



STERLING RANCH
COLORADO



Energy Action Plan for Sterling Ranch

August 2020



 **Xcel Energy**[®]

PARTNERS IN ENERGY
An Xcel Energy Community Collaboration

ACKNOWLEDGEMENTS

Thank you to the following individuals who contributed many hours of service to developing this Energy Action Plan.

The content of this plan is derived from a series of planning workshops hosted by Xcel Energy's Partners in Energy. Xcel Energy is the electric and gas utility serving Sterling Ranch. Partners in Energy is a two-year collaboration to develop and implement a community's energy goals. For more information about the planning workshops, see Appendix B.

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This Energy Action Plan was funded by and developed in collaboration with Xcel Energy’s Partners in Energy.

STERLING RANCH ENERGY ACTION PLAN DISCLAIMER

The data, projections, goals, and other information contained in this Energy Action Plan and Appendices are for general educational and informational purposes only. This information is provided in good faith; however, actual results will vary. Sterling Ranch Development Company, Sterling Ranch Community Authority Board, their affiliates, and anyone associated with this Energy Action Plan do not make any representations or warranties of any kind, express or implied, as to the accuracy, reliability, or completeness of the information. The plans and goals in this Energy Action Plan are dependent on several assumptions and other factors, many of which are outside of Sterling Ranch's control, and therefore are aspirational only. There are no guarantees that the plans and goals in this Energy Action Plan will be achieved. This Energy Action Plan does not create any binding commitment on Sterling Ranch Development Company, Sterling Ranch Community Authority Board, their affiliates, or anyone associated with this Energy Action Plan, which may be modified or terminated at any time.

Sterling Ranch Energy Action Plan



About this Plan

The Sterling Ranch development community has been founded on sustainability principles, including clean energy and energy efficiency. In the summer of 2020, Xcel Energy Partners in Energy facilitated a series of workshops with the Energy Action Team to develop this Energy Action Plan. With more than 20 years of development ahead, this plan sets specific goals and a concrete implementation plan to achieve the community's desired energy future, building on Sterling Ranch's successes to date in energy efficiency, renewable energy, water sustainability, and technological innovation.

Community Vision

Our community will lead the way to a sustainable energy future.

Goals

- 100% renewable electricity by 2030
- Carbon neutral energy supply by 2040

Forecasted Energy Use

The strategies outlined in the Energy Action Plan focus on reducing future energy use and using cleaner sources of energy as the Sterling Ranch community continues to grow. Using baseline (2019) rates of energy use, build out estimates, and estimated energy use intensities (EUI), a baseline energy forecast was modeled for Sterling Ranch.

Over 20 years, the forecast shows:

10X Total energy use will grow more than 10x to just over **700,000 MMBtu**

6X Total emissions will grow more than 6x to nearly **30,000 MTCO₂e**

70 GWh Total annual electricity use will grow to **70 GWh**

 50% Residential **35 GWh**

 36% Commercial **25 GWh**

 14% Electric Vehicles **10 GWh**



Implementation Phases

To move toward its goals, Sterling Ranch’s Energy Action Team identified two phases for organizing the delivery of its energy strategies. Phase One is the primary focus of the plan, and these strategies are the working elements that will generate concrete actions and impacts.

Phase 1

- ✓ Residential Efficiency & Behavior Change
- ✓ Residential New Construction
- ✓ Residential Renewables & Solar Development

Phase 2

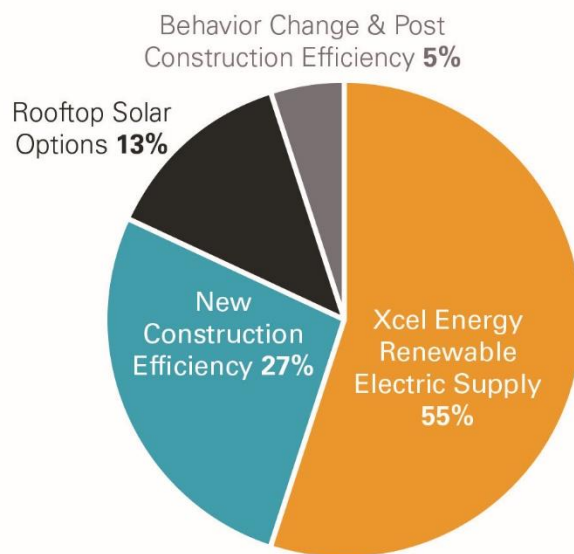
- ✓ Commercial Energy Efficiency
- ✓ Commercial Electrification
- ✓ Residential Electrification
- ✓ Carbon Offsets

Impact and Results of Plan Implementation

This plan outlines the strategies to achieve 100% renewable electricity by 2030 and charts a path toward carbon neutrality by 2040, shown in the chart to the right. Innovation and technology will be at the forefront of this plan implementation and incorporated throughout, leading the way for the community and region.

Strategy Breakdown, 100% Renewable Electricity Goal

Projected Electricity Use:
29,013,764 kWh



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INTRODUCTION



Sterling Ranch is a 3400-acre, master-planned community in Douglas County, Colorado. Over the next 20 to 30 years, Sterling Ranch will be built out with more than 10,000 homes as well as shops, office buildings, and schools. As of January 2020, approximately 550 homes were completed and occupied.

Sustainability is one of the core values of the community, expressed through the overall community design, an award-winning water management plan, low impact community infrastructure, and energy efficiency standards.

Development in the Sterling Ranch community is planned with energy efficiency top of mind. The community's Universal Principles and Design Guidelines contain energy efficiency provisions that address building energy performance, increase renewable energy generation, and deploy technologies that enable transitions for a cleaner energy future.

Sterling Ranch has made great progress, to date, toward its clean energy goals:

- New homes in Sterling Ranch are at least ten percent more efficient than typical new home construction.

“Living in the West demands a high level of respect and responsibility for our land, water, and energy resources. Sterling Ranch was founded with this idea top of mind, and we take environmental conservation and sustainability seriously, especially when it comes to planning and growing our community. We are pioneering best practices and leveraging state-of-the-art technology and resources so future generations can enjoy the same gorgeous scenery and quality of life that we do today.”

Source: Sterling Ranch [Sustainability Webpage](#)

- All homes are enabled with smart sensors that help residents monitor and adjust water and energy use.
- Nearly 50 percent of homes in Sterling Ranch generate clean renewable energy with rooftop solar panels.
- All garages in new homes come ready to charge an electric vehicle.

Why We Want an Energy Action Plan

The three key tenets of sustainability in Sterling Ranch include land planning, water sustainability, and energy efficiency. Sterling Ranch has been highly successful and has made significant contributions to sustainable development best practices with regard to land planning and water sustainability.

Land planning in Sterling Ranch was the first, foundational step. It was largely completed with the approved community master plan. Sterling Ranch founders have been awarded for visionary leadership in land planning and development by the Denver Business Journal, while ongoing management practices are recognized by the American Cultural Resources Society¹.

Related to water sustainability, the community designed a water management plan to optimize water use, resulting in homes using half or even less water compared to other communities in the region. Implementation of the plan has piloted new technologies, like dual-water meter systems and smart irrigation controllers. Further, Sterling Ranch was the first rainwater harvesting pilot project in the state². As in land planning, water management in Sterling Ranch has won significant recognition and multiple awards.

In 2020, Sterling Ranch began to develop an Energy Action Plan to achieve community sustainability values around energy. The community’s aim is to realize success in energy efficiency on par with

“At Sterling Ranch, we are raising the bar on what it means to be energy efficient. When it comes to energizing our community and our homes, we are working toward reducing our carbon footprint with the goal to have as little negative impact on our planet as possible — something our residents can be proud of day and night. Using renewable energy sources such as solar and wind whenever possible, we are taking great strides toward pulling less from the grid.

