THREE-COUNTY

SOLAR + STORAGE STUDY AND ACTION PLAN

MEETING LOCAL, STATE AND UTILITY CLEAN ENERGY TARGETS WHILE MAXIMIZING REGIONAL BENEFITS IN EAGLE, GARFIELD & PITKIN COUNTIES

EXECUTIVE SUMMARY

THREE-COUNTY SOLAR + STORAGE STUDY AND ACTION PLAN

OCTOBER 2021

Meeting local, state and utility clean energy targets while maximizing regional benefits in Eagle, Garfield and Pitkin counties.

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The Colorado Department of Local Affairs Renewable Energy Challenge Grant included a package of five projects related to energy use and development in the region:

1. A regional energy inventory to measure energy use, costs and emissions.
2. A study of the potential for further development of solar energy coupled with battery storage, along with a dynamic solar map that identifies all viable land parcels.
3. An online toolbox of resources to inform landowners and local governments about successful solar plus storage project development.
4. Consultation with local governments to streamline the permitting processes for solar energy projects.
5. An economic transition study to assess the local economic implications of shifting from fossil fuels to 100% clean energy.

The online toolbox (3) is hosted on the Western Colorado Clean Energy Network website, and on the CORE and Walking Mountains Science Center websites. The toolbox offers landowners, solar developers and local government officials helpful user-oriented information about community-scale solar projects.

Consultation with local governments (4) is under way with seven municipal and county governments in the region, using the U.S. Department of Energy's SolSmart program[1] for communities as a guide. To date, four local governments in the region have achieved SolSmart designations as communities that are "open for business" for solar energy development.

The economic transition study (5) explains the taxing framework for the oil and gas industry in Colorado, tallies the tax revenues received by local governments, reports on the fiscal impacts that would result from a transition away from fossil energy to renewable energy, and begins to strategize ways to make that transition less disruptive for local governments, workers and businesses.

1. SolSmart Designee Map: https://solsmart.org/our-communities/designee-map/

Wolcott, Eagle County - Emily Kent photo

EXECUTIVE SUMMARY

The state of Colorado, local governments in Eagle, Garfield and Pitkin counties, and the electric utilities serving the three-county region have all set goals to shift the region's electricity supply to renewable energy.

At present, renewable energy only fuels a portion of the three-county region's electricity usage. Most of that clean energy comes from large, utility-scale solar and wind facilities located in other areas. Yet the region is blessed with abundant sunshine, and a significant share of the region's electricity demand could be met by generating more solar-powered electricity within the region.

While utility-scale solar projects produce electricity for the lowest unit cost, building such large facilities within the mountainous three-county region isn't feasible. The region is ideally suited, however, for development of mid-sized community-scale and smaller net-metered systems. The incrementally higher generation costs of these systems can be significantly offset by avoiding long-distance transmission costs and by capturing a share of installation and operational costs to benefit the regional economy. Coupling these systems with battery storage delivers further benefits to consumers and utilities.

This report builds on longstanding efforts in the three counties to accelerate locally-produced clean energy. A team of local clean energy advocates and experts, technical advisors and a national real estate mapping firm worked together to quantify and evaluate the region's potential for development of more community-scale and net-metered solar plus battery storage. The project team also examined how solar plus storage could deliver other benefits to the region, developed a map of all of the potential sites for community-scale solar development and created an online toolbox for landowners and local government officials.

The project team noted the high value of customer-owned, net-metered solar plus storage systems. Because there are so many variables associated with smaller net-metered systems, the team concentrated its in-depth analysis on the potential for community-scale solar plus storage.

This study is focused on the development of new resources for energy production. However, energy efficiency plays a critical role in these calculations. Reductions in electricity consumption achieved through efficiency measures will increase the ratio of local energy production to usage.

Through this study, the project team sought to answer a series of questions about the potential scale of solar plus storage development and the benefits such development could deliver. The answers, presented here as key findings, show exceptional promise for using solar plus storage to help meet renewable energy goals.

EXECUTIVE SUMMARY

KEY FINDINGS

- *How much electricity is used in the region per year?*
  1.86 million megawatt-hours of electricity, at a cost of $193 million, in 2019.

- *How much more community-scale solar could feasibly be developed in the region, under current market conditions?*
  232 megawatts, equal to about 420,000 megawatt-hours of production per year.

- *What roles will battery storage play?*
  Help utilities balance supply and demand, maintain a resilient energy supply during emergencies, and make new solar development viable for the local electric grid.

- *How much of the region's electricity consumption could be met by developing more community-scale solar plus storage?*
  If all 232 MW were developed, it could provide 23% of the region's electricity consumption.

- *What benefits and advantages would come from growth in community-scale and net-metered solar plus storage?*
  Cutting carbon emissions, building resilience in the energy supply, and boosting the economy.

- *What are the local economic benefits for developing 232MW solar plus storage?*
  Local purchase of products and services, property tax revenue, land lease revenue, energy savings and jobs.

- *What barriers and restrictions stand in the way of an even higher amount of solar plus storage development?*
  Grid limitations, energy storage costs, and current regulations.

