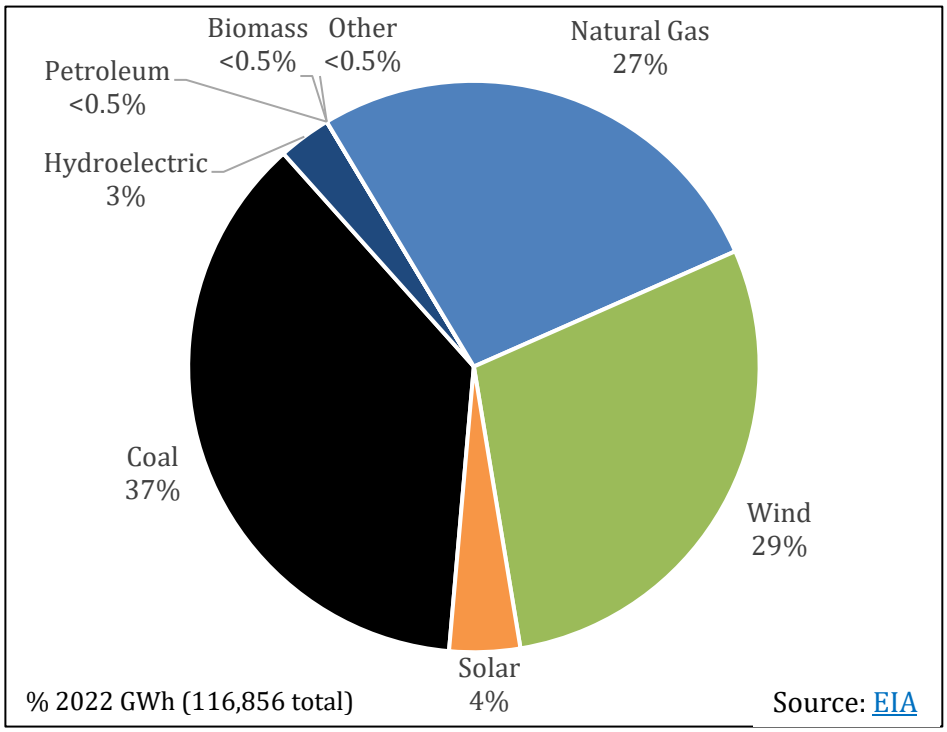
State Brief: Colorado

BACKGROUND

Colorado has historically relied heavily on coal and natural gas for the state's electric generation. The state's generation from coal declined by almost half in the last decade (68% in 2010 versus 37% in 2022). Colorado's largest utility, Xcel Energy, will close its remaining coal-fired electric generating plants in the state, and has pledged to source 80% of its electricity from renewable resources by the end of 2030. As of 2022, renewable resources supplied approximately 37% of Colorado's net electric generation.

Colorado's Estimated Net Annual Electric Generation, 2022



While coal's contribution continues to decline, wind energy's share of the generation mix increases, accounting for 29% of the Centennial State's net electricity generation in 2022, up 9% from 2018. In 2022, wind power accounted for 75% of Colorado's renewable electric generation. In early 2023, the Solar Energy Industries Association (SEIA) ranked the state 13th in the nation in terms of installed solar capacity (2,671 megawatts (MW)). SEIA also ranks Colorado as 13th in the nation for projected growth over the next five years with 3,778 megawatts (MW) in expected installations.

The 2023 U.S. Energy and Employment Report found that Colorado had an estimated 153,223 energy workers (5.4% of total state employment) in 2022, which includes 35,847 workers employed in energy efficiency. In a 2022 report, Colorado ranked 18th nationally for clean energy jobs, with approximately 61,179 Coloradans employed by the industry.

Colorado's 2021 Greenhouse Gas (GHG) Pollution Reduction Roadmap identified policy avenues for meeting the GHG reductions required by House Bill 19-1261: 26% by 2025, 50% by 2030, and 90% by 2050 (from 2005 levels). In 2023, Senate Bill 23-016 set new interim GHG emissions reduction targets: 65% by 2035, 75% by 2040, and 90% by 2045. Enacted in 2021, Senate Bill 21-264 set GHG reductions for gas utilities from a 2015 baseline: 4% by 2025 and 22% by 2030. It also requires investor-owned gas utilities to file a "Clean Heat Plan" with the Colorado Public Utilities Commission (PUC) to outline how they will meet these targets. In September 2019, the PUC joined the Western Public Utility Commissions' Joint Action Framework on Climate Change with California, Nevada, Oregon, and Washington. The Joint Action Framework aims to facilitate regional cooperation to address climate change, focusing on clean energy deployment.

The Colorado Public Utilities Commission (PUC) regulates the state's investor-owned utilities (IOUs). All three commissioners are appointed by the governor and confirmed by the state senate. The PUC has two democratic commissioners and one independent commissioner. Democratic Governor Jared Polis took office in January 2019, and Democratic majorities control both chambers of the Colorado General Assembly.

POLICY STRENGTHS AND OPPORTUNITIES

The National Renewable Energy Laboratory (NREL) developed the notion of "policy stacking,"[1] an important framework for policymakers to consider. The basic idea behind policy stacking is that there is an interdependency and sequencing of state policy that, when done effectively, can yield greater market certainty, private sector investment, and likelihood of achieving stated public policy objectives.

In theory, but not always in practice, clean energy policies can be categorized into one of three tiers of the policy stack. Tier 1, market preparation policies, remove technical, legal, regulatory, and infrastructure-related barriers to clean energy technology adoption. Tier 2, market creation policies, create a market and/or signal state support for clean energy technologies. Tier 3, market expansion policies, create incentives and other programs to expand an existing clean energy market by encouraging or facilitating technology uptake by additional market participants.

For example, before financial incentives for combined heat and power (CHP) will be successful, two key considerations for deployment are having clear interconnection standards and favorable stand-by rates for customers who opt to add CHP. In this example, states should adopt policies to address interconnection and stand-by rates before adopting financial incentive programs.

INVESTING IN THE WORKFORCE

In 2022, there were nearly 3.1 million net-zero aligned jobs in the U.S., comprising over 40% of total energy jobs. However, a lack of qualified candidates across occupations and education levels could impede states' abilities to modernize their grids and deploy clean energy resources. To ensure that the workforce can meet industry demand, policymakers can consider several policies to educate and train qualified candidates. This can simultaneously enhance industry employment and provide economic opportunity to individuals and local communities.

In 2019, the Colorado Office of Just Transition was established to assist workers and communities impacted by the energy transition. The Office aims to support workers in finding high-paying jobs and to facilitate communities in replacing lost revenues. Additionally, the Colorado Workforce Development Council (CWDC) works to ensure employers have access to a skilled workforce that benefits the state economy. The CWDC is working on several projects regarding the state's energy transition, needed workforce shifts, and best practices.

In 2021, House Bill 21-1149 required the CWDC to work with partners to develop energy sector career pathways for students. The bill also includes funds for training programs within the Strengthening Photovoltaic and Renewable Careers (SPARC) workforce development program. Enacted in 2023, Senate Bill 23-292 created a new category of public works projects, energy sector public works projects, which are projects relating to the generation, transmission, and distribution of electricity or natural gas for customers, businesses, or cooperative electric associations. The projects will be required to meet apprenticeship utilization and prevailing wage laws. Also enacted in 2023, House Bill 23-1074 will require the Office of the Future of Work to examine transitions for oil and gas workers while Senate Bill 23-283 will make funds available from the Inflation Reduction Act (IRA) and the state for communities to use for planning or grant matching assistance.

The policies states can explore to address workforce development include:

1. **Incentive Programs** – States can attract new workers to the field by providing financial and other incentives to students who pursue education in specified trades or in the science, technology, engineering, and math (STEM) fields. States might require that graduating students remain and work in the state for a given time to remain eligible for the incentive. In conjunction with this, states might also provide economic development incentives to companies employing students with training in specified STEM and trades fields. To ensure safety in the workplace, states can adopt programs that will cover the costs of OSHA training.

   Initiatives to improve access to broadband and public transportation in underserved communities can boost access to educational and employment opportunities.