Because of our efforts, our residents enjoy:

- Improved air quality inside and outside their homes
- Higher home resale values
- Lower electric bills
- Feeling great about helping preserve our precious resources
- Real-time energy feedback with STEWARD, smart-home-automation system”

Source: Sterling Ranch Energy Efficiency webpage

¹ [Sterling Ranch Awards and Recognition](#)

² [Sterling Ranch Water Sustainability](#)

its track record in other aspects of sustainability, and to find innovative approaches to a sustainable energy future.

With more than 20 years of development ahead, this Energy Action Plan sets specific goals and a concrete implementation plan to achieve the community's desired energy future, building on Sterling Ranch's successes to date in energy efficiency, renewable energy, and technological innovation.

Our Engagement & Outreach Process

The creation of this Energy Action Plan was a 6-month process to help Sterling Ranch characterize its energy use, identify energy-related goals, and develop engaging strategies to guide change toward the community's energy future. Starting in February 2020, the Energy Action Plan was driven by a series of planning workshops held online with community stakeholders (the Energy Action Team) with a planning team committed to representing local energy priorities in collaboration with Douglas County and Xcel Energy Partners in Energy. More than 15 stakeholders were engaged in two workshops to complete the plan. See Appendix B for more information about the planning process and about Xcel Energy Partners in Energy.

WHERE WE ARE NOW

An integral part of the Partners in Energy planning process is reviewing historic energy data that informs our community’s energy baseline. Xcel Energy provided data on energy use, participation counts, and utility energy conservation program savings for Sterling Ranch as detailed in the following sections. Energy data was analyzed by source (electricity, natural gas) and sector (residential, commercial). See Appendix A for additional Sterling Ranch energy data.

Current Energy Use

Three years of energy data (2017-2019) were analyzed, covering the first year that homes were occupied in Sterling Ranch; 2019 was established as the baseline year. Each year includes all occupied premises in Sterling Ranch in that year. By the end of 2019, there were approximately 550 occupied homes and six commercial premises in Sterling Ranch. The existing premises account for less than four percent of the total anticipated build-out. As such, current energy use represents a fraction of projected energy use in Sterling Ranch.

**Energy Consumption
(61,000 MMBtu)**

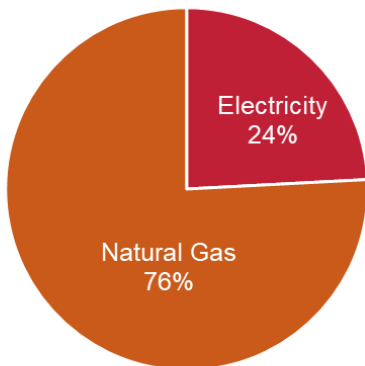


Figure 1: Sterling Ranch 2019 Energy Consumption

Energy Consumption

The 2019 baseline total energy consumption is 61,000 million British Thermal Units (MMBtu), of which 76 percent is natural gas and 24 percent is electricity (Figure 1). Total electricity consumption was about 4.3 million kilowatt-hours (kWh) in 2019. Of that, 84 percent, or 3.6 million kWh, was from the residential sector and 16 percent was from commercial users (Figure 2). Although only a small number of commercial premises have already been built in Sterling Ranch, these premises make up a significant portion of the community’s electricity consumption; therefore, reducing energy use in both residential and commercial sectors will be important for Sterling Ranch to achieve its energy goals. The majority

(97 percent) of the natural gas consumption comes from the residential sector (see Figure 3), which tracks with most of the premises being residential. As the commercial sector continues to grow, natural gas consumption in this sector will also grow. Addressing the natural gas portion of Sterling Ranch’s energy consumption will also be important for achieving the goals outlined in this plan.

Electricity Consumption (4.3 million kWh)

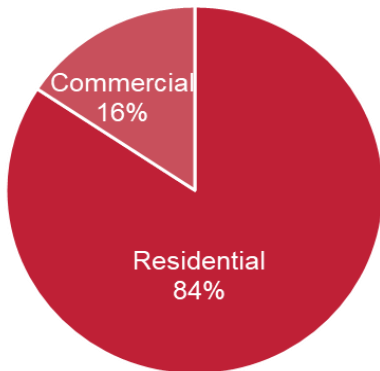


Figure 2: Sterling Ranch 2019 Electricity by Sector

Natural Gas Consumption (470,000 therms)

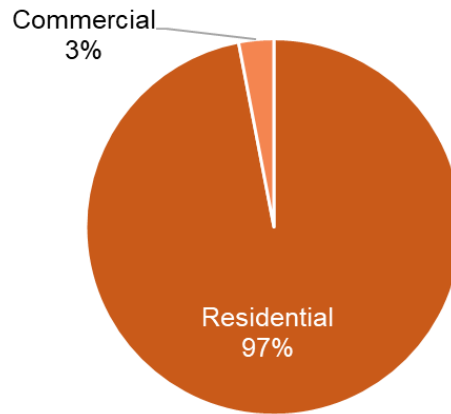


Figure 3: Sterling Ranch 2019 Natural Gas by Sector

Greenhouse Gas Emissions

Community-wide greenhouse gas (GHG) emissions are expressed as metric tons of carbon dioxide equivalent (MTCO_{2e}). GHG emissions, as shown in Figure 4, are calculated from electricity and natural gas consumption data and corresponding emissions factors provided by Xcel Energy. As the community continues to grow, total energy use will increase, resulting in an increase in greenhouse gas emissions. However, as Xcel Energy works toward its 2050 carbon-free electricity goal, the emissions factor for electricity will decrease, resulting in lower emissions from electricity; therefore, natural gas consumption will make up a larger portion of Sterling Ranch’s total greenhouse gas emissions.

GHG Emissions (4,700 MTCO_{2e})

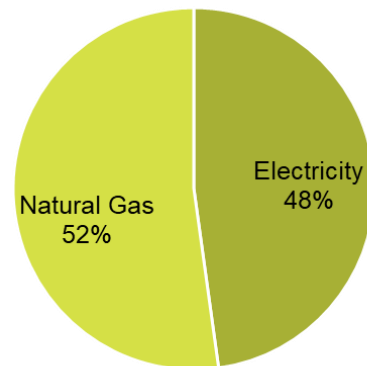


Figure 4: Sterling Ranch GHG Emissions, 2019

Renewable Energy

As of 2019, Xcel Energy’s Colorado electricity supply was 30 percent carbon-free.³ With abundant wind and solar resources in Colorado, Xcel Energy’s [Colorado Energy Plan](#) lays out a path to expand renewable energy generation. By 2030, Xcel Energy expects

³ [Xcel Energy 2019 Corporate Responsibility Report](#)

the electric grid in Colorado to be supplied by 80 percent renewable energy sources such as wind and solar.

Renewable energy generation within the Sterling Ranch community currently comes from rooftop solar. Prior to 2020, one builder in Sterling Ranch (Lennar Homes) installed solar on every home, while other home builders were required to make their homes solar-ready, allowing homeowners to more easily arrange for installation from a third-party solar provider. Sterling Ranch is in the process of implementing a community-wide solar opt-out option, with implementation expected to be complete by 2021. The Energy Action Plan builds on this solar opt-out program to achieve the goals of the community.

Currently, in Sterling Ranch⁴:

- About half of existing Sterling Ranch homes have solar panels installed.
- For homes with solar panels in Sterling Ranch, the average installation per home is 3 kW.