- *What can the region do to realize its full solar plus storage potential?*
  An action plan, Section 8.0, spells out the steps for local governments, utilities, solar developers and landowners.

DEFINING UTILITY-SCALE, COMMUNITY-SCALE & NET-METERED SOLAR

Utility-scale solar is typically 15 megawatts (MW) or more in size, covering 75 or more acres and connected directly to regional transmission lines.

Community-scale solar (CSS) is typically 1 MW to 15 MW in size, built on parcels of 5 to 75 acres, and connected to the distribution grid.

Net-metered (NM) solar, which can be on rooftops or ground-mounted nearby, is much smaller and usually sized to offset about 100% of the customer's annual energy use. Systems are connected "behind the meter," where they directly offset a customer's electricity

1.0 INTRODUCTION

The Solar-Plus-Storage Study shows that development of more community-scale solar plus storage would meet nearly one quarter of the region's electric consumption, while delivering other benefits. Changes to current regulatory policies and market barriers, coupled with expansion of the electrical transmission grid, could boost that percentage even higher.

In the quest to reach 100 percent clean energy, combining cost-effective utility-scale renewable energy projects with the flexibility and resilience of community-scale solar plus storage will be an essential strategy.

2.0 UNDERSTANDING REGIONAL ENERGY USE & CURRENT SOLAR PRODUCTION

To learn what share of the electricity used in the three-county region could be produced locally, the project team conducted an inventory of energy use for the year 2019. The inventory compiled electricity and natural gas use in buildings and industry, using data from utilities serving the region. The inventory did not quantify transportation energy.

2.1 Energy Use & Cost

In 2019, buildings and industry in Garfield, Eagle and Pitkin counties used:

- 1.86 million megawatt-hours of electricity
- 119.5 million therms of natural gas

In 2019, lighting, powering and heating buildings and industry in the three-county region cost:

- $186.5 million for electricity
- $72 million for natural gas
- $258.5 million total for electricity and natural gas

2.2 Carbon Emissions & Utility Fuel Mix

Carbon emissions from the four main electric utilities serving the region vary depending on fuel mix. Each utility's current share of renewable energy, predominantly from wind turbines, is:

- Xcel Energy: 30%
- Holy Cross Energy: 42%
- Aspen Municipal Utility: 100%
- Glenwood Springs Electric: 100%

2.0 UNDERSTANDING REGIONAL ENERGY USE & CURRENT SOLAR PRODUCTION

Homeowners, businesses and local governments in the region have been investing in solar energy over the past two decades. The six existing community-scale solar arrays have a total generating capacity of 8.4 megawatts, while hundreds of net-metered arrays have a total generating capacity of 24.1 megawatts.

Utilities typically sell little to no net energy to net-metered customers. Therefore, most of these systems and the renewable energy they produce are not reported in the fuel mix of utilities, nor are they factored into the region's total electricity usage or spending.

Solar developers are currently planning another 31.25 megawatts of new community-scale solar projects in the region. These prospective projects are included in the market potential calculations in Section 3.

NET-METERED SOLAR CAPACITY IN THE REGION, BY UTILITY, 2020

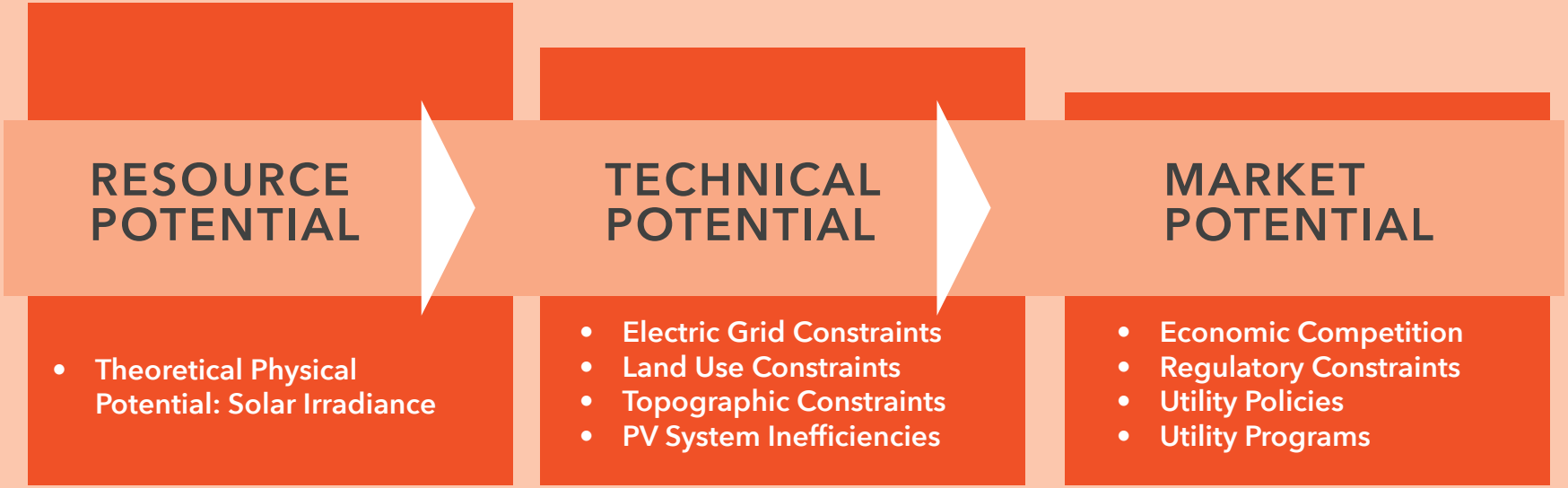
	Community-scale generating capacity	Community-scale generation per year	Net-metered generating capacity	Net-metered generation per year
Holy Cross Energy	6.4 MW	11,592 MWh	16.7 MW	25,110 MWh
Xcel Energy	2.1MW	3,600 MWh	6.5 MW	9,687 MWh
Glenwood Springs Electric	0 MW	0 MWh	1 MW	1,404 MWh
TOTAL	8.5 MW	15,192 MWh	24.2 MW	36,201 MWh

