

NEW COLORADO POLICIES TO ADVANCE BUILDING ELECTRIFICATION AND ENERGY EFFICIENCY WILL BOOST JOBS STATEWIDE

REPORT ANALYSIS | JUNE 2021

| EEBC MISSION

EEBC is a 501 (c)(6) nonprofit statewide trade association that represents and advocates for businesses that provide energy efficiency, demand response, and beneficial electrification, products, and services in Colorado. EEBC supports energy efficiency policies and programs that creates sustainable workforce, increases cost-effective energy, improves the environment and public health, uphold the standards for safety, quality, and professionalism in the energy efficiency industry.

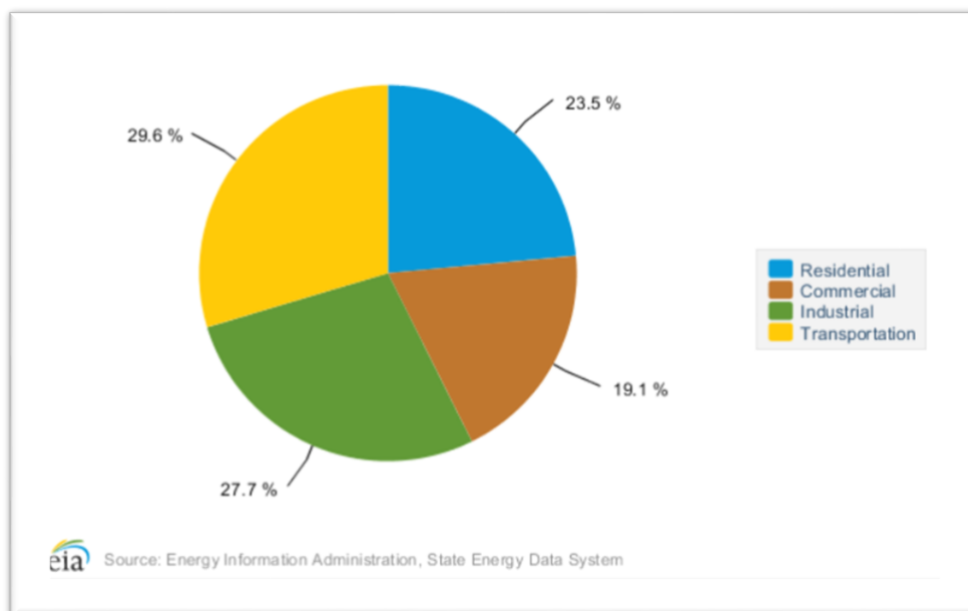
PATRICIA ROTHWELL, ENERGY EFFICIENCY BUSINESS COALITION
CONNIE M. NEUBER, ENERGY EFFICIENCY BUSINESS COALITION
IN CONJUNCTION WITH SOUTHWEST ENERGY EFFICIENCY PROJECT

NEW COLORADO LEGISLATIVE POLICIES TO ADVANCE BUILDING ELECTRIFICATION AND ENERGY EFFICIENCY HAVE POTENTIAL TO BOOST JOBS ACROSS COLORADO

The growing movement towards improving energy efficiency and electrifying buildings – spurred by pending legislation in Colorado – offers notable potential to add well-paying jobs in a variety of energy efficiency sectors across the state.

According to the Department of Energy, buildings are major users of energy, accounting for approximately 39% of the energy used in the U.S. and producing 35% of carbon emissions. In Colorado buildings use 43% of the energy consumed.¹

CHART 1. Colorado Energy Consumption by End-Use Sector [EIA]



Several bills introduced in the 2021 session of the Colorado General Assembly target the electrification of buildings and other ways to cut fossil use in homes and workplaces. The need for this transition often focuses on the critical urgency to cut greenhouse gas emissions. A new study found that completely switching Colorado’s homes and businesses to electricity by 2050 is expected to result in net emission reductions of 8 million metric tons of carbon dioxide – equivalent to taking 1.7 million passenger vehicles off the road.²

While it is of significant value to reduce the use of fossil fuels used in buildings to benefit Coloradan's health and environment, this transition will also hold opportunities for new jobs throughout the state. Thousands of energy efficiency jobs will be created across the value supply chain — including manufacturing, distributing, installing, and maintaining clean, energy-efficient electric appliances, furnaces, and water heaters—if we electrify and improve the energy efficiency of our buildings on a large scale.