[1] V.A. Krasko and E. Doris. 2012. "Strategic Sequencing for State Distributed PV Policies: A Quantitative Analysis of Policy Impacts and Interactions." *National Renewable Energy Laboratory*. Available: http://www.nrel.gov/docs/fy13osti/56428.pdf.

2. **Education and Continuing Education** – Existing electrician training and mentorship programs can be expanded to encourage more young people to enter the industry. Policymakers can direct public colleges and universities, with input from industry, offices of economic and workforce development, and other interested parties, to create new trades and STEM programs. This could include the development of "green" credentialing programs. States can also provide financial resources to organizations that educate or retrain students in STEM and trades professions.

   For the state's existing energy workforce, policymakers might direct state departments of workforce services or their equivalent to work with utilities and other interested parties to develop continuing education and training programs for existing utility employees to remain in their field or to transition to a new role. Incentive programs might also be developed for employers that design roles that include ongoing skills development and continuous learning to help keep pace with evolving roles.

The Interstate Renewable Energy Council (IREC) developed a set of Career Maps to demonstrate the various types of careers offered in the clean energy industry. The Green Buildings Career Map, the Solar Career Map, and the HVAC/R Map are helpful tools for anyone from job seekers and employers to policymakers looking to explore the employment opportunities presented by the industry. IREC also created a Registered Apprentices Toolkit for Clean Energy Employers, which provides information about and resources for implementing Registered Apprenticeship Programs (RAPs) to spur the development of a clean energy workforce.

MODERNIZING UTILITIES AND EMPOWERING CONSUMERS

The electric grid is a complex system of generation, transmission, and distribution. Aging infrastructure and emerging technologies force grid modernization to keep pace with historic and emerging expectations. Grid modernization encompasses a broad range of actions intended to make the electrical system more resilient, interactive, and capable of meeting current and future demand.

The transition to a digital economy requires affordable, sustainable, and reliable electricity and creates challenges and opportunities for grid management. Emerging physical and cybersecurity threats and increased demand for faster outage response times require, at minimum, real-time incident tracking and response capabilities. Increased grid penetration of distributed energy resources (DERs) such as renewable energy coupled with increasing adoption of energy efficiency, energy storage, microgrids, and other technologies will provide economic benefits, increase security, and ensure more reliable, resilient, and clean energy. Utility-scale renewable energy may require expanded transmission capabilities. As adoption of these innovations increases, so too will the need for modern grid technology to strengthen the grid, the implementation of which will require substantial planning and investment by states and utilities.

By allowing a two-way flow of information between the electric grid and grid operators and between utilities and their customers, new technologies enable utilities to better manage the grid and provide opportunities for consumers to customize their services to fit their priorities and to reduce their electric bills. By enabling better tracking and management of resources, emerging technologies improve system reliability and resiliency. These technologies also allow grid operators to incorporate central and distributed energy resources, energy storage technologies, and electric vehicles (EVs). This all assists in addressing the challenges associated with planning, congestion, asset utilization, and energy and system efficiency.

On the customer's side of the meter, dynamic pricing, advanced metering infrastructure (AMI), and other technologies allow a more dynamic exchange of information and electricity between a consumer and their electric provider. Grid modernization is associated with greater consumer choice by allowing customers to meet their energy priorities by producing and storing their own energy or through contracting for innovative clean energy services from different providers.

Grid modernization will require a suite of policy changes to support advancements in grid technologies, grid management, and utility regulation.

Senate Bill 19-236 directed the PUC to create rules concerning the filing of distribution system plans[2] and requiring the evaluation of non-wires alternatives, among other things. In November 2021, the PUC issued final rules requiring that utilities file distribution system plans, grid innovation plans, and non-wires alternatives cost-benefit assessments every two years. Further, Senate Bill 21-072 created the Colorado Electric Transmission Authority. This Authority will create intrastate electric transmission corridors and operate the storage and transmission facilities required for utilities to participate in regional markets. The bill also requires that all of Colorado's transmission utilities join a regional wholesale market by 2030. Three utilities recently announced their plans to join the Southwest Power Pool (SPP) Western Energy Imbalance Service Market while they continue to study options regarding joining or forming a wholesale market.

In March 2021, Xcel Energy submitted a proposal to invest at least $1.7 billion in new transmission to connect renewable energy projects in rural areas of the state to urban regions. The project, Colorado's Power Pathway, was approved by the PUC in June 2022, and will be a collaborative effort with other utilities in the state including Tri-State, Colorado Springs Utilities, Black Hills Energy, and Platte River Power Authority. The new transmission lines will accommodate the 5500 MW of new wind, solar, and other resources Xcel Energy plans to add through 2030. In January 2023, the Colorado Power Pathway received key approvals in five counties for around 300 miles of the transmission project.

New community resilience initiatives in the state are targeted at improved resilience during extreme weather and other disasters. In May 2019, in response to House Bill 18-1270, Xcel Energy filed an application with the PUC for approval of their Community Resiliency Initiative (CRI); a plan to dedicate up to 15 MW of the company's energy storage systems to community resiliency centers. The proposal was approved in 2020 and Xcel Energy has selected six sites in Alamosa, Arvada, Denver, and Nederland for battery-based microgrids that will provide back-up power to critical infrastructure in the event of an outage. While House Bill 22-1013 creates a grant program to finance microgrid projects developed by cooperative and municipal utilities in rural communities, House Bill 22-1249 directs the Colorado Energy Office to develop, through a collaborative process, a grid resilience and reliability roadmap that includes consideration of the role of microgrids in improving reliability and resilience.

In 2023, House Bill 23-1039 was enacted and requires load-serving entities to submit a resource adequacy report to the Colorado Energy Office on an annual basis, who will publish a statewide resource adequacy report annually. Also enacted was Senate Bill 23-291, which reduces customer exposure to volatile gas prices, makes it easier for customers to switch from gas to electric, and puts in place new PUC regulations regarding utility cost recovery and gas infrastructure.

The Infrastructure Investment and Jobs Act of 2021 (IIJA) is a landmark federal spending bill that includes funding earmarked for grid modernization projects. This includes $11 billion for Department of Energy (DOE) grants directed specifically towards electric infrastructure resiliency projects (including grid hardening against severe weather and cybersecurity improvements), $2.5 billion for transmission development, and $3 billion for the Smart Grid Investment Matching Grant Program.[3] Enacted August 2022, the Inflation Reduction Act (IRA) set aside $2 billion for loans for constructing new high-capacity transmission lines and upgrading interties. The bill includes funding for technical assistance and grants for states and tribal governments, which includes assistance for siting transmission projects. The bill also directs DOE to undertake interregional transmission planning, modeling, and analysis, including analysis of transmission for offshore wind and the use of grid-enhancing technologies (GETs).[4]

There are policies that Colorado's policymakers could adopt to support in-state grid modernization efforts.

1. Develop a grid modernization strategy through a collaborative process. Alternatively, states might decide to require that utilities develop and propose a ten-year grid modernization plan to the PUC within a specified timeframe. Utilities would then be required to implement that plan within another specified timeframe.

[2] For more on distribution system planning see: https://www.utilitydive.com/news/distribution-system-planning-proactively-planning-for-more-distributed-ass/542129/.

[3] For more information on the grid-related earmarks included in the IIJA, see Potomac Law Group's January 2022 analysis: "The Infrastructure, Investment & Jobs Act of 2021: What's in It for You? (Part V: Grid Infrastructure and Resiliency)." Available: https://www.potomaclaw.com/news-Infrastructure-Investment-Jobs-Act-of-2021-Whats-In-It-For-You-Part-V-Grid-Infrastructure-and-Resiliency.

[4] J. Runyon and J. Engel. 2022. "The Inflation Reduction Act is Signed into Law." *PowerGrid International*. 16 August. Available: https://www.power-grid.com/td/the-inflation-reduction-act-is-signed-into-law/#gref.

Strategies and/or plans should outline a clear set of grid modernization goals and describe methods to measure, report, verify, and enforce progress towards those goals. Colorado's Senate Bill 10-180 created the Colorado Smart Grid Task Force, which produced "Smart Grid Deployment in Colorado," a 2010 report that provided policy recommendations for legislators and the PUC. The state might consider updating the report to reflect recent technological advancements and policy and market changes.