3.0

REGIONAL POTENTIAL OF COMMUNITY-SCALE SOLAR + STORAGE (CSS+)

To determine how much solar electricity could be produced in the three-county area by community-scale solar, the project team started with the full solar resource potential. In collaboration with a national mapping firm, the team created a dynamic solar map to show a bird's-eye view of open land in the three counties and identify parcels suitable for solar development. The project team then applied various technical criteria to identify suitable private land parcels, and finally narrowed the list of parcels by market limitations that are in play today.

REGIONAL SOLAR POTENTIAL FRAMEWORK & PROCESS OF ANALYSIS



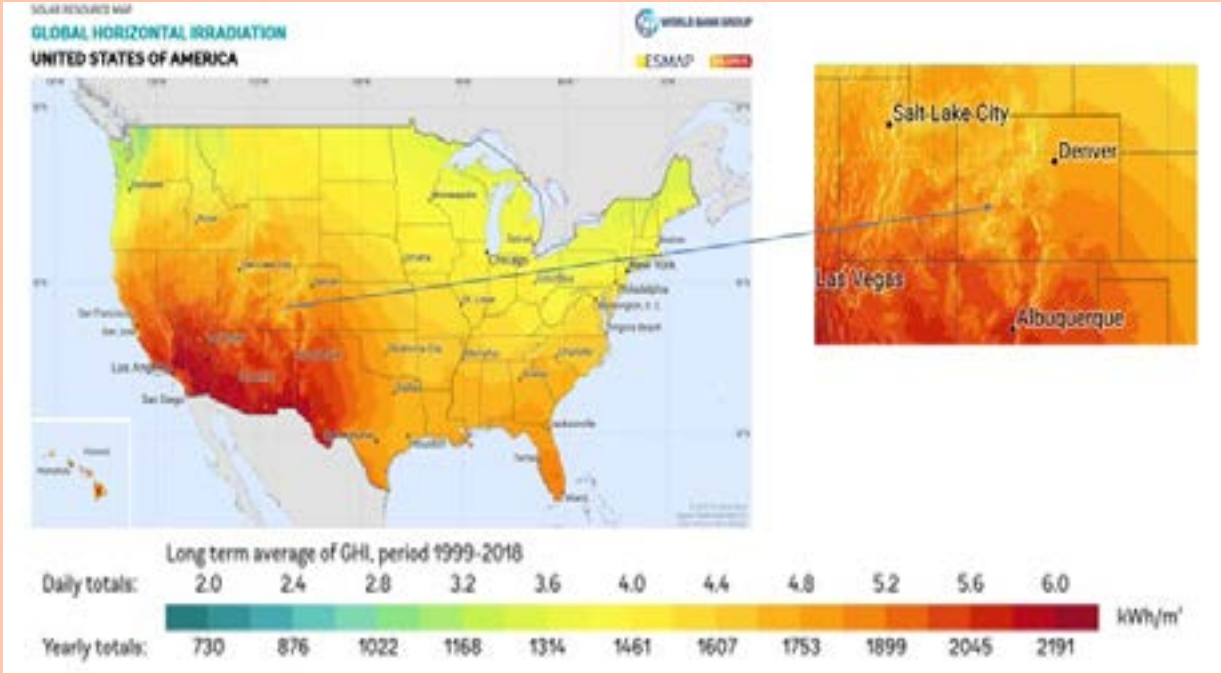
ADAPTED FROM: National Renewable Energy Laboratory, "Estimating Renewable Energy Economic Potential in the United States: Methodology and Initial Results," Brown et al, 2016, p.8.

3.0 REGIONAL POTENTIAL OF COMMUNITY-SCALE SOLAR + STORAGE (CSS+)

3.2 Resource Potential

With an average Global Horizontal Irradiance (GHI), the theoretical potential of sunshine, of approximately 4.8 kilowatt hours per meter squared, the three-county region benefits from an abundant solar resource.

SOLAR IRRADIATION FOR THE CONTIGUOUS 48 STATES



SOURCE: https://globalsolaratlas.info/ download accessed April 5, 2021.

3.3 Technical Potential

The technical potential step applied various practical constraints such as land use, topography, site suitability, factors obtained from local solar developers, and the existing utility grid system and related infrastructure.