Since 2016, the energy efficiency industry, the largest provider of energy jobs in Colorado, has seen impressive job growth of 21.3%. Energy efficiency jobs cannot be outsourced and are stable sources of employment in every county in Colorado.³

ENERGY EFFICIENCY IS THE LARGEST PROVIDER OF ENERGY JOBS IN COLORADO

As of 2019, Colorado had nearly **60,000 clean energy workers**, including more than **36,000 people working in energy efficiency jobs**. At that time, there were **6,416 energy efficiency businesses in Colorado**, an increase of 300 from the year before. These jobs contribute tax revenue to every county in Colorado and are not subject to the boom-and-bust cycles of some traditional energy jobs such as oil and gas production. The bulk of the companies specialize in construction and professional services.⁴ These businesses include members of the Energy Efficiency Business Coalition in the lighting, heating, ventilation, air conditioning, insulation, air sealing, renewable heating, and cooling industries.⁵

While last year the COVID-19 pandemic hurt businesses (and job prospects), pending legislation before the Colorado General Assembly would significantly boost employment opportunities in these fields. These bills all fall under the general theme of providing incentives for consumers and businesses to reduce fossil fuel use in buildings:

- SB21-246 [Electric Utility Promote Beneficial Electrification](#) will encourage the electrification of buildings through new utility incentive, market development and education programs.
- HB21-1238 [Public Utilities Commission Modernize Gas Utility Demand-side Management Standards](#) will expand the energy efficiency programs of gas utilities.
- HB21-1286 [Energy Performance for Buildings](#) will require energy benchmarking of larger commercial buildings as well as energy efficiency upgrades by poorly performing buildings.

PENDING LEGISLATION BEFORE THE COLORADO GENERAL ASSEMBLY HAS THE POTENTIAL TO BOOST EMPLOYMENT OPPORTUNITIES IN THESE FIELDS

Numerous job opportunities in the energy efficiency industry will be created as beneficial electrification accelerates in response to the adoption of SB21-246. Additional jobs will be supported if gas utility energy efficiency programs expand, and commercial building owners ramp up energy efficiency upgrades. The EEBC anticipates that **Colorado could add roughly 11,000 to 18,000 annual new potential jobs resulting from electrification of buildings as described further below.**

Providing education and incentives – like those enabled by SB21-246 – is critical to the growth of the energy efficiency industries as Colorado moves to electrify buildings. For example, heat pumps today represent a tiny fraction of replacement heating systems. The challenges of educating both contractors and consumers are enormous. Government and utility programs help unlock the growth of the market.

One of the other bills proposed in the Colorado legislature focuses on commercial buildings, which represent a big piece of the energy-saving opportunity. The Energy Performance for Buildings Act would require buildings greater than 50,000 square feet to measure and report their energy use in a standardized way, known as benchmarking. Then, building performance standards would ensure that less-efficient buildings become more efficient over time.

By implementing benchmarking and building performance standards throughout the state, Coloradans could save a cumulative \$3.5 billion on their energy bills over 10-years. Because Colorado has a C-PACE Financing Program,⁶ many energy efficiency upgrades can have no upfront costs and produce immediate savings to the building owners. Additionally, EEBC members like McKinstry provide financing programs called Energy Performance Contracting for efficiency and electrification projects. Financing like this applies to all high-performance products and services with both gas and electric technologies in buildings across Colorado.

JOB OPPORTUNITIES IN A CHANGING INDUSTRY

The transition is akin to consumers who upgrade their smartphones and computers from one version to the next – the construction and energy industries are upgrading their building technologies and advanced features for increased savings and comfort annually.

