf.

**Evaluation Based on SAB Criteria**

- **Cost Effective:** Xcel Energy’s Windsource program has a relatively high premium for participation: $1.50 per one 100 kWh block. For an average Nederland residence seeking to offset 100% of their energy consumption, this would mean an annual premium of approximately $156. Relative to the Renewable*Connect program, this is a much more expensive proposition.
- **Justice:** Although the Windsource program is available to all customers, as a premium price product, it is likely too expensive for lower income customers.
- **Local:** RECs are sourced from wind generation resources located within Colorado.
- **New Renewable Generation:** The program premium pays for RECs generated by already established wind resources in eastern Colorado. The additional revenue stream from participating customers does not support the construction of new renewable generation.

**Recommendation**

Although the Windsource program delivers RECs to a customer with relative ease, it is both more expensive than similar products such as Renewable*Connect and does not lead to the construction of new renewable generation. **It is not recommended that Nederland pursue this action at this time.**

\[\text{Calculation: } 10,351 \text{ kWh annual estimate (Xcel 2017)} = 104 \text{ blocks } \times \$1.5/\text{block} = \$156\]
c. Xcel Energy Solar®Rewards (On-site solar)

**Action:** Xcel Energy Solar®Rewards (On-site solar)

**Summary:** Under Solar®Rewards, Xcel Energy purchases RECs generated by distributed residential and small business rooftop solar for a set price

**Status:** Not recommended

**Recommendation:** Not recommended to pursue at this time

Xcel’s Solar®Rewards program allows customers to sell the RECs generated by their own rooftop PV systems back to the utility, creating a small revenue stream that can count against the cost of installation or lease payments. Under this program, as the customer sells the RECs they generate, the customer cannot claim the environmental benefits of their own rooftop solar. In other words, a customer with rooftop solar enrolled in this program is not “100% renewable.”

**Evaluation Based on SAB Criteria**

- **Cost Effective:** For residential installations under the Solar®Rewards Small Program (defined as 0.05-25 kW), Xcel pays residents $0.005/kWh. Assuming generation to equal the average Nederland residential usage of 10,351 kWh/year, this would amount to an annual payment of $51.75 to a given resident. This program does not come at a cost to the Town of Nederland.
- **Emissions Reduction:** Additional rooftop solar PV reduces GHG emissions.
- **Human Capital:** There are many different vendors through which businesses and residents can easily receive solar assessments, quotes, and eventual installation of panels, however, this process requires active engagement from the resident or business.
- **Local:** Rooftop solar PV provides the most local generation possible.
- **New Renewable Generation:** Participation in Solar®Rewards is predicated on installing a rooftop solar PV system, which is a new renewable generation resource providing electricity to the grid.
- **Regulatory Compliance:** The Solar®Rewards incentive program was approved by the PUC and the program launched in March 2006.
- **Renewable Energy Credits:** Under Solar®Rewards, participating residents agree to sell all generated RECs to Xcel Energy in exchange for a $/kWh payment. Residents lose all claims to the “green” attributes of their solar generation and Xcel is able to claim these RECs towards RPS compliance.
- **Replicability:** Any customer can install rooftop solar PV, however the incentive program run by Xcel Energy is limited and capped by a certain number of participants based on system size.
- **Time:** Rooftop PV systems can be assessed and installed in less than 6 months. Solar®Rewards contracts last for 20 years.
**Recommendation**

Solar*Rewards does not allow the customer to claim RECs generated by their rooftop solar, thus this renewable generation cannot be counted towards advancing the town’s electricity goal. Due to this fact and the relative size of the payments received under the program, it is **not recommended that Nederland pursue this action at this time**.

### iv. NON-XCEL DISTRIBUTED GENERATION IN NEDERLAND

Several potential actions of interest outside of Xcel Energy programmatic offerings exist that could advance the town towards its electricity goal.

#### a. On-site solar (non-Solar*Rewards)

**Action:** On-site solar (non-Solar*Rewards)

**Summary:** This action refers to residents and small businesses installing solar PV systems through Xcel Energy’s net metering processes, but not enrolling in Xcel Energy’s Solar*Rewards program so that RECs generated by the systems can count towards the town’s goal

**Status:** Ongoing

**Recommendation:** Pursue

Colorado is one of 38 states (plus Washington, D.C.) with a net metering policy enabling residents and businesses to install solar PV on their rooftops or property and sell the electricity back to the utility. Unless a consumer is completely off-grid, solar installed at a residence or business is “grid-tied,” meaning that all electricity generated by a rooftop system goes directly on to the grid. A net metering policy ensures that customers who install solar PV at their own houses can sell the electricity they generate above their consumption back to the incumbent utility (Xcel Energy), and that the customer will be able to receive and purchase electricity from the grid when panels do not generate a sufficient amount – for example, at night.

This action proposes that residents and businesses install or lease solar PV systems without enrolling in programs that sell the associated RECs generated by these systems back to the utility or to any other purchaser. This would allow the resident or business to claim the environmental benefits of their PV system, and claim that their electricity is “100% renewable,” thereby advancing Nederland’s goal.

**Evaluation Based on SAB Criteria**

- **Cost effective:** This action requires residents and businesses to bear the cost of installing solar PV. While there are a number of rebates, grants, and incentives available, this is still a costly solution. This action also requires customers to forgo enrollment in Xcel Energy’s Solar*Rewards program, which could be valued at approximately $1,000 over the course of the 20-year contract for an average Nederland resident.
- Emissions Reduction: Direct installation of rooftop solar PV is the surest way to guarantee that fossil fuels are being displaced from the grid and reducing emissions.
- Human Capital: There are many different vendors through which businesses and residents can easily receive solar assessments, quotes, and eventual installation of panels. This action requires active engagement from a resident or business.
- Local: Rooftop solar PV provides the most local electricity generation option possible.
- New Renewable Generation: Installation directly guarantees new renewable generation that would not otherwise be built.
- Regulatory Compliance: “In December 2005 the Colorado Public Utilities Commission adopted standards for net metering and interconnection, as required by Amendment 37, a renewable energy ballot initiative approved by Colorado voters in November 2004.”
- Renewable Energy Credits: Rooftop solar PV installation without enrollment in Solar*Rewards allows customers to keep their RECs and claim the environmental benefits.
- Replicability: Installation is available for any home or business owner in the state, but the orientation, age, or location of some roofs may make this option less beneficial.
- Time: Rooftop PV systems can be assessed and installed in less than 6 months.

**Recommendation**

On-site solar is an expensive but worthwhile proposition for Nederland residents and businesses to pursue. New solar PV systems require upfront capital, yet they directly contribute to Nederland’s 100% electricity goal. **It is recommended that Nederland pursue this action.**

**b. Bulk Purchasing of Solar PV**

<table>
<thead>
<tr>
<th>Action: Bulk Purchasing of Solar PV</th>
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<tbody>
<tr>
<td><strong>Summary:</strong> A bulk purchasing program creates discounts for new residential rooftop PV customers by offering a solar developer a ready portfolio of clients that reduces acquisition costs.</td>
</tr>
<tr>
<td><strong>Status:</strong> Proposed</td>
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<tr>
<td><strong>Recommendation:</strong> Pursue</td>
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</table>

In 2016, Boulder County piloted a bulk purchasing platform which has been successfully used to lower the cost and increase the distribution of electric bikes, electric vehicle chargers, and residential rooftop PV systems. The bulk purchasing program leverages peer-to-peer marketing and offers a supplier a number of ready-to-buy customers in exchange for a discount on a product.
In the case of solar PV, the bulk discount program would apply to the cost of installing the solar PV hardware on a customer’s roof, decreasing the upfront capital required. However, the customer would still be required to receive approval from Xcel Energy to be a part of the net metering program and would have to follow all normal interconnection processes as directed by the utility. 

A program like this requires a central organizer with knowledge of rooftop solar and the ability to negotiate discounts with solar developers, as well as the capacity to attract the requisite number of customers needed to make the economics work for all parties.

**Evaluation Based on SAB Criteria**
- Cost Effective: Bulk purchasing offers residents up-front savings potential on the installation of solar PV systems.
- Local: Rooftop solar PV provides the most local option possible.
- New Renewable Generation: Installation directly guarantees new renewable generation that would not otherwise be built.
- Regulatory Compliance: Bulk purchasing has previously been successfully utilized by Boulder County.

**Other Considerations**
REC donation could play a role in facilitating a bulk purchasing program (see the following section “Bulk Purchasing of Solar PV with REC Donations”).

**Recommendation**
Bulk purchasing could be an innovative way for Nederland to increase the amount of local rooftop solar and decrease upfront costs to residents and businesses. **It is recommended that Nederland pursue this action.**

c. Bulk Purchasing of Solar PV with REC Donations

<table>
<thead>
<tr>
<th>Action: Bulk Purchasing of Solar PV with REC Donations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Summary:</strong> A REC-swap program pioneered in Colorado by CU Boulder creates a mechanism for residents and businesses to receive discounts on solar PV installations in turn for donating the RECs to CU Boulder.</td>
</tr>
<tr>
<td><strong>Status:</strong> Proposed</td>
</tr>
<tr>
<td><strong>Recommendation:</strong> Pursue</td>
</tr>
</tbody>
</table>

The University of Colorado Boulder Athletics Department is conducting a unique combined bulk purchasing and REC donation program that may have applicability to Nederland.
Starting in Summer 2018, the Athletics Department and their partner – residential contractor Solaroo Energy – launched “Buffs Community Solar.” Residents received a bulk discount rate on new solar PV systems installed on their homes in exchange for donating all RECs generated by the systems to the Athletics Department. In turn, the RECs are being used to advance the Athletics Department towards their sustainability goals. This model mirrors the progress tracking methodology being used to track Nederland’s own progress towards its 100% renewable electricity goal. It also capitalizes on the local and additional nature of the new solar PV installed, providing certainty to the program organizer – the Athletics Department – that the RECs they are receiving are directly tied to new solar generation in the community.

The transfer of RECs happens through the Western Renewable Energy Generation Information System (WREGIS). The program organizer – in this case, the Athletics Department – pays a small annual fee to create an account with WREGIS, which then tracks the generation of RECs by the residential systems that were installed through the program. WREGIS will retire the RECs on behalf of the Athletics Department, ensuring that the transfer of RECs is accounted for properly and can be validated.

The annual administration cost of a WREGIS account would break even with the costs of simply purchasing voluntary RECs with approximately ten average-sized homes in Nederland participating in such a program. This participation rate would advance Nederland 0.8% towards its electricity goal.

According to Solaroo Energy, this is the first program of its kind in Colorado although similar programs have been implemented successfully in Utah. Because the program lowers customer acquisition costs for the solar contractor by having the REC recipient bear the majority of marketing and advertising costs, the solar contractor is able to provide the PV systems at a discount.

Initiating a program like this would be a way for the BoT - at the cost of about $125/year - to incentivize new rooftop solar in Nederland and also ensure upfront discounts for customers interested in doing so. It also provides a strong alternative to Xcel Energy’s Solar Rewards program, where Xcel Energy purchases RECs produced by rooftop PV.

**Evaluation Based on SAB Criteria**

- **Cost Effective:** This program would be low cost and offer better economics to the town than buying voluntary RECs, and an alternative to Solar Rewards for customers. The financial benefits of this program are realized mostly in the discounts offered to customers contemplating installing solar PV, however, installing solar PV is still an expensive action.

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9 See Appendix E for calculations
• Local: This program would allow Nederland residents and businesses to contribute to the town’s goal via an official relationship with WREGIS and increase the amount of rooftop solar PV in the community.
• Renewable Energy Credits: This would be a viable way for Nederland to aggregate and collect RECs generated locally in exchange for providing an incentive for new construction.

**Recommendation**
This program can offer Nederland a way to advance their progress towards 100% while increasing the penetration of solar PV in the community and offering a discount to customers willing to participate. **It is recommended that Nederland pursue this action.**

d. **Installation of behind-the-meter solar PV on municipal rooftops or land**

**Action:** Installation of behind-the-meter solar PV on municipal rooftops or land

**Summary:** Behind-the-meter solar PV directly offsets a particular facility’s electric consumption.

**Status:** Not recommended

**Recommendation:** Not recommended to pursue at this time

The term behind-the-meter refers to solar PV installed at a customer location that directly offsets the amount of electricity purchased from the utility to meet the demand of the customer.

Behind-the-meter solar PV installations are utilized by a single on-site building or facility that acts as the direct offtaker of the electricity. Installations are often located on the rooftop of, or on land directly adjacent to, the customer. Electricity generation from this system is tied in to the electric meter and is used to fully meet the demands of the customer or reduce the amount of electricity that must be purchased from the utility. In the event of excess generation from the solar installation, net metering provides the customer the ability to sell the electricity back to the utility.

Due to Nederland’s decision to sign a 20-year PPA with Oak Leaf Energy Partners for 100% of the town’s 2017 municipal load (approximately 950,000 kWh), no additional solar PV can be installed with municipal facilities intended as the offtaker without a dramatic increase in electricity consumption beyond what is projected.\(^{94}\)

**Evaluation Based on SAB Criteria**
• Cost effective: Installation of solar PV requires upfront capital.
Human capital: BoT and SAB members would be required to solicit bids and engage a solar developer for such a project.
Local: This action would result in new renewable generation within the town.
Renewable Energy Credits: This option would allow Nederland to claim the environmental attributes of the system and count progress towards the town’s electricity goal.
Time: While contracting and building solar PV systems could be completed in about a year’s time span, the amount of electricity consumption growth that would be required to make this action feasible is not projected over the course of the next few years.

**Recommendation**
While this action meets many of SAB’s criteria, the town does not have enough electricity consumption at this time to support a new solar PV system given the nuances of the Oak Leaf Community Solar garden contract. **It is not recommended that Nederland pursue this action at this time.**

**D. ENERGY EFFICIENCY ACTIONS**

Transitioning to a 100% renewable electricity system must consider how to leverage energy efficiency upgrades. The methodology for Nederland’s goal defines the town’s 100% “pie” by pegging it to the total amount of electricity consumed by the town; therefore, reducing overall electricity consumption through energy efficiency measures shrinks the relative size of the 100% pie.

Due to this logic, the Town of Nederland can advance towards their goal of 100% renewable electricity consumption at a faster rate by encouraging and supporting energy efficiency programs for residents, businesses, and the municipality. Energy efficiency efforts are not only capable of moving Nederland towards its goal; they typically confer cost savings and enhance comfort of homes and businesses as well.

This section will give an overview of energy efficiency projects that the Town of Nederland is currently executing and should consider promoting within the community.