Based on this data, in 2019 solar power made up 947,400 kWh of electricity generation - which represents 18% of total electricity consumption.

Program Participation & Savings

Xcel Energy offers renewable energy programs and subscriptions, and energy saving programs for residential and business customers. Some programs, such as Home Energy Squad® and Thermostat Optimization, are applicable primarily to existing homes, rather than to newly built homes. The rate of subscriptions to these programs is low, as expected in a new development, but may grow over time as homes age. Table 1 below shows the participation in demand side management (DSM) and renewable energy programs in Sterling Ranch in 2019.

Table 1: Xcel Energy DSM and Renewables Programs Participation

Program Offering	2019 Participants
ENERGY STAR® New Homes	208
Home Energy Audit	1
Home Energy Squad®	1
Refrigerator & Freezer Recycling	2
Saver's Switch	9
Thermostat Optimization	5
Renewable*Connect	1
Windsorce®	10
Net-Metering (solar)	114
Solar*Rewards® for Residential	1

⁴ Based on net-metering participants and total number of premises from Partners in Energy data.

Participation in ENERGY STAR® New Homes (ESNH) is high, as nearly all homes in Sterling Ranch are built utilizing this program, incentivizing builders to exceed local codes and use energy saving construction methods. Net-metering, a residential on-site solar program, also has strong participation as many homeowners install solar. Both programs are expected to continue to grow as Sterling Ranch continues building efficient homes and the solar opt-out program is implemented.

Forecasted Energy Use

In order to evaluate goals and strategies, an energy forecast was developed for Sterling Ranch. Energy use is expected to grow substantially as new homes and businesses are developed. Sterling Ranch Development Company provided best available build-out estimates for residential uses in Sterling Ranch, including the mix of home types and sizes. Using current rates of energy use, build-out estimates, and estimated EUI (energy use intensity, a measure of energy used per square foot), by building type⁵, a baseline energy forecast was modeled for Sterling Ranch (see Figure 5).

Grid Energy Use Forecast

Over 20 years, the forecast shows:

- Total energy use will grow more than tenfold (to just over 700,000 MMBtu)
- Total annual electricity use will grow to 70 GWh
 - 50 percent residential (35 GWh)
 - 36 percent commercial (25 GWh)
 - 14 percent electric vehicles (10 GWh)

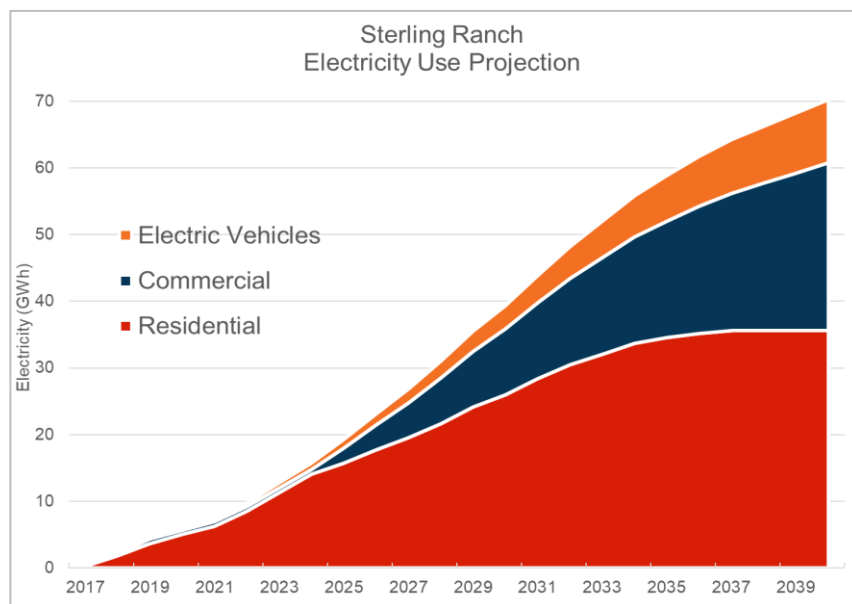


Figure 5: Sterling Ranch 2040 Energy Forecast

⁵ Based on [2018 IECC Residential Requirements Energy Savings Analysis](#) by the U.S. Department of Energy.

This forecast was used as a starting point for modeling the feasibility of the goals of the Energy Action Plan as well as the impact of potential strategies.

Greenhouse Gas Forecast

As energy use grows, greenhouse gas emissions also grow. Figure 6 below shows the emissions projection for Sterling Ranch as the community develops, based on current estimates for electricity emissions factors out to 2040. This projection does not account for building electrification or the impact of the strategies outlined in this plan. As shown in the chart, residential natural gas is the largest and most significant component of Sterling Ranch’s greenhouse gas emissions over time.

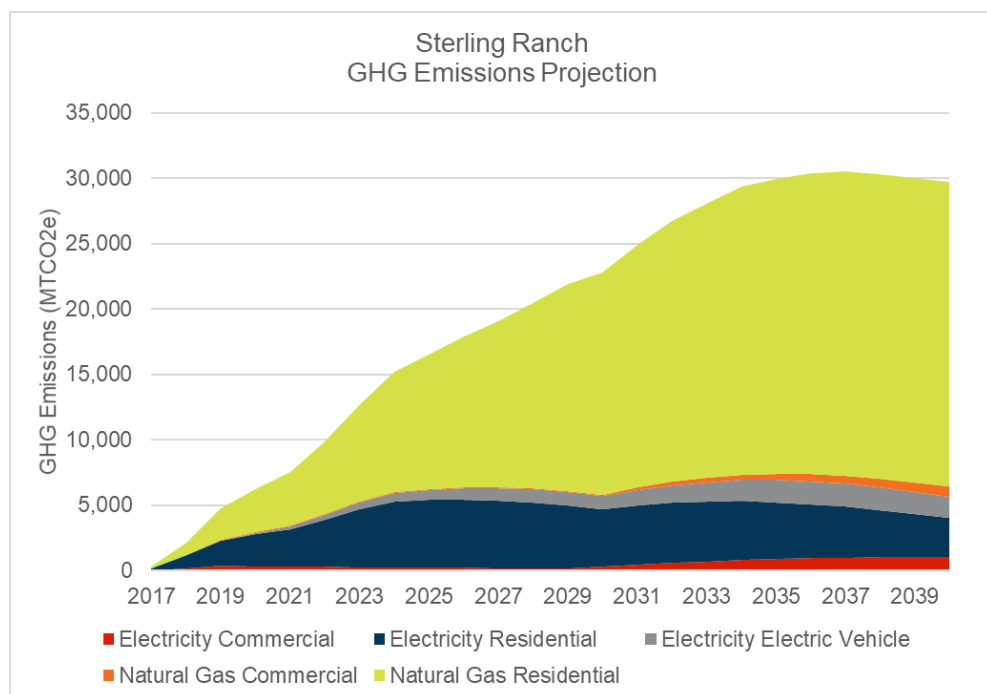


Figure 6: Greenhouse Gas (GHG) Emissions Projections

WHERE WE ARE GOING

Energy Vision Statement

During the planning process, the Energy Action Team created a vision statement for this Energy Action Plan, intended to express Sterling Ranch’s energy intentions and values and to be used to guide the goals and strategies of this plan:

Our community will lead the way to a sustainable energy future

Goals

Building on energy modeling for the build-out of the community and Sterling Ranch’s stated Technology Plan goals (focused on energy conservation and decarbonization of the energy supply) two goals were established for this Energy Action Plan:

- Achieve 100% renewable electricity by 2030
- Achieve a carbon neutral energy supply by 2040

“We want Sterling Ranch to reduce its carbon footprint without necessarily impacting the cost of housing or negatively impacting our residents...We are fortunate to live in a state where we have a lot of strong wind and solar resources to use in order to accomplish this goal.”