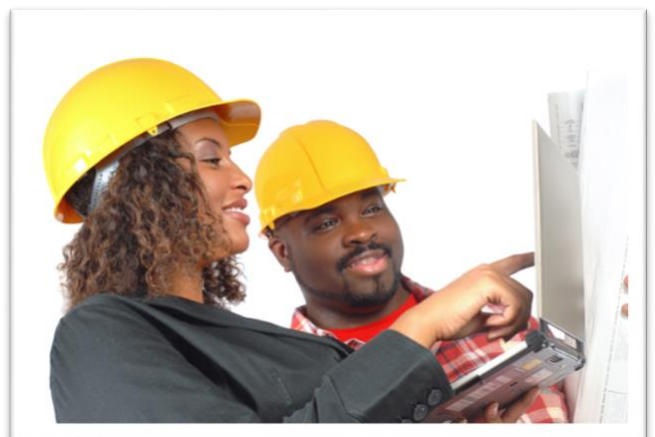
Besides traditional jobs in the building industry we now have more “green/clean jobs” – specialists with specific high-performance training such as for installing heat pump systems – and “clean/renewable jobs” – specialists in renewable energy systems. The energy efficiency workforce is agile, and workers can transition from technology to technology, but their skills are also transferable to other professions such as building code enforcement. In many cases, the workforce is ready to support the use of less energy and less fossil fuels, and ready to transition into a net zero energy future full of expanded job opportunities.

Table 1 displays the energy transition upgrades available for construction workers in Colorado that coincide with the building structure and technical transitions. The workforce will typically start in traditional minimum-code job of building construction and then advance in the science and technology of energy efficiency and high-performance building construction. This comes with increased knowledge and specialization such as installing higher performing insulation, efficient windows, LED lighting, high-efficiency HVAC equipment, and air sealing. All of these jobs are good careers in the construction industry.

The next step is training workers to transition buildings to highly-efficient electric systems – known as energy efficiency and beneficial electrification. **Table 2** shows the technical changes required for buildings and construction workers in Colorado to transition to swap gas or propane forced-air furnaces for all-electric high-efficiency air source heat pumps, swap gas water heaters for high-efficiency heat pump water heaters and employ other methods to reduce overall home energy use and increase building occupant comfort.

In new construction, a study by RMI compared homes that rely on gas for heating, water heating, and cooking with all-electric homes. The study found that over 15 years an all-electric new home in Denver would save \$2,900 in net present costs and 12 tons of CO₂ emissions.⁷

And finally, adding renewable energy brings buildings to their peak energy performance for Colorado. To forecast the potential jobs increase, it's helpful to think of a building as a “whole interrelated system” rather than separate parts. This is what the industry calls building science.



Beneficial electrification and benchmarking bills will create well-paying middle-class jobs for multiple individuals in the construction industry.

According to the U.S. Bureau of Labor Statistics, *May 2020 Occupational Employment and Wage Statistics*⁸ HVAC installers and service technicians earn a median salary of \$55,650 while service technicians for building appliances see a median salary of \$50,220. Electricians earn a median salary of \$56,300 while insulation installers earn \$34,470 annually.

While the median pay is a good middle-class salary, the potential for significantly higher salaries exists across the job categories. High-performing professionals in the construction industry in Colorado can earn much. For example, in the insulation industry, contractors self-reported high-performing installers for blown-in and spray foam air sealing and insulation products may earn between \$45,000 to \$100,000+ annually. HVAC contractors self-reported installer service technicians may make between \$55,000 to \$100,000+ annually. Salespersons in these fields may earn between \$65,000 to \$200,000+ annually.

ALTOGETHER, THIS BRINGS BUILDINGS TO THEIR PEAK ENERGY PERFORMANCE FOR COLORADO

OTHER STATES' EFFORTS AND COLORADO JOB GROWTH OPPORTUNITIES

Other states that are farther along in electrifying buildings have shown the potential. More than 100,000 full-time workers in the construction industry and up to 4,900 manufacturing workers will be required in California to electrify existing and new buildings by 2045 – a goal aligned with a 2018 Executive Order. Total building electrification in California could support between 64,200 and 104,000 net jobs annually, after accounting for job losses in the gas industry.⁹ California's population is about 40 million.