**i. MUNICIPAL CAMPAIGNS TO INSTALL LED LIGHT BULBS**

**Action:** Municipal Campaign to Install LED Light Bulbs  
**Summary:** Nederland is currently replacing street lights and municipal facility lights with LEDs.  
**Status:** Ongoing  
**Recommendation:** Pursue
Lighting retrofits to replace incandescent light bulbs with LEDs are a low-hanging fruit and high-impact project when it comes to electricity consumption and cost savings: LED bulbs use 75% less energy and can last up to ten times longer than incandescent bulbs. The Town of Nederland is currently undertaking LED retrofits in the Nederland Community Center and plans to replace incandescent bulbs in all municipally-owned facilities within the next few years.

In 2018, Nederland and Xcel Energy signed a partnership through the Colorado LED Street Lighting Program to replace all municipal street lights with LED fixtures. Municipal street lights are owned by Xcel Energy, but their electricity consumption is billed to Nederland and so the town will benefit from the cost savings realized through the retrofits.

**Evaluation Based on SAB Criteria**

- **Cost effective:** The upfront cost of LED light bulbs is higher than incandescent bulbs, but cost savings are realized in lower electricity bills over time.
- **Efficiency gains:** LEDs can last up to 25 times longer than incandescent bulbs while using up to 75% less energy.
- **Emissions reductions:** By saving energy and lasting longer, LEDs emit less GHG emissions than incandescent bulbs and create less waste.
- **Local:** Replacing LEDs is a quick way to increase local energy efficiency within residents’ homes, businesses and municipally owned facilities.
- **Replicability:** LED retrofit projects are replicable in homes, businesses, and communities throughout Colorado.
- **Time:** LED retrofits can be undertaken well before the 2025 goal timeline.

**Recommendation**

Continuing efforts to support LED retrofits in the community will help to decrease Nederland’s overall electric consumption and create cost savings. **It is recommended that Nederland pursue this action.**

**ii. BOULDER COUNTY’S RESIDENTIAL ENERGYSMART PROGRAM**

**Action:** Boulder County’s Residential EnergySmart Program

**Summary:** EnergySmart offers advising services, rebates, and grants to residents pursuing energy efficiency upgrades.

**Status:** Ongoing

**Recommendation:** Pursue

EnergySmart is a Boulder County Sustainability Office program that helped residents reduce electricity consumption in Nederland by 70,000 kWh in 2017. EnergySmart
connects residents with an advisor who can provide expert advice, offer free or low-cost solutions tailored to the specific home, help identify available rebates, and refer residents to approved contractors for larger efficiency retrofit projects. EnergySmart’s initial energy audit and advising comes free of charge to the resident, who can then choose how to proceed.

EnergySmart collaborates with the Clean Energy Federal Credit Union and Elevations Credit Union to offer low interest financing to assist homeowners with larger energy efficiency retrofits. Additionally, the program continuously provides new rebates to be used jointly with financing options or on a standalone basis.

Nederland could consider using sustainability grant or tax revenues from the Sustainability Tax to increase EnergySmart’s budget for serving Nederland residents specifically. According to a 2016 Boulder County GHG inventory, approximately 2/3 of electricity consumption in Nederland comes from the residential sector. Therefore, improving energy efficiency offerings to residents is a high impact strategy for the town to achieve its goal.

**Evaluation Based on SAB Criteria**

- **Cost effective:** the program offers multiple financing options, including low interest loans and rebates, to make energy efficiency projects more affordable for all homeowners. While projects carry upfront costs, most also offer positive returns on investment. With additional funding earmarked for Nederland residents, EnergySmart may be able to improve economics for the community.
- **Efficiency gains:** Greater engagement with EnergySmart will help Nederland residents reduce their electricity consumption.
- **Emissions reductions:** Reducing electricity consumption is a certain way to reduce emissions.
- **Human capital:** EnergySmart requires direct engagement between residents and an advisor, and then possible future engagement between residents and contractors. If Nederland decides to provide further financial support to EnergySmart, this will require time from SAB and BoT members.
- **Justice:** The program is available to all residents within Boulder County.
- **Local:** The program is run through the Boulder County Sustainability Office and helps to reduce energy consumption in all Boulder County communities.

**Recommendation**
The Board of Trustees should consider providing additional funds to EnergySmart in order to increase the program’s reach and impact within Nederland. As nearly 2/3 of Nederland electric consumption comes from the residential sector, earmarking Nederland-specific funds for EnergySmart would be an easy way to leverage the

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1 See page 27 for a discussion of the 2016 countywide sustainability tax
program’s expertise for greater impact. It is recommended that Nederland pursue this action.

iii. BOULDER COUNTY’S PARTNERS FOR A CLEAN ENVIRONMENT (PACE) BUSINESS PROGRAM

**Action:** Boulder County’s Partners for a Clean Environment (PACE) Business Program  
**Summary:** PACE offers advising services, rebates, and grants to businesses for energy efficiency upgrades.  
**Status:** Ongoing  
**Recommendation:** Pursue

A program tailored to local businesses within Boulder County is Partners for a Clean Environment (PACE). Since 2010, Boulder County’s PACE program has advised 33 businesses in Nederland and completed five large efficiency upgrades, resulting in avoided consumption of about 100,000 kWh annually.105

Free of charge, PACE connects businesses with sustainability advisors who conduct waste and energy audits to identify opportunities for upgrades and cost savings. In addition, PACE offers LED light bulbs, low-flow faucet heads, bike racks, and recycling bins to the business for free. Finally, PACE can also help businesses access rebates and grant money for larger efficiency projects including lighting, cooling and heating, and restaurant equipment efficiency.104

PACE receives funding for rebates from Boulder County and the City of Boulder. In order to ensure there are enough funds to support the growing demand for efficiency upgrades, PACE has set a cap of 50% of project costs or $2,000 per business, whichever comes first, for projects within Boulder County but outside the City of Boulder.105 Regardless of the location within Boulder County, businesses can receive up to $15,000 for solar projects. If Nederland was able to contribute to the funding pool through the 2019 Boulder County Sustainability Matching Grant or Boulder County Sustainability Tax revenue, more businesses would be able to install energy efficiency retrofits and invest in larger efficiency projects.

**Evaluation Based on SAB Criteria**
- Cost effective: PACE offers rebates for lighting, cooling and heating efficiency. PACE can also help businesses access other financing opportunities to make energy efficiency upgrades more affordable.
- Efficiency gains: PACE offers a concrete path for businesses to reduce electricity consumption.
Emissions reductions: one of the most certain ways to reduce emissions is to cut back on energy consumption. Projects conducted through PACE will help to cut back energy consumption in the business sector.

Human capital: Participation in PACE requires a business owner or manager to engage with a PACE advisor, and potentially with additional contractors. If Nederland decides to provide further financial support to PACE, this will require time from SAB and BoT members.

Local: PACE has helped businesses in Boulder County complete over 2,300 upgrades since the program opened in 1993.\textsuperscript{106}

Recommendation
With over 70 businesses in the town, there is a considerable opportunity for PACE participation to continue to grow and help more businesses reduce their overall electricity consumption. \textit{It is recommended that Nederland pursue this action.}

v. XCEL ENERGY EFFICIENCY INCENTIVES

\textbf{Action:} Xcel Energy Residents and Business Energy Efficiency Incentives
\textbf{Summary:} Xcel Energy offers a suite of rebates, incentives, and programs to customers pursuing energy efficiency upgrades.
\textbf{Status:} Ongoing
\textbf{Recommendation:} Pursue

Xcel Energy offers various energy efficiency solutions to their customers in Colorado. In 2017, Nederland residents and businesses avoided 6,728 kWh and 40,608 kWh, respectively, in electricity consumption through participating in various energy conservation programs provided by Xcel Energy.\textsuperscript{107}

For residents, Xcel Energy provides rebates and audits to increase energy efficiency in homes. Incentives focus on lighting and HVAC upgrades, and for $75 residents can receive a home energy audit, LED light bulbs, weather stripping for one door, efficient showerheads, aerators for sink faucets, water heater insulation, and a programmable thermostat. Xcel Energy also offers equipment rebates and efficiency project financing to businesses through a partnership with HBC Energy Capital.\textsuperscript{108}

Programs like Boulder County’s EnergySmart and PACE are designed to be complementary to Xcel Energy’s suite of rebates and incentives.

\textit{Evaluation Based on SAB Criteria}

- Cost effective: Programs are designed to be low-cost and provide returns to customer.
- Efficiency gains: All programs aim to decrease electricity consumption through energy efficiency measures.
- Human capital: Xcel Energy efficiency programs require engagement from a resident or business owner or manager.
- Local: These programs directly address residence and business electricity consumption.
- Replicability: These incentives are available throughout Xcel Energy territory in Colorado and may be offered by other utilities.

**Recommendation**
Nederland should ensure that residents and businesses are aware of the opportunities available through Xcel Energy. **It is recommended that Nederland pursue this action.**

**iv. COLORADO PROPERTY ASSESSED CLEAN ENERGY (C-PACE) BUSINESS FINANCING**

<table>
<thead>
<tr>
<th>Action:</th>
<th>Colorado Property Assessed Clean Energy (C-PACE) Business Financing</th>
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<tbody>
<tr>
<td><strong>Summary:</strong></td>
<td>C-PACE allows businesses to finance energy efficiency upgrades or install solar PV through assessments on property tax bills.</td>
</tr>
<tr>
<td><strong>Status:</strong></td>
<td>Ongoing</td>
</tr>
<tr>
<td><strong>Recommendation:</strong></td>
<td>Pursue</td>
</tr>
</tbody>
</table>

More than 30 states, including Colorado, offer property assessed financing for energy efficiency, renewable energy, and water conservation improvements. Colorado Commercial Property Assessed Clean Energy (C-PACE) enables commercial and multifamily housing property owners to finance up to 100% of the costs of large energy efficiency and renewable energy projects. Several of the eligible energy efficiency improvements include automated building controls, building envelope upgrades, and boiler upgrades. Financing through C-PACE is repaid through assessments on a business owner’s property tax bill.

At this time, C-PACE is not a residential program, but informal discussions with members of local government have revealed interest in exploring an “R-PACE” program for residents.

**Evaluation Based on SAB Criteria**
- Cost effective: working with C-PACE helps to make larger efficiency projects feasible by offering long-term financing at little to no upfront cost to business owners. Efficiency upgrades provide returns to owners by decreasing building energy costs.
- Efficiency gains: C-PACE is another option for businesses interested in pursuing large energy efficiency projects.
- Human capital: Participation in C-PACE requires engagement from a business owner or manager.
- New renewable generation: C-PACE offers businesses and owners of multi-family housing buildings a unique financing mechanism for installing solar PV.
- Local: C-PACE is only available to Colorado businesses and multi-family housing owners.
- Replicability: This financing mechanism is also available in most other states.

**Recommendation**
Nederland should educate business owners and eligible multi-family housing owners about C-PACE opportunities, and support future endeavors to stand up an R-PACE program. **It is recommended that Nederland pursue this action.**

### vi. ENERGY PERFORMANCE CONTRACTING

Energy Performance Contracting (EPC), also referred to as Energy Savings Performance Contracting, is a powerful, cost-neutral approach to financing energy efficiency upgrades and new renewable generation but is also complex and requires a sophisticated partnership for successful implementation. In Colorado, the Colorado Energy Office (CEO) runs a public EPC program to further encourage investment in clean energy and efficiency projects. The CEO also offers a private EPC program, but there have not been any demonstrated successes as of yet in Colorado.

The goal of an EPC program is to enable entities to fund more expensive energy efficiency repairs and upgrades through future cost savings that result from the project. Eligible efficiency improvements include boiler replacements, indoor and outdoor lighting, building envelope upgrades, and occupancy sensors. Over 150 public jurisdictions have completed approximately $34 million in annual utility savings since the public EPC program was established in the 1990s.

In May 2018, the Colorado Energy Office conducted a feasibility study on Nederland’s municipal facilities to determine whether energy performance contracting would be a suitable strategy for financing energy efficiency improvements to municipally-owned...
facilities.\textsuperscript{116} It was determined that a traditional EPC project would not be a practical course of action for the Town of Nederland to pursue, largely because the town’s facilities are already relatively efficient, and the town’s electricity consumption falls below a typical EPC project threshold.\textsuperscript{117} EPC projects typically range between $500,000 to $1,000,000 in costs, and given that Nederland’s municipal electricity costs in 2017 totaled just above $87,600, there would not be a high enough margin for the town to attract EPC financing.\textsuperscript{118} 

Colorado Senate Bill 12-186, enacted in 2014, enabled the aggregation of efficiency projects between small communities, but no projects have been successfully completed at this time.\textsuperscript{119} An exploratory discussion between the authors, CEO, and SAB members held during Summer 2018 looked at the feasibility of the Town of Nederland aggregating EPC projects with other communities in Boulder County in order to attract investment opportunities, but due to the financial complexity, time, and bandwidth that would be required to pursue such a partnership, there have been no further discussions.

\textit{Evaluation Based on SAB Criteria}

- Cost effective: EPC projects are funded through future cost savings and so are very affordable to the beneficiary, but there are no projects in Nederland currently large enough to attract EPC financing.
- Efficiency gains: EPC financing allows for major efficiency upgrades.
- Human capital: EPC financing would require the attention of town staff.
- Replicability: EPC financing is fairly common and should be replicable in most places.

\textit{Recommendation}

Discussions with the CEO revealed that attempts to aggregate EPC projects had so far failed due to the complexity of the projects, difficulty in establishing equitable financial and risk-sharing agreements, complexity of coordination between communities, and overall lack of partners willing to engage.\textsuperscript{120} It is not recommended that Nederland pursue this action at this time.

\section*{E. OTHER TECHNOLOGY OPPORTUNITIES}

\textbf{Action:} Other Technology Opportunities  
\textbf{Summary:} Technologies in this category proved too early-stage or small scale to adequately support the town’s goals.  
\textbf{Status:} Not recommended  
\textbf{Recommendation:} Not recommended to pursue at this time

\textsuperscript{5} See Appendix B for municipal electricity consumption and costs
Innovations in clean energy technology are occurring at a rapid pace. This is exciting for the 100% renewable electricity movement as a whole, but likely puts most of the technologies on the following list in the several-year time frame for achieving minimal feasibility. As technologies emerge, they still need time to prove themselves, become widely available, economically feasible, and accepted by regulators.

The following technologies were identified by Nederland stakeholders as areas of potential interest to the town. As these technologies were determined to be too early stage or too small scale to advance the town’s goal, this section did not evaluate these technologies according to decision making criteria established by the Sustainability Advisory Board.

i. FLOATING SOLAR PV

In 2018, the Public Works Department of Nederland Colorado engaged the Colorado Energy Office to produce a feasibility analysis on energy efficiency and renewable electricity generation possibilities. Given Nederland’s location adjacent to Barker Reservoir, floating solar PV was listed as a potential consideration.\(^1\)

Floating solar presents a unique set of challenges in Colorado due to the legal complexity of water rights and water access laws. In 2001, the City of Boulder purchased Barker Dam, Barker Meadow Reservoir, and the associated hydroelectric infrastructure.\(^{121}\) As a potential site for future generation - irrespective of the generation technology - Barker Dam would be legally complicated.