2. States might also provide incentives or cost recovery mechanisms for utilities that meet grid modernization goals. Policymakers could consider directing the PUC to evaluate alternative ratemaking mechanisms, performance-based regulation (PBR) and/or new utility business models that support grid modernization. As required by Senate Bill 19-236, the PUC of Colorado opened a proceeding to explore PBR in 2019 and produced and submitted a report on the results of its investigation in 2020. The PUC recommended continuing to build upon existing performance-based mechanisms in Colorado, especially where these mechanisms could encourage reductions in GHG emissions.

The adoption of incentives for or a requirement to integrate a certain amount of renewable energy and energy storage on the grid alongside enhanced building energy standards and electric vehicle policies can support grid modernization efforts.

MAINSTREAMING RENEWABLES

Renewable energy is increasingly seen as the least cost and lowest risk form of energy (excluding energy efficiency). With increased deployment, utilities are learning more about how to integrate renewables effectively, investors are becoming more comfortable with the technologies, and building code officials are recognizing common standards and best practices for integrating distributed renewable energy resources. In the U.S., the expansion of renewable energy has been one of the most consequential shifts in electricity generation over the last decade. According to the EIA, renewable energy generation surpassed coal and nuclear generation in 2022, and more than half of all new generation capacity in 2023 is expected to be solar. As of 2022, there were more than 470,000 jobs in the wind and solar industry. Accordingly, it is in the interest of policymakers to ensure that their states are well positioned to benefit from this shift.

Several pieces of legislation relating to renewable energy were enacted in the 2023 legislative session. House Bill 23-1281 develops a regulatory framework to support a clean hydrogen economy in Colorado and adds financing and financial incentives for clean hydrogen. Senate Bill 23-092 supports the use of solar coupled with agricultural practices (agrivoltaics) by creating grants for new or ongoing agrivoltaic projects.

Colorado's enacted Senate Bill 23-198 makes several changes to the laws regarding utility clean energy plans, including expanding the applicability of clean energy plans and requiring verification and enforcement of these plans.

While the IIJA doesn't provide money for specific renewable energy projects, the funding in the Act will benefit renewable energy development as grid resiliency, increased deployment of energy storage, and modernized transmission are all essential to the successful integration of renewable energy generation. The IRA appropriated $369 billion to fund a variety of energy and climate initiatives – the largest climate investment in U.S. history. The bill also extended the investment tax credit (ITC) and the production tax credit (PTC) through the end of 2024 and revived the PTC for solar projects. For projects placed in service in 2025, the bill "effectively extended" the ITC and PTC by creating new tax credits for zero emission facilities. The bill also extended the residential energy property tax credit through 2034 and created a new advanced manufacturing production credit, to apply to sales of components for constructing wind and solar energy facilities beginning in 2023.[5]

The IRA also includes several provisions related to energy equity, including $3 billion to the Environmental Protection Agency (EPA) for grants for community-led projects in disadvantaged communities and $27 billion for nonprofit, state, and local climate finance institutions supporting the deployment of low- and zero-emission technologies. In support of rural communities, the bill also includes a $1 billion appropriation to the U.S. Department

[5] For a detailed discussion of the IRA's tax provisions, see: A.S. Levin-Nussbaum. 2022. "Update: President Biden Signs Historic Legislation Providing Expansive Clean Energy Tax Incentives." *The National Law Review*. 17 August. Available: https://www.natlawreview.com/article/update-president-biden-signs-historic-legislation-providing-expansive-clean-energy.

of Agriculture (USDA) for loans to finance renewable energy projects, $1 billion for USDA's Rural Energy for America Programs, and $9.7 billion to USDA to finance rural electric cooperatives' purchases of renewable energy.

To reduce barriers to customer and utility participation in the renewable energy market, and to build upon the federal initiatives, policymakers in Colorado might consider several options.

Customer-Oriented Policies

1. **Interconnection, Net Energy Metering (NEM), and Streamlined Permitting** – In general, customers want a clear, streamlined, affordable, and predictable process for connecting renewable energy systems to the grid. Colorado adopted standards for net energy metering and interconnection in 2005 and updated the rules in 2008. The standards apply to utilities with 40,000 or more customers, municipal utilities with 5,000 customers or more, and all cooperative utilities. An update in 2018 through Senate Bill 18-009 allowed solar-plus- storage systems to be eligible for net metering. In Spring 2021, the PUC approved amendments to the state's interconnection rules, which will "make it faster and easier to connect solar and storage systems to the grid." These recent amendments will increase not only deployment, but also transparency and choice for customers. Additionally, Senate Bill 21-261 expanded access to solar for customers without access under the previous net-metering policy. Prior to the bill's adoption, net metering regulations limited the size of a solar system to 120% of a customer's previous year's energy use. Senate Bill 21-261 removed most of the limitations on the size of distributed energy systems and prohibits IOUs from limiting the size of on-site renewable energy systems solely based on past use. The bill also allows a customer's overproduction at the end of the year to be donated to low-income energy assistance and bill reduction programs, or the customer can elect to carry the credits forward.

   In May 2021, NREL launched the SolarAPP+, an online platform designed to automate the solar permitting process. By running compliance checks and processing permit approvals, the service is intended to drastically reduce permit wait times. Currently restricted to rooftop solar, thirty-two communities in five states have adopted the platform, processing over 15,000 permits for more than 100 MW of generation with an estimated 15,000 hours saved in permit review time. House Bill 23-1234 creates a grant program to fund technical support for permitting agencies to implement "free automated permitting and inspection software."

2. **Shared Renewables** – Due to building and property attributes and ownership issues, many customers are unable to install renewable energy technologies where they live or work. Allowing shared, or community, renewable energy projects addresses these barriers. These projects have multiple owners or subscribers who pay for a portion of the project, or the generation provided by the system. Colorado currently allows virtual net metering for solar customers of IOUs only. Virtual net metering allows a customer to receive credits from a shared system as if the generation were on site and is different from a power purchase agreement (PPA), which pays the customer for the proportion of power they produce. Because it is treated as a credit on the customer's bill, the customer can avoid the tax implications of a PPA payment – which can adversely affect the economics of the system (and may come as a surprise to the participant). To expand program participation, the state might consider expanding the virtual net metering policy. Enacted in 2019, House Bill 19-1003 removed restrictions on Community Solar Gardens (CSGs) and increased the maximum size of a CSG from 2 MW to 5 MW and allowed the PUC to increase the maximum size to 10 MW beginning in July 2023.

   Low credit ratings can prevent participation in renewable energy markets; this can affect low- and moderate-income (LMI) households' adoption of renewable energy solutions. Supportive policies for shared renewables can be designed to enable participation by LMI households; this can increase adoption of renewable technologies and reduce energy costs. LMI inclusion can be encouraged either through a percentage mandate for the overall annual contracted capacity, like Colorado's five percent requirement, or by offering a higher rate of payment for the portion of shared solar capacity attributed to LMI customers. States that have a shared renewables program may want to coordinate this program with implementation of the federal Weatherization Assistance Program (WAP) to provide recipients of assistance with access to participation in a shared system. Colorado is a national leader in bringing the benefits of shared renewable energy projects to LMI households, having pursued such programs since 2015. Colorado's Low-Income Community Solar Demonstration Program could be expanded to meet additional need.

3. **Adapt Energy Assistance Programs** – Programs such as the Low-Income Home Energy Assistance Program (LIHEAP) and WAP provide assistance for paying utility bills and reducing household energy costs. Including

distributed energy resources as eligible for funding under these programs can reduce energy costs and increase energy security for those LMI families who are able to benefit from WAP and LIHEAP. Colorado's Energy Office has a proven record of successful implementation of WAP. The state's WAP was the first in the nation to be granted permission by DOE to use rooftop solar as an approved measure to reduce household energy burdens. Senate Bill 21-231 appropriated $3 million to finance WAP. House Bill 21-1105 increased funding for low-income assistance programs through a systems benefit charge to be collected by gas and electric investor-owned utilities beginning October 2021. This will support dedicated funding for the WAP program, which can be used for solar installation. Since 2015, Colorado has received $48.1 million from WAP and $6.9 million from the State Energy Program (SEP) which has helped to fund a number of energy initiatives in the state.