If California is any indication, Colorado's job growth in electrifying buildings can be expected to be impressive also. To value the benefit of electrification on job growth in Colorado, the EEBC reviewed California's projected potential job growth from electrification efforts, analyzed anecdotal information from other states, and applied similar ratios based on state population and average household size.¹⁰ **Taking into account Colorado's smaller population, our state's job growth in electrification could lead to about 9,400 to more than 15,000 jobs based on the trajectory projected in California and other states.** Colorado's population is about 5.9 million.

Additionally, because the average household size in Colorado is smaller than California, and since Colorado has 17% as many households as California, the job potential could be even higher from - 11,000 to 18,000 annual jobs.

Other states have proposed or implemented relatively aggressive efforts to support clean energy jobs. In New York, for example, the New York State Energy Research and Development Authority has dedicated \$100 million in funding to support the clean energy workforce. The program administers on-the-job training and has specific career pathways for high-efficiency heating, ventilation, and air conditioning (HVAC), and heat pumps.¹¹ New legislation introduced there this spring estimates 150,000 green jobs will be created and

sustained over the next 10-years funded through a program that would charge polluters a fee on carbon dioxide emissions.^{12 & 13}

In conjunction with the move toward heat pumps, efforts to make homes more energy efficient are important. The process of weatherizing homes reduces the heat needed in a building, allows for a smaller heating system to be installed, and makes it easier for a heat pump to supply a home's needs, even on cold days. State programs that require weatherization as part of heat pump programs include Vermont Zero Energy Now, Energize Connecticut Program, and the National Grid Rhode Island Program.¹⁴

PATHS IN ENERGY TRANSITION | CONSTRUCTION/ENERGY JOBS & BUILDINGS

Table 1. Jobs and Buildings in The Energy Transition [EEBC]

JOBS IN ENERGY TRANSITION	TRADITIONAL JOBS	GREEN JOBS	GREEN/CLEAN JOBS	RENEWABLE JOBS
HOME & BUILDING OWNER EXPERIENCE	A home/building with inconsistent temperatures, drafts, and no additional energy bill savings	Increased comfort and energy savings	Reduced indoor air pollution and carbon emissions in addition to increased comfort and energy savings	More fossil energy savings and potential to generate all the energy needed and even to send energy back to the utility grid
JOB TYPES & OPPORTUNITIES Workers can transition in either direction Over the last decade... many of the traditional construction jobs transitioned into higher code and energy efficiency practices During the next decade, with the 2021 pending legislation, these jobs will continue to evolve with higher building performance skills and practices	CODE CONSTRUCTION JOBS Traditional Construction Jobs in Home Building & Commercial Construction Fields New focus on energy codes began after 2006 Workers are trained to meet increasingly strict energy codes in construction practices	ENERGY EFFICIENCY CONSTRUCTION JOBS High Performance Building Jobs Called 'Green Building' With Gas Homes Jobs in adding comfort and lowering energy use to new and existing homes and businesses, and communicating energy savings to customers Jobs selling and installing energy efficient water and space heating [mechanical systems] and tightening the overall "shell/envelope" of a building to achieve specifications for Energy Star, LEED, Passive House, and Net Zero programs	BENEFICIAL ELECTRIFICATION CONSTRUCTION JOBS Jobs Transitioning from Gas To 'Clean Building' With Electric Mechanical Systems and Appliances Known as "Beneficial Electrification," jobs include swapping gas and propane systems and "right sizing" electric and mechanical systems Jobs include communicating the added value of energy savings, carbon footprint savings, and greenhouse gas reductions, and sales and installation of high efficiency ducted or ductless heat pumps	RENEWABLE ENERGY CONSTRUCTION JOBS Jobs Take Higher-Efficiency Buildings, Whether Gas or Electric, And 'Bolt On' Renewables Jobs designing and installing solar energy and backup storage battery systems Jobs installing electric vehicle charging infrastructure in homes, and commercial buildings Jobs making wind turbine and solar energy components in factories, building microgrids, etc.