TECHNICAL POTENTIAL OF CSS+ SOLAR DEVELOPMENT FOR IDENTIFIED LAND SITES, BY UTILITY SERVICE AREA

SERVICE TERRITORY	LAND PARCELS IDENTIFIED	LAND USE AT AVERAGE 6 ACRES PER MW	POTENTIAL GENERATION CAPACITY	POTENTIAL GENERATION PER YEAR
HOLY CROSS ENERGY	635	2,274 acres	379 MW	688,643 MWh
XCEL ENERGY	87	312 acres	52 MW	94,484 MWh
TOTAL TECHNICAL POTENTIAL	722	2,586 acres	431 MW	783,127 MWh

3.0

REGIONAL POTENTIAL OF COMMUNITY-SCALE SOLAR + STORAGE (CSS+)

3.4 Market Potential

The market potential quantified the maximum amount of solar generation capacity that could be interconnected to the utility grid, taking into account current regulations governing utilities, utility policies and programs in place today, and economic competition from large utility-scale solar projects elsewhere.

MARKET POTENTIAL OF CSS+ SOLAR DEVELOPMENT, BY UTILITY SERVICE AREA

SERVICE TERRITORY	LAND USE AT AVERAGE 6 ACRES PER MW	POTENTIAL GENERATION CAPACITY	POTENTIAL GENERATION PER YEAR
HOLY CROSS ENERGY	1,080 acres	180 MW	327,060 MWh
XCEL ENERGY	312 acres	52 MW	94,484 MWh
TOTAL TECHNICAL POTENTIAL	1,392 acres	232 MW	421,544 MWh

Estimating Market Potential for Battery Storage

Battery storage can be added to almost any PV system. The project team created an example that models one 5 MW / 15 MWh battery storage system on the 12 three-phase feeder lines in the Holy Cross Energy distribution system. The 12 systems were paired with the 180 megawatts of market potential in Holy Cross territory. No storage was modeled for Xcel Energy because it does not yet offer programs and incentives for paired battery storage. (Section 3.4.3)

3.5 Local Development as a Percentage of Actual Consumption

An important reason for this study is to determine how much of the region's current electricity demand could be met by developing more community-scale solar plus storage projects in the region. Is the potential significant enough to make the effort worthwhile? The answer is a definite "Yes."

Community-scale solar plus storage, existing and potential, could meet 23% of the region's present annual electricity consumption.

4.0 REGIONAL POTENTIAL FOR ROOFTOP NET METERED SOLAR + STORAGE (NM+)

The 24 MW of existing net-metered solar in the region is powering residential and commercial buildings, equal to about 3,650 homes. Growth in net-metered solar plus storage (NM+) systems could add substantial local solar generation, further supporting the utility grid and boosting economic benefits.

The project team used a tool developed by NREL (SLOPE) to quantify the potential for rooftop solar at the county level for residential and for commercial electric customers. The tool does not account for utility grid constraints, existing rooftop solar, or utility service territories.

Results are significant. Using the rough estimates generated by the NREL tool, the technical potential for net-metered solar in the region is 487.8 MW. Additional analysis will be needed to quantify the actual market potential for development of more net-metered PV systems in the region, as well as the role and benefits of paired battery storage.

TECHNICAL POTENTIAL OF ROOFTOP NM+ SOLAR GENERATING CAPACITY, BY COUNTY & SECTOR

	RESIDENTIAL	COMMERCIAL	TOTAL BY COUNTY
GARFIELD COUNTY	66.8 MW	175.4 MW	242.2 MW
EAGLE COUNTY	38.1 MW	128.0 MW	166.1 MW
PITKIN COUNTY	15.8 MW	63.7 MW	79.5 MW
TOTAL BY SECTOR	120.7 MW	367.1 MW	487.8 MW

5.0 UNDERSTANDING THE REGIONAL ELECTRICITY MARKET

Advancing renewable energy in the region depends on more than finding suitable locations for solar projects. Other factors include the region's patchwork of electric utility service territories, physical limits to accessing the local distribution grid, barriers inhibiting development of battery storage, and lack of a regional transmission grid operator. The region's current market potential could increase as barriers are adjusted or removed.

RESOURCE POTENTIAL	TECHNICAL POTENTIAL	MARKET POTENTIAL	MARKET POTENTIAL with fewer barriers
• Theoretical Physical Potential: Solar Irradiance	• Electric Grid Constraints • Land Use Constraints • Topographic Constraints • PV System Inefficiencies	• Economic Competition • Regulatory Constraints • Utility Policies • Utility Programs	• Removal of some market barriers to capture more technical potential capacity

ADAPTED FROM: National Renewable Energy Laboratory, "Estimating Renewable Energy Economic Potential in the United States: Methodology and Initial Results," Brown et al, 2016, p.8.