Floating solar seems to be gaining ground primarily internationally: a 17 MW floating solar plant is planned for France, with more installations in Asia and Europe.\(^{122}\) Arguments for floating solar typically point to the water’s effectiveness at cooling panels to optimum performance temperature and making use of a traditional non-use space.

The technology itself remains in the early adopter phase, but will soon have a demonstration in Colorado as the Town of Walden in Jackson County plans to move forward with the construction of a 50 kW floating solar array, which will be a behind-the-meter source of electricity for the town’s wastewater treatment plant.\(^{123}\) Walden is not within Xcel Energy territory, but instead receives electricity from a rural cooperative, Mountain Parks Electric.\(^{124}\) As a member-owned cooperative, the balance of power and relationship between utility and consumer is fundamentally different from Nederland’s relationship with Xcel Energy.

\(^1\) Shortly before the CEO’s feasibility analysis was published, the Nederland Board of Trustees voted to sign a PPA with Oak Leaf Energy to purchase 100% of municipal load from a community solar garden for 20 years. As a result of this decision, new municipal load above the amount purchased from Oak Leaf would have to be created to have electricity consumption to offset or power through a behind-the-meter option, be it traditional rooftop or ground mount PV or floating solar.
ii. RESIDENTIAL BATTERY STORAGE

In 2018, the Colorado legislature passed SB18-009 (Allow Electric Utility Customers to Install Energy Storage Equipment) to ensure that customers have the right to install, interconnect, and use battery storage systems without undue barriers levied by the utility.125

Battery storage has become a popular topic as increasing technological efficiency and a drastic reduction in price have opened up market opportunities in the near future. At a high level, residential battery storage offers the ability to capture electricity generated by rooftop PV systems and store it for future use. This creates an opportunity for customers with solar PV and storage to purchase much less electricity from the grid.

As of yet, the price point of residential battery storage is still too high to consider for mass deployment, but the applications of this technology pairing may have a significant impact and bear watching.

iii. MICRO-HYDRO GENERATION

The Nederland Public Works Department, in partnership with the Colorado Water Resources & Power Development Authority, is investigating the feasibility of retrofitting the town’s pump stations with small hydro power generators to produce electricity which will help to power the stations.126 The project is estimated to cost about $16,000, and possible grant funding may be available.127 The small hydro power generators would, at maximum, be able to offset a portion of the electricity that the pump stations require to operate, but would not have a large application to the town.

At the time of publication, the feasibility analysis was still being conducted and will identify the number of stations appropriate for this retrofit. It is the initial belief of the Nederland Public Works Department that micro hydro generation at the pressure reducing stations could prove to be cost effective.128 However, until the results of the feasibility analysis are known, a recommendation cannot be made to pursue this action.
PART 3
RESULTS
I. OVERVIEW

Two different visions of the town’s electricity consumption in the year 2025 were constructed using information from research, expert interviews, and the authors’ analysis.

The two scenarios are named the Base Case Scenario and the Action Scenario:

- **The Base Case Scenario** assumes that no additional actions are taken by Nederland residents, businesses, or the municipality, and that Xcel Energy’s Colorado Energy Plan is implemented by December 21st, 2025. Under these conditions, Nederland would consume 66% of its electricity from renewable resources in 2025.
- **The Action Scenario** describes the progress Nederland could make towards its goal if a suite of actions is undertaken by residents, businesses, and the municipality. The actions all build on top of the Base Case and grow progressively ambitious. If all actions are completed to the extent described by the model, Nederland would far surpass its goal of 100% renewable electricity by 2025.

The scenarios do not represent guarantees of the future; but instead are tools to help decision makers begin to conceptualize and understand the conditions that would need to be in place to achieve the outcome that the scenario describes. Both scenarios use 2017 baseline consumption data to quantify progress towards Nederland’s goals.

A. METHODOLOGY

The methodology to measure Nederland’s progress towards 100% renewable electricity consumption was created to be replicable and easily measurable. The methodology relies on tracking the electricity consumed by Nederland in a given year and tracking the parallel amount of electricity that could be attributed to a renewable generation source through RECs. In 2017, Nederland consumed 12,254,593 kWh of electricity. For the town to be 100% renewable, the equivalent of 12,254,593 kWh of RECs need to reside within the town, meaning that the RECs were retired on behalf of a customer within the town, or generated by a system within the town and not sold or traded away.
This methodology aligns with standards for green marketing claims developed by the Federal Trade Commission (FTC). The FTC is clear that 100% renewable electricity claims can only be made by an entity if the appropriate number of RECs equivalent to the entity’s electricity consumption are accounted for.\textsuperscript{129}

In the Action Scenario, electricity reductions due to energy efficiency upgrades were measured as a percentage achieved against the 2017 baseline. For example, if total consumption is 100-kWh, a 10-kWh reduction in consumption due to energy efficiency upgrades accounts for 10% progress towards achieving 100% consumption of renewable electricity.

\textbf{II. NEDERLAND’S BASELINE ELECTRICITY CONSUMPTION}

The purpose of identifying a baseline of Nederland’s electricity consumption is to measure and evaluate progress as the town moves towards 100% community wide renewable electricity. The year used to establish the baseline is 2017 because the resolution was passed in this year and it is the most recent full year of data on record.

In 2017, the municipal sector accounted for 7% (866,505 kWh) of electricity consumption, the business sector accounted for 39% (3,489,860 kWh), and the residential sector accounted for 64% (7,877,256 kWh).\textsuperscript{130} In total, Nederland’s electric consumption in 2017 was 12,254,593 kWh.

\textbf{A. GROWTH PROJECTIONS FOR ELECTRICITY CONSUMPTION}

The Town of Nederland’s electricity consumption is held constant through 2025. This assumption is derived from trends in electric loads and population, which project flat growth.\textsuperscript{131} The single exception to this is a 100,000-kWh addition to electric consumption in 2019 from the expansion of Nederland’s wastewater treatment plant. This addition is reflected in the models.

In the dynamic tool provided to the town to track progress towards Nederland’s goal, decision makers will be able to input actual consumption data on an annual basis.
III. SCENARIOS OF ELECTRICITY CONSUMPTION IN 2025

A. THE BASE CASE SCENARIO

Nederland’s Progress Towards 100% Renewable Electricity: Base Case

<table>
<thead>
<tr>
<th>2017</th>
<th>2018</th>
<th>2025</th>
</tr>
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<tbody>
<tr>
<td>kWh</td>
<td>kWh</td>
<td>kWh</td>
</tr>
<tr>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
</tbody>
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- Nederland’s Shortfall to 100% Goal
- Renewable*Connect Green Tariff Subscriptions (Summer 2018)
- On-site Solar (non-Solar*Rewards)
- Windsource Green Power Program Subscriptions
- Baseline Renewable Electricity from Xcel Grid

<table>
<thead>
<tr>
<th>Nederland’s Progress Towards 100% Renewable Electricity</th>
<th>2017</th>
<th>2018</th>
<th>2025</th>
<th>2017</th>
<th>2018</th>
<th>2025</th>
<th>2017</th>
<th>2018</th>
<th>2025</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base Case Assumptions</td>
<td></td>
<td></td>
<td></td>
<td>%.</td>
<td>%.</td>
<td>%.</td>
<td>%.</td>
<td>%.</td>
<td>%.</td>
</tr>
<tr>
<td>Baseline Renewable Electricity from Xcel Grid</td>
<td>3,394,522</td>
<td>3,394,522</td>
<td>6,740,034</td>
<td>27.7%</td>
<td>27.7%</td>
<td>54.6%</td>
<td>328</td>
<td>328</td>
<td>653</td>
</tr>
<tr>
<td>Windsource Green Power Program Subscriptions</td>
<td>267,436</td>
<td>267,436</td>
<td>267,436</td>
<td>2.2%</td>
<td>2.2%</td>
<td>2.2%</td>
<td>26</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td>On-site Solar (non-Solar*Rewards)</td>
<td>27,228</td>
<td>27,228</td>
<td>27,228</td>
<td>0.2%</td>
<td>0.2%</td>
<td>0.2%</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Renewable*Connect Green Tariff Subscriptions (Summer 2018)</td>
<td>1,017,281</td>
<td>1,017,281</td>
<td>1,017,281</td>
<td>0.0%</td>
<td>8.3%</td>
<td>8.3%</td>
<td>98</td>
<td>98</td>
<td>98</td>
</tr>
<tr>
<td>Voluntary REC</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

| Total Nederland Annual Consumption (kWh)               | 12,254,595 | 12,254,595 | 12,254,595 |
| Nederland’s Shortfall to 100% Goal                    | 8,565,409  | 7,548,128  | 4,292,624   |
| % Shortfall                                            | 70%        | 62%        | 34%          |

| % Renewable                                           | 30%        | 38%        | 66%          |
i. OVERVIEW

The Base Case describes the progress that Nederland will make towards its 100% renewable electricity goal if no additional actions are taken by residents, businesses, or the municipality between now and 2025. The Base Case intends to illustrate the remarkable progress that the town made between 2017 and 2018, and the significant impact that Xcel Energy’s Colorado Energy Plan will have on the town’s goal.

In 2018, actions were taken that moved the town’s consumption of electricity from renewable resources from 30% in 2017 to 38% as of August 2018. This was the result of an immense campaign by SAB and the municipality for residents and businesses to subscribe to Xcel Energy’s Renewable*Connect program.

Nederland’s electricity mix in 2017 is illustrated below.

![Nederland 2017 Electricity Mix](image)

### Nederland 2017 Electricity Mix

- **44%** Coal
- **28%** Natural gas
- **23%** Wind
- **3%** Solar
- **2%** Hydro

#### a. Baseline renewable electricity from Xcel Energy

In 2017, Xcel Energy’s electricity generation mix in Colorado consisted of 44% coal, 28% natural gas, 23% wind, 3% solar, and 2% hydro. As customers of Xcel Energy, which supplies electric generation to the grid, Nederland residents, businesses, and the municipality, by default, consume electricity defined by Xcel Energy’s generation mix.

In 2017, as Xcel Energy generated 27.7% of total electricity from renewable sources and 72.3% of total electricity from non-renewable sources, Nederland’s baseline consumption of electricity from renewable resources was also 27.7%. Progress made towards 100% renewable electricity above the baseline is the result of voluntary actions taken by residents, businesses, and the municipality.
Due to the way that RECs are accounted for and because RECs produced by community solar gardens in Colorado are sold back to Xcel Energy, a small portion of the baseline 27.7% figure can be attributed to Nederland’s decision to subscribe 100% of its municipal load to Oak Leaf Energy Partner’s Weld County community solar garden.

In 2025, the Base Case shows significant increases in the baseline renewable electricity from Xcel Energy. This will be the result of the implementation of Xcel Energy’s Colorado Energy Plan (CEP), which received PUC approval in 2018. The CEP calls for 55% electricity from renewable resources by December 31, 2025.

b. Windsource Green Power Program Subscriptions
Residents and businesses advanced Nederland 2% towards its goal through subscriptions to Windsource in 2017. This level of subscriptions is assumed to remain constant because the opt-out process for Windsource is relatively cumbersome. Increases in subscription levels is not anticipated due to expectations of less expensive alternatives becoming available to customers by 2025.

c. On site solar (non-Solar*Rewards)
This category refers to progress made by residents and businesses with solar PV who are not enrolled in a program like Xcel Energy’s Solar*Rewards, thus keeping the RECs generated by their PV systems. Customers in this category were responsible for advancing the town 0.22% towards its goal in 2017.

On site solar (non-Solar*Rewards) accounts for such a small portion because most customers with solar PV in Nederland are enrolled in Xcel Energy’s Solar*Rewards program. Additionally, Xcel Energy has limited historical data on the number of PV systems outside of their Solar*Rewards program, so the contribution of this segment of Nederland residents and businesses had to be extrapolated from the 2015, 2016, and 2017 install capacity data available in Xcel Energy’s Community Energy Reports.

Due to the longevity of solar PV systems, this number is expected to hold steady through 2025.

d. Renewable*Connect Green Tariff Subscriptions (Summer 2018)
Xcel Energy’s successful Renewable*Connect pilot program launched in Summer 2018 and resulted in 93 subscriptions from residential and C Class (small business) customers in Nederland. The subscriptions account for approximately 8% progress towards the town’s goal of 100%, and it is assumed that the levels of program participation will remain steady through 2025. This assumption is made based on the auto-renew options embedded within Renewable*Connect contracts and the percentage of 5 and 10-year

\[\text{As of time of publication, it was still unclear whether the Renewable*Connect data shared by Xcel Energy reflected subscriptions within the Tax District or Library District. For the purposes of our analysis, we have assumed it reflects the Tax District.}\]
contracts signed by Nederland customers. Additional data on Renewable*Connect subscriptions can be seen in Appendix F.

ii. CAVEATS

a. General model caveat
The numbers used to calculate Nederland’s progress to 100% renewable electricity predict exact results: i.e., X% progress due to X action being completed by X households and X businesses. This is because historical data of exact consumption is used to project future behavior; however, electricity is a commodity and its consumption can fluctuate immensely due to weather patterns, installed technology, and changes in the needs or behaviors of consumers. Therefore, the exact predictions of both scenarios should be considered general targets around which to estimate progress.

b. “Average” house and business size
Average Nederland residence and business size reflects a simple calculation of the electricity consumption of that segment divided by the number of meters in the residential and commercial sectors. The average Nederland household is considered equal to 10,351 kWh/year. The average Nederland business is considered equal to 25,661 kWh/year. When the scenarios use a household equivalence – i.e., an action taken by X households would advance Nederland X% towards its goal – this assumes that each household took an action offsetting 10,351 kWh consumed per year. This metric should be used to give a general idea of the scope of a project, and not be considered an exact measurement.

c. Assumed flat growth of electricity consumption
All models assume that Nederland will continue to consume about 12 million kWh of electricity annually through 2025.

d. REC eligible resource compliance multipliers
Under current Colorado statutes, a distributed generation carve out provides additional REC value for eligible resources beyond the usual equivalency of 1 REC = 1 MWh of renewable electricity generation. The relevant compliance multipliers for eligible resources are as follows:

- **1.25x** for electricity generated from eligible energy resources beginning operation prior to 2015 (excludes retail distributed generation).
- **1.50x** for electricity generated at a “community-based project.”

Qualified eligible resources are outlined under section 40-2-124 of Colorado Revised Statutes Title 40 as electricity generated via the following resources: anaerobic digestion, geothermal, hydropower (existing hydropower sized 30 MW or less operating prior to 2005 or new hydropower 10 MW or less), landfill gas, recycled energy, solar, wind, and woody biomass. Generation from coal mine methane and pyrolysis can also qualify if deemed by the PUC to be greenhouse gas neutral.
Therefore, the percentage of baseline renewable electricity from Xcel Energy utilized in this report’s analysis may not represent the exact fuel mix of Xcel Energy’s generation, but rather what Xcel Energy can legally claim under current Colorado regulation.