4. **Fund Distributed Generation (DG) for Community Organizations** – Organizations or groups that provide support services for LMI communities can be provided funding to install solar or other distributed energy resources. Sites such as homeless shelters, food banks, clinics, and community centers often have enough rooftop area for solar installations. After installation, these resources can reduce an organization's utility bills, freeing up funds for other activities that support the community.

   The Community Office for Resource Efficiency (CORE) offers grants to schools, nonprofits, businesses, and public agencies in the Roaring Fork Valley for projects that reduce GHG emissions through energy efficiency, renewable energy, and green building design. The City of Boulder funds an LMI residential and nonprofit solar grant program through sales and use taxes collected on solar installations.

5. **On-Bill Financing/Pay As You Save (PAYS**) – On-bill Financing and Repayment programs enable consumers to invest in energy upgrades with no upfront payment. The utility or a third party will pay the initial costs to install the upgrade with the cost of that upgrade recovered through the utility bill. Because repayment includes consideration of the cost savings resulting from the energy upgrade, customers can see monetary benefits almost immediately. Once equipment costs are recovered, the equipment belongs to the customer. State policies that reduce lending risk by creating a loan loss reserve and/or a credit enhancement fund can encourage lending to customers that might otherwise not qualify for a loan and can keep interest rates low.

   The Colorado Residential Energy Upgrade (RENU) loan program offers low, fixed interest rate loans for renewable energy and energy efficiency improvements. Homeowners can finance up to $75,000 of project costs and borrowers with credit scores of 580 and up are eligible. Senate Bill 21-230 allocated $2 million to this program. Senate Bill 21-261 required that the PUC "encourage" utilities to offer a standard rebate whereby "customers are offered a specified amount per watt for the installation of eligible solar electric generation on the customer's premises". The bill also required that utilities be encouraged to develop other incentive programs targeting low-income and traditionally underrepresented customers. Senate Bill 21-272 directed the PUC to establish rules requiring that the Commission "improve equity for, minimize impacts on, and prioritize benefits to disproportionately impacted communities." The bill also added a requirement that utilities' plans consider and improve equity outcomes, including a requirement that 40% of new utility expenditures on renewable energy and distributed generation between 2022 and the end of 2028 go to benefitting low-income customers and disproportionately impacted communities.

6. **Corporate Procurement** – Many Fortune 100 and 500 companies have established either climate goals or commitments to purchase renewable energy. Since 2014, over 70 gigawatts (GW) of renewable energy has been procured by corporate entities. In the first half of 2022, corporations entered into contracts for 21 GW. This is leading policymakers to provide additional avenues for businesses to procure renewable energy. In Colorado, Xcel Energy's Renewable Connect offers corporate buyers a fixed price contract for solar power on a month-to-month basis, or for five or 10 years. While the program is currently fully subscribed, Xcel is accepting applications for its waitlist. Policymakers might also consider incorporating corporate renewable procurement targets into the state's IRP process. By integrating these renewable purchase commitments into the IRP process, utilities can avoid over-building resources and stranding generation assets.

Utility-Oriented Policies

Some states have created programs that aim to reduce greenhouse gas (GHG) emissions and increase investments in clean energy resources. Utilities are also setting their own GHG reduction goals and are increasingly investing in clean energy resources. In 2004, Colorado passed the first voter-initiated Renewable Portfolio Standard (RPS) in the

country, requiring utilities to obtain a certain percentage of their power from renewable energy sources.[6] Colorado's 2021 Greenhouse Gas (GHG) Pollution Reduction Roadmap identified policy avenues for meeting the GHG reductions required by House Bill 19-1261: 26% by 2025, 50% by 2030, and 90% by 2050 (from 2005 levels). Though Senate Bill 21-200, a bill that was designed to enforce the roadmap, was not enacted, many of its objectives were incorporated into House Bill 21-1266. This bill directed the Air Quality Control Commission (AQCC) to develop rules to monitor emissions in the oil and gas, electric utility, transportation, and industrial and manufacturing sectors, and includes enforceable emissions requirements for industry and the electric utility and oil and gas sectors. Colorado's largest utility, Xcel Energy, will close all of its coal-fired electric generating plants and has pledged to source 80% of its electricity from renewable resources by the end of 2030. Black Hills Energy plans to reduce its GHG emissions 90% from 2005 levels by 2030.

House Bill 21-1269 requires the PUC to study to the feasibility of allowing community choice energy (CCE), which allows cities and counties to choose alternative electricity suppliers. The bill also required that the PUC evaluate the likely impacts of CCE on achieving state climate and clean energy goals.

CPUC Rule 3627 requires electric utilities to submit annual 10-year plans for transmission projects in Colorado. Utilities are required under the rule to give government agencies and shareholders a chance for significant involvement in the planning process.

The Sunset Public Utilities Commission Bill (Senate Bill 19-236) requires an IOU when submitting a filing to the Commission that includes a proposed retirement of an electric generating facility, and that the filing includes a workforce transition plan that provides an estimate of the workforce changes that will occur due to the closure of the facility. The bill also includes provisions for refinancing aging coal plants to support the transition toward clean energy with a policy tool called securitization. Securitization restructures utilities' unpaid debt on non-competitive coal plants, allowing them to pay reduced interest rates with ratepayer-backed bonds to minimize the economic effects of closures on coal-reliant communities. A portion of bond proceeds goes toward funding jobs-focused transition assistance programs and renewable energy initiatives. This enables utilities to retire coal plants ahead of schedule while also promoting a just energy transition.

To increase utility adoption of clean energy technologies, Colorado's policymakers might consider accelerating and/or amending its RPS. One of the oldest and most successful advanced energy policy tools, renewable portfolio standards usually set a target for a specific percentage of renewable electric generation to be achieved by a specific date. The RPS was designed to build the market for renewable energy, which, at the time when most states were adopting these standards, was more expensive than conventional electricity sources. Today, states and utilities are in a much different situation for most land-based, utility-scale renewable energy resources (primarily wind and solar). These technologies are increasingly economical on a direct kilowatt hour (kWh) cost and are being aggressively pursued by most utilities for this reason. In general, RPSs require utilities to procure the lowest-cost qualifying resources and cap expenses under the program, which has helped deployment of more mature wind and solar technologies. However, this does not automatically promote resource diversity necessary to enhance system resilience and invest in emerging but promising clean energy technologies of the future like offshore wind, storage, and others.

States can update existing RPSs to increase targets and/or accelerate target dates to continue to spur the development of renewable resources and save ratepayers money. States might add one or more carve-outs to incentivize the development of distributed and offshore resources. Embedding an RPS within a broader clean electricity or emissions standard can allow technological flexibility.

ENERGY STORAGE

Energy storage offers a unique opportunity to dynamically manage supply and demand while also maximizing the value of grid resources. By deploying storage to strategic locations, utilities can more effectively manage their energy portfolios. First, storage allows utilities to manage intermittent demand – helping reduce peak demand

[6] Each qualifying retail utility is required to generate or get electricity from eligible energy resources in the following proportions of its retail electricity sales for 2020 and each year thereafter: 30% for each IOU, 20% for each electric cooperative serving 100,000 meters or more, and 10% for each electric cooperative serving less than 100,000 meters and each municipal utility serving more than 40,000 meters.

requirements. Because the generation resources that provide peak power are the system's most expensive, reducing peak demand can save consumers money. Second, the responsiveness of energy storage can allow utilities to implement voltage regulation and other ancillary services, which improve system efficiency. Third, because storage technologies can both store and dispatch power, storage enables better integration of intermittent power generation resources, like wind and solar, to the grid.

The flexibility of battery storage combined with advanced metering infrastructure can allow customers to control how and when they use energy from the grid or from solar panels installed on their home or business. In most cases, this can provide greater cost savings than standalone solar systems. Combined with time-varying rates or real-time pricing programs, state policy can further support customer choice and open a new market for energy services. Prices that better reflect the time-varying and location-dependent costs of producing and delivering electricity can also lead to a number of economic and environmental gains.