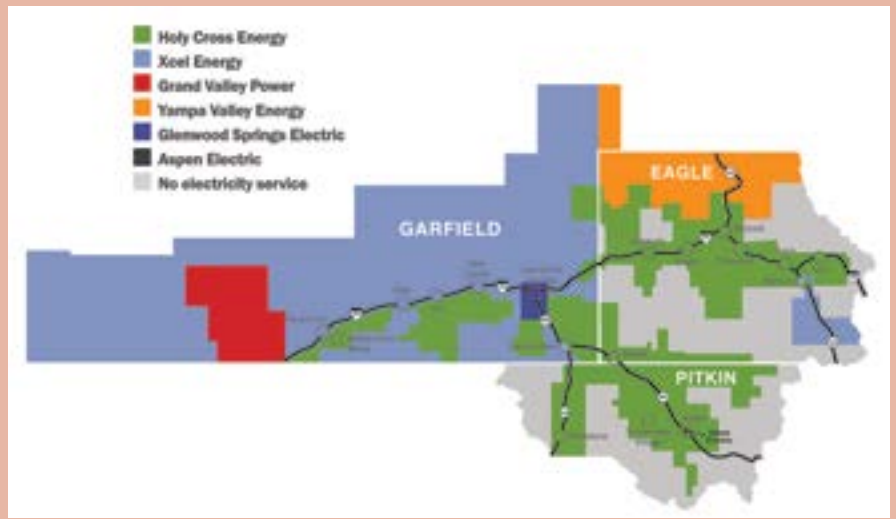
5.1 Regional Retail Electric Service

The three-county region is served by six electric utilities that are operated under three different ownership and regulatory systems.

- Holy Cross Energy, Grand Valley Power and Yampa Valley Energy are rural electric cooperatives, which are not-for-profit entities owned by their customers and governed by an elected board.
- Xcel Energy is an investor-owned utility, which is a for-profit, publicly traded corporation governed by a board of directors.
- Glenwood Springs Electric and Aspen Electric are municipal utilities, owned by city governments and governed by city councils.

Service territories within the three-county region for Grand Valley Power and Yampa Valley Energy are very small spillovers from their main service areas. Because they serve such small portions of the three-county market, they were excluded from further study.

FIGURE 12: ELECTRIC UTILITIES SERVING EAGLE, GARFIELD & PITKIN COUNTIES



5.0 UNDERSTANDING THE REGIONAL ELECTRICITY MARKET

5.2 Regional Wholesale Electric Service

Wholesale electricity is provided to the region by two entities.

Xcel Energy generates much of its electricity at its own facilities in Colorado and other states. These include coal-fired and gas-fired power plants, wind farms and large solar arrays. Xcel provides power to its own retail customers and, under a wholesale contract, to Holy Cross Energy. Xcel Energy's business in Colorado is regulated by the Colorado Public Utilities Commission.

The Municipal Energy Agency of Nebraska (MEAN) provides wholesale electricity and transmission to 69 communities in Colorado, including Glenwood Springs and Aspen, and in Iowa, Nebraska and Wyoming. MEAN is regulated by the Federal Energy Regulatory Commission. While MEAN provides wind-powered electricity to Glenwood Springs and Aspen, it has placed limits on the amount of renewable energy that can be generated by the municipal utilities and their customers.

5.3 Barriers to Grid Infrastructure Access

Use of the regional energy grid by multiple utilities with different operating structures is a longstanding challenge. As renewable energy producers develop generating facilities, obstacles inhibit their ability to push fluctuating levels of electricity onto regional grids.

In Colorado, these include Xcel Energy's practice of restricting access to regional transmission grids and slow processing of interconnection applications. Lack of joint transmission planning across the larger market region is also slowing the transition to clean energy, and "pancaked" transmission charges make purchasing electricity across long distances more expensive.

5.4 Regulatory Barriers to Stand-Alone Battery Storage

Battery storage allows utilities to store low-cost renewable energy when generation is high and demand is low, and use that stored power when demand rises locally or on the wider electric grid. Modifying the federal Investment Tax Credit and the federal Public Utility Regulatory Policies Act to recognize and accommodate stand-alone battery storage would make investments in storage more feasible, especially for rural utilities.

5.5 A Regional Transmission Operator (RTO) for the Mountain West

For Colorado's electric utilities to maximize use of the state's rich solar energy resources, joining or forming a regional transmission organization (RTO) or independent system operator (ISO) is essential. Colorado's grid is too small to balance out supply and demand with increased levels of renewable energy.

RTOs and ISOs are independent organizations that operate electric transmission assets and provide wholesale transmission services within a defined region. Joining an RTO or ISO power pool would balance supply and demand and give utilities access to energy markets that could drive investment in new generation resources.

Promising advances are occurring today to bring transmission operators into the West's regional energy market. Utilities in the mountain west are looking to join the California Independent System Operator or the Arkansas-based SouthWest Power Pool, an RTO.

6.0 ECONOMIC IMPACT ANALYSIS OF REGIONAL MARKET POTENTIAL FOR CSS+

Community-scale solar plus storage projects create a project value chain that starts with installation and continues over the life of the project. Regions where projects are developed can reap economic benefits, especially when local businesses and a trained workforce are prepared to work with developers.

6.1 Local Capture of Project Installation Costs

The project team closely studied installation costs for community-scale solar, using a local example project and ongoing nationwide cost benchmarking studies done by NREL.

Major solar equipment components, which are produced outside the region, account for 45% of project costs. In the local example project, just 10.8% of project costs were spent locally. Local economic benefits could be increased to as much as 21% by using more local contractors and purchasing all "balance of system" hardware locally.