**B. THE ACTION SCENARIO**

**Nederland’s Progress Towards 100% Renewable Electricity: Action Scenario**

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline Renewable Electricity from Xcel Grid</td>
<td>3,594,522</td>
<td>3,594,522</td>
<td>6,740,026</td>
<td>27.7%</td>
<td>27.7%</td>
<td>54.6%</td>
<td>328</td>
<td>328</td>
<td>651</td>
</tr>
<tr>
<td>Windsource Green Power Program Subscriptions</td>
<td>267,436</td>
<td>267,436</td>
<td>267,436</td>
<td>2.2%</td>
<td>2.2%</td>
<td>2.2%</td>
<td>26</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td>On-site Solar (non-Solar*Rewards)</td>
<td>27,426</td>
<td>27,426</td>
<td>27,426</td>
<td>0.2%</td>
<td>0.2%</td>
<td>0.2%</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Additional On-site Solar (non-Solar*Rewards)</td>
<td>–</td>
<td>1,017,281</td>
<td>1,017,281</td>
<td>0.0%</td>
<td>8.3%</td>
<td>8.3%</td>
<td>98</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>2MW Nederland Community Solar Garden with RECs</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Renewable*Connect Green Tariff Subscriptions (Summer 2018)</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Renewable*Connect Green Tariff Subscriptions (Future Capacity)</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Nederland’s Shortfall to 100% Goal</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Energy Efficiency Reductions through EnergySmart</td>
<td>–</td>
<td>70,186</td>
<td>491,505</td>
<td>0.0%</td>
<td>0.6%</td>
<td>4.0%</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Energy Efficiency Reductions through PACE</td>
<td>–</td>
<td>100,701</td>
<td>704,907</td>
<td>0.0%</td>
<td>0.8%</td>
<td>5.7%</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Energy Efficiency Reductions through Xcel Energy</td>
<td>–</td>
<td>38,710</td>
<td>270,970</td>
<td>0.0%</td>
<td>0.3%</td>
<td>2.2%</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Additional On-site Solar (non-Solar*Rewards)</td>
<td>–</td>
<td>–</td>
<td>207,524</td>
<td>0.0%</td>
<td>0.0%</td>
<td>1.7%</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Renewable*Connect Green Tariff Subscriptions (Future Capacity)</td>
<td>–</td>
<td>–</td>
<td>2,034,562</td>
<td>0.0%</td>
<td>0.0%</td>
<td>16.5%</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>2MW Nederland Community Solar Garden with RECs</td>
<td>–</td>
<td>–</td>
<td>2,590,909</td>
<td>0.0%</td>
<td>0.0%</td>
<td>21.0%</td>
<td>–</td>
<td>–</td>
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</tr>
</tbody>
</table>

**Total Nederland Annual Consumption (kWh)**

<table>
<thead>
<tr>
<th>Year</th>
<th>kWh</th>
<th>Shortfall to 100% Goal kWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>12,284,593</td>
<td>8,565,409</td>
</tr>
<tr>
<td>2018</td>
<td>12,284,593</td>
<td>7,338,531</td>
</tr>
<tr>
<td>2025</td>
<td>12,284,593</td>
<td>–</td>
</tr>
</tbody>
</table>

| % Shortfall | 70% | 60% | -17% |

| % Renewable | 30% | 40% | 117% |
i. OVERVIEW

The Action Scenario describes what Nederland could achieve by 2025 through a combination of actions taken by residents, businesses, and the municipality on top of the progress described in the Base Case Scenario. The methodology used to track and model Nederland’s progress towards 100% shows that if all of the actions discussed below are undertaken, the town will achieve 117% consumption of electricity from renewable sources. Because the methodology relies on tracking RECs that can be attributed to a Nederland residence, business, or the municipality in addition to electricity consumption, the town can theoretically be more than 100% renewable.

It is not the intention of this scenario to recommend that the town pursue all actions to their fullest extent, but rather to show how a suite of options can work together to advance the town towards its goals. This way, the town can encourage businesses and residents to seek the solutions that fit their budgets, priorities, and needs.

ii. ASSUMPTIONS

The Action Scenario assumes that Nederland businesses and residents, with municipal support, continue to increase their participation in established or anticipated programs that: provide rebates and incentives for energy efficiency upgrades; install solar PV on residential rooftops; and allow residents and businesses to purchase electricity from renewable resources – including the associated RECs – from Xcel Energy.

The actions below begin with those informing the Base Case Scenario (actions A-D) and then begin to include actions that become progressively more ambitious. The final two actions – future capacity of Renewable*Connect and a Community Solar Garden in Nederland – would require Xcel Energy support, PUC approval, and possible revisions to Colorado’s energy statutes.

a. Baseline Renewable Electricity from Xcel Grid
The Action Scenario holds assumptions from the Base Case steady, assuming the completion of the Colorado Energy Plan by year-end 2025. The Colorado Energy Plan will add 1.8 GW of solar and wind to Xcel Energy’s generation mix. 159

b. Windsource Green Power Program Subscriptions
The Action Scenario holds assumptions from the Base Case steady regarding the Windsource program.

c. On-site Solar (non-Solar Rewards)
The Action Scenario holds assumptions from the Base Case steady regarding on-site solar not enrolled in Solar*Rewards. The impact that additional capacity in Nederland would have on the town’s progress is explored separately below in action H.
d. Renewable*Connect Green Tariff Subscriptions (Summer 2018)
The Action Scenario holds assumptions from the Base Case steady regarding subscriptions to Renewable*Connect during Summer 2018. The impact that more capacity being added to the program, creating new subscription opportunities, would have on Nederland’s progress is explored separately below in action i.

e. Energy Efficiency Reductions through EnergySmart
Boulder County’s EnergySmart program offers energy advising services, rebates, and incentives to residents within Boulder County, and has been successful at reducing consumption in Nederland by approximately 70,000 kWh per year. Because most of Nederland’s electricity is consumed by the residential sector, increasing residential engagement with EnergySmart is a particularly impactful action. The Action Scenario assumes that EnergySmart will work with new residential partners in Nederland to realize additional avoided electricity consumption of about 70,000 kWh per year.

f. Energy Efficiency Reductions through PACE
Boulder County’s Partners for a Clean Environment (PACE) Program offers businesses incentives and rebates for completing energy and water efficiency upgrades, as well as installing solar PV and introducing sustainability measures around waste. Five businesses in Nederland have participated in PACE programs as of July 2018, representing an approximate electricity savings of 100,000 kWh per year.140 In other words, Nederland’s baseline annual electricity consumption of about 12 million kWh per year would be 100,000 higher if not for the upgrades made by these businesses. The Action Scenario assumes that PACE will reproduce these results in the years between 2018-2025, adding an additional five businesses in Nederland per year that will make comparable energy efficiency upgrades to realize the eventual electricity savings demonstrated in 2025 of the Action Scenario.

g. Energy Efficiency Reductions through Xcel Energy
On average, Xcel Energy’s efficiency incentive and rebate programs realized avoided electricity consumption of about 38,700 kWh per year between 2016–2018. The Action Scenario assumes that a mix of Nederland residents and businesses participate each year between 2018–2025 to realize additional savings of about 38,700 kWh per year. Because Boulder County’s efficiency programs are designed to be complementary to Xcel Energy’s program, no cannibalization of savings realized between each program is assumed.

h. Additional On-Site Solar (non-Solar*Rewards)
The Action Scenario assumes the addition of 20 new residential solar PV installations in Nederland by 2025. Each installation represents an average Nederland household and assumes that the solar PV system generates 100% of the household’s needs, or 10,351 kWh over the course of a year. This would represent the installation of an approximate 8 kW rooftop solar PV system per household. This action assumes that none of these new installations will enroll in Xcel Energy’s Solar*Rewards program, thereby allowing each resident to retain the RECs generated by their system and count them towards the town’s
goal. Previous sections discuss bulk purchasing and bulk purchasing with REC donation schemes that may be able to lower capital costs for customers.

i. Renewable*Connect Green Tariff Subscriptions (Future Capacity)
The Action Scenario assumes that Xcel Energy will build future capacity in the Renewable*Connect program, and that by 2025 one additional 50 MW plant of wind or solar in Colorado will be operating and have opened for additional subscriptions. This assumption is based off of conversations with Xcel Energy.

Nederland’s interest in Renewable*Connect is that it offers an easy, low-cost, and zero upfront capital pathway to consuming renewable electricity, because Xcel Energy retires the RECs generated by the installation on behalf of the subscriber. For these same reasons, Renewable*Connect is also of interest to commercial and industrial firms with renewable energy goals.

The Action Scenario assumes that an additional 20% (representing two times the subscription rate of the Summer 2018 pilot) of Nederland’s residential and business accounts would subscribe to a second offering of Renewable*Connect given the opportunity, and that with appropriate lead time, the SAB could facilitate the educational outreach and marketing activities necessary to reach this level of subscriptions. If achieved, this could represent a nearly 17% advance towards Nederland’s electricity goal.

Nederland should support the expansion of the Renewable*Connect program through forums at the PUC and comments on Xcel Energy plans. This work would fall under the scope of the Energy Future Collaboration MOU that the town signed with Xcel Energy, and collaboration on this matter could lead to additional opportunities for the town.

j. 2-MW Nederland Community Solar Garden with RECs
The Action Scenario assumes that the Town of Nederland, together with a development partner, builds a 2 MW community solar garden and receives all of the RECs generated by the installation.

Even in an environment with no regulatory uncertainty, solar development at the megawatt scale is an expensive, complicated, and lengthy process. In order for the town to keep the RECs generated by a community solar garden, legislative and regulatory changes to current CSG guidelines would be required. Therefore, this is the most ambitious action proposed in this document, and not one to be pursued without further research and expertise.

Several of the main challenges of this action are summarized below:
- Title 40 of the Colorado Revised Statutes outlines current Colorado law around community solar gardens and specifies that the incumbent Investor Owned Utility - Xcel Energy - is entitled to receive all of the RECs generated by CSGs. In order
to change this, legislation would be required to amend the Title. Following the drafting and passing of a bill in the Colorado legislature, the PUC would then be able to amend regulatory guidelines for CSGs. Without this step, and under current regulatory conditions, a CSG would not advance Nederland towards its 100% renewable electricity goal.

- Solar project development is a complicated proposition that must be undertaken by a professional developer. The basic steps involved in a solar project development include: resource assessment, site selection, site control or acquisition, permit acquisition, transmission access acquisition, Power Purchase Agreement negotiation, project design, equipment supply, Engineering Procurement & Construction partner contracting, project finance, infrastructure installation, operational testing, commercial operation, ongoing maintenance and operating activities, and debt and contract compliance. For Nederland to have a minimally viable 2 MW project, the town first needs to identify and acquire an approximately 10-acre site.

- Community solar gardens are a growing product offering from solar developers, yet still not widely utilized in Colorado due to the economics of these projects relative to behind-the-meter projects. CSG legislation was written with the intent of opening up a product to home renters, small businesses, and homeowners who otherwise cannot install rooftop solar PV due to the capital outlay required, location of home and solar resource quality, or ability to install solar on the roof (if a renter in a shared building). However, this model carries a high price of customer acquisition, and therefore, in Colorado, CSGs have seen more success when serving several commercial and industrial customers, large municipal customers, or a large “anchor” customer with few other smaller customers. Given these broad challenges, there are still several reasons why this remains an attractive option to consider and further research.

  - A 2 MW CSG where the town holds the RECs generated by the installation would meaningfully advance Nederland towards its goal and provide a local and tangible representation of Nederland’s commitment to renewable electricity.
  - Operated as a non-profit by the town, a CSG could provide a way for low and middle-income residents to share in the benefits of solar.
  - Operated as a behind-the-meter installation for a town facility like the wastewater treatment plant that bills residents and businesses for its services, a “CSG” could pass along the cost savings of such an installation to customers. In this situation, it would not strictly be a CSG, and Nederland is currently constrained from pursuing this course of action due to its PPA with Oak Leaf Energy Partners.

### iii. NEXT STEPS FOR PROPOSED ACTIONS

High-level next steps are provided for the ten proposed actions discussed above. In many cases, additional input, research, and expertise may be required.
a. Baseline Renewable Electricity from Xcel Grid
No actions need to be taken on the part of the Nederland BoT, SAB, businesses or residents to realize the increase in renewable resources from Xcel Energy’s generation mix, as the Colorado Energy Plan has been approved to move forward by the PUC.

b. Windsource Green Power Program Subscriptions
The Nederland SAB should monitor the annual Xcel Energy Community Energy Report to track subscription numbers for the Windsource program; no other steps need to be taken.

c. On-site Solar (non-Solar Rewards)
No action needs to be taken.

d. Renewable*Connect Green Tariff Subscriptions (Summer 2018)
The Nederland SAB should review the 2018 Xcel Energy Community Energy Report to verify that Renewable*Connect subscription numbers used in this report reflect subscriptions from Nederland’s Tax District, and not the wider Library District. Outside of annual monitoring, no other actions need to be taken.

e. Energy Efficiency Reductions through EnergySmart
The Action Scenario proposes that increased participation in EnergySmart by Nederland residents will result in the avoided consumption of 70,000 kWh annually through 2025. Steps to support this goal include:

<table>
<thead>
<tr>
<th>Goal</th>
<th>Action</th>
<th>Responsible Party</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set a target of at least seven additional households participating in EnergySmart each year through 2025.</td>
<td>Consider providing funds to EnergySmart earmarked for Nederland residents, or creating matching incentives given to residents who participate in EnergySmart upgrades. About 2/3 of Nederland’s electricity consumption comes from the residential sector, and energy efficiency upgrades not only advance Nederland towards its 100% goal but also increase ambient home comfort and decrease monthly heating and cooling costs. Providing earmarked funds to EnergySmart or incentives for participation would amplify EnergySmart’s reach in Nederland.</td>
<td>BoT</td>
</tr>
<tr>
<td></td>
<td>Consider using all or a portion of Boulder County’s 2019 Sustainability Matching Grant for this funding.</td>
<td>SAB</td>
</tr>
<tr>
<td></td>
<td>Consider using a portion of the future Boulder County Sustainability Tax revenue for this funding.</td>
<td>SAB</td>
</tr>
</tbody>
</table>
Cultivate case studies from Nederland residents that have engaged with EnergySmart for efficiency upgrades and disseminate these case studies through appropriate channels to increase participation levels. 