Energy storage can also help the commercial sector avoid demand charges, which establish an incremental cost above energy usage based on the highest period (highest 15 minutes, for example) of demand during the month. Eliminating spikes in demand with storage can reduce these costly charges for businesses. As utilities around the country consider implementing or extending demand charges to other sectors, energy storage will become more relevant as both a customer cost-saving investment and a system efficiency measure.

Declining costs and technological advancements in battery storage have contributed to increased deployment. The EIA expects total battery storage deployment to nearly triple from 7.8 GW in 2022 to 30 GW in 2025. State policies can further encourage this by establishing both a framework for easy integration of energy storage resources onto the grid and a marketplace that monetizes the benefits of energy storage for cost-effective investment.

In 2018, Colorado became one of the first states in the U.S. to grant customers the right to store energy. Senate Bill 18-009 granted electricity users the ability to store energy without discrimination in rates or excessive barriers to connecting to the grid. It also required the PUC to adopt rules allowing the installation, interconnection, and use of energy storage systems by utility customers. House Bill 18-1270 directed the PUC to adopt rules establishing mechanisms for the procurement of energy storage systems by electric IOUs. Cost and benefit analyses of storage systems were directed to include such factors as grid reliability and reduced need for additional peak generating capacity. The information supplied by utilities in response to the procurement requirement had to include appropriate data and specify interconnection points to enable independent evaluation. At the end of 2018, the PUC issued rules incorporating storage into utility planning processes.

In 2019, Synapse Energy Economics was contracted by the Colorado Energy Office to complete a report, The Future of Energy Storage in Colorado, which outlines opportunities, barriers, and policy recommendations to increase the deployment of energy storage in the state. The report concluded that unless facilitating policies and mandates to promote energy storage are adopted, deployment will be slow in Colorado throughout the next decade.

More recent storage updates include plans for the Pike Solar and Storage Facility in El Paso County – a project that includes a 25 MW battery storage system. In Spring 2021, Xcel Energy announced objectives to double its capacity of renewables and battery storage by 2030. The PUC amended interconnection rules in 2021 to streamline permitting and create a pilot program that offers incentives for storage development. In August 2022, Xcel Energy announced a liquid metal battery storage demonstration project at Aurora's Solar Technology Acceleration Center.

The IIJA provides a unique opportunity for funding energy storage projects. The IIJA provides $505 million for grants to support energy storage demonstration projects, more than $7 billion for building out the U.S. battery supply chain, and $14 billion for grid resilience programs that include energy storage as a qualified technology. The IRA extended the ITC to include standalone energy storage systems. When the ITC is replaced by the technology neutral Clean Electricity Investment Tax Credit (CEITC) in 2025, qualified storage facilities placed in service after 2024 will remain eligible. The advanced manufacturing production credit will apply to battery cells and modules and the critical minerals used in their production. The $27 billion GHG Reduction Fund, also established by the bill, will provide funding enabling low-income or disadvantaged communities to adopt zero-emission technologies including energy storage.

There are several policy opportunities to take advantage of the growing technological advances in and declining costs of energy storage and build upon recent federal initiatives. The recommendations here draw heavily from

IREC's 2017 report, "Charging Ahead – An Energy Storage Guide for Policymakers." Policymakers in Colorado could consider the following:

1. Consider creating a mandatory energy storage procurement target or requirement for energy storage with a documented process for periodic review of progress towards that goal. Procurement targets can limit the amount of utility-owned storage; require that a certain amount of storage be targeted to low-income customers; and create carve-outs for storage at the transmission, distribution, and customer levels. Procurement targets can jump-start market creation, spur fast learning, and guide the development of a regulatory framework.

2. Finance and incentivize energy storage for customers and utilities. Incentives can enable customers to use storage to manage their electric load and store locally produced renewable energy. Incentives in the form of rebates, grants, and tax credits can provide a bridge to scalable deployment of storage. Incentives can be designed to decline as storage values become more readily monetized and/or as the cost of storage decreases. Policymakers could allow utilities that provide incentives to customers to recover the costs of installing smart meters. This would enable dynamic and time-varying energy management from multiple distributed battery systems. This could also signal to customers the value of leveraging storage and better align customer costs with system costs. Financing energy storage installations for commercial customers could help reduce their demand charges. Policymakers might want to start first with a policy that provides grants to pilot projects. Incentive programs might also target solar system owners. Financial incentives should be designed to ensure that the state will meet other goals including emissions and peak demand reductions, and equitable access to clean energy.

3. Consider taking advantage of the "direct pay" option available to state and local governments for energy storage investment tax credits (ITC) available in the IRA. The direct pay option allows states (or other qualified entities without tax obligations) to be directly refunded a 30% ITC from the federal government after the project is online. The IRA also allows for up to a 70% credit for projects that incorporate domestic components, serve low-moderate income communities, and/or are located in energy communities.

THE BUILT ENVIRONMENT

In the U.S., buildings consume nearly 40% of total energy used.[7] Because it reduces energy demand and emissions and creates savings for utility customers, energy efficiency[8] often plays a prominent role in state energy and climate policies. Coupled with beneficial electrification, which involves replacing direct fossil fuel use with electricity, there is even greater potential to reduce energy costs and pollution, and provide more resilient, comfortable, and healthy buildings. This is especially the case in states where increasing levels of low carbon resources are supplying the electric grid. When policies are adopted to shift energy sources for such things as space and water heating, to highly efficient electric alternatives, states can maximize achieving the dual objectives of increased energy efficiency and reduced emissions. In some cases, this can also result in lower energy costs.

The American Council for an Energy Efficient Economy (ACEEE) published a State Energy Efficiency Scorecard in 2022 that evaluates states' energy efficiency programs and policies in six policy areas, focusing on equity and policies that assist low-income and disadvantaged households. Colorado is ranked 13th in the 2022 report. In addition to its Energy Efficiency Scorecard, ACEEE tracks how states are incorporating equity into their energy efficiency and clean energy programs and policies.

Colorado has taken several steps to incorporate energy efficiency and beneficial electrification into its built environment. As required by Senate Bill 19-236, the PUC opened a proceeding to explore PBR in 2019 and produced and submitted a report on the results of its investigation in 2020. The PUC recommended continuing to build upon existing performance-based mechanisms in Colorado, especially where these mechanisms could encourage reductions in GHG emissions.

Senate Bill 21-246 directed the PUC to establish energy savings targets for and approve beneficial electrification plans submitted by Colorado's IOUs. The new policy, to be modeled on the state's existing demand-side management (DSM) programs, aims to promote, and incentivize voluntary adoption of beneficial electrification measures by

[7] For additional information, see ACEEE Building Policies and Codes.
[8] Energy efficiency includes a multitude of measures to reduce energy consumption. These measures range from behavioral changes to installing energy efficient appliances to full building renovations, including updating a building's envelope.

residential, commercial, and industrial customers. Utility plans must include programs targeted at low-income and disproportionately impacted communities (with at least 20% of funding allocated to these households). IOUs must also create outreach plans for engaging with these households and communities at every phase of their beneficial electrification program. This includes offering incentives to multifamily buildings.

Senate Bill 22-193 creates the Industrial and Manufacturing Operations Clean Air Grant Program to provide grants to private entities, local and tribal governments, and public-private partnerships for projects to reduce air emissions from industry and manufacturing. Eligible projects include energy efficiency improvements, building and transportation electrification, and renewable energy installations, among others. The bill also directs the Colorado Energy Office to provide financial incentives to reduce energy and water use in the state's cannabis industry, creates both a grant and a rebate program to incentivize electric bicycles, and creates an electrifying school buses grant program.

In 2019, House Bill 19-1231 established water and energy efficiency standards for certain products and required the standards be made publicly available. Senate Bill 23-1161 expanded the list of appliances subject to the water and energy efficiency standards.