Battery storage improves local grid reliability and can help utilities reduce peak demand costs. However, battery storage is manufactured elsewhere, and less than 3% of installation costs are spent locally.

Cost benchmarking studies informed the project team's work in calculating costs for the region's solar plus storage market potential, identified in Section 3.4. The cost for 232 MW of solar is estimated to be $335 million, and the cost for 12 units of 5 MW / 15 MWh battery storage would be $85 million.

The project team then calculated how much of the installation costs could be captured in the regional economy. Installation costs for solar PV could yield $70.9 million in local spending, and installation of battery storage could yield $2.2 million.

LOCAL ECONOMIC BENEFITS OF MARKET POTENTIAL COMMUNITY-SCALE SOLAR PLUS STORAGE DURING INSTALLATION

	INVESTMENT	PERCENT OF TOTAL PROJECT COST	MAXIMUM POTENTIAL FOR LOCAL CAPTURE
Solar PV 232 MW (AC)	$335.0 million*	21.16%	$70.9 million
Storage (12 units) 5 MW / 15 MWH	$85.2 million*	2.63%	$2.2 million
SOLAR PV PLUS STORAGE TOTAL	$420.2 million*	17.4%	$73.1 million

* These estimates do not account for decreasing equipment and implementation costs over time.

6.0 ECONOMIC IMPACT ANALYSIS OF REGIONAL MARKET POTENTIAL FOR CSS+

6.2 Local Capture of Project Operational Costs

Over its operational life of about 30 years, community-scale solar plus storage systems deliver further value that can be captured in the regional economy. Local spending by project owners includes system maintenance, property taxes on equipment, and lease payments to landowners. Payments for other operational costs, such as insurance, management and administration, will likely go to companies outside the region.

LOCAL ECONOMIC BENEFITS OF MARKET POTENTIAL COMMUNITY-SCALE SOLAR PLUS STORAGE OVER OPERATIONAL LIFE

	MULTIPLIER	LOCAL CAPTURE PER YEAR	LOCAL CAPTURE OVER 30-YEAR SYSTEM LIFE
Operations & Maintenance	232 MW solar	$1.3 million	$37.5 million
Property Taxes	232 MW solar + 12 units of 5 MW / 15 MWH storage	$0.9 million	$26.5 million
Land leases	1,392 acres	$1.0 million	$31.3 million
TOTAL		$3.2 million	$95.3 million

6.3 Employment and Energy Savings Estimates

To estimate the potential benefits of energy cost savings and employment growth, the project team contracted with a consultant who used an input-output modeling tool. Such economic modeling uses assumptions about key factors to create an estimate of future economic impacts.

The modeling used results of the regional energy inventory and the regional solar potential research of this study. It assumed costs for supportive community programs, significant electricity cost savings for utilities and consumers, and gains in project affordability from low-cost financing. The model predicts regional savings in energy spending for utilities and customers, which would boost the regional economy and support employment.

The analysis indicated the possibility of achieving regional energy bill savings of $19 million per year and a sustained average of 260 jobs across the broad regional economy.

6.4 Other Economic Benefits

Distribution utilities would receive other economic benefits, such as reduced demand charges paid to wholesale suppliers and deferred infrastructure upgrades. Utilities and their customers would also benefit financially from improved grid resilience.

7.0 ADDITIONAL BENEFITS OF SOLAR PLUS STORAGE DEVELOPMENT

In addition to generating electricity and contributing to the local economy, solar plus storage can deliver other value-added benefits.