Encourage businesses and residents installing energy efficiency upgrades through EnergySmart to also utilize complementary incentives from Xcel Energy programs, as appropriate.

f. Energy Efficiency Reductions through PACE

The Action Scenario proposes that increased participation in PACE by Nederland businesses will result in the avoided consumption of 100,000 kWh annually through 2025. Steps to support this goal include:

<table>
<thead>
<tr>
<th>Goal</th>
<th>Action</th>
<th>Responsible Party</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set a target of at least five additional businesses participating in PACE each year through 2025.</td>
<td>Consider providing additional earmarked funds to PACE to augment funding opportunities for businesses in Nederland. In 2018, PACE placed a cap of $2,000 per business for efficiency upgrades and $15,000 per business for solar projects, available on a first-come, first-served basis until funds ran out. PACE receives funding from Boulder County and the City of Boulder; Boulder County funds are split between the City of Boulder and other cities and towns within the county, while City of Boulder funds are only awarded to city businesses. By providing $10,000 or more in additional funding to PACE, the BoT could ensure that more Nederland businesses can install energy efficiency upgrades and improve the economics on big-ticket upgrades.</td>
<td>BoT</td>
</tr>
<tr>
<td>Consider using all or a portion of Boulder County’s 2019 Sustainability Matching Grant for this funding.</td>
<td></td>
<td>SAB</td>
</tr>
<tr>
<td>Consider using a portion of the future Boulder County Sustainability Tax revenue for this funding.</td>
<td></td>
<td>SAB</td>
</tr>
</tbody>
</table>
Cultivate case studies from Nederland businesses that have engaged with PACE for efficiency upgrades and disseminate these case studies through the Downtown Development Authority to increase participation levels.  

Encourage businesses and residents installing energy efficiency upgrades through PACE to also utilize complementary incentives from Xcel Energy programs, as appropriate.

### g. Energy Efficiency Reductions through Xcel Energy

The Nederland SAB and BoT should work to promote Xcel Energy incentives and rebates for energy efficiency through marketing campaign to businesses and residents.

<table>
<thead>
<tr>
<th>Goal</th>
<th>Action</th>
<th>Responsible Party</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encourage at least one additional house and at least two additional businesses utilize Xcel Energy efficiency programs to realize avoided electricity consumption decrease of about 39,000 kWh annually each year until 2025</td>
<td>Cultivate case studies from Nederland businesses and residents that have engaged with Xcel Energy for efficiency upgrades and disseminate these case studies through appropriate channels.</td>
<td>SAB</td>
</tr>
<tr>
<td>Encourage businesses and residents installing energy efficiency upgrades through Xcel Energy programs to also utilize complementary incentives from EnergySmart or PACE, as appropriate.</td>
<td></td>
<td>SAB</td>
</tr>
</tbody>
</table>

### h. Additional On-Site Solar (non-Solar*Rewards)

The Action Scenario assumes 20 new residences with annual electricity consumption of 10,351 kWh will install approximately 8 kW solar PV systems on their rooftops. Depending on the variability of solar production, a PV system of this size is roughly capable of generating 100% of the household’s annual consumption.

In addition, the Action Scenario assumes that none of these new installations will opt to participate in Xcel Energy’s Solar*Rewards program, instead only operating as net energy metering systems. In 2018, the Solar*Rewards program paid the resident or consumer $0.005 per each kWh produced by the system in exchange for selling RECs produced by the PV systems back to Xcel Energy. By selling the RECs through Solar*Rewards, the electricity generated by the PV systems cannot be directly counted towards Nederland’s 100% renewable electricity goal.
<table>
<thead>
<tr>
<th>Goal</th>
<th>Action</th>
<th>Responsible Party</th>
</tr>
</thead>
<tbody>
<tr>
<td>By 2025, an additional 20 average Nederland homes (or 8 average Nederland businesses) install solar PV, with an aggregate projected generation of about 207,000 kWh annually. All new installations opt only for net energy metering contracts with Xcel Energy rather than enrolling in Solar*Rewards.</td>
<td>The Nederland BoT should state its support for Boulder County’s initial investigations into a bulk purchasing solar PV program. If a program is successful, SAB should plan to market the program as an additional incentive for residents and businesses to make the investment in rooftop PV. One interesting consideration is the role that REC donation could play in facilitating a bulk purchasing program. The SAB should investigate setting up a program like the one discussed on page 44 in Nederland.</td>
<td>BoT</td>
</tr>
</tbody>
</table>

**i. Renewable*Connect Green Tariff Subscriptions (Future Capacity)**

Based on demonstrated residual demand for capacity in the Renewable*Connect Summer 2018 pilot and conversations with Xcel Energy representatives, it is reasonable to predict that Xcel Energy will add more capacity to the Renewable*Connect program by 2025.

<table>
<thead>
<tr>
<th>Goal</th>
<th>Action</th>
<th>Responsible Party</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work to encourage an additional 142 average Nederland residences and 44 average Nederland businesses to sign up for opportunities under Renewable*Connect, totaling about 2.04 million kWh of renewable electricity that can be counted towards Nederland’s goal.</td>
<td>Arrange for the Mayor of Nederland to meet with Colorado’s Public Utilities Commissioners and state support of future additional Renewable<em>Connect offerings. The BoT liaison to Colorado Communities for Climate Action (CC4CA) should ensure that the group understands that this is a regulatory priority for Nederland. CC4CA expertise and lobbyists may provide assistance in this area. Work with Xcel Energy through the Energy Future Collaboration MOU to offer Nederland’s support for the expansion of Renewable</em>Connect. This may be achieved through a letter submitted with the regulatory filing for additional Renewable*Connect capacity to the PUC. Support legislation like KC Becker’s HB18-1428, which failed in 2018 but may provide future opportunities with regards to Xcel Energy programs to Nederland by codifying the Energy Future Collaboration MOU and placing it under the purview of the PUC.</td>
<td>BoT</td>
</tr>
</tbody>
</table>

*SAB

*Refer to page 25 for more discussion about HB18-1428*
Convene the other communities which have signed the Energy Future Collaboration MOU with Xcel: Alamosa, Breckenridge, Denver, Lakewood, Lone Tree, (Nederland), Windsor, and rally support for future capacity additions.  

SAB

Embed this goal into Nederland’s work plan with Xcel Energy, in progress as of Fall 2018; encourage all other communities to also embed this goal into their work plans.  

SAB

Develop a marketing strategy and implement it at least three months prior to the open period for new Renewable*Connect subscriptions. Cultivate community advocates from the residents and businesses who signed up for the Summer 2018 pilot of Renewable*Connect and collect both stories and data illustrating Renewable*Connect’s impact on monthly electricity bills.  

SAB

Consider financial incentives to increase participation in future offerings of Renewable*Connect. For example, the BoT could offer to rebate the early termination fee (in 2018, $50/residence and $100/business) that is levied if residences or businesses exit their 5 or 10-year contracts early.  

BoT

---

### j. 2-MW Nederland Community Solar Garden with RECs

As a preliminary step, Nederland should engage the services of a solar developer with CSG experience in Colorado to evaluate options and better understand project economics, requirements, and needs.

<table>
<thead>
<tr>
<th>Action</th>
<th>Responsible Party</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engage local solar developers. Potential firms to engage may include: AES Distributed Energy, Colorado Energy Collective, Grid Alternatives, Namaste Solar, Oak Leaf Energy Partners.</td>
<td>SAB</td>
</tr>
<tr>
<td>In order to secure a change in legislation facilitating the possession of RECs generated by a CSG, Nederland should begin engaging with lawyers with PUC experience, Xcel Energy, and state legislators to begin drafting legislation. This may be able to happen through Colorado Communities for Climate Action (CC4CA).</td>
<td>SAB</td>
</tr>
<tr>
<td>Nederland should continue to seek appropriate sites for a 2 MW project (about 10 acres needed). Sites would need to be purchased by Nederland or leased for at least 20 years.</td>
<td>SAB</td>
</tr>
</tbody>
</table>
iv. CAVEATS

a. Base Case Scenario Caveats
All caveats from the Base Case scenario apply to the Action Scenario.

b. Methodology for counting actions taken by Nederland businesses and residents
Where SAB goals target a specific number of businesses and households for actions, these targets assume that an action completely offsets the calculated average annual consumption of a business (25,661 kWh) or residence (10,351 kWh). However, not all actions will completely offset this amount - for example, while it would be possible to install an 8-kW solar PV system on a house and generate 10,351 kWh annually, it is not possible to reduce electric consumption of a household through energy efficiency upgrades by 10,351 kWh. Therefore, the targets established by the Next Steps section should also be considered as general benchmarks, and by no means the absolute number of households or businesses that must be recruited to adopt an action in order for Nederland’s goal to be achieved.

c. Renewable*Connect Future Capacity
The Action Scenario assumes that adding more capacity to Renewable*Connect is feasible and likely, and that future offerings of the program will be available to Nederland residents and businesses before 2025.

d. 2-MW Nederland Community Solar Garden with RECs
This solution represents the most ambitious action presented in this document. A brief list of requisites for achieving an operational CSG in 2025 includes: drafting and passing legislation allowing RECs to stay with the town; amending regulations to reflect this legislative change; acquiring land; conducting an interconnection study; identifying a development partner; constructing a reasonable financing strategy; creating a new administration to run and manage CSG subscriptions; and many other steps.

It is not an impossible solution, but it would require the most working-hours by members of the BoT and SAB over a period of at minimum three years. Implementing this action would also require a partnership with a private sector solar developer, retaining energy lawyers, and – depending on capital requirements – a tax on residents and businesses. Over time, a CSG would likely be cost-neutral or provide cost-savings, but this payback period would be at least five to seven years. Within this report, there are alternative actions that will cost Nederland less in time, capital, and expertise while advancing the town towards its energy goals. Additionally, it is also likely that shifts in the political environment may produce legislative and regulatory changes over the next few years that may open up new opportunities or ease barriers to pursuing an action like this.
IV. A TOOL TO TRACK NEDERLAND’S PROGRESS TOWARDS 100%

A. OVERVIEW

The “Nederland Progress Tracking Spreadsheet” is a tool developed to assist the town in tracking progress towards 100% renewable electricity and help decision makers weigh the relative impact actions will have on advancing the town’s progress.

The tool uses the same methodology as the Base Case and Action Case scenarios, with one additional feature: instead of measuring all progress against a 2017 baseline electricity consumption, the SAB can use Xcel Energy’s annual Community Energy Reports to track progress against the most recent levels of electricity consumption found in the reports. The tool will need to be updated annually by SAB members with data found in the Community Energy Reports to provide accurate tracking. No other sources of data are required.

The spreadsheet is embedded with directions for finding and inputting numbers, as well as additional measurement tools. For example, estimates for on-site Solar (non-Solar*Rewards) can be calculated using the tool “Solar PV - Installed Capacity (kW) - Calculator” for customers who install solar generation resources, but elect to not participate in Xcel’s Solar*Rewards rebate program.

B. ASSUMPTIONS

Xcel Energy’s Community Energy Reports provide read-outs of annual program participation and contribution, but in order to track and estimate the annual generation of on-site solar (non-Solar*Rewards) data (i.e., solar rooftop PV that is not enrolled in Solar*Rewards), it was necessary to create a calculator. Xcel Energy does not make this data available but reports annual installation data under the category “Capacity Installed During Reporting Year (kW).”

The calculator estimates annual production using the following formulas:

- Annual Production (kWh) = Capacity Installed During the Reporting Year (kW) * Nederland Solar Capacity Factor * Hours in the Year
- Annual Production (kWh) = Capacity Installed During the Reporting Year (kW) * 14.8% * 8760

C. NEXT STEPS

Annual data entry will be required to ensure that the spreadsheet accurately reflects community progress towards the 100% renewable electricity goal.
CONCLUSION

One year after committing to the consumption of 100% renewable electricity, the Town of Nederland achieved 38% consumption of renewable electricity. While the majority of this progress is due to the baseline amount of renewable electricity in Xcel Energy’s generating mix, 10% of the progress is the result of individual actions taken by Nederland residents and businesses and 8% of that occurred this year alone. This incredible progress was made possible by the efforts of the Sustainability Advisory Board and community leaders.

With the continued dedication and energy of Nederland residents, businesses, and the municipality, it is possible for Nederland to achieve its goal of 100% community-wide electricity supplied by renewable sources by 2025.

Acknowledging that the resolution responsible for Nederland’s 100% goal had an underlying motivation of reducing the town’s greenhouse gas emissions, as progress continues to be made towards 100% renewable electricity it will be important for Nederland to look to other sectors responsible for emissions: thermal energy, transportation, and waste. Furthermore, if Nederland achieves its 2025 electricity goal, maintaining 100% renewable consumption year over year will require consistent monitoring, analysis, and additional actions as contracts for electricity expire and new opportunities resulting from technological, regulatory, or legislative changes become available.

PROJECT OUTCOMES

This document concludes that it is possible for the Town of Nederland to achieve its goal of 100% community-wide electricity supplied by renewables sources by 2025. To prove this, the authors constructed a methodology to measure Nederland’s renewable electricity consumption and created two scenarios: the Base Case Scenario, where Xcel Energy is solely responsible for increasing the amount of renewable generation on the grid; and the Action Scenario, where the additional progress of potential voluntary actions is evaluated on top of Xcel Energy’s planned increases. The actions used to build the Action Scenario were vetted for feasibility and alignment with Nederland’s community priorities, as defined by decision making criteria outlined by the Sustainability Advisor Board.

The percentage of renewable electricity each scenario achieves by 2025 and the required next steps are summarized below:

- Base Case Scenario: Nederland would consume 66% of its electricity from renewable sources by 2025. No additional actions need to be taken in order to achieve this level of progress.
• Action Scenario: Nederland would consume 100% of its electricity from renewable sources by 2025. The Action Scenario will require engagement from Nederland residents, businesses, and the municipality for the community to achieve its goal.

FUTURE ACTIONS AND RESEARCH NEEDED

The Action Scenario will require collaboration between members of the Nederland community, Boulder County, PUC, and Xcel Energy. In some cases, Nederland residents and businesses will need to dedicate resources in order for actions recommended in this document to succeed. Steps that the municipality can begin taking immediately to support the Action Scenario include:

• Municipal education, marketing, and support resulting in energy efficiency increases through EnergySmart, PACE, or Xcel Energy programs.
• Contributing funds to Boulder County EnergySmart and PACE programs to accelerate energy efficiency upgrades in Nederland.
• Advocating for future capacity of Xcel Energy’s Renewable*Connect program before the PUC and creating incentives and outreach programs to ensure high levels of community subscription rates.
• Working with Boulder County to set up a solar PV bulk purchasing discount program and associated outreach and marketing campaigns, potentially involving a REC donation mechanism.
• Engaging with CC4CA to build Nederland’s advocacy and lobbying capacity and share lessons learned amongst Colorado communities.
• Supporting legislation that would enact changes to CRS Title 40 allowing for RECs to be retired by CSGs on behalf of subscribers.