Energy Smart Colorado offers residential and commercial energy efficiency assessments and access to financing for 18 Colorado counties. Several utilities, including IOUs, municipal utilities, and electric cooperatives in the state offer energy efficiency rebate programs. Most of these include electric heat pumps as eligible improvements and some also include electric vehicle charging equipment. Colorado is also host to several institutions and collaborations researching energy efficiency and energy efficient technologies.

The IIJA provides $500 million for grants to fund energy efficiency and renewable energy upgrades in public schools, $3.5 billion for the Weatherization Assistance Program, and increases funding for the Energy Efficiency and Conservation Block Grant program by $550 million and the State Energy Program by $500 million. The IRA appropriates $4.3 billion to DOE for an energy efficiency rebate program that will be administered through state energy offices. Another $4.3 billion appropriation will fund electrification rebates for single- and multi-family homes. The bill also extends the tax credits for residential energy efficiency improvements and new efficient home construction and increases the maximum deduction for energy efficient commercial buildings. A $837.5 million appropriation will be used by the Department of Housing and Urban Development (HUD) for resiliency, energy efficiency, renewable energy, and grid integration projects at public housing units.

Policymakers in Colorado can consider a variety of policies to further encourage energy efficiency and beneficial electrification:

Energy Efficiency Policies

1. **Building Codes** – The DOE projects that, over time, improvements in building codes can have the greatest single impact on energy efficiency within the built environment. On average, commercial buildings waste 30% of energy used.[9] Because buildings will be around for generations, energy efficiency within the built environment is a matter of statewide and long-term importance. States can set requirements for energy systems, require statements of energy use, and set performance standards for energy use or emissions. Building codes can be required by state legislation or implemented through 'home rule', where local governments set their own standards or adopt more strict building codes than those mandated by the state.

   The IIJA includes a $225 million appropriation for a competitive grant program to support the "sustained cost-effective implementation of updated building energy codes." The grant program will run for five years, through fiscal years 2022 – 2026. In December 2022, DOE issued the Resilient and Efficient Codes Implementation Funding Opportunity Announcement to support the adoption of updated building energy codes. Approximately $45 million is available for this competitive grant program. The program requires the participation of a "relevant state agency" and projects must be tied to "an updated building energy code."

   While Colorado is a home rule state, meaning that there is no mandatory statewide building code, and local governments adopt and implement their own codes, House Bill 19-1260 established a requirement that local

[9] For more information, see the Office of Energy Efficiency & Renewable Energy's Commercial Buildings Integration (CBI) Program.

governments adopt one of the three most recent versions of the International Energy Conservation Code (IECC) when they update any other building code. According to ACEEE, "more than 60 jurisdictions have adopted the 2018 IECC so far, with many more in the process or under consideration." This accounts for approximately 48% of the state's population.[10] House Bill 22-1362 further strengthens building code requirements, in that localities that update building codes must adopt at minimum the 2021 IECC and the electric and solar ready model codes created by the state energy code board (discussed further below). However, if a locality applies for and does not receive a grant to assist with implementation and code enforcement training, the requirement reverts to adopting one of the three most recent versions of the IECC.

2. **Appliance Efficiency Standards –** Appliance efficiency standards set minimum requirements for efficiency in everything from washing machines to water heaters. Efficiency standards save consumers money on utility bills and reduce energy demand on the grid, most importantly reducing peak energy demand. Some states have elected to adopt the federal appliance standards that were in effect on January 1, 2017.[11] These include, among other things, standards on metal halide lamp fixtures, residential furnaces and boilers, and external AC to DC power supplies. While Colorado has implemented some efficiency standards as mentioned above, policymakers could consider implementing additional efficiency standards for other types of appliances.

3. **Low-Income Energy Efficiency Programs** – While equity should be incorporated into all policy development, it is often necessary to ensure that specific programs are targeted towards historically underserved populations. Recent research suggests that weatherization improvements can reduce energy use by 25-35%, allowing households to reduce their financial energy burden. The federal WAP program provides energy efficiency upgrades for income qualified homeowners. However, there might be difficulty in reaching individuals who are eligible. Policymakers might require outreach and education programs targeted at eligible groups.

   Colorado's program, as discussed above, was the first in the nation to be granted permission by DOE to use rooftop solar as an approved measure to reduce household energy burden. Senate Bill 21-231 appropriated $3 million to the state's WAP. The state WAP is also piloting a program to install air source heat pumps for its participants.

4. **Energy Efficiency Resource Standards (EERS)** – EERSs require utilities to demonstrate a reduction in energy demand from programs offered to their consumers. Because this means selling less energy and reducing revenues, there is not always an incentive for the utility to make their consumers more productive or efficient users of energy. If legislatures want to ensure a more productive and efficient energy distribution system that takes advantage of the latest technological innovations, they may want to require that a utility demonstrate a percent reduction in demand through efficiency or "demand side" programs. Legislators can also instruct their utility commissions to consider energy efficiency when approving rate cases by allowing cost-recovery of energy efficiency improvements through utility bills.

   Colorado's EERS requires that utilities meet a 5% energy savings target and reduce peak demand by 5% by 2028. In 2021, House Bill 21-1238 amended cost-effectiveness tests for natural gas utility DSM programs to include avoided costs to ratepayers related to reduced natural gas consumption using a calculation that includes a social cost of carbon of $68 per short ton and a social cost of methane of $1,756 per short ton. The bill also set contracting, licensing, and apprenticeship requirements for DSM projects and directed the PUC to set DSM savings targets for natural gas utilities that reflect the "maximum cost-effective and achievable" savings potential.

5. **Revenue Decoupling and Performance-Based Incentives** – Utilities earn revenue by selling energy. As a result, there is little to no incentive for them to promote energy efficiency because it leads to a reduction in sales, and therefore a reduction in revenue. Revenue decoupling disconnects revenue from the amount of energy sold. This provides utilities a set amount of revenue regardless of the amount of energy sold. While this does not directly incentivize energy efficiency, it does remove the inherent disincentive to promote energy efficiency.

   Incentive policies can be layered on top of a decoupling policy. For example, if a utility meets set energy reduction targets, then performance-based incentives can provide monetary rewards for meeting those targets.

[10] ACEEE. 2021. Buildings Summary: Colorado. Available: https://database.aceee.org/state/buildings-summary.
[11] Based upon research conducted by the Center for the New Energy Economy.

Colorado does offer revenue decoupling for gas utilities though it does not for electric utilities. The state does provide incentives for exceeding goals and disincentives for not meeting set goals. Xcel Energy is hosting a revenue decoupling pilot program for residences and small businesses, the adjustment is currently limited to a 3% base rate surcharge or credit on customer bills. The pilot program is scheduled to finish at the end of 2023.

Electrification Policies

1. **Strategically Target Beneficial Electrification** – Target areas of beneficial electrification in buildings include space and water heating systems and other systems and appliances that typically use natural gas or another fossil fuel as an energy source. According to the Environment and Energy Study Institute, new electric heat pump technology can heat space and water at efficiencies of 200 to 300 percent, compared to 67 percent efficiency in typical Energy Star gas water heaters.[12] This not only allows savings on energy bills, but it also results in reduced GHG emissions and improved indoor air quality.

2. **Adopt Tools for Advancing Electrification** – Building codes and financial incentive programs can be used to advance beneficial electrification. While in some states, local governments are primarily responsible for adopting and implementing building energy codes, in other states, a state legislature, or a code commission tasked by the legislature, adopts and implements statewide standards. Incentive programs established and implemented by states, local governments, or utilities can target replacing systems and appliances that traditionally rely on fossil fuel resources with high efficiency electric systems and appliances including water heaters, furnaces, ovens, and ranges. As an example, heat pump water heaters and space heating systems can serve as high efficiency replacements for traditionally fossil-based equipment. In conjunction with utility regulatory policy, these technologies can also serve as demand response tools.