7.1 Reduced Carbon and Greenhouse Gas Emissions

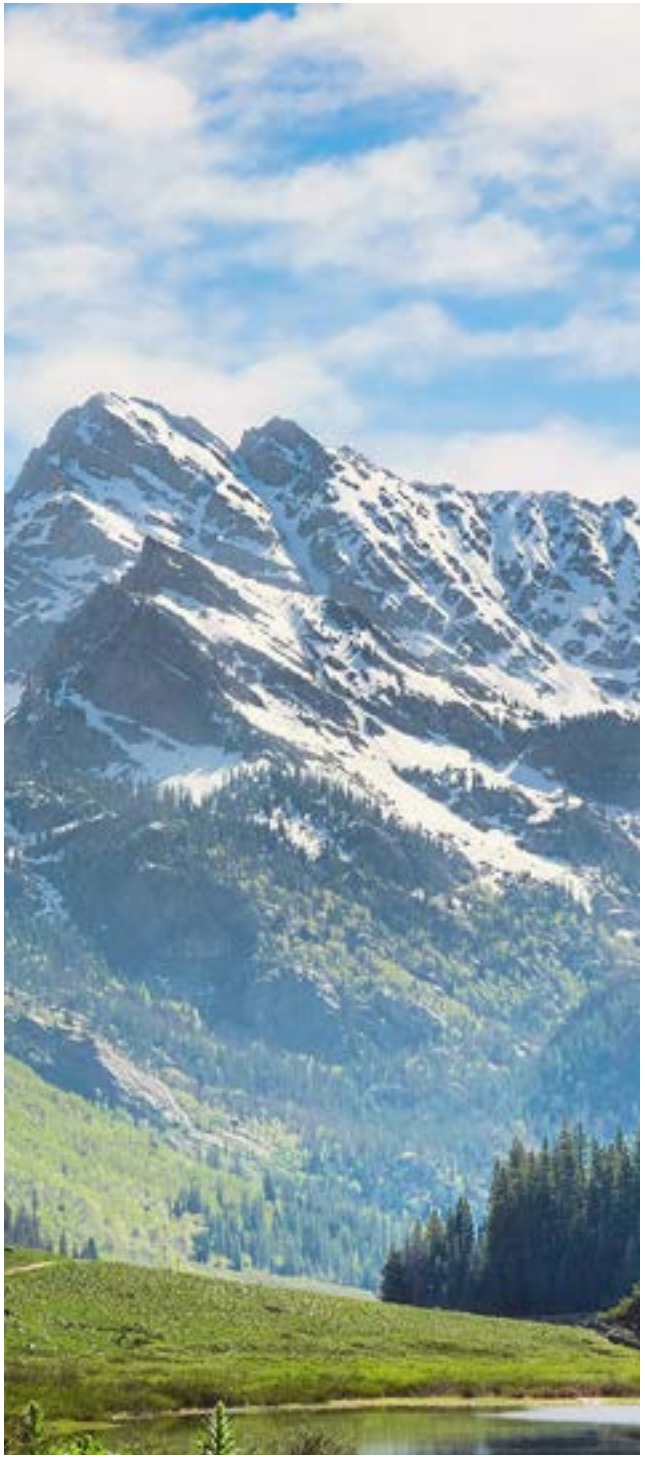
Electricity use in the three-county region produced 838,000 metric tons of carbon dioxide-equivalent (CO_2e) emissions in 2019. Developing the full 232 MW of community-scale solar would reduce emissions by about 298,000 metric tons.

7.2 Power Supply Resilience

A reliable power supply supports our lives and operates essential facilities. Solar plus storage systems can continue to generate new power during an extended outage and draw on stored backup power. This makes communities more resilient during extreme weather, wildfire, flooding, earthquakes, accidental damage and other emergencies.

7.3 Low-Impact Development Practices

A low-impact approach to solar development can improve soil health, retain water, nurture native species, produce food and still provide low-cost clean energy. Practices include replanting native vegetation, particularly plants that attract pollinators, and using grazing animals to control vegetation.



Piney Lake, Eagle County - Emily Kent photo

8.0

Action Plan

The following Action Plan was developed by the project team and presented to stakeholders who had the opportunity to provide input and comments. Stakeholders included the Garfield Clean Energy Board of Directors (comprising nine government partners), Pitkin County BOCC, Eagle County BOCC, Holy Cross Energy, and staff from the National Renewable Energy Lab and RMI.

8.0 ACTION PLAN

1. Commitments to develop local solar + storage

A: Adopt a "local renewable energy first" policy and commit to a certain percentage of the total energy used by the community or the utility power mix to be generated from locally sited clean energy resources.
Local distribution utilities, local governments, businesses

B: Utilize the map, study and resources to inform planning processes (e.g., comprehensive plans, land use planning, utility resource plans) to make the region ready for local renewable energy.
Local governments, local distribution utilities

C: Work together with Municipal Energy Agency of Nebraska (MEAN) to revise contractual clauses that disincentivize rooftop solar production in order to allow higher levels of solar generation on municipal distribution grids.
Local government and municipal utilities in communities that contract with MEAN for energy services

D: Develop an inventory/checklist of potential opportunities to advance local solar + storage projects within each jurisdiction's boundaries, and establish timelines and budgets for implementation.
Local governments, local distribution utilities, businesses, households

E: Codify rooftop solar or solar + storage as an onsite requirement for new construction where possible.
Local governments, Authorities Having Jurisdiction (AHJs)

F: Explore and develop code mechanisms to incentivize solar + storage for existing buildings.
Local governments, AHJs

G: Streamline solar + storage permitting and land use review to remove unintentional barriers and unnecessary cost.
Local governments, AHJs

8.0 ACTION PLAN

2. Funding and low-cost financing sources

A: Make low-cost financing sources, grants and rebates easily accessible to every community, our region and other rural regions in a sustained, reliable manner.
State government, federal government, utilities

B: Offer time-limited bulk-buy programs to accelerate rooftop solar + storage implementation with a focus on expanding access to low- and middle-income (LMI) households.
Energy nonprofits, local distribution utilities

C: Create financing models that prioritize local funding and ownership of community scale solar developments to support regional economic development.
Nonprofit/advocacy groups, investors and financial institutions, economic development groups

D: Participate in joint approaches to accelerate solar + storage implementation on local government facilities to utilize economies of scale to reduce costs.
Local governments, clean energy collaboratives (GCE, CAC, UvRFCAC)

E: Make financing, funding and rebate options equitably accessible and inclusive of diverse communities throughout varying utility territories and counties.
State government, federal government, utilities, policy makers

F: Develop mechanisms to help cover the costs of adding solar + storage in new construction to help make sure new structures are built as energy-wise as possible while remaining affordable.
State government, federal government, utilities, policy makers