In order to gauge progress towards the 2025 target, the Town of Nederland will need to incorporate data reported in Xcel Energy’s Community Energy Reports into the progress tracking tool annually. The key factors that will impact Nederland’s progress include:

• Baseline renewable energy from Xcel Energy’s generation mix, which will begin to increase as the Colorado Energy Plan is implemented.
• Electricity consumption in the Tax District of Nederland, which will provide the benchmark against which to measure progress towards 100%. Decreases in electricity consumption resulting from energy efficiency upgrades will be inherently reflected in this total.
• Participation in Xcel Energy’s green tariffs and green power programs.
• New solar PV systems installed in Nederland that elect to keep the RECs they generate.

If the town achieves its goal by 2025, Nederland will subsequently need to develop a plan to maintain its consumption of 100% community-wide renewable electricity. This plan should reflect changes in regulatory, technology, and market landscapes. To this end, Nederland decision makers should remain aware of political trends and legislation that affects Title 40 of the Colorado Revised Statutes and may impact Nederland’s strategy.
for 100% renewable electricity as well. Engagement with CC4CA should help the town stay current with pertinent changes.

Additionally, newly developed technologies could offer Nederland residents, businesses, and government significant opportunities in purchasing renewable energy. By staying up-to-date on new technological developments in the energy sector, Nederland may be able to take advantage of cost-effective and innovative purchasing decisions unforeseen within this report. Finally, as time and resources allow, Nederland should seek to develop strategies that address reducing greenhouse gas emissions from thermal, transportation, and waste sectors.

With sustained support by the Board of Trustees and advocacy from the Sustainability Advisory Board; creativity and collaboration between communities and Xcel Energy; and action on the part of residents and businesses; Nederland is well positioned to achieve 100% consumption of renewable electricity by 2025.
APPENDICES

Appendix A: Resolution 2017-10

TOWN OF NEDERLAND
Boulder County, Colorado

RESOLUTION 2017-10

A RESOLUTION OF THE BOARD OF TRUSTEES AND MAYOR OF THE TOWN OF NEDERLAND TO ENSURE THE TRANSITION TO 100% RENEWABLE ENERGY FOR THE TOWN OF NEDERLAND’S COMMUNITY ELECTRICITY SUPPLY BY 2030

WHEREAS, the Nederland Board of Trustees recognizes carbon dioxide, methane, and other greenhouse gases released into the atmosphere from the use and reliance on fossil fuels for electricity production causes anthropogenic climate change; and

WHEREAS, Nederland is already experiencing the effects of climate changes through increased temperatures and water cycle changes leading to increased length and severity of wildfire seasons, and increased frequency and severity of both flooding and droughts; and

WHEREAS, the associated costs of these effects decrease the resiliency of our local economy and ecosystems and their ability to provide for our current and future health and welfare; and

WHEREAS, emissions from electricity generation are a large component of municipal and community greenhouse gas emissions for the Town of Nederland; and

WHEREAS, the Nederland board of Trustees passed a resolution in support of the Paris Agreement (resolution 2017-07) resolving to reduce greenhouse gas emissions to meet the goals set by the international community under the agreement; and

WHEREAS, the transition to a community reliant of efficient uses of renewable energy resources will improve air quality, water quality, and enhance public health; and

WHEREAS, rooftop solar, low-income community solar, energy efficiency, and demand control technologies offer the opportunity to equitable distribute resources, address poverty, stimulate new economic activity in Nederland, and ease financial burden on those most impacted by high energy costs; and

WHEREAS, “renewable energy” includes energy derived from wind, solar, and geothermal sources; and

WHEREAS, low-impact, small hydro and some forms of biomass may be considered “renewable energy” after being evaluated for sustainability and environmental justice implications; and

WHEREAS, “renewable energy” specifically excludes energy derived from fossil fuels, nuclear, incineration of municipal and medical waste, and large-scale future hydroelectric development; and
WHEREAS, a 100% renewable electricity commitment by the Town of Nederland addresses global solutions to climate change through: (1) increasing incentives for our electric utility to transition away from fossil fuels, and (2) communicating to state and national government, alongside other towns and cities in Colorado and the United States which have made similar commitments, that renewable energy generation is a priority for our communities.

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF TRUSTEES AND MAYOR OF THE TOWN OF NEDERLAND, COLORADO, THAT, the Town of Nederland will transition to 100% renewable energy for its community electricity supply by 2025, and as interim milestones: (1) the Town will transition to 100% renewable electric use for its municipally owned buildings and services by 2020, and (2) the Town of Nederland will achieve 50% renewable energy for its electrical supply by 2020 and (3) the town will achieve 75% renewable energy for its electrical supply by 2022.:  

BE IT FURTHER RESOLVED, that priority will be given to the lowest cost measures to meet renewable energy needs including strategies to increase energy efficiency, and programs that create an energy saving culture in the Town of Nederland, and that the public will have an opportunity and be encouraged to participate in the process for planning and implementation; and

BE IT FURTHER RESOLVED, that the Town will create structured mechanisms to include low-income citizens in the benefits to be derived from affordable clean energy; and

BE IT FURTHER RESOLVED, the Town seeks to collaborate with areas surrounding the Town of Nederland which are part of our community, and also with other communities within Xcel’s service territory to share best practices on planning and implementation and seek partnerships on implementation pathways where beneficial for both parties; and

BE IT FINALLY RESOLVED, by January of 2018 the Sustainability Advisory Board will develop a preliminary plan for the Town of Nederland to achieve 100% community-wide renewable electricity by 2025, that includes interim milestones, budget estimates, equity metrics, estimated financial impacts, financing mechanisms, and the percentage of clean energy that shall be locally or regionally generated, and that the Sustainability Advisory Board may actively pursue public and private partnerships to obtain the Town’s goal of 100% renewable electricity supply by 2025.

RESOLVED, APPROVED and ADOPTED this 15th day of August, 2017

TOWN OF NEDERLAND

By: ____________________________

Kristopher Larsen, Mayor

ATTEST:

Laura Jane Baur, Town Clerk
### Appendix B: Municipal Electricity Consumption Calculations

<table>
<thead>
<tr>
<th>Facility</th>
<th>Meter Address</th>
<th>Jun16-May17</th>
<th>Max KW</th>
<th>Jun17-May18</th>
<th>Max KW</th>
<th>2017</th>
<th>Max KW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visitor Center</td>
<td>2 W 1ST ST, NEDERLAND CO 80466</td>
<td>14,275</td>
<td>0</td>
<td>16,080</td>
<td>0</td>
<td>16,786</td>
<td>0</td>
</tr>
<tr>
<td>Town Hall</td>
<td>45 W 1ST ST, NEDERLAND CO 80466</td>
<td>8,220</td>
<td>0</td>
<td>6,674</td>
<td>0</td>
<td>7,179</td>
<td>0</td>
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<tr>
<td>Annex</td>
<td>53 W 1ST ST, NEDERLAND CO 80466</td>
<td>2,710</td>
<td>0</td>
<td>2,840</td>
<td>0</td>
<td>2,815</td>
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<tr>
<td>Conger St PRV</td>
<td>107 BIG SPRINGS DR, NEDERLAND CO 80466</td>
<td>5,955</td>
<td>0</td>
<td>5,979</td>
<td>0</td>
<td>5,942</td>
<td>0</td>
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<tr>
<td>Pump House</td>
<td>500 BIG SPRINGS DR, NEDERLAND CO 80466</td>
<td>31,296</td>
<td>8</td>
<td>22,234</td>
<td>5</td>
<td>23,774</td>
<td>6</td>
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<tr>
<td>Bridge St PRV</td>
<td>440 N BRIDGE ST, NEDERLAND CO 80466</td>
<td>7,211</td>
<td>2</td>
<td>7,049</td>
<td>2</td>
<td>6,716</td>
<td>2</td>
</tr>
<tr>
<td>Elementary Tank</td>
<td>900 COUNTY ROAD 128, NEDERLAND CO 80466</td>
<td>776</td>
<td>0</td>
<td>751</td>
<td>0</td>
<td>759</td>
<td>0</td>
</tr>
<tr>
<td>WWTP</td>
<td>211 EAST ST, NEDERLAND CO 80466</td>
<td>451,280</td>
<td>112</td>
<td>436,400</td>
<td>100</td>
<td>439,600</td>
<td>110</td>
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<tr>
<td>Water Plant</td>
<td>509 ELDORA RD, NEDERLAND CO 80466</td>
<td>97,760</td>
<td>34</td>
<td>95,120</td>
<td>34</td>
<td>91,200</td>
<td>34</td>
</tr>
<tr>
<td>11 Forest Rd</td>
<td>11 FOREST RD, NEDERLAND CO 80466</td>
<td>2,220</td>
<td>3</td>
<td>318</td>
<td>2</td>
<td>1,054</td>
<td>3</td>
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<tr>
<td>Pedestrian Bridge</td>
<td>5 HIGHWAY 119, NEDERLAND CO 80466</td>
<td>863</td>
<td>0</td>
<td>962</td>
<td>0</td>
<td>939</td>
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<tr>
<td>Community Center</td>
<td>750 HIGHWAY 72 NEDERLAND CO 80466</td>
<td>164,640</td>
<td>44</td>
<td>164,800</td>
<td>42</td>
<td>163,360</td>
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</tr>
<tr>
<td>673 Indian Peaks Dr</td>
<td>673 INDIAN PEAKS DR, NEDERLAND CO 80466</td>
<td>11,814</td>
<td>0</td>
<td>10,455</td>
<td>0</td>
<td>9,837</td>
<td>0</td>
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<tr>
<td>Chipeta Park</td>
<td>101 E LAKEVIEW DR, NEDERLAND CO 80466</td>
<td>13,051</td>
<td>0</td>
<td>10,549</td>
<td>0</td>
<td>12,094</td>
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<td>Police Department</td>
<td>20 E LAKEVIEW DR, NEDERLAND CO 80466</td>
<td>13,312</td>
<td>4</td>
<td>11,773</td>
<td>4</td>
<td>12,159</td>
<td>4</td>
</tr>
<tr>
<td>Hilltop PS and Tank</td>
<td>60 NAVAJO TR, NEDERLAND CO 80466</td>
<td>10,838</td>
<td>15</td>
<td>14,144</td>
<td>16</td>
<td>11,243</td>
<td>16</td>
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<tr>
<td>Rollinsville PRV</td>
<td>700 W PINE ST, NEDERLAND CO 80466</td>
<td>5,701</td>
<td>2</td>
<td>5,347</td>
<td>1</td>
<td>4,288</td>
<td>2</td>
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<tr>
<td>Facility - PW Shop</td>
<td>294 RIDGE RD NEDERLAND CO 80466</td>
<td>*</td>
<td>*</td>
<td>55,320</td>
<td>22</td>
<td>56,760</td>
<td>22</td>
</tr>
</tbody>
</table>

TOTAL: 841,922 223 807,475 206 866,505 241

**NOTES**

*Pedestrian Bridge: This property has a double bill period in 2017*

*Facility - PW Shop: "2017" usage for this account is based on months June 17-May18 because of incomplete data in 2017*
### Appendix C: Nederland Community Energy Report

**ANNUAL COMMUNITY ENERGY REPORT BY XCEL ENERGY**

|                          | Community: | City of Nederland | Year of Data: | 2017 |

#### Utility System Characteristics [1]

<table>
<thead>
<tr>
<th>Resource</th>
<th>Electric</th>
<th>Gas</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.5630</td>
<td>0.0063</td>
</tr>
</tbody>
</table>

#### Resource Mix

<table>
<thead>
<tr>
<th>Resource</th>
<th>Resource Contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal</td>
<td>44.00%</td>
</tr>
<tr>
<td>Gas</td>
<td>28.00%</td>
</tr>
<tr>
<td>Wind</td>
<td>23.00%</td>
</tr>
<tr>
<td>Hydro</td>
<td>2.00%</td>
</tr>
<tr>
<td>Solar</td>
<td>3.00%</td>
</tr>
<tr>
<td>Nuclear</td>
<td>0.00%</td>
</tr>
<tr>
<td>Bio Mass</td>
<td>0.00%</td>
</tr>
<tr>
<td>Other</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

#### Energy Consumption Data [4]

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Business</td>
<td>154</td>
<td>4,356,365</td>
<td>2,583</td>
<td>$442,113</td>
<td>1</td>
</tr>
<tr>
<td>Residential</td>
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<td>7,877,256</td>
<td>4,671</td>
<td>$672,435</td>
<td>0</td>
</tr>
<tr>
<td>Street Lighting</td>
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<td>20,972</td>
<td>12</td>
<td>$7,301</td>
<td>-</td>
</tr>
<tr>
<td>Total:</td>
<td>915</td>
<td>12,254,593</td>
<td>7,267</td>
<td>$1,321,849</td>
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</table>

<table>
<thead>
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#### Programmatic Data [10]

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<th>Windsource</th>
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<th>Total Capacity (kW)</th>
<th>Capacity Installed During Reporting Year (kW)</th>
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<th>Total Incentives Paid ($) [12]</th>
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<th>Natural Gas Energy Savings (Th)</th>
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<td>Colorado - Business Total</td>
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Footnotes

[1] Available in the latest Energy and Carbon at a Glance Brief at: [https://www.xcelenergy.com/EnvironmentPolicy/Carbon_Policy](https://www.xcelenergy.com/EnvironmentPolicy/Carbon_Policy). See the table on page 3, which shows our latest CO2 intensity by region in metric tons/MWh and lbs/MWh, as calculated using the Climate Registry’s electric power sector protocol. Note these are system-wide metrics and do not reflect differences between communities.

[2] Note that the CO2 emission factor for electricity is a preliminary estimate, as calculated using the Climate Registry protocols but not yet third-party verified. This reflects the most accurate and current emissions information available, but sometimes emissions data changes slightly as our power suppliers send us revised information, as our emissions go through third-party verification, or as reporting protocols improve. Note also that the emission factor does not include biogenic CO2 from biomass power generation, which is reported separately under the Climate Registry protocols.

[3] In the customer energy usage section, if minimum aggregation standards are not met, Xcel Energy will combine Commerical and Industrial classes into one “Business” line before not presenting data.

[4] In the customer energy usage section, if minimum aggregation standards are not met (see note 8 below), Xcel Energy will combine Commercial and Industrial classes into one “Business” line before not presenting data. Commercial Customers are classified by 2-digit NAICS sector falling between 1 and 49, while Industrial Customers are classified by 2-digit NAICS sector falling between 50 and 98. These classifications are collected by Xcel Energy through a voluntary third-party customer survey. Due to the fact that not all customers respond to this survey, where no other information is available, Xcel Energy assigns those customers to the Commercial class.

[5] The number of customers represents the number of active service connections during the reporting year. The number of actual businesses or residences within the jurisdiction is smaller than that shown due to the fact that more than one service connection can be assigned to one customer at a given location.