   As a note, cities across the country are implementing new building codes promoting beneficial electrification by limiting or banning the installation of natural gas in new construction. State legislatures can pass enabling legislation, allowing municipalities to make independent decisions on beneficial electrification. On the other hand, some states have adopted pre-emptive legislation, banning local governments from adopting policies that limit utility service.[13]

   Colorado's House Bill 22-1362 created several new provisions related to building energy codes. The bill creates an energy code board tasked with developing a model electric ready and solar ready code before June 1, 2023, and a model low energy and carbon code before July 1, 2025. The bill also tasks the Colorado Energy Office with developing a model green code for adoption by local governments and state agencies. An "electric ready" code is one that ensures that "buildings can be converted to high efficiency electric space and water heating […] at the lowest possible cost to building owners" and provides adequate panel capacity to accommodate electric vehicle charging. "Solar ready" is defined as "adequate panel capacity, dedicated electric panel space … physical roof space, and structural load to accommodate future installation of solar panels." The bill creates exemptions for small roofs and consistently shaded buildings. The bill also sets timelines for the adoption of new codes by local governments and state agencies, provides certain exemptions for rural counties, creates new grant programs for the purchase and installation of high efficiency equipment and appliances, and provides for training related to the implementation of the new codes.

Programmatically, there will always be greatest benefit by combining measures – incentives that bundle improvements will generate greater gains than individual measures. For example, a high efficiency heat pump will be much more effective and efficient when coupled with improved building insulation. Rather than only realizing the gains of the new mechanical component, this combination of measures will increase the efficiency of the entire system.

[12] For more information, see EESI's Beneficial Electrification.

[13] See: "States that outlaw gas bans account for 31% of US residential/commercial gas use." S&P Global Market Intelligence, 9 June 2022. Available: https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/states-that-outlaw-gas-bans-account-for-31-of-us-residential-commercial-gas-use-70749584.

ELECTRIFICATION OF THE TRANSPORTATION SECTOR

Bloomberg New Energy Finance estimates that nearly 80% of new car sales in the U.S. will be electric by 2040. Therefore, a key part of building a modernized grid involves designing infrastructure that will facilitate easy connection of electric vehicles (EVs) to the grid. One of the most important barriers to increased adoption of EVs is the consumer's awareness of the availability of EV charging stations. Ultimately, drivers want to be sure that their car will get them where they need to go. The good news is that both supportive policies for developing charging infrastructure and technological advancements have eased this "range anxiety."

ACEEE publishes a State Transportation Electrification Scorecard that evaluates states' progress in electrifying transportation in six key policy areas and offers nationally applicable policy recommendations. Colorado ranks 3rd in the 2023 report.

Colorado has several incentives to promote the purchase of EVs. These include tax credits for light-, medium-, and heavy-duty EVs, direct current fast charging (DCFC) grant program, and an EV and infrastructure coaching service. As discussed above, Senate Bill 22-193 creates the Industrial and Manufacturing Operations Clean Air Grant Program to provide grants to private entities, local and tribal governments, and public-private partnerships for projects to reduce air emissions from industry and manufacturing. Eligible projects include transportation electrification. The bill also creates an electrifying school buses grant program. A partnership between the Colorado Energy Office and the Regional Air Quality Council supports grant programs for EV charging stations. Other incentives include an EV emissions inspection exemption and a low emission vehicle (LEV) sales tax exemption.

ReCharge Colorado advances EV adoption and the installation of charging infrastructure by assisting consumers, local governments, businesses, and housing developments to identify grant opportunities and other incentives related to EVs. EV owners are required to pay an annual fee of $50 to use public EV supply equipment (EVSE) in Colorado. Fees contribute to the Highway Users Tax Fund and the EVSE grant fund. In 2021, Senate Bill 21-260 added additional fees for plug-in hybrids ($3) and Plug-In EVs ($4) that start in 2022 and increase annually through 2032 to fund and promote sustainability of the transportation system.

Regional collaborations around the U.S. are coordinating the development of EV infrastructure. Colorado is a signatory of the Regional EV (REV) West Plan, a collaborative effort among eight western states to construct a regional EV charging corridor. The goals of the multi-state effort are to reduce transportation sector carbon emissions, bolster EV adoption, increase consumer awareness about the benefits of EVs, coordinate development of charging infrastructure, and incentivize manufacturing of EVs. Colorado is also a member of Drive Electric USA, a coalition of states committed to serving as examples of how to build successful statewide strategies to incentivize the purchase and use of EVs.

As discussed above, House Bill 22-1362 created several new provisions related to building energy codes. In relation to transportation electrification, this legislation requires electric ready code that, among other things, provides adequate panel capacity to accommodate EV charging. The model code is to include EV-ready wiring standards and require that 20% or more of the parking spaces at commercial and multi-family buildings have EV-charging equipment installed. This bill was updated in 2023 by House Bill 23-1233, which requires the state electrical board to adopt electric ready and solar ready rules by March 2024. The bill also prohibits unreasonable restrictions on EV parking and allows for a temporary reduction in some property taxes for EV charging infrastructure.

Senate Bill 21-260 created three transportation electrification enterprises: clean transit enterprise, clean fleet enterprise, and community access enterprise. Over the next decade, roughly $730 million is expected to support EV charging, LMI adoption of EVs and electric bikes, and fleet conversions to zero emission vehicles (ZEVs) – including public transit, school buses, public fleets, and medium- and heavy-duty trucks.

Colorado has a goal to have 940,000 light-duty EVs on Colorado's roads by 2030. In 2018, the state adopted California's LEV and ZEV standards. A partnership with Rivian will enable the building of a minimum of two level 2 EV chargers at up to 50 Colorado Parks and Wildlife locations, including all 42 state parks. In January 2021, in what was dubbed "the largest single utility transportation electrification program approval outside of California and New York recorded so far," the PUC approved Xcel Energy's Transportation Electrification Plan. The utility's plan, the first approved in the state, will invest $110 million in transportation electrification and will support the deployment of

more than 20,000 charging stations. In 2020, Colorado joined 14 other states and the District of Columbia in signing an MOU to support the deployment of medium- and heavy-duty ZEVs. The MOU has since expanded to include 17 states and D.C., and in 2022 they released a multi-state action plan to support the electrification of medium- and heavy-duty vehicles.

Executive Order B-2019-002 directed the Transportation Electrification Workgroup to develop strategies and programs to support transportation electrification in the state. Colorado released the 2023 Electric Vehicle Plan, the third iteration of the plan, which outlines actions taken and updates to the state's goals. The Plan envisions a transition to EVs by increasing the market share of light duty EVs to nearly 100% by 2050, transitioning 100% of medium- and heavy- duty vehicles, and expanding electric mobility and public transportation options. Colorado's GHG Pollution Reduction Roadmap recommends that meeting the state goal of reducing GHG emissions to 90% below 2005 levels by 2050 will require that transportation sector emissions are reduced by 25% by 2025, 40% by 2030, and "nearly" 100% by 2050.

The IIJA provides nearly $5 billion over the next five years to support the electrification of the transportation sector. In 2022, $615 million was made available for the installation of charging stations along designated alternative fuel corridors, through a new National Electric Vehicle Infrastructure (NEVI) formula grant program. To be eligible to receive this funding, states must have submitted a NEVI plan to the Federal Highway Administration (FHWA) by August 2022. All 50 states plus D.C. and Puerto Rico submitted a NEVI plan. Colorado will receive an estimated $12,042,045 in Fiscal Year 2023.

The Act also provides approximately $1.1 billion for grants to state and local governments to assist with the purchase or lease of low- or no-emission vehicles for transportation fleets. To be eligible, a state must have a Zero-Emission Fleet Transition Plan in place.

The IRA extended the $7,500 EV tax credit for purchases of new plug-in EVs through 2032 and removed the eligibility cap based on number of vehicles sold by manufacturers. The Act includes requirements for material sourcing that must be met by manufacturers starting in 2027. The IRA also created a new $4,000 refundable tax credit for the purchase of used EVs and a new credit for commercial EVs. Appropriations in the Act include $1 billion for replacing medium- and heavy-duty vehicles with EVs, $3 billion to fund projects to reduce transportation sector emissions, and $3 billion to procure alternatively fueled vehicles for the federal fleet.

There are several policy opportunities to further encourage and prepare for increased market penetration of EVs in the state, including:

1. **Parking Infrastructure Requirements** – In tandem with the implementation of Colorado's NEVI plan, legislation could set requirements for parking lots and other infrastructure. Some states have adopted permitting standards for parking lots, requiring, for instance, that for every 100 parking spaces, there must be at least one EV charging space. Legislation could also incentivize utilities to develop make-ready locations.