Brock Smethills, President, Sterling Ranch Development Company

The first goal will be imperative to achieving the second goal. Sterling Ranch strives to be a leader in the Denver Metro area by targeting carbon neutrality by 2040, which is earlier than state-level efforts. To focus the efforts of the Energy Action Plan and Partners in Energy implementation efforts, these goals will inform two phases under which strategies will be executed.

Phased Approach

To achieve a community-wide commitment to a sustainable energy future, the Energy Action Team identified two phases to prioritize strategies and resources that align with the community’s goals. Phase 1 strategies consider technology and innovation, energy efficiency, and renewable energy. Phase 2 strategies will also consider beneficial electrification and carbon offsets.

Table 2 outlines the phases and strategies applicable to each phase.

Table 2: Energy Action Plan Strategies by Phase

Implementation Phase	Phase 1: 2021-2030 (9 years)	Phase 2: 2030 to build-out (10-15 years)
Goal	100% renewable electricity by 2030	Carbon neutral by 2040
Energy Efficiency Strategies	<ul style="list-style-type: none"> • Residential efficiency and behavior change • Residential new construction 	<ul style="list-style-type: none"> • Commercial Energy Efficiency
Renewable Energy Strategies	<ul style="list-style-type: none"> • Residential renewables and solar development 	
Beneficial Electrification & Carbon Offset Strategies		<ul style="list-style-type: none"> • Residential new construction electrification • Residential electrification retrofits • Commercial electrification • Carbon offsets

HOW WE ARE GOING TO GET THERE



Phase 1: Strategies to Achieve 100% Renewable Electricity by 2030

This phase is the primary focus of the Energy Action Plan. These strategies will ensure that Sterling Ranch can achieve their goal of 100% renewable electricity by 2030 (and possibly earlier). The strategies emphasize technology and innovation, energy efficiency, and renewable energy, as described below.

Focus on Technology and Innovation

Sterling Ranch and Xcel Energy will work together to create a process for innovation and piloting new technology in Sterling Ranch, to continue pushing the boundaries of what is possible at the nexus of technology and conservation. Technology and innovation are key considerations for each of the strategies outlined in this plan

Focus on Energy Efficiency

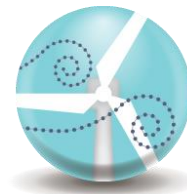
Although Sterling Ranch is still in the early development stages, energy efficiency will be critical to achieving the goals previously outlined. This focus area considers efficiency in existing homes and in new construction. Currently, many homes in Sterling Ranch are built using Xcel Energy's ENERGY STAR® New Homes program (see Table 1 above). Additionally, homes are equipped with Copper Labs energy monitoring sensors - to provide homeowners with real time feedback regarding their energy usage - showing a strong commitment to energy efficiency and technological innovation. Phase 1 strategies aim to build on this commitment by also promoting Xcel Energy residential efficiency programs and home energy reports, and by continuing to leverage energy efficient and advanced technology new construction programs. It will be important to continue engaging residents around energy efficiency over the course of Sterling Ranch's development, as homes age and as residents purchase high-energy-



using equipment for their homes. Xcel Energy continues to enhance their residential new construction offerings by aligning more closely with Net Zero Ready Homes - to help with the transition to carbon neutral. And the new construction strategy can continue to consider advanced technologies and services.

Focus on Renewable Energy

Sterling Ranch's goal to achieve 100% renewable electricity by 2030 will require a concerted effort. Renewable energy is already an integral part of the community, with half of the homes built by 2020 having installed solar on their rooftops, and a plan to develop an opt-out program for new homebuyers. The intent of this strategy is to assist with the design of the opt-out program, to give residents choices beyond rooftop solar through adoption of innovative technologies, and by exploring partnerships for community-scale renewable energy development



Strategy 1: Residential Efficiency & Behavior Change

Scope

- Promote Xcel Energy residential efficiency programs and tools via communications and outreach channels, including:
 - Earth Day events
 - Community meetings
 - Landscaping workshops or similar
 - Webinars
- Provide educational workshop opportunities, for residents, about Xcel Energy programs and about using their home energy monitoring systems and electric vehicle options

Technology & Innovation

- Potential to pilot Xcel Energy home energy reporting and gamification
- Continue improving Copper Labs interface

Targets

- 2% of residents in existing home participate in Xcel Energy programs
- 2 educational workshops per year

Target Audience

- Sterling Ranch residents – existing and new

Resources

- Xcel Energy program information
- Xcel Energy Home Energy Reports
- Copper Labs home energy sensor information

Communication Channels

- Social media
- Events (pending COVID-19 restrictions) and webinars
- Email newsletters & blasts
- Sterling Ranch Community Authority Board (CAB) Website
- Print collateral
- Push notifications via STEWARD app

Roles and Responsibilities

- Sterling Ranch: Sue Santos, Melodi Sheppard, Cal Reynolds, Walker Hinshaw
- Partners in Energy: Channing Evans, Nikki Caicedo, Brendle Group

Partners

- Siemens/Copper Labs

Timeline

- Develop outreach plan and materials by end of 2020
 - Newsletter and social media content
 - Collateral for distribution
 - Conservation kits for distribution
 - Webinar or in-person workshops
- Consider development of resident advisory group by end of 2020.
- Begin outreach in Q1 2021 and continue throughout implementation period

Project Management

- Bimonthly 1-hour calls with community-facing implementation team beginning October 2020

Strategy 2: Residential New Construction

Scope

- Work with home builders on beyond-code improvements in residential new construction
- Coordinate with Xcel Energy on available programs and services.
- Communicate benefits to home buyers
- Regularly review and consider updating energy guidelines section of Universal Principles & Design Guidelines

Technology & Innovation Opportunities

- Potential for piloting net-zero ready homes

- Potential for heat pump technology to reduce natural gas load from heating
- Potential to consider solar orientation for which homes require rooftop solar
- Potential to enhance, co-develop, and pilot new home energy monitoring technology

Targets

- 75% participation in Xcel Energy residential new construction programs
 - This currently includes Energy Star New Homes; new programs and pilots may come available during the implementation period

Target Audience

- Sterling Ranch residents and prospective home buyers
- Sterling Ranch home builders

Resources

- Xcel Energy new construction program information
- [Partners in Energy New Construction and Redevelopment Toolkit](#)

Communication Channels

- | | |
|--|---|
| <ul style="list-style-type: none"> • Homebuilders <ul style="list-style-type: none"> ○ Universal Principles & Design Guidelines ○ Sales process ○ Plot-plan approval ○ Inspection process ○ Design Review Committee | <ul style="list-style-type: none"> • Homebuyers: <ul style="list-style-type: none"> ○ Social media ○ Email newsletters & blasts ○ Sterling Ranch CAB Website ○ Print collateral |
|--|---|

Roles and Responsibilities

- Sterling Ranch: Walker Hinshaw, Brock Smethills, Denise Hogenes
- Partners in Energy: Andre Gouin, Tami Gunderzik, Brendle Group

Partners

- Homebuilders
- Douglas County

Timeline

- Develop outreach plan and messaging for homebuilders by end of Q1 2021
 - Consider workshop for homebuilders on electrification options during implementation period
- Develop outreach plan and messaging for homebuyers by end of Q1 2021

- Review Universal Principles and Design Guidelines by end of 2021 and update as necessary

Project Management

- Bimonthly 1-hour calls with development implementation team beginning September 2020

Strategy 3: Residential Renewables and Solar Development

Scope

- Finalize solar opt-out program offering to new home buyers as well as related collateral and implementation workflows
- Offer existing residents opportunities to add solar to their homes
- Conduct outreach to homeowners requesting they provide letters of support for Renewable*Connect
- Coordinate with a solar developer to evaluate options for community solar or Renewable*Connect installation
- Develop talking points for builders about adding solar to homes

Technology & Innovation

- Potential to pilot solar plus storage program from Xcel Energy

Targets

- 25% of homes have 3 kW or equivalent of solar by 2030, through rooftop solar or Xcel Energy subscription programs
- Identify developer partner and site location, by end of 2022, for 500 kW system in community for community solar

Target Audience

- Sterling Ranch residents and prospective home buyers
- Home builders

Communication Channels

- | | |
|--|---|
| <ul style="list-style-type: none"> • Homebuilders <ul style="list-style-type: none"> ○ Universal Principles & Design Guidelines ○ Sales process ○ Plot-plan approval ○ Inspection process ○ Design Review Committee | <ul style="list-style-type: none"> • Homebuyers: <ul style="list-style-type: none"> ○ Social media ○ Email newsletters & blasts ○ Sterling Ranch CAB Website ○ Print collateral |
|--|---|

Roles and Responsibilities

- Sterling Ranch: Walker Hinshaw, Brock Smethills, Denise Hogenes
- Xcel Energy: Andre Gouin
- Partners in Energy staff

Partners

- Dennis Helblig, SunStreet
- Solar developer

Timeline

- Draft letters of support for Renewable*Connect by end of Q3 2020
- Implement community wide solar opt out program by end of Q1 2021
- Develop outreach plan and messaging for homebuilders by end of Q1 2021
- Develop outreach plan and messaging for homebuyers by end of Q1 2021

Project Management

- Bimonthly 1-hour calls with development implementation team beginning September 2020

Energy Action Plan Impact

The combined targets and strategies outlined in this plan will help Sterling Ranch achieve 100% renewable electricity by 2030 and save the community an estimated 2.4 million kWh of electricity and 486,000 therms of natural gas from their participation in Xcel Energy programs and home sensor monitoring systems. Figure 7 shows the impact of each strategy toward achieving the 2030 renewable electricity goal. To be conservative, the energy model considered fewer renewables from Xcel Energy, which could allow Sterling Ranch to reach their goals earlier if the strategy targets are achieved.

Strategy Breakdown, 100% Renewable Electricity Goal

Projected Electricity Use: 29,013,764 kWh

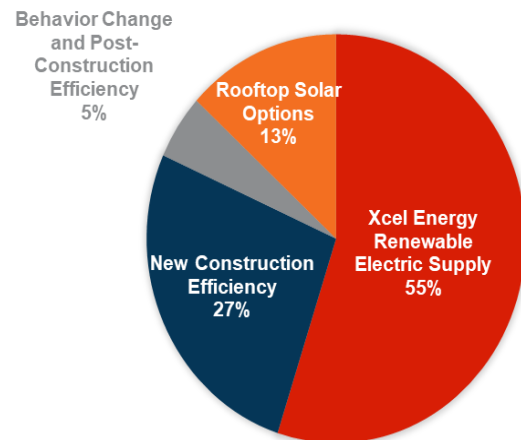


Figure 7: Strategies for EAP Goal

Phase 2: Strategies to Achieve Carbon Neutral Energy Supply by 2040

To achieve the Phase 2 goal, a carbon neutral energy supply by 2040, the strategies and targets outlined for Phase 1 need to be maintained and built upon. Additionally, new commercial development will need to be built as efficiently as possible and maintain that efficiency as the buildings age.

The additional strategies to be considered for achieving the 2040 goal include:

- Commercial energy efficiency
- Residential new construction electrification
- Residential electrification retrofits
- Commercial electrification
- Carbon offsets

Carbon neutrality will require converting natural gas consumption to electricity via beneficial electrification of space heating, water heating, and possibly cooking gas, or by offsetting the consumption with carbon offsets. Modeling of the Energy Action Plan impacts for Sterling Ranch's carbon neutrality goal assumes all new residences and commercial buildings will be built with electric space and water heating, at a minimum, by 2030.

By 2040, Xcel Energy expects their electric supply to be 90 percent carbon-free, covering a significant portion of Sterling Ranch's electric consumption. The remainder will come from on-site or subscription renewables.

The remaining natural gas will be addressed via electrification retrofits of existing homes, to address any natural gas uses that have not been converted to electric, and annual carbon offsets. See Figure 8, showing the 2040 greenhouse gas emissions projection.

These strategies and assumptions should continue to be evaluated over time to ensure carbon neutrality can be reached by the target year.

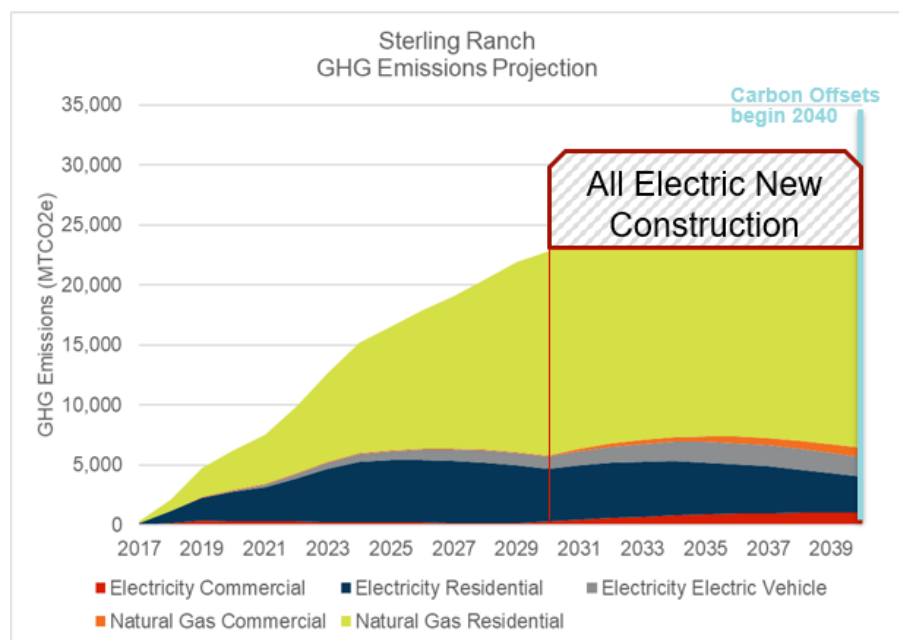


Figure 8: Path to Carbon Neutrality by 2040

HOW WE STAY ON COURSE



This Energy Action Plan is a living document. Goals and strategies will be assessed and refined as needed, based on data and community staff capacity.

Data and Reporting

Partners in Energy will provide biannual progress reports with metrics of success and overall progress toward goals for Xcel Energy rebates and programs. These reports will be available publicly and shared with both the community and the Energy Action Team. These reports will be used to measure strategy success and can help determine if adjustments should be made to stay on track to reach the targets and goals set. Figure 9 shows the iterative method Partners in Energy takes to implementation tracking.



Figure 9. Actions and Tracking

Project Management and Tracking

Partners in Energy will host regular project management check-in calls with Sterling Ranch's project management team, to ensure we stay on course so we can achieve our strategies. Strategy teams will also be formed and will hold regular check ins to discuss strategy refinement, workplans, and progress toward goals.