[6] Estimated total carbon emissions from electricity for a customer class are equal to the total kWh consumed by the customer class, multiplied by the CO2 emission factor for the Xcel Energy system in the applicable region. This does not account for transmission and distribution system line losses or for the fact that some customers within a class may be participating in voluntary renewable energy programs.

[7] Revenues are the bill components associated only with metered energy and demand.

[8] To protect individual customer confidentiality, Xcel Energy applies the “15/15 rule” as an aggregation standard to the energy consumption section of this report. So long as a given aggregated value contains 15 or more customers and no single customer makes up 15 percent or more of the aggregated value, the value can be published in this report. If these conditions are not met, customers will be removed. The number of customers removed is presented for informational purposes. For more information about Xcel Energy’s Privacy Policy, please visit [https://www.xcelenergy.com/billing_and_payment/customer_data_privacy/privacy_policy_customer_data](https://www.xcelenergy.com/billing_and_payment/customer_data_privacy/privacy_policy_customer_data).

[9] Estimated total carbon emissions from natural gas for a customer class are equal to the total therms consumed by the customer class, multiplied by the standard CO2 coefficient of 11.7 lbs/therm.

[10] This section simply reports participation by customer class, within the geographical boundaries of the community or state being reported, in various voluntary wind and solar programs. No representations are made as to the ownership of the renewable or carbon-free attributes of the electricity being purchased by those customers. In the case of Windsource, Xcel Energy retains Renewable Energy Credits (RECs) on behalf of the participating customer. Treatment of RECs varies among the solar programs. In general, ownership of environmental attributes is either with the customer or remains with Xcel Energy, unless specifically transferred to the community, so cannot be claimed by the community. In addition, our accounting methods do not allow us to adjust the system CO2 emission factors for individual jurisdictions to remove the effects of any CO2-free kWh transferred to customers under our voluntary programs.

[11] For Solar Rewards customers, the energy production value shown reflects that of customers who have a dedicated production meter for their photovoltaic system as well as an estimated value for those that do not. For those customers that do not have a production meter, the estimated production value is based off of the average generation per nominal capacity of production-metered systems multiplied by the known nominal capacity of the customer system. Number includes Made in Minnesota production.

[12] Incentives Paid are those Solar Rewards incentive paid by Xcel Energy only. Does not include Made in Minnesota payments.

*As described in note 8 above, an asterisk represents a row of values for which one or more customers were removed due to implementation of Xcel Energy’s Privacy Policy.

The information contained in this report relies on various assumptions, including some identified in footnotes, and is intended for general informational and instructional purposes only. The report is not to be relied upon for any other reason, including any litigation or other contested proceedings. Any customer data removed from the report is done so in compliance with Xcel Energy’s Privacy Policy and applicable state commission customer information and data privacy requirements.
Appendix D: Energy Future Collaboration MOU

ENERGY FUTURE COLLABORATION - MEMORANDUM OF UNDERSTANDING BETWEEN THE TOWN OF NEDERLAND, COLORADO AND XCEL ENERGY

This Memorandum of Understanding ("Memorandum"), dated May 15, 2018, between the Town of Nederland (the "Town") and Public Service Company of Colorado, a Colorado corporation and an Xcel Energy company ("Xcel Energy") provides a strategy for collaboration to achieve shared goals where they exist as pertaining to decreasing greenhouse gas emissions through an increased use of clean energy, energy efficiency, and other innovative solutions ("Energy Future Collaboration" or "EFC Partnership"). The Town and Xcel Energy are each a "Party" and collectively the "Parties" to this Memorandum. This Memorandum does not limit either Party to pursuing strategies outside of this EFC Partnership to achieve their visions.

BACKGROUND

A. The Town is a Colorado statutory municipality. It is responsible for protecting the public health and safety of its residents.

B. The Town has various clean energy, economic development, public works and innovation goals and desires, which have been developed in collaboration with the community including with Xcel Energy, at times.

C. The Town and Xcel Energy recognize that the Town must prioritize the needs of its community and its developed plans and policies. The Town must ensure that its business practices are fair and without bias toward any provider of services.

D. There are a variety of different energy provider models in the state. Xcel Energy is a statewide, integrated public utility energy provider, which is regulated by the Colorado Public Utilities Commission ("PUC"). Xcel Energy has an exclusive certificate of public convenience and necessity, granted by the PUC, to provide electric and natural gas service to the Town and its residents. In addition, Xcel Energy offers certain programs per its rules and regulations that involve a third-party developer or customer-provided generation, such as its Solar*Rewards, Community Solar*Rewards and net metering programs.

E. The Town and Xcel Energy have many aligned interests at a local, state and federal level and desire to advance those interests in a new way, capitalizing on each entity’s strengths and expertise via partnership.

F. The Town and Xcel Energy are creating a holistic, collaborative, mutually beneficial relationship that supports Nederland and the greater community.
g. The Town and Xcel Energy desire to memorialize, in this Memorandum, their shared vision, guiding principles, values and goals regarding the EFC Partnership.

**MUTUAL COLLABORATION**

**VALUES**

We seek to lead with our values. The standards that define what the community, the Town and Xcel Energy determine are important and desirable are the values. In essence, values help shape the “why” of what we do on a daily basis. Overall, the community has a large impact on determining both the Town’s and Xcel Energy’s values. Below are the Town and Xcel Energy values related to the EFC Partnership.

1.1 *Emission Reductions:* Reducing greenhouse gas emissions through transitioning to clean energy is necessary for conserving and preserving a sustainable community both now and into the future.

1.2 *Economic Development:* Innovation and technology, as well as investment in clean energy resources, provide opportunities to boost Nederland’s and Colorado’s economy, attract businesses, and be an innovation leader.

1.3 *Community and Stakeholder Input:* Community and stakeholder input regarding the EFC Partnership priorities will be sought through each Party’s established processes and any new processes that the Town and Xcel Energy believe may be beneficial to the EFC Partnership.

1.4 *Energy Provider:* Xcel Energy must continue to deliver safe, reliable, and affordable energy that its customers need and expect, including adding cost-effective renewable energy to its system.

1.5 *Healthy Town and Energy Provider:* A healthy Town and energy provider are important to driving certain of the mutual visions and goals of the Parties.

1.6 *Regional Collaboration:* EFC Partnership solutions should be sought through regional collaboration, whenever feasible.

**VISION**

Aspirations and goals, which drive a desired future, represent a person’s or organization’s vision. The Town and Xcel Energy each have a vision and, as part of the EFC Partnership, have identified a shared vision.
2.1 *The Town's Vision:* In 2011, the Town Board of Trustees approved a Nederland Vision 2020, which states the following:

“In Nederland, our greatest assets are our residents – the diverse people who live, work, play and contribute to all aspects of our unique mountain community. Nederland is a complete community guided by a shared vision reflecting community values and priorities. It is a place where our children thrive and people connect; neighbors know and care for one another, and community members are proud of their town, their deep and rich history, and a quality of life that is both deliberate and second to none. Our community proudly maintains its small-town feel and distinct identity – a small is beautiful, less is more approach. While our town has grown, we have remained true to our origins while internalizing a model of sustainability in which a healthy society comes from a healthy economy and a healthy environment is essential for both.”

Within the Town of Nederland’s Vision 2020 document is the goal of establishing rooftop solar, solar gardens, increasing energy efficiency, and many other project goals that explore and explain Nederland’s localized approach to sustainability and the importance of developing our community and local economy to reflect the prioritization of the tenets of sustainability.

In 2017, the Town adopted a renewable energy resolution that states the following: “The Town will transition to 100% renewable energy for its community electricity supply by 2025,” and as interim milestones: “(1) the Town will transition to 100% renewable electric use for its municipally owned buildings and services by 2020, and (2) the Town will achieve 50% renewable energy for its electrical supply by 2022.”

The Town of Nederland aspires to transition to renewable energy at or below current electricity rates to provide long-term price stability on energy. The Town aims to achieve this by utilizing the continued reduction in the cost of renewable energy, increasing energy efficiency, and many other strategies. The Town also desires to utilize a holistic framework in its decision making, which considers social, economic, and environmental costs, including those that it has determine directly contribute to climate change.

2.2 *Xcel Energy’s Vision:* Xcel Energy will be the preferred and trusted provider of the energy its customers need. As part of this, Xcel Energy wants to collaborate in this EFC Partnership with the Town as set forth in the Shared Vision below.

2.3 *Shared Vision:* Through the EFC Partnership, the Town and Xcel Energy will work to support and achieve each other’s vision and objectives in areas of
alignment, when it is beneficial for residents, businesses and the broader community.

**GUIDING PRINCIPLES**

As the Town and Xcel Energy, in conjunction with the community, seek achievement of their shared vision, certain tenets will be followed. These principles will supply the “how” of achieving the shared vision and execution of the EFC Partnership.

3.1 **Collaboration:** The Town and Xcel Energy will work collaboratively where appropriate to achieve the shared vision, with respect, transparency and innovative thinking as well as by establishing open and effective channels of communication to further our shared vision.

3.2 **Prioritization:** Both parties will prioritize developing a successful relationship under the EFC Partnership.

3.3 **Scalability:** The EFC Partnership framework developed between the Parties must be scalable and available to other communities in Colorado.

3.4 **Avoidance of Cost Shifts:** Pursuit and execution of the EFC Partnership, including renewable energy and sustainability targets, will be cost effective to Town residents, given the anticipated costs of the proposal, along with its anticipated benefits, and will avoid shifting costs, except to the extent approved, and deemed reasonable, by the PUC. The Town, in its discretion and in accordance with its laws and requirements, could elect to provide additional Town funding toward EFC partnership projects or to low-income residents, if it so desires.

3.5 **Public Policy Support:** The Town and Xcel Energy may collaborate to advance public policy matters related to clean energy and sustainability at the state and local level where they share common interests.

3.6 **Colorado Regulatory Model:** The state regulatory model will be fully utilized to support the EFC Partnership and the Parties support using this model to achieve the shared vision. The Parties also agree that this model supports Xcel Energy being a thriving energy provider.

3.7 **Leveraging Town Efforts:** The EFC Partnership will support the Town’s efforts that buttress the Town’s goals, such as collaboration on federal and private grants and funding opportunities that align with the partnership efforts.

3.8 **Leveraging Xcel Energy Statewide Efforts:** The EFC Partnership will support Xcel Energy’s efforts that buttress Town goals, such as Xcel Energy’s proposed
Colorado Energy Plan, which provides a jump start on the Town achieving its sustainability and environmental objectives in an economic manner.

**COLLABORATION FOR RENEWABLE ENERGY, ADVANCED TECHNOLOGY AND THE ECONOMY - PLANNING, PROGRESS AND EXECUTION**

4.1 *Planning and Deliverables*: The Parties will develop a plan to advance the EFC Partnership, typically on a biennial basis (the "**Work Plan**"). The Work Plan for each time period will detail the deliverables to be presented and will follow the guiding principles outlined in this Memorandum. The Parties will use their best efforts to achieve such deliverables. [An overview of the Work performed and the results achieved will be prepared by the Parties on an annual basis.]

In prioritizing the items to be performed in a specific Work Plan, the Parties will consider the shared vision as well as regulatory requirements in Colorado and will focus on selecting the top two to three priorities. Initial ideas for the Parties to consider for the Work Plan are outlined in Attachment 1 to this Memorandum. These ideas are not exhaustive or controlling, but illustrative. The Town has a Sustainability Advisory Board ("**SAB**") that has been appointed by the Town Board of Trustees. The SAB will collaborate with the Town to help identify and recommend EFC Partnership priorities and provide input, thoughts and ideas regarding the Work Plan. This Work Plan is separate from any other plans that the SAB and Town of Nederland may develop in regards to achieving their vision and does not require the Town of Nederland to collaborate with Xcel on all future energy projects.

4.2 *Meetings and Staffing*: The Town and Xcel Energy will meet at least quarterly. The Parties will provide staff and resources appropriate to support the Work.

4.3 *PUC*: The Parties recognize that future action taken by Xcel Energy to support the Town’s goals and the EFC Partnership may be subject to state regulatory utility requirements under Colorado law. If the Parties agree on certain actions in support of the EFC Partnership that require state regulatory approval, they agree to cooperatively work together to seek necessary approvals or regulatory changes to facilitate such regulatory approvals. Program costs and customer incentives offered by Xcel Energy to its customers in Colorado extending beyond the scope of programs offered to all Xcel Energy customers will be the responsibility of the Town.

4.4 *Waiver and Legal Applicability*: Nothing in this Memorandum constitutes a waiver of the Town ordinances, the Town’s regulatory jurisdiction or Colorado’s utility regulatory jurisdiction. It is agreed by the Parties that nothing in this Memorandum will be deemed or construed as creating a joint venture, trust, partnership, or any similar legal relationship among the Parties. Each Party shall be responsible for its own obligations under this Memorandum. The Parties
agree that this Memorandum is to memorialize the intent of the Parties regarding the EFC Partnership, but does not create a legal agreement between the Parties. This Memorandum is for the benefit of the Parties and does not create third-party rights.

4.5 *No Impact on Franchise Agreement or Other Agreement:* The Town and Xcel Energy are parties to a Franchise Agreement, effective as of November 1, 2007 and adopted as Ordinance No. 635 (*Franchise Agreement*). The Franchise Agreement has no impact on this Memorandum, which likewise does not alter or modify the Franchise Agreement.

4.6 *Duration:* The EFC Partnership is a new endeavor and therefore the Parties want to provide adequate time to develop the partnership and successfully implement its goals and Work Plans. It is anticipated that the duration will coincide with the term of the Franchise Agreement, but either Party may end the EPC Partnership in the event it elects to do so.
This Memorandum has been signed on the date first above written.

TOWN OF NEDERLAND
By: ________________________
   Mayor, Kristopher Larsen

Attested by: ________________________
   Town Clerk, Nicole Cavalino

PUBLIC SERVICE COMPANY OF COLORADO, A COLORADO CORPORATION AND AN XCEL ENERGY COMPANY

By: ________________________
   President, Alice K. Jackson
ATTACHMENT 1 – EFC PARTNERSHIP WORK PLAN IDEAS

- **Energy efficiency**: Lowering energy consumption reduces operating costs for Town businesses and residents, while lowering air pollution and greenhouse gas emissions. Energy efficiency is the lowest-cost energy resource and should be utilized across all sectors to achieve the shared vision. For example, LED street lights provide a significant opportunity to reduce energy consumption across the Town while increasing safety, piloting smart technologies, and enhancing resident experience. Heating and heat retention is one of the largest contributors to inefficiency in many Town buildings, businesses, and residences.