Table 2. Jobs and Building Technical Changes [EEBC]

EVOLVING BUILDING STRUCTURE	CODE BUILDINGS	ENERGY EFFICIENCY BUILDINGS	BENEFICIAL ELECTRIFICATION BUILDINGS	RENEWABLE ENERGY BUILDINGS
<p>TECHNICAL CHANGES</p> <p>Buildings will use less fossil fuels, customers will have lower energy bills, increased comfort, and less impact on the environment during this transition to a Net Zero Energy Future</p> <p>The energy transition is shifting from an “environmentally” driven movement to a bottom-line cost reduction business decision by home and building owners</p>	<p>Buildings Continue to Meet Increasingly Strict Codes</p> <p>In 2006, the focus on energy codes became more prevalent</p> <p>ENERGY STAR for buildings and appliances became more widely known as a standard for energy efficiency in homes – building 10% better than code</p> <p>Building evaluations started with a baseline of the 2009 International Energy Conservation Code (IECC)</p>	<p>Buildings are Tighter Structures Using Less Energy</p> <p>Workers design and install advanced materials, technologies, and applied Building Science Principles, considering the “Building as a System”</p> <p>Workers use technologies such as added insulation above code, air sealing, water and space-heating, and high-performance mechanical systems</p> <p>Energy audits, smart thermostats, high-performance HVAC mechanicals, etc. are used to meet more stringent building energy codes</p> <p>Energy code standards increased in 2012, 2015, 2018 and 2021. The 2021 IECC code will provide approximately 10% greater energy efficiency relative to the 2018 model energy code</p>	<p>Buildings Include Electrical and Mechanical Systems that Work Together and with the Building</p> <p>In an electrified building, workers must consider the many aspects of the building as a system</p> <p>Jobs increasingly include computerized control systems and , electronic mechanical systems, which workers are trained to understand and manage</p>	<p>Buildings Built with Additional Technology that Increases Savings, Manages Energy Demand And Generates Clean Energy On-Site</p> <p>Installers of solar electric and solar thermal systems add energy-producing systems to buildings</p> <p>Jobs include working with other contractors to size equipment correctly</p> <p>Backup battery systems provide onsite energy storage to buildings</p> <p>Electric vehicle charging systems will require more electricians and energy</p> <p>Utilities implement “demand response” programs and “grid-connected buildings” that allow customers and/or the utility to manage energy demand</p>

COLORADO BUSINESS HIGHLIGHTS

Business Highlight | Heat Pumps/HVAC

For 30 years, Mike Missimer, president of MGI Mechanical Services, has been serving customers from Fort Collins to Denver, providing mechanical systems to buildings. Since last summer, Mike has seen a three-fold increase in heat pump installations. And, as consumer demand increases, he is focusing on this new part of the market.



“We still cater to the existing market,” Mike says, “but we’re really trying to promote heat pumps as a significantly better long-term investment for consumers.”

In an existing home, the key to both energy savings and job growth is to think of not just changing out some equipment but reducing the energy use and increasing the comfort of the home. Rather than employing one or two people to sell and install a new furnace, Mike sees the potential for more than 10 workers per home. For example, energy raters analyze the home’s energy use before work is started and then again after it’s done, he explains. An electrician is likely needed to upgrade circuits and panels. Insulators and air sealers can make the home air-tight and less leaky, which results in reduced energy requirements. New more efficient windows and lights are often cost-effective because they provide significant energy savings as well as improve comfort. Efficient all-electric appliances can further reduce energy bills. In many cases, rooftop solar makes financial sense to supply on-site energy to the appliances and mechanical equipment.

“We know from before-and-after auditing that energy savings of up to 50 percent are not unusual,” he notes. “All the fields need to grow,” Mike says. “Enhancing comfort by reducing energy use can be a big benefit for everybody.”

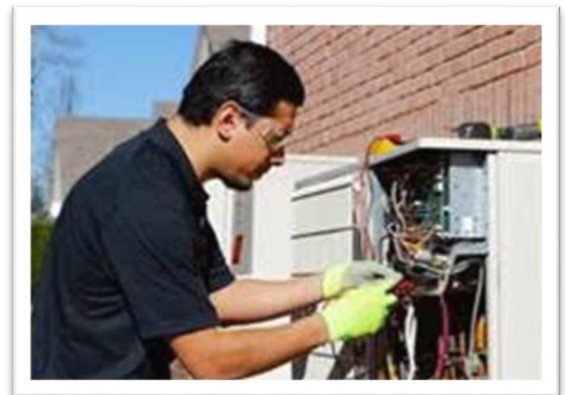
“THE MARKET SIZE IS AT LEAST 15 TIMES GREATER THAN BEFORE THE INCENTIVES”

Business Highlight | Heat Pump Only Business Findings

Jonathan Moscatello, owner of The Heat Pump Store/Mainstream Innovations in Portland, Oregon, has seen firsthand how incentives can drive the market as he watched his heat pump sales skyrocket after incentives in the northwest started in 2007. “There’s no doubt that rebates have helped drive our business, helped create awareness, and helped validate the technology as a viable choice for interested homeowners,” he says.

The market size now for modern variable-capacity heat pumps, like those sold by The Heat Pump Store, is at least 15 times greater than before incentives, Jonathan says, and he sells about 2,000 heat pumps per year. He predicts that with incentives, Colorado will follow suit. “Colorado is going to be a heat pump state because you have all the consumer preferences we have, can offer dual-fuel as a transition option, and you have an amenable climate as well as cold-climate heat pumps available for mountains,” Jonathan says. “Modern heat pumps do provide more comfort while spending less to get it.”

“Utility rebates and state-funded incentives do a great deal to raise awareness and support early adopters,” he noted. “After that, building codes and other regulatory devices are important ways to move the market.”



Business Highlight | Heat Pump/HVAC

Abram Conder, co-owner of Pueblo's Flow Right Plumbing Heating and Cooling which serves southern Colorado, has experienced how much utility programs like those enabled by SB21-246 can help. His electric co-op utility recently started offering incentives to help customers finance high-efficiency systems, including heat pumps. "It helps streamline the process and homeowners can do more," Conder explains. Customers can often cut their monthly payments for loans on high-efficiency home improvements to roughly what they are paying in utility bills. "It's a win-win for the customer," he says. "If you do solar, and then insulate your house and put in a heat pump, you are going to be heating and cooling your house for almost nothing."

Conder, who sells about 20 residential ducted heat pump systems and hundreds of ductless mini-split systems a year, notes there is a great deal more education needed to meet the potential of the technology. "You're talking about 99 percent of the market for potential growth," he says. "Every home has the potential for heat pump electrification."

**"UTILITY PROGRAMS ARE GREAT BECAUSE THEY HELP TO
MOVE THE MARKET, AND THE STRONGER THE REBATES,
THE MORE LIKELY CUSTOMERS ARE TO MOVE FORWARD
WITH ENERGY EFFICIENCY PROJECTS"**

Business Highlight | Lighting

Scot Kelley, sales director of Colorado Lighting, sees business opportunities from the legislation, especially by helping commercial building owners install more efficient lighting. He envisions consulting with owners on how they can comply with required efficiency upgrades helping them achieve their savings goals. Typically, that means replacing fluorescent and other older types of lighting with low-energy LEDs.

"It's not uncommon to see 50 percent energy savings resulting from more efficient lighting," Scot notes, "And, that translates into lower bills for building owners."

The growth in energy efficiency business driven by state policies has helped fuel Colorado Lighting's growth. When Scot Kelley started 17 years ago, Colorado Lighting had 20 employees, and he was the only salesperson. Today it has more than 100 employees with a sales team of 11.

"Utility programs are great because they help to move the market, and the stronger the rebates, the more likely customers are to move forward with energy efficiency projects," he says. "We're hopeful rebates can remain strong. There's a bright future for lighting and lighting controls. It's typically one of the lowest-hanging fruits."

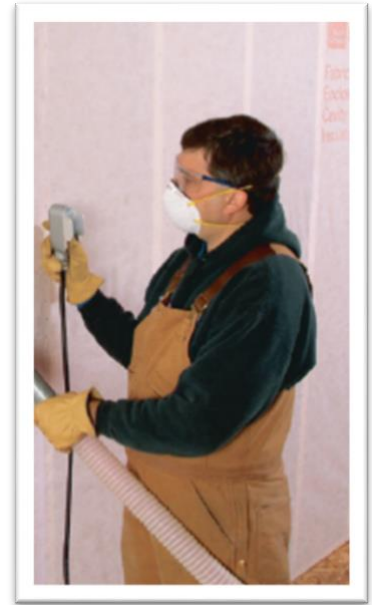


Business Highlight | Insulation and Air Sealing

Shawn Mullins of Owens Corning’s insulation division hopes that initiatives developed to encourage beneficial electrification and expand Demand Side Management programs will encourage broad participation. “We need to figure out how to reduce red tape and make it more market friendly and still have contractors be accountable,” Shawn says.

For example, if consumers could receive even a relatively small incentive to add to their existing insulation, such a program could lead to more participation. That would mean potentially larger energy savings for consumers and added revenue and jobs for contractors compared to more complex and limited programs.

Some insulation contractors forecast revenue increases of 15-20% from new DSM programs with such “cafeteria” style options, Shawn says.



Business Highlight | Insulation and Air Sealing

Debbie Weingardt, co-owner of Bestway Insulation, LLC, has been one of the foremost advocates for the importance of insulation as part of weatherization. Debbie traces the launch of Colorado's efficiency programs to her company's success in dramatically lowering the Governor's Mansion annual energy bills starting in 2008. That helped Bestway Insulation grow from two trucks to 12 trucks.

Today, Debbie is hoping the pending legislation such as HB12-1238 will lead to a renewed focus on insulation, particularly improving the efficiency of the building's walls. “We’ve got a long way to go,” she says. “Everyone says do the attic, but the walls give comfort to the house, so those are important too.”

At the same time, she notes that quality control is important as work grows. That is likely to mean more work for energy auditors and raters, as well as installers and other industry jobs. Asked what effect the pending legislation might have on her business, she responded, “Quadruple – maybe even more.”



SUMMARY

Enacting new policies to accelerate energy efficiency and beneficial electrification in Colorado’s homes and workplaces will potentially add well-paying jobs and new work opportunities for Coloradans. As of 2019, Colorado had nearly **60,000 clean energy workers**, including more than **36,000 people working in energy efficiency jobs**. New policies to accelerate electrification efforts in buildings could **roughly add an additional 11,000 to 18,000 potential jobs over time**.

Jobs improving energy efficiency and electrifying buildings are well-paying, skilled jobs in areas ranging from sales to building energy assessments to installation of heat pumps, insulation and air sealing measures, LED lighting and building energy management and control systems.

Furthermore, the jobs are expected to occur in every county across the state in Colorado and not be subject to boom and bust cycles that occur in oil and gas production. Thus, the suite of energy efficiency and electrification policies under consideration by the Colorado legislature in 2021 should be viewed as jobs policies and building improvement, in addition to climate policies.



¹ Energy Information Administration (EIA), [State Energy Consumption: Colorado](#)

² COPIRG, [Electric Buildings: Repowering Homes and Businesses for Our Health and Environment](#)

³ E4, [Energy Efficiency Jobs in America 2020](#)

⁴ E4, [Energy Efficiency Jobs in America 2020](#)

⁵ E2, [Clean Jobs Colorado 2019 - 59,666 Clean Energy Jobs in Colorado](#)

⁶ Colorado Energy Office, [Colorado Commercial Property Assessed Clean Energy \(C-PACE\)](#)

⁷ RMI, [The New Economics of Electrifying Building](#)

⁸ U.S. Bureau of Labor Statistics, [Occupational Employment and Wage Statistics: Colorado](#)

⁹ UCLA Luskin Center for Innovation (LCI), [California Building Decarbonization-Executive Summary](#)

¹⁰ The job estimates found in the [New Colorado Policies To Advance Building Electrification And Energy Efficiency Will Boost Jobs Statewide](#) Report Analysis are based on footnote⁹, the above study of potential new jobs from growth in electrification of buildings in California.

¹¹ Northeast Energy Efficiency Partnerships, [Policy Tracker: April 2021 – Workforce and Equity](#)

¹² New York State Energy Research and Development Authority, [Clean Energy Workforce](#)

¹³ New York State Senate Bill, [S4264A Climate and Community Investment Act](#)

¹⁴ American Council for an Energy-Efficient Economy, [Programs to Electrify Space Heating In Homes and Buildings Brief](#)