2. **Rental Properties and HOAs –** Legislation can also make it easier for lessees, renters, and members of a homeowners' association (HOA) to install charging equipment. Typically, lessors are directed to allow lessees, at their own cost, to install charging systems. In some cases, lessees are required to maintain additional insurance for the system. Legislation related to HOAs typically directs these organizations to avoid restrictions that would inhibit the installation of charging equipment.

3. **EV and Charging Equipment Financing and Financial Incentives –** Providing financial incentives and innovative financing options can help spur greater market penetration of EVs. Sales, property, and income tax credits are some of the simplest methods for addressing the high up-front costs of EVs and EV charging equipment. While sales tax credits are typically applied at the time of purchase, property and income tax credits may do less to address upfront cost barriers, as the credit is not applied at the time of purchase.[14] States have adopted other financial incentives including low-interest loans, vouchers, and rebates. A handful of states qualify EV charging equipment under their property assessed clean energy (PACE) programs. A simple solution is to increase and expand existing tax credits to incentivize commercial, publicly available charging stations.

[14] A study by the Congressional Research Service suggests that tax credits are important tools for ensuring increased adoption of alternative-fueled vehicles.

States might consider adopting programs to incentivize the purchase of used EVs. With increasing battery capacities and falling prices, there are an increasing number of EVs with relatively low mileage that are being traded in. States might also consider programs that target low- and moderate-income (LMI) customers that may not qualify for a loan directly. Such a program could facilitate sales through such things as loan loss reserve and interest buy down programs.

4. **HOV and HOT Incentives** – Allowing EVs to use high-occupancy vehicle (HOV) or high-occupancy toll (HOT) lanes, regardless of number of passengers and without paying the toll, may make EV ownership more attractive. Most states require that EVs using these lanes display a decal or a particular license plate; others also limit eligibility to certain types of vehicles or to a certain number of vehicles.

5. **Fleet Mandates** – Some states require state agencies to acquire a fixed or growing percentage of electric, hybrid, and/or alternative fuel vehicles. For instance, Massachusetts required that its state fleet be no less than 50% hybrid or alternative fuel vehicles by 2018 and set the following state fleet targets for zero emission vehicles (ZEVs): 5% by 2025; 20% by 2030; 75% by 2040; and 100% by 2050. A City of Seattle study found that the city could save millions by switching to EVs. Colorado's Fleet Zero Emissions Resource Opportunity (Fleet-ZERO) aims to address GHG emissions from the transportation sector by providing funding for fleet electrification.

6. **Federal Congestion Mitigation and Air Quality (CMAQ) Funds** – CMAQ funds (almost $2.6 billion in fiscal year 2023) are available to states to assist them in meeting Clean Air Act requirements. State funds can be used to deploy EV charging infrastructure. There may be a unique opportunity to pair a request for CMAQ funds with a commitment from utilities to invest in charging infrastructure as a public/private partnership that would leverage the federal investment.

NEWS

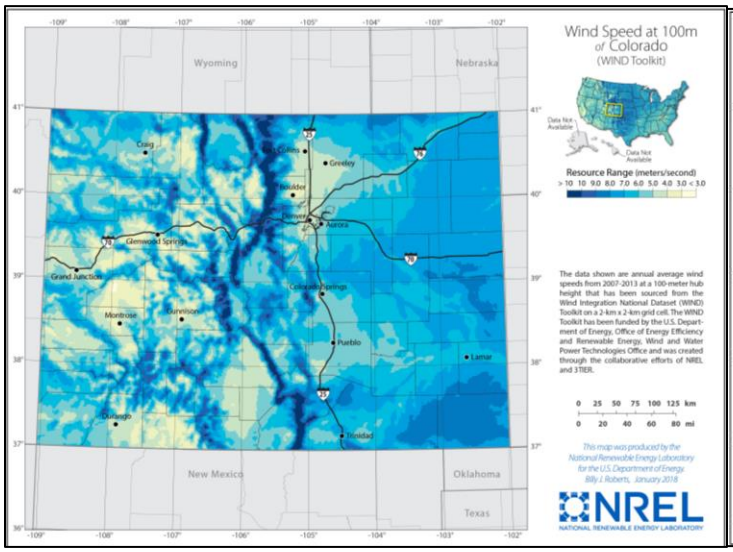
- August 9, 2023:Battery Plant Will Lift Colorado's Energy Economy
- August 8, 2023: Gov. Polis Shares State Renewable Energy Progress, Goals at CU Boulder
- August 8, 2023: Chevron Finalizes $7.6B Purchase Of PDC Energy, Expands Presence In Colorado
- May 22, 2023: Energy Secretary Announces $150M for Renewable Energy Lab During Colorado Visit
- May 18, 2023: Colorado is Poised to Set the Nation's First Standards for Green Hydrogen. Will the Federal Government Follow Suit?
- May 16, 2023: Colorado Offers Millions in Grants to Help Government, Business Truck, and Car Fleets Go Electric
- May 12, 2023: 50 States of Solar Incentives: Colorado
- March 3, 2023: Colorado Releases New Electric-Vehicle Plan as EV Sales Hit 10% Market Share
- January 27, 2023: Xcel Building Massive Battery to Store Clean Energy at Pueblo's Comanche Complex
- January 24, 2023: Colorado Co-Op Signs on for 1.2 TWh of Annual Renewable Energy
- January 24, 2023: As Gas Car Sales Drop, How Many Electric Vehicles Did Colorado Buy in 2022? A Lot.
- January 19, 2023: Duke Acquires 175 MW Colorado Municipal Utility Solar Project

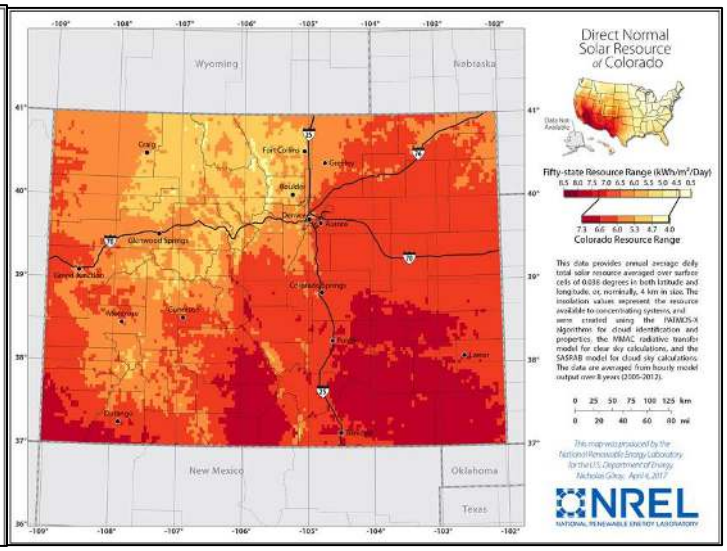
OTHER RESOURCES

- Colorado Energy Office: https://www.colorado.gov/energyoffice
- The American Council for an Energy-Efficient Economy State and Local Policy Database, Colorado: https://database.aceee.org/state/colorado
- The Database of State Incentives for Renewables and Efficiency, Colorado: http://programs.dsireusa.org/system/program?fromSir=0&state=CO
- U.S. Department of Energy's Alternative Fuels Data Center, Colorado: https://www.afdc.energy.gov/states/co
- U.S. Energy Information Administration, Colorado: https://www.eia.gov/state/?sid=CO
- American Clean Power Association, Colorado State Fact Sheet: https://cleanpower.org/facts/state-fact-sheets/
- SPOT for Clean Energy, Colorado: https://spotforcleanenergy.org/state/colorado/

COLORADO'S WIND AND SOLAR RESOURCES

WIND https://windexchange.energy.gov/states/co





Our Resources

CNEE Homepage: http://cnee.colostate.edu/

The SPOT for Clean Energy: https://spotforcleanenergy.org/

The Advanced Energy Legislation (AEL) Tracker: https://www.aeltracker.org/

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