- **Renewable Energy and Carbon Emission Reduction Goals**: The Town can leverage Xcel Energy’s statewide renewable energy plans, such as the Colorado Energy plan, to provide a strong foundation for its renewable energy and carbon reduction goals. Building upon that foundation, the Town and Xcel Energy would like to explore renewable energy offerings that can support the Town meeting its 2020 goal for 100 percent of the electric energy needed to power municipal operations and facilities coming from additive renewable energy on the Xcel Energy grid, e.g., through programs like Renewable*Connect and Solar*Rewards Community, etc. They also desire to explore options of how Xcel Energy and the Town could collaborate to achieve the Town’s 100 percent renewable energy goal community-wide by 2025.

- **Additional Collaborations**: The Town and Xcel Energy would like to explore possible collaboration opportunities with local businesses and the United States Forest Service as it relates to the possible installation of community solar gardens under the Solar*Rewards Community offering, as well as possible measures that may be mutually beneficial regarding wildfire mitigation risks. There may also be an opportunity to collaborate with other EFC Partnership towns in the region on these efforts.

- **Solar Garden**: Establishment of community solar installation, whether through the options above in “Additional Collaborations” or through a different land partnership.

- **Fuel Switching-Stationary Sector**: Electrification of space and water heating, utilizing renewable electric energy, is an area the Town and Xcel Energy would like to study and explore.

- **Transparency and Data Access**: The success of this relationship will depend, in part, on cooperative sharing of information and data in a timely manner. Sharing should be in alignment with EFC partnership activities and be to the full extent permitted by law and data sharing capabilities.
Appendix E: Residential Community Solar Program Discount & Donation of RECS

Assumptions:
- WREGIS Fee for Generating Unit Aggregator = $125/year
- WREGIS Transactional Fees = $0.05/MWh, adding $5/year in fees in the example below.
- Voluntary RECs = $1.25/MWh
- Average Nederland residential electric consumption = 10,351 kWh
- Capacity factor of solar PV = 14.8%
- Hours in a Year = 8760
- 1 MW = 1000 kW

Calculations:
MWh production calculation: MWh produced = Installed Capacity (MW) x Capacity Factor x Hours in a Year

Based on these assumptions and calculations:
- If WREGIS costs are $125/year, engaging in this construct versus purchasing Voluntary RECs breaks even at enrolling 100 MWh/year.
- Enrolling 100 MWh/year would require approximately 80 kW of installed solar PV in Nederland, or ten residential systems of 8 kW each, which would produce about 10,372 kWh per year, per system.
- For each group of ten homes or 100 MWh enrolled in this scheme, they will produce enough RECs - which are then donated to the town - that Nederland will advance about 0.8% towards its goal of 100% electricity from renewable resources.
- For residents and businesses interested in installing rooftop PV, doing so through a program like this provides upfront discounts to the resident or business and is an alternative to enrolling in Xcel Energy’s Solar Rewards program, which provides payment of $0.005/kWh generated, or about $60/year.

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2 For more information, contact the WREGIS Help Desk at 1-888-225-4213.
7 Nederland’s annual electric consumption is about 12,000 MWh: as a percentage of this, 100 MWh = 0.8%
https://www.xcelenergy.com/programs_and_rebates/residential_programs_and_rebates/renewable_energy_options_residential/solar/available_solar_options/on_your_home_or_in_your_yard/solar_rewards_for_residences
### Residential 2017 Data

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### Contract Length

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<tr>
<td>5 Year</td>
<td>$ 0.001</td>
<td>$ 0.86</td>
<td>$ 2.36</td>
</tr>
<tr>
<td>10 Year</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
</tr>
</tbody>
</table>

*Based only on Xcel's published 2018 rates
# Appendix G: List of Experts Consulted During Project

<table>
<thead>
<tr>
<th>Name</th>
<th>Association</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alan Apt</td>
<td>Nederland BoT</td>
</tr>
<tr>
<td>Melody Baumhover</td>
<td>Nederland SAB</td>
</tr>
<tr>
<td>Koben Calhoun</td>
<td>Rocky Mountain Institute</td>
</tr>
<tr>
<td>Vince Calvano</td>
<td>Attorney</td>
</tr>
<tr>
<td>Mirka della Cava</td>
<td>Colorado Energy Office</td>
</tr>
<tr>
<td>Dave Cherney</td>
<td>PA Consulting</td>
</tr>
<tr>
<td>Craig Eicher</td>
<td>Xcel Energy</td>
</tr>
<tr>
<td>Nadia El Mallakh</td>
<td>Xcel Energy</td>
</tr>
<tr>
<td>Gwen Farnsworth</td>
<td>Western Resource Advocates</td>
</tr>
<tr>
<td>Matt Hannon</td>
<td>Partners for a Clean Environment</td>
</tr>
<tr>
<td>David Hatchimonji</td>
<td>Boulder County</td>
</tr>
<tr>
<td>John Hereford</td>
<td>Oak Leaf Energy Partners</td>
</tr>
<tr>
<td>Karen Gerrity</td>
<td>Nederland BoT</td>
</tr>
<tr>
<td>Lester Karplus</td>
<td>Town of Nederland</td>
</tr>
<tr>
<td>Jonathan Koehn</td>
<td>City of Boulder</td>
</tr>
<tr>
<td>Paul Komor</td>
<td>University of Colorado Boulder</td>
</tr>
<tr>
<td>Justin Kudo</td>
<td>Marin Clean Energy</td>
</tr>
<tr>
<td>Kris Larsen</td>
<td>Mayor, Town of Nederland</td>
</tr>
<tr>
<td>Lydia Lawhon</td>
<td>University of Colorado Boulder</td>
</tr>
<tr>
<td>Taylor Lewis</td>
<td>Colorado Energy Office</td>
</tr>
<tr>
<td>Antoinette Maes</td>
<td>Verde Energy</td>
</tr>
<tr>
<td>Ryan Matley</td>
<td>Xcel Energy</td>
</tr>
<tr>
<td>Rich Mignogna</td>
<td>RASEI Education Faculty</td>
</tr>
<tr>
<td>Jennifer Morse</td>
<td>Nederland SAB</td>
</tr>
<tr>
<td>Erin Overturf</td>
<td>Western Resource Advocates</td>
</tr>
<tr>
<td>Chris Pelletier</td>
<td>Nederland Public Works Department</td>
</tr>
<tr>
<td>Adam Reed</td>
<td>University of Colorado Boulder</td>
</tr>
<tr>
<td>John Schneider</td>
<td>Xcel Energy</td>
</tr>
<tr>
<td>Brad Smith</td>
<td>Boulder County</td>
</tr>
<tr>
<td>Susie Strife</td>
<td>Boulder County</td>
</tr>
<tr>
<td>Zachary Swank</td>
<td>Partners for a Clean Environment</td>
</tr>
<tr>
<td>Larry Tasaday</td>
<td>Town of Nederland</td>
</tr>
<tr>
<td>Anthony Teixeira</td>
<td>Rocky Mountain Institute</td>
</tr>
<tr>
<td>Eryka Thorley</td>
<td>Nederland SAB</td>
</tr>
<tr>
<td>Collin Tomb</td>
<td>Partners for a Clean Environment</td>
</tr>
<tr>
<td>Louise Wood</td>
<td>Xcel Energy</td>
</tr>
<tr>
<td>Theresa Worsham</td>
<td>City of Golden</td>
</tr>
<tr>
<td>Lea Yancey</td>
<td>Boulder County</td>
</tr>
<tr>
<td>Jeff York</td>
<td>University of Colorado Boulder</td>
</tr>
</tbody>
</table>
### Appendix H: Survey Results

<table>
<thead>
<tr>
<th>Response</th>
<th>Do you live and/or conduct business within Nederland town limits?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>32</td>
</tr>
<tr>
<td>No</td>
<td>4</td>
</tr>
<tr>
<td>Not sure</td>
<td>1</td>
</tr>
<tr>
<td>Blank</td>
<td>23</td>
</tr>
</tbody>
</table>

| Do you pay the electricity bill for the property where you live and/or conduct business? |
|-----------------------------------|------------------------------------------------------------------|
| Yes                               | 36                                                               |
| No                                | 3                                                                |
| Blank                             | 24                                                               |

<table>
<thead>
<tr>
<th>Does your property currently have solar panels, and if so, are they:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grid-tied</td>
</tr>
<tr>
<td>Off-grid</td>
</tr>
<tr>
<td>Not sure</td>
</tr>
<tr>
<td>Blank</td>
</tr>
</tbody>
</table>

**Do you have additional thoughts on this? Please add them below.**

- I may be interested in solar panels to either generate electricity or to heat water. I've heard that solar panels should be placed over a new roof. So part of the concern with getting solar panels would be any additional expenses in replacing older shingles.

- What is the cost? I can't afford much at all, retired and can hardly pay my bills now.

- My home ilk many do not face the sun and we have wind.

- Thank you!

- There was no option for 'I don't have solar panels' I am interested in the environment, but this town is wasteful, corrupt and incompetent. I am not interested in anything they pursue as a town. I want nothing to do with increasing Nederland's overreaching attempts to turn us into a micro managed version of Boulder. I came here to escape Boulder, not increase density and become a city.

- question 3 above didn't have a "No" option...we don't currently have solar panels but would like to get some at some point

- A good idea for those that can afford it.

- Please require solar on new buildings (res and com)

- A homeowner incentive for installing solar panels in exchange for the town getting the RECs would be helpful, especially since Xcel Energy's program is usually over-subscribed so hard to get into.

- I own several rentals in town, no rebates to install solar on them. It makes it not affordable.

- Solar should be a priority for residents and business owners in the sunny state of Colorado

- Nederland is unaffordable for regular people, I am concerned that more expenses added to people will ad to the affordability issues...

- Build Solar in Ned, not in Weld county on some farm where the power isn't really going to Ned.
<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustainability in general is too often used a phrase in Ned and generally equates to morality taxes that do little more the provide fee based guilt absolution.</td>
<td></td>
</tr>
<tr>
<td>I like the thought of solar energy, but don't want to be forced into buying and installing solar panels if I can't afford it. Also, if we don't install solar panels, then I worry about my power bill increasing if we buy the solar power from Excel.</td>
<td></td>
</tr>
<tr>
<td>already have solar</td>
<td></td>
</tr>
<tr>
<td>thank you!</td>
<td></td>
</tr>
<tr>
<td>Are you currently enrolled in any of Xcel Energy's renewable energy programs (i.e., Windsource, Solar<em>Rewards for Community, Solar</em>Rewards for Residences)?</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>6</td>
</tr>
<tr>
<td>No</td>
<td>29</td>
</tr>
<tr>
<td>Not sure</td>
<td>2</td>
</tr>
<tr>
<td>Blank</td>
<td>23</td>
</tr>
<tr>
<td>Are you currently enrolled in any of Xcel Energy's renewable energy programs (i.e., Windsource, Solar<em>Rewards for Community, Solar</em>Rewards for Residences)?</td>
<td></td>
</tr>
<tr>
<td>Yes. Please specify.</td>
<td></td>
</tr>
<tr>
<td>Windsorce</td>
<td>4</td>
</tr>
<tr>
<td>Solar*Rewards</td>
<td>2</td>
</tr>
<tr>
<td>Is it important to you to participate in the Town of Nederland’s efforts to become 100% renewable?</td>
<td></td>
</tr>
<tr>
<td>Extremely important</td>
<td>14</td>
</tr>
<tr>
<td>Very important</td>
<td>11</td>
</tr>
<tr>
<td>Moderately important</td>
<td>4</td>
</tr>
<tr>
<td>Slightly important</td>
<td>1</td>
</tr>
<tr>
<td>Not at all important</td>
<td>6</td>
</tr>
<tr>
<td>Blank</td>
<td>24</td>
</tr>
<tr>
<td>What is your interest in a community discount for solar panels on your home or place of business?</td>
<td></td>
</tr>
<tr>
<td>Extremely interested</td>
<td>18</td>
</tr>
<tr>
<td>Very interested</td>
<td>5</td>
</tr>
<tr>
<td>Moderately interested</td>
<td>6</td>
</tr>
<tr>
<td>Slightly interested</td>
<td>1</td>
</tr>
<tr>
<td>Not at all interested</td>
<td>6</td>
</tr>
<tr>
<td>Blank</td>
<td>24</td>
</tr>
<tr>
<td>Given the following options of the new renewable energy program Renewable*Connect, which interests you most?</td>
<td></td>
</tr>
<tr>
<td>A 10-year contract, at no additional cost to your current monthly electricity bill</td>
<td>10</td>
</tr>
<tr>
<td>Choice</td>
<td>Row</td>
</tr>
<tr>
<td>-----------------------------------------------------------------------</td>
<td>-----</td>
</tr>
<tr>
<td>A 5-year contract, with an additional monthly cost of about $0.83 on top of your current electricity bill</td>
<td>9</td>
</tr>
<tr>
<td>A month-to-month contract, with an additional cost of about $3.50 on top of your current electricity bill</td>
<td>3</td>
</tr>
<tr>
<td>I am not interested in this program, but might be interested in other renewable energy programs</td>
<td>7</td>
</tr>
<tr>
<td>I am not interested in this or any other program</td>
<td>5</td>
</tr>
<tr>
<td>Blank</td>
<td>26</td>
</tr>
</tbody>
</table>

---

**Do you have any additional thoughts on this? Please add them below.**

- What happens to the contract if I sell my home? Is the buyer required to take it over? Or do I have to pay the remaining amount?
- We rent so while a long term contract would be nice we don’t know how long we would be in our house
- Seems like a no brainer.
- These programs are just another method of destroying the middle class; easily affordable to the rich and free to the poor who are being boxed into the affordable housing units. You only want homeowners to join these "programs" so you don't have to personally foot the bill. Build your own solar units rather than charge me to put up solar and then charge me again to use it.
- I got on the Xcel website but I am not convinced that this isn't just a way for Xcel to charge more for electricity; I don't see any procedures in place for an outside agency to monitor and enforce Xcel's increased use of solar and decreased use of nonrenewable energy sources. I also don't like the early termination fee if you move out of Xcel's area either. Let's just say
- Many houses in Nederland are rentals or AirBNBs, and many people living in Nederland have no spare cash. Any program needs to especially help those that are living on the 'edge'.
- Need more specifics about the program.
- I use United Power at the end of Magnolia.
- I have no idea the pros and cons of the options above. I would be fine with any of the 100% renewable energy options.
- Most people may not understand what this question means. Small explanation of the contract would have made the answers much more helpful for you.
- I am interested in having my OWN solar panels on my home, and would be interested in receiving an incentive in exchange for the REC credits.
- I have no electric Bill and pay no additional cost already.
- I would prefer to have my own solar on my house and feed back into the grid, but my current low energy consumption does not make this cost effective for me.
- How does a contract effect the resale of a property?
- Xcel has been a inconsistent and monopolist energy provider here in Ned and much like Boulder's previous intention, that hold should be loosened as much as reasonable rather than adding further contractually obligations.
- Need to learn more about the program.
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