8.0 ACTION PLAN

3. Investment in regional expertise and capacity building to accelerate clean energy progress

A: Invest in regional expertise and capacity building to accelerate and sustain enduring progress within interconnected regions that share a clean energy workforce and utility territories.
State government, local governments, foundations and philanthropists

B: Conduct an analysis of Western Slope supply chains to identify and take action on clean energy business and manufacturing opportunities and challenges.
Economic development groups, Colorado Energy Office, OEDIT, Just Transition office

C. Invest in annual data collection on a regional basis to track and guide progress on reaching clean energy targets with timely, actionable data.
Local governments, energy groups, climate and clean energy advocates

D. Remember that the overall effort is a marathon, not a sprint – find ways to maintain sustained commitment to developing regional knowledge, awareness, community will and widespread collaboration needed to reach challenging 100% renewable goals.
Local governments, energy groups, climate and clean energy advocates, foundations

E: Continue/increase investment in programs that implement efficiency measures and reduce demand so that existing renewable resources provide a larger percentage of the total.
State government, local governments, local distribution utilities, energy groups

8.0 ACTION PLAN

4. Utility regulatory and infrastructure improvements

A: Identify and prioritize grid improvements needed in the three-county region and secure the needed funding to make the improvements.
Local distribution utilities

B: Advocate for, help create and join a regional transmission organization (RTO).
Energy nonprofits and partners, state legislature, Colorado Public Utilities Commission

C: Incentivize the addition of battery storage to net-metered solar PV systems through utility rebate programs and other compensation mechanisms.
Local distribution utilities, PUC, energy nonprofits

D: Advocate that FERC update PURPA regulations to include utility-scale storage as a qualifying facility.
Local distribution utilities, local governments

E: Provide education about the importance of infrastructure upgrades and creating an RTO.
Energy nonprofits

5. Best land use practices for solar + storage development

A: Review land use application process and policies to ensure utilization of best practices for solar + storage development.
Local governments

B: Include performance standards in land use permitting by requiring runoff mitigation planning and site revegetation.
Local governments

C: Create a scoring system to assess PV sites as pollinator-friendly using a common statewide methodology.
State government

D: Facilitate training opportunities for local government staff to understand PV development best practices, and methodologies for review and enforcement of those best practices.
Energy nonprofits

E: Prioritize siting solar + storage on available rooftops wherever possible.
Local governments

8.0 ACTION PLAN

6. Supportive tax policies and improved incentives

A: Advocate for changes to the federal Investment Tax Credit to extend eligibility to standalone storage technologies (those not sited with solar).
Federal government, state government, local governments, industry groups, nonprofit/advocacy groups

B: Advance federal legislation that would provide the value of the solar investment tax credit as a cash payment to those unable to monetize the tax credit (e.g., LMI households, nonprofits and governmental entities).
Federal government, state government, local governments, industry groups, nonprofit/advocacy groups

C: Create incentive structures for solar + storage that are not based around tax credits and are accessible to nonprofit organizations.
Federal government, state government

D. Ensure that large-scale solar developments pay annual taxes that can help replace a portion of the public revenue generated by fossil fuels without discouraging solar development.
State government

8.0 ACTION PLAN

7. Expanded economic development support to rural regions and transition economies

A: To more fully maximize the economic development benefits of meeting the state 100% Renewable Goal, provide more assistance to rural regions throughout the state to tap the economic development benefits of clean energy with the following actions:

- Provide tools to maximize local solar development on rooftops and land sites.
- Identify, map and accelerate local solar + storage in each region of the state.
- Provide funding including low-cost financing, equitable access to funding sources for rebates and grants throughout the state.

B: Increase and strengthen easily accessible expertise at the regional and state agency level to help remove barriers and accelerate the use of solar + storage and other renewable technologies.
State government, Colorado Energy Office

C: Focus on equity by providing development incentives to low-income housing and communities that incorporate solar + storage.
State government, local governments

D: Focus on equity by providing development incentives to community solar gardens that provide lower-cost energy to LMI households.
State government, local governments

E: Support the growth of the clean energy industry with business development grants, technical assistance, innovation grants and incubators.
Federal and state governments, local economic development organizations

E. Provide funding and programs to help all regions in getting to 100% renewable energy, realizing that even places that have made progress have a long way to go.
Federal and state government, foundations

8.0 ACTION PLAN

8. Education and training

A: Provide sustained, reliable funding and support to community colleges and community partners to establish/enhance solar + storage comprehensive workforce job training programs, ongoing workshops, and professional development opportunities.
State government: workforce training department

B: Create educational apprentice and professional accreditation opportunities for high school and community college students interested in working in the renewable energy and related industries.
Schools, colleges, nonprofits,professional accreditation organizations

C: Ensure that pertinent building professionals (engineers, architects, general contractors, trades, etc.) are trained to integrate solar PV + storage systems into traditional building design and construction.
Colorado Energy Office, nonprofits, industry associations, building departments

D: Include energy education in K-12 curriculum to prepare and empower all students (no matter what field they go into), to be aware consumers, decision makers on energy issues.
Schools, colleges, Colorado Energy Office