Energy Action Team Commitment

The Energy Action Team formed to create this plan will support implementation by spreading information, among Sterling Ranch residents and businesses, by participating

in outreach efforts. Other members will support implementation through identifying potential opportunities to leverage innovative technologies for renewable energy and beneficial electrification in the Sterling Ranch community.

Implementation teams will be divided into two groups - one community facing and one development focused – with both groups meeting every other month. A summary of the implementation teams is outlined in Table 3 below.

Table 3: Implementation Team Summary

Implementation Team	Community Facing	Development Focused
Team Members	<ul style="list-style-type: none"> • Sterling Ranch Community Authority Board (CAB): Sue Santos • Sterling Ranch homeowner: Cal Reynolds • Essentia: Melodi Sheppard • Lumiere: Walker Hinshaw • Partners in Energy: Sarah Martin (Judy Dorsey supporting) • Xcel Energy: Channing Evans, Nikki Caicedo 	<ul style="list-style-type: none"> • Sterling Ranch Development Company: Brock Smethills • Sterling Ranch CAB: Denise Hogenes • Lumiere: Walker Hinshaw • Partners in Energy: Melody Redburn (Judy Dorsey supporting) • Xcel Energy: Andre Gouin, Tami Gunderzik, Rob Buchanan
Meetings	<ul style="list-style-type: none"> • 2020: Oct, Dec • 2021: Feb, Apr, Jun, Aug, Oct, Dec • 2022: Feb 	<ul style="list-style-type: none"> • 2020: Sept, Nov • 2021: Jan, Mar, May, Jul, Sep, Nov • 2022: Jan
Strategies to lead	<ul style="list-style-type: none"> • Residential efficiency and behavior change 	<ul style="list-style-type: none"> • Residential Renewables and Solar Development, including enhanced solar opt-out program, including Renewable Connect and Sterling Ranch Development Company (SRDC)-led solar development opportunities • Residential New Construction, including energy efficiency and advanced technologies
Strategies to support	<ul style="list-style-type: none"> • Solar opt-out interface with residents • New construction efficiency and advanced technologies interface with residents 	
First Steps	<ul style="list-style-type: none"> • Conservation kits distribution • Develop resident-facing collateral on plan goals and steps residents can take for post-construction efficiency • Coordinate behavior change messaging with Copper Labs data • Begin messaging through newsletter and events • Consider developing a resident advisory group • Efficiency classes for established homebuyers 	<ul style="list-style-type: none"> • SRDC presentation for plan report out and approval (late Aug/early Sep) • CAB presentation and plan approval or report-out (Sep) • Renewable Connect - residential letter of support • Work on updating universal design standards for new construction and CAB enforcement mechanisms • Training for builders, including electric-based technologies

		<ul style="list-style-type: none">• Coordination with XE on solar + storage program opportunities
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APPENDIX A: ADDITIONAL DATA ANALYSIS



Premises

By the end of 2019, there were 613 residential premises⁶ in Sterling Ranch (all within Providence Village) along with 105 commercial premises. A premise is a unique identifier for the location of electricity or natural gas service. In most cases, it is a facility location. Some facilities may have multiple meters and therefore multiple premises associated with a single facility – this can be the case with large businesses, but also with residential buildings like duplexes and townhomes.

Sterling Ranch energy data is available for the years 2017-2019. 2017 is the first year in which there were occupied homes in Sterling Ranch. Each year of data used includes all occupied premises in Sterling Ranch in that year. For analysis, 2019 was established as the baseline year

A future build-out map, Figure 10, shows colored villages or “phases” of development. The energy forecast assumes total build-out by 2039.

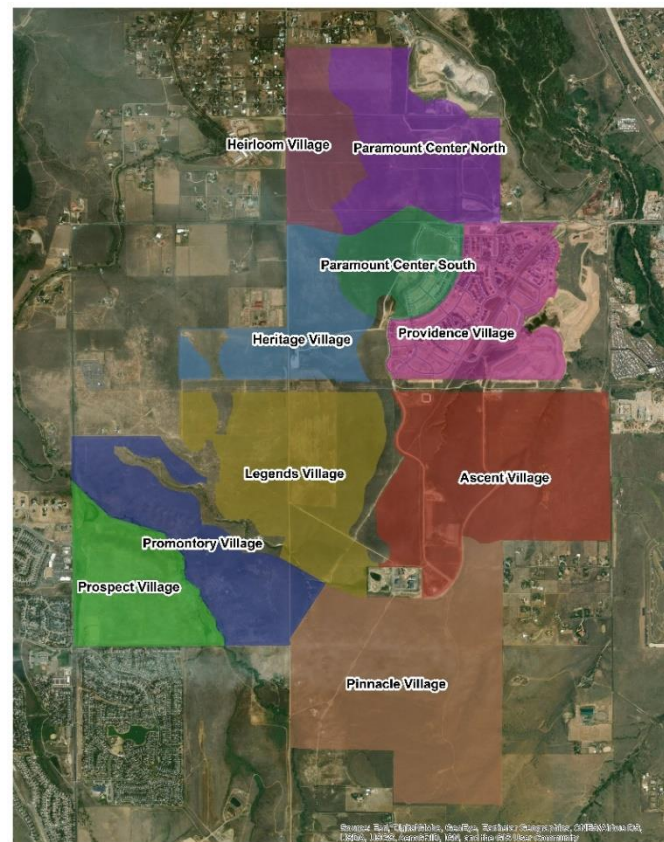


Figure 10: Sterling Ranch 2040 Build-out Map

⁶ A premise is not equal to a customer; it is a unique identifying for the location of electricity or natural gas service. The discrepancy between the number of homes built and the number of premises may be due to rate code classifications, solar production meters, or multiple premises associated with a single customer.

Forecasted Energy Use and Greenhouse Gas Emissions

The annual residential electricity forecast was developed using current trends and build-out projections, shown in Figure 11 by the phase of development, represented by village names.

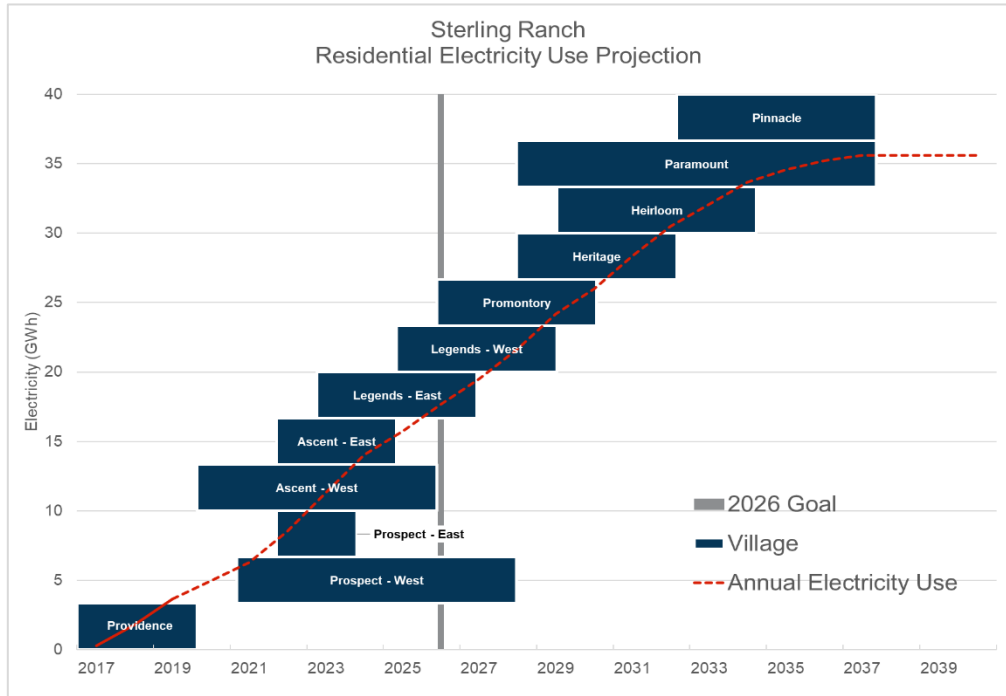


Figure 11: Build-out Forecasted Residential Electricity Use

Figure 13 shows the forecasted energy use with electrification of homes beginning in 2030. As shown, electricity consumption rises sharply with the last several villages, however this also indicates a reduction in natural gas consumption and coincides with Xcel Energy adding carbon-free resources to their supply.

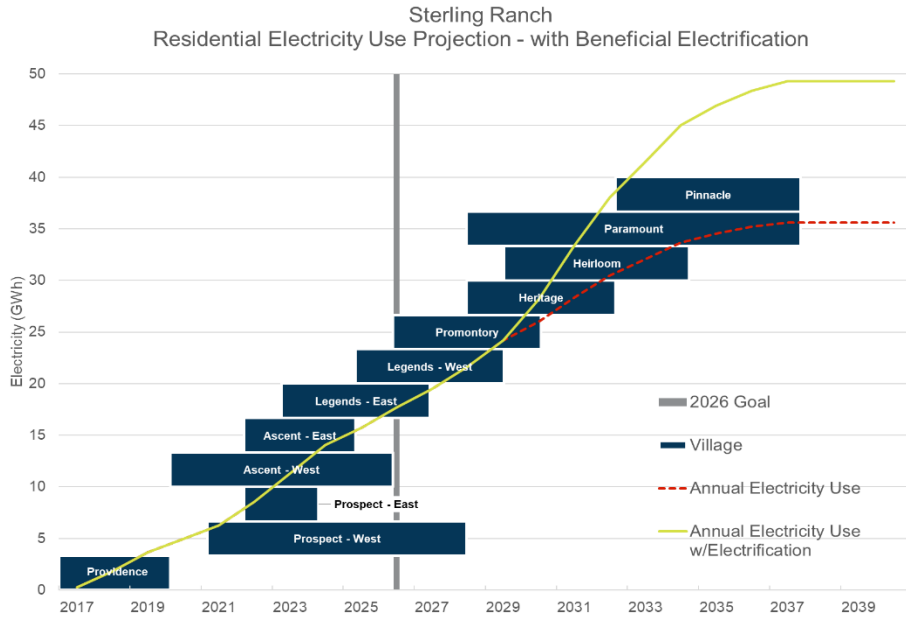


Figure 13: Build-out Forecasted Residential Annual Electricity Use with Electrification

The emissions associated with this use projection are shown in Figure 12, where emissions from electricity grow as natural gas consumption is converted. However, because the overall emissions factor for electricity decreases, the total emissions from electricity does not grow as rapidly. The remaining natural gas emissions are from homes and businesses built before 2030 (with natural gas systems). To achieve the 2040 carbon neutral goal, the natural gas portion of Figure 13 will need to be converted to electric systems or offset through carbon offsets, as discussed in *Phase 2: Strategies*.

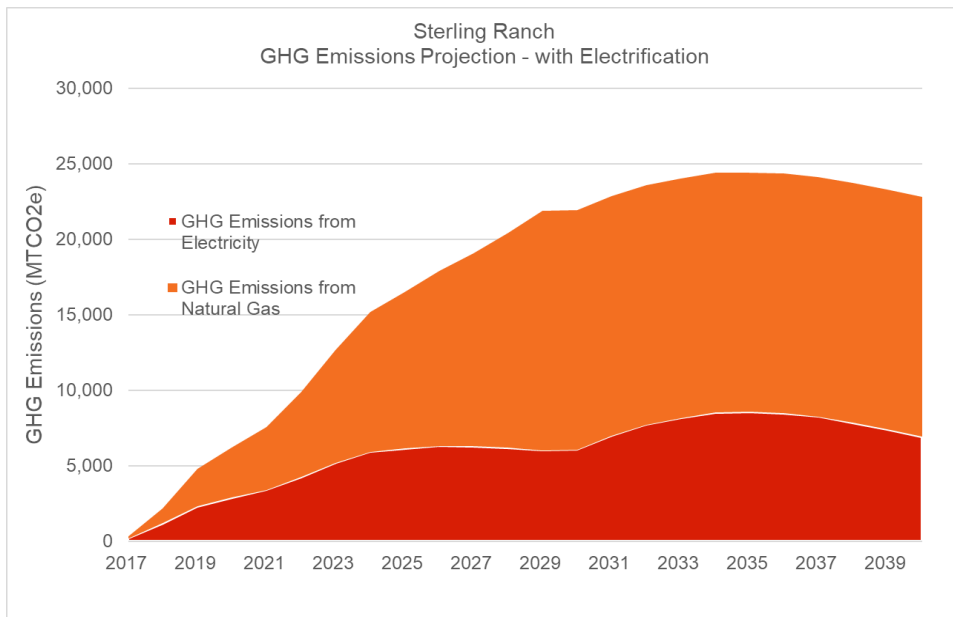
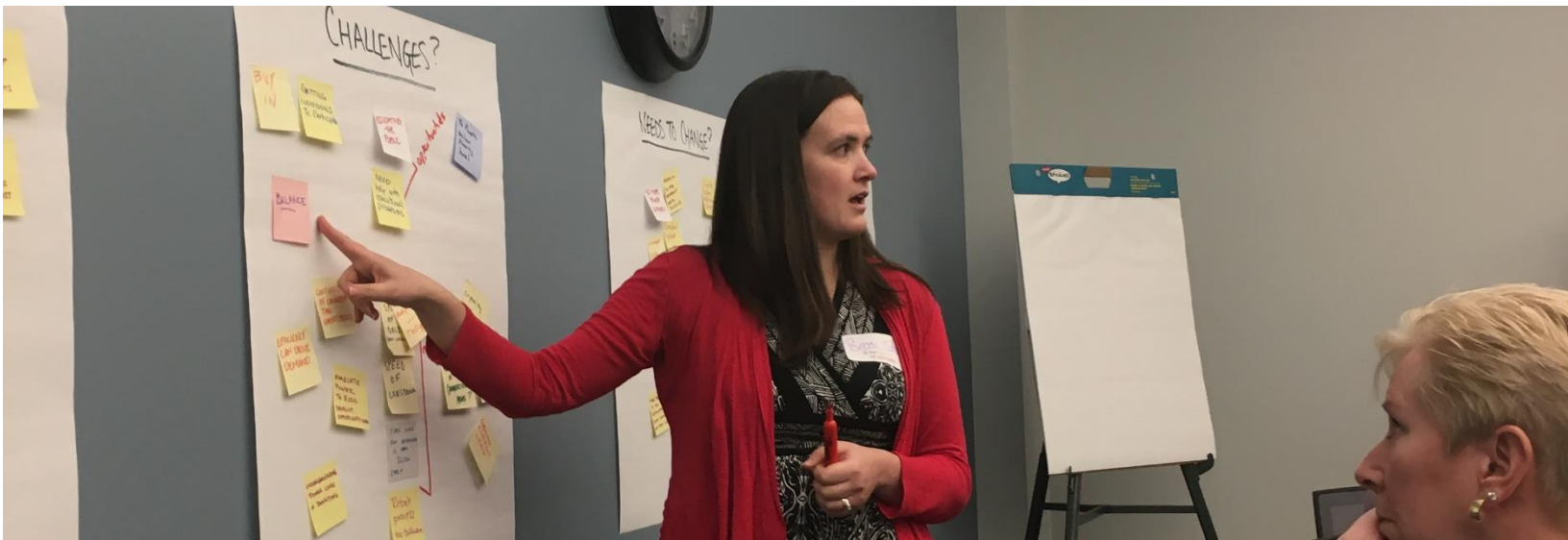


Figure 12: Projected GHG Emissions with Electrification

APPENDIX B: XCEL ENERGY'S PARTNERS IN ENERGY PLANNING PROCESS



About Xcel Energy's Partners in Energy

Xcel Energy is an electric and natural gas utility that provides the energy that powers millions of homes and businesses across eight Western and Midwestern states. Each community Xcel Energy serves has its own unique priorities and vision for its energy future. The energy landscape is dynamically changing, with communities leading the way in setting energy and sustainability goals. To continue to innovatively support their communities, Xcel Energy launched Partners in Energy in the summer of 2014 as a collaborative resource with tailored services to complement each community's vision. The program offerings include support to develop an energy action plan or electric vehicle plan, tools to help implement the plan and deliver results, and resources designed to help each community stay informed and achieve their outlined goals. Figure 14 and Figure 15 show the Partners in Energy process and support provided for each community.

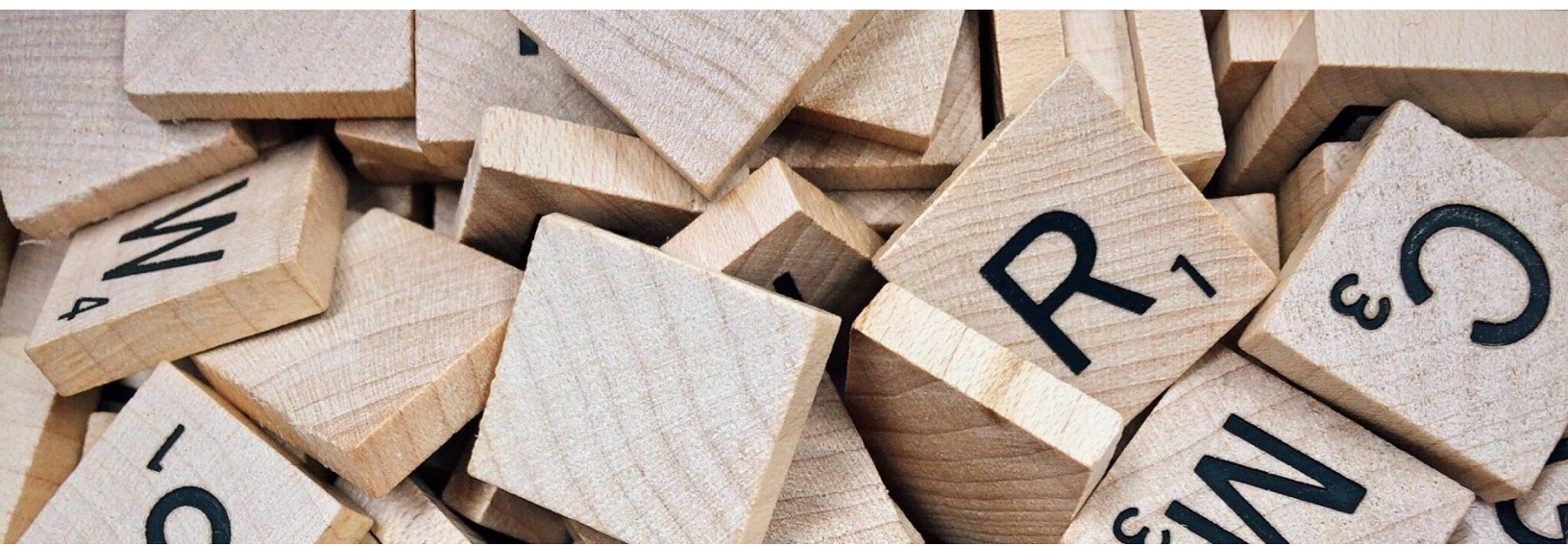


Figure 14: Partners in Energy Process for Success



Figure 15: Resources from Xcel Energy for Implementation

APPENDIX C: GLOSSARY OF TERMS



15 x 15: Xcel Energy’s privacy rule, which require all data summary statistics to contain at least 15 premises, with no single premise responsible for more than 15% of the total. Following these rules, if a premise is responsible for more than 15% of the total for that data set, it is removed from the summary.

Community Data Mapping: A baseline analysis of energy data in a geospatial (map) format across the community.

Demand Side Management (DSM): Modification of consumer demand for energy through various methods, including education and financial incentives. DSM aims to encourage consumers to decrease energy consumption, especially during peak hours, or to shift time of energy use to off-peak periods, such as nighttime and weekend.

Direct Installation: Free energy-saving equipment, installed by Xcel Energy or another organization for program participants, that produces immediate energy savings.

Energy Burden: Percentage of gross household income spent on energy costs.

Greenhouse Gases (GHG): Gases in the atmosphere that absorb and emit radiation and significantly contribute to climate change. The primary greenhouse gases in the earth's atmosphere are water vapor, carbon dioxide, methane, nitrous oxide, and ozone.

Grid Decarbonization: The current planned reduction in the carbon intensity of electricity provided by electric utilities through the addition of low- or no-carbon energy sources to the electricity grid.

Kilowatt-hour (kWh): A unit of electricity consumption.

Million British Thermal Units (MMBtu): A unit of energy consumption that allows both electricity and natural gas consumption to be combined.

Metric Tons of Carbon Dioxide Equivalent (MTCO_{2e}): A unit of measure for greenhouse gas emissions. The unit "CO_{2e}" represents an amount of a greenhouse gas whose atmospheric impact has been standardized to that of one unit mass of carbon dioxide (CO₂), based on the global warming potential (GWP) of the gas.

Megawatt (MW): A unit of electric power equal to 1 million watts.

Premise: A unique identifier for the location of electricity or natural gas service. In most cases it is a facility location. There can be multiple premises per building, and multiple premises per individual debtor.

Renewable Energy Certificate (REC): For every megawatt-hour of clean, renewable electricity generation, a renewable energy certificate (REC) is created. A REC embodies all of the environmental attributes of the generation and can be tracked and traded separately from the underlying electricity. Also known as a Renewable Energy Credit.

Resilience: The ability to prepare for and adapt to changing conditions and withstand and recover rapidly from disruptions. Resilience includes the ability to withstand and recover from deliberate attacks, accidents, or naturally-occurring threats or incidents.

Recommissioning: An energy efficiency service focused on identifying ways that existing building systems can be tuned up to run as efficiently as possible.

Solar Garden: Shared solar array with grid-connected subscribers who receive bill credits for their subscriptions.

Solar Photovoltaic (PV): Solar cells/panels that convert sunlight into electricity (convert light or photons into electricity or voltage).

Subscription: An agreement to purchase a certain amount of something in regular intervals.

Therm (thm): A unit of natural gas consumption.

Trade Partner: Also known as Trade Allies or Business Trade Partners. Vendors and contractors who work with business and residential customers - servicing, installing, and providing consulting services regarding the equipment associated with utility rebate programs. Their support for utility programs can range from providing equipment and assisting with rebate paperwork, to receiving rebates for equipment sold.

APPENDIX D: IMPLEMENTATION MEMORANDUM OF UNDERSTANDING