

BIG PIVOTS

ENERGY and WATER transitions in Colorado and beyond

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After the big fire, questions about cost of rebuilding

by Allen Best

A remarkable discussion has been underway since the Marshall Fire in Boulder County about how to rebuild.

The conversation has seesawed on the question of costs, the short term vs. the long term. Really, the question revolves around the viability and cost-effectiveness of existing building technology that does not rely directly upon fossil fuels.

Colorado has been having this conversation quietly in small circles for over a decade: the GEOS project in Arvada, the Westminster residence whose owner several years ago stubbed his natural gas line; and the two lower-income housing projects in Basalt that have no natural gas.

Last year, Colorado legislators began nudging the conversation along with new laws that tilt the table, some would say level the field, to recognize the long-term costs of natural gas use in homes. More legislation is being considered that is explained later in this issue.

The Marshall Fire had put some of these same questions about costs and change front and center.

Louisville, being among Colorado's most progressive municipalities, had adopted the 2021 iteration of the International Energy Conservation Code. This code represents a 9% gain in energy efficiency over the code adopted in 2018.

Building codes in the 21st century have become ever-more attentive to energy efficiency. The 2018 code represents a 51% gain over the last few decades, including the codes which houses were required to meet in the early 1990s, when most of the 1,000 homes lost in the Marshall Fire were constructed.

The newest code also envisions a future in which electricity will displace some existing uses of fossil fuels, requiring higher

standards of wiring for charging electric vehicles and air-source heat pumps. That extra wiring does bump up the costs.

At issue is the cost of building to this latest code vs. the 2018 code. That is relevant in that many of the homes lost in the fire were underinsured.

Superior decided that those rebuilding need only meet the 2018 code. A majority of city council members in Louisville, in a meeting this past week, indicated that they also intend to allow those who lost homes to revert back to the older code.

Just how much more would it cost to build to the 2021 code? City officials sought

Conversation in Louisville about exactly what can and should be done for the

the aid of builders, and others. The estimates range widely, between \$5,000 and \$75,000. The lowest cost estimate comes from the Southwest Energy Efficiency Project, and the latter for a 2,400-square-foot house by the Home Builders Association of Metro Denver.

The city staff report settled on an estimate of \$20,000.

As [reported by the Boulder Reporting Lab](#), some at last week's meeting of the Louisville City Council said they want to be sustainable—but it just costs too much. Others, including at least one council member who lost her home, want to stay the course with the 2021 code. That homeless council member, Deborah Fahey, said she believes the incentives and rebates will cover the added cost.

Those incentives are remarkable. Xcel Energy offers one-time incentives ranging from \$10,000 to \$37,500, the latter built to Passive House standards. A solar developer, SunShare, quickly engineered plans to dedicate a 5-megawatt community solar garden for use of those rebuilding. This allows homebuilders to lower their scores of HERS, a rating system designed to reflect emissions. The lower the rating, the fewer the emissions. This would replace the higher cost of on-roof solar.

State Rep. Tracey Bennett, whose district includes Louisville, believes that building back with reduced emissions won't be that difficult. "You have to know how to do it, but it's not necessarily any more expensive," she says citing the consultations with green builders, including testimony last week to the Louisville City Council.

One option in building back is to eliminate natural gas hook-ups. Air-source heat pump technology has arrived. It's more expensive than a natural gas furnace, but the fuel—electricity, derived increasingly from renewable sources—will be much cheaper over the long haul. Also interesting is how the social cost of carbon has entered such discussions. All

electric technology will within a few years largely displace fossil fuels from homes as the electric grid becomes much more dependent on renewables. Looking at continued burning of natural gas through the lens of the social cost of carbon would add \$3,210 over 15 years to a home burning natural gas.

Beyond the social cost of carbon, there is the cost of carbon itself. Natural gas has been cheap for more than a decade, but prices have been rising. There are no assurances they will drop again.

"The thing that gets lost in the conversation is if you are not dependent upon natural gas, that really affects your long-term energy costs," says Bennett.

That was also the testimony last week of Andrew Michler principal of [Hyperlocal Workshop](#), a design firm in Colorado dedicated to Passive House construction, the type that milks energy out of the sun. His bottom-line message in a 90-minute workshop last week sponsored by the Colorado Renewable Energy Society is that it need not cost more, but you do have to think harder.

"Production builders have pretty much fought all code improvements in my experience over the last 25 years," he said. Building codes are minimums—not what can be done, he emphasized, although maximizing benefits does require rigorous thinking.

The irony of the Boulder County discussion is that this wildfire that consumed more than 1,000 houses did have something to do with climate change. It was admittedly at the edges, hard to pick out from the confluence of events that resulted in a fire-ripe environment in December. That shifting climate is a major reason for these advances in technology, for the revised building codes.

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Why exactly did these Delta County officials nix this solar project?

Story/photos by Allen Best

The central question in a story out of Colorado's Delta County is what exactly were the two commissioners thinking when they voted to deny a permit for a 472-acre solar farm?

Reports in the Montrose Daily Press and the Delta County Independent, two jointly owned newspapers, offer only the thinnest of explanations why the commissioners, in a 2-1 vote, denied a permit for the solar farm proposed by Guzman Energy and Delta-Montrose Electric.

The 80-megawatt solar farm, said Commissioners Mike Lane and Wendell Koontz, would cause loss of agricultural

An early adopter in the energy transition also clings stubbornly to the past

A rendering of what drivers on Garnett Mesa near Delta would see from the proposed solar farm.

land and was incompatible with existing uses.

The third commissioner, Don Suppes, [told the Daily Press](#) that he was "apprehensive about the precedent that we've set here." He cited private property rights.

"In an attempt to save farm ground, we have to be careful that we are not dooming a farmer to maintain an operation that they cannot afford to operate anymore," he said.

This may be the first solar project in Colorado rejected on the basis of lost agricultural productivity. Proposed solar projects have run afoul of local sensibilities, including in Pueblo County, but on the issue of aesthetics. An installation was also rejected in Park County because of impacts to pronghorn.

"I'm dumbstruck," said one Delta County resident, who was among several

local residents consulted for this story on the promise of confidentiality.

Another local resident, Natasha Léger, executive director of Paonia-based [Citizens for Healthy Community](#), was willing to speak on the record, and she had the same reaction: “I’m frankly flabbergasted.”

On the simple basis of economics, she pointed out, the solar project would have been a huge win for Delta County. The land now used for cattle grazing yields \$3,000 a year in property taxes for Delta County and its various taxing districts. Over the space of 15 years, that will be \$45,000.

That compares with \$13 million during the same time if the land became covered with thousands of solar panels.

The commissioners, said Léger, did not talk at all about the economics, nor did they cite specifics about how this conflicted with the Delta County land-use code that was adopted in early 2021, the county’s first. Quasi-judicial bodies, when making decisions, must cite the specific conflicts with such plans, she points out.

Adding further perplexity to the story is that Guzman Energy, who would have purchased the power through a power-purchase agreement from the developer, proposed to continue to use the land for agriculture, working out a deal to graze sheep on the parcels. The soil at the

location on Garnet Mesa, about three miles east of downtown Delta, is not particularly fertile and hence ill-suited for corn or other row crops.

A final noteworthy fact is that the land in question is located near an existing electrical substation—and a quarter of the electricity produced by the solar farm would have been sold to the local electrical cooperative, Delta-Montrose Electric, supplying about 20% of the demand in Delta and Montrose counties. It would have supplied enough electricity annually to meet needs of 18,000 homes.

Delta County is a place that at times is among the most forward-looking enclaves in the Rocky Mountains and, at other times, a place that lags.

Consider building codes. The county itself has no building code, although the towns within the county do. Meetings are not broadcast live, unlike most places, although audio recordings are made. They can only be accessed through request of the county clerk. It didn’t have a land-use code until the beginning of 2021.

Agriculture, mostly corn and forage crops for livestock, dominates along the Gunnison and Uncompahgre rivers. In the North Fork Valley east of Delta there are apple, pear, and other orchards around the towns of Hotchkiss and Paonia and a growing number of specialty farms, including those dedicated to organic methods. Some of the orchardists, such as Steve Ela, travel every weekend during summer and fall to Colorado’s Front Range to sell their fruit at farmers’ markets.

Coal used to be a major part of the county’s DNA. Several mines operated near the hamlet of Somerset, a few miles from Paonia. In the last



Downtown Delta, September 2021.



Corn near Delta being harvested for silage, September 2017.

decade, most mines have closed, leaving just one still operating.

Even as coal miners have left, others have arrived, creating a boom in real estate that has roughly tripled prices in just a few years. The prices are not those of Steamboat Springs or Durango, let alone Vail or Aspen, but for a place with mountain skylines, it's hard to beat.

That's another way of saying it lacks the wealth of mountain resorts or Front Range communities.

The [2020 census](#) found that the median family income in Delta County was \$51,539. Along the I-70 corridor, Garfield County (think Glenwood Springs) was \$57,022 and Eagle County (think Vail) was \$74,456.

Along the Front Range it was \$58,628 in Larimer County (Fort Collins and Loveland) and \$57,125 in EL Paso (Colorado Springs).

Lacking great wealth, there tends to be an attitude of grow-your-own and self-sufficiency in Delta County.

That was one of the motivations for Delta-Montrose Electric, the local electrical

cooperative, to break with its wholesale supplier, Tri-State Generation and Transmission. Tri-State in 2005 wanted Delta-Montrose and other member cooperatives to commit to their all-requirements contracts until 2050 so that Tri-State could build a new coal-fired power plant in Kansas. Delta-Montrose refused the 10-year extension, the start of frictions with Tri-State that ultimately resulted in Delta-Montrose paying \$63 million to buy out its contract with Tri-State in 2020.

Denver-based Guzman Energy, a relatively new firm created to take advantage of opportunities in the pivot to renewable energy, immediately replaced Tri-State as the wholesale supplier. It offered a new model, one demonstrated with its first major client, Kit Carson Electric.

Kit Carson, also a cooperative, in 2006 had similarly rejected Tri-State's vision of coal-burning electricity far into the 21st century.

It broke with Tri-State in 2016, and expects to have paid off its \$37 million exit



Paonia, one of four towns in Delta County, has become more interesting as it has also become less affordable in recent years.

fee this summer while almost simultaneously completing enough solar farms across its service territory in northern New Mexico to meet the daytime needs of its members.

Guzman offered a similar pathway for Delta-Montrose. This solar farm near Delta was going to be the first major step in creating home-grown energy. Guzman would own the power but sell it for the next 15 years to Delta-Montrose in a power-purchase agreement, a common business practice that allows private companies to recoup federal tax credits.

The project jibed with the land-use plan for Delta County. The planning staff recommended approval. Planning commissioners were more skeptical but were persuaded by the win-win described by representatives of Guzman and Delta-Montrose. That body in a 6-2 vote recommended approval.

A key feature of the proposal was the concept called agrivoltaics. The idea, demonstrated at [Jack's Solar Garden](#)

near Longmont, is that agricultural production can continue on land, sometimes with the added benefit of solar panels. Corn does not benefit from more shade, but potatoes do. So, perhaps, can some grazing animals. Ever notice grazing cattle gathered in the shade of a tree on a hot summer day?

This was cited by Suppes, the commissioner who voted for the project. "They were going to graze sheep underneath," he told the Daily Press. "This isn't row crop agriculture, like sweet corn or green beans or onions or whatever. This is a different type of agriculture, but grazing is an incredibly important part of agriculture in Delta County," he said.

"To me, this isn't necessarily about solar power. This is about multiple uses of land."

Why did the two county commissioners reject the proposal? There had been testimony from neighbors who objected to seeing the solar panels. But then, those knowledgeable with the area say this is not exactly a place governed by the mow-your-

lawn-weekly covenants of a home-owners' association.

Others wonder if the backgrounds of the two commissioners influenced their votes.

Wendell Koontz is a geologist who worked for a now-shuttered coal mine near Paonia. Mike Lane, the other commissioner voting no, grew up in Delta County, ending his work in the private sector with 9 years as a Halliburton employee.

Their vote was exceptional, say courthouse observers, in that nearly all cases in the last 20 years the votes of commissioners have been unanimous.



The Montrose Daily Press talked with Bill Patterson, a board member of Delta-Montrose Electric, who said the vote was “kind of a kick in the teeth.” The cooperative and Guzman issued a joint statement that emphasized the economics as well as the benefits to the local electrical grid.

In an interview the day after the vote, Robin Lunt, chief strategy officer for Guzman, said she remained hopeful that a solution could be found but she did not elaborate on the options.

Closely watching the solar application was JoAnn Kalenak, who several years ago began publishing the [Delta County Citizen Report](#) after 18 years with High Country News. She sees Delta County's elected officials painting themselves into a corner. What specifically about this proposal violated the land-use code that is supposed to be guiding such decisions?

A test case may be a proposal for a concrete batch plant in the same area. Will the commissioners also nix that because of incompatibility with previous uses?

The bigger, broader issue is what is the future for agriculture in Delta County? As the one commissioner said, if a farmer can't sell but to another farmer, what are the real options? And that calls into question the future of agriculture. Can the same level of agriculture be sustained in coming decades? Commissioners have approved large chicken-farming operations of 15,000 to 25,000 chickens. What about a few thousand solar panels with 600 or 700 head of sheep?

Climate change, a topic broached carefully if at all in Delta County, is the background issue that Kalenak sees. If temperatures across

Colorado have been rising across the Southwest, a band across western Colorado stands out as super-charged heating. That may have to do with the reduced water flows. It most certainly has in the Colorado River Basin altogether, as has been established by climate scientists, including a new report published in February in Nature Climate Change.

That shifting climate may also have something to do with the so-so water flows of recent years. Runoffs have trended downwards.

“Because of climate change, ranchers (and farmers) need the ability to get innovative on their land,” says Kalenak.

And that then poses the question of what change can be accepted?

Bob Kalenak, JoAnn's husband and a board member for the non-profit Delta County Citizen Report, sees a county that is fundamentally stuck. The county engineer for 13 years, he sees elected officials afraid of change. The solar farm represented change.

“This was a pretty much no-impact operation, but it scared them,” he says.



How legislators are trying to fill in the gaps of Colorado’s decarbonizing map

by Allen Best

Conventional wisdom holds that politicians shy away from major initiatives in election years. Some think that is at play in Colorado this year. After all, inflation is at work, energy prices are rising, and analysts predict a rough election year for Democrats in Congress.

But if Colorado’s 2022 climate and energy legislative agenda certainly won’t match that of 2019, nor of 2021, it’s shaping up as an impressive year to advance the work on achieving economy-wide decarbonization goals of 50% by 2030 and 90% by 2050.

“This is probably not going to be a session filled with transformation legislation on climate change as 2019 and 2021 were,

but there are some really good bills,” says Jacob Smith executive director of Colorado Communities for Climate Action, a coalition of 40 local governments.

Legislators are considering bills that seek to advance Colorado’s efforts to reduce emissions associated with buildings, clean up the crappy air quality along the northern Front Range, and bring the agriculture sector into the decarbonization effort.

Others address microgrids, the potential for carbon storage, and funding for the state’s Office of Just Transition, the agency crafted in 2019 for coal communities and workers to reinvent themselves.

Legislators in 2019 adopted a remarkable set of bills that essentially pivoted Colorado’s energy system in a way that had never been done. Most prominent were the economy wide decarbonization goals.

Only 2004, when Colorado voters adopted the first renewable energy portfolio standard, comes close to the same pivot in energy.

The 2019 tsunami was made possible by heightened worries about climate change but also a shift in the Colorado Senate that gave Democrats majorities in both chambers. This came concurrently with the arrival of Jared Polis as governor after his campaign on a platform of 100% renewable electricity by 2040.

Then came 2020—and the covid shutdown, followed by the flood of even more powerful bills in 2021, including several that targeted methane from extraction to end-use in buildings. At least one of the ideas adopted in 2021 had been first proposed in 2007 but never got close to the finish line.

Now is catch-up time, a filling in of the gaps.

“Last year we essentially had two legislative sessions in one, and we accomplished a lot, and now we need to work on the implementation of it,” says Mike Kruger, chief executive of Colorado Solar and Storage Association. “That won’t require as much legislation,” he points out. “That’s more regulatory work.”

Still, even as they waited the governor’s signature on many of the 30-plus bills that had been passed, state legislators indicated they knew there was still major work ahead. State Sen. Steve Feinberg, then the majority leader (and now the Senate president), said a major priority in the 2022 session would be legislation to improve air quality along the Front Range. Sen. Chris Hansen said he was thinking about how to integrate agriculture into Colorado’s decarbonization.

In September, Hansen revealed at a fundraiser that he intended to introduce legislation that would set interim decarbonization targets for Colorado. Those new targets—for 2028 and for 2040—are intended to create a steady trajectory for Colorado’s decarbonization efforts, to avoid the tendency to punt the decarbonization can down the road until a last-night cram session before the test.

When did Hansen decide this was needed?

“I think it was part of what I do essentially every summer and fall, which is really try to think about the important gaps, where they are and which ones, if you were to address them, you’d get the most bang for the buck when it comes to decarbonization,” said Hansen in an interview.

“So I’m always trying to think about that supply curve, of carbon abatement opportunities, let’s do the cheapest, easiest ones as fast as we can. And that is really kind of driving my policy development process.”

Meanwhile, in Boulder, State Rep. Edie Hooton was thinking about microgrids, and in Longmont, Rep. Tracey Bennett was thinking about both air quality and buildings.

This week, the bills having to do with buildings. Next week, air quality, agriculture and other bills.

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Nipping emissions from buildings the Colorado way: carrots and sticks

Several bills this year attempt to build on last year's impressive efforts to start trimming emissions from buildings.

The [Colorado Greenhouse Gas Pollution Reduction Roadmap](#) adopted in early 2021 identifies buildings as the fourth-largest sector for emissions in Colorado. What it does not say, in quite so many words, is that the building sector almost certainly will be more difficult to pivot than electrical generation, transportation, and the oil-and-gas sector.

Unlike cars, we don't trade in buildings very often. And unlike coal plants, of which there are just a handful, we have hundreds of thousands of buildings.

The fuel-switching also is more problematic. Coal has become very expensive compared to renewables. The economics in the pivot from natural gas consumed in buildings isn't as immediately persuasive.

The easiest pivot is done at the front-end, in the 30,000 or more new buildings constructed each year. Several bills being considered or proposed recognize this.

Existing buildings are more difficult and expensive to retrofit, but the bills also provide incentives for that task.

An aside: My house was built in 1889 during a time of horses and buggies. When I bought it in the late 1990s, it had little more than newspapers in the walls for insulation. Attic insulation was probably R-9. (It's now R-60, although the windows are still R-1—no badges of honor for me). I have a 96% efficient natural gas furnace, but it took some talking to get the company to understand I really was willing to pay more than the off-the-shelf 85% efficiency model. That was about 12 years ago.

This pivoting of buildings is going to be really hard work. It will take a long time.

Colorado's decarbonization roadmap notes that the target adopted in 2019 for full decarbonization by 2050 is based on a large-scale shift to the use of electric heat pumps, powered by zero-carbon electricity, for space and water heating. "There may be other pathways, depending on technological developments, which is why the near-term actions support a wide variety of strategies for the buildings sector," the roadmap says.

This thinking was the foundation for the laws passed in 2021, and the proposals being readied in 2022 push them along. As

has been a theme, there are both carrots and sticks, pushes and pulls, what Democratic legislators like to call “the Colorado way.”

SB22-051

Heat pumps and more

Carrots are most evident in [SB22-051: Policies to Reduce Emissions from Built Environment](#). The bill is sponsored by Sen. Chris Hansen and Rep. Emily Sirota, both Democrats from Denver. The bill provides tax incentives to encourage low-emission building products in the private sector and to advance the adoption of heat-pump technology.

Building materials

The building materials component builds on a 2021 law, [HB21-1303: Global Warming Potential for Public Project Materials](#), also known as “Buy Clean Colorado.” That law requires the state architect and the state’s transportation department to establish maximum global warming potential for asphalt, steel, cement, glass, and other materials used in state buildings and roads.

This bill extends that nudge to the private sector. Instead of mandating their use, however, it proposes sales and use tax incentives for purchases of those materials found to be eligible by the Office of the



State Architect. The tax incentives would take effect July 1, 2024, after the state architect has completed the work of inventorying the emissions embodied in building materials.

Heat pumps

Adoption of heat pumps would also be encouraged by the tax incentives offered in the bill. This technology will likely be the most important single piece of technology in Colorado’s decarbonization of buildings. The heat pumps must have the capacity to achieve 80% of the heating or cooling needs of a building.

The carrots come in the sales and income tax breaks for purchases of air-source, ground-source heat pumps, and heat-pump water heaters used in commercial and residential buildings. The bill also provides tax breaks for residential energy storage systems. The mechanism for handling tax credits to purchasers is modeled on what is used for purchase of electric vehicles.

Heat pumps come in several applications: air, ground, and water. All use electricity to extract and move heat from one place to another, both buildings and water.

In the case of air pumps, they milk the heat in the exterior air to warm a building. Ground-source heat pumps require coils buried in the ground 6 to 10 feet below where the temperature is a relatively constant 55 degrees. The same concept can be applied to water, whether ponds, lakes or rivers, as the water near the bottom of the pond will be far warmer than that at the surface.

The same technology can work in reverse, too, cooling buildings during summer. In both cases, heating and cooling, the electricity is used to move the heat (or coolness) and crunch it, so to speak. That’s why the heat pumps can extract heat from 55-

degree air to warm a building to 70 degrees. Or draw coolness out of 90-degree outdoor temperature to cool a house to 70.

“I think there's a huge upside in Colorado for heat-pump technology. We need to electrify home heating and cooling to reach our decarbonization goals as a state. That is very clear from all of the credible analysis that's out there,” said Hansen in a Feb. 24 interview.

“The current state of heat-pump technology is very good and improving. For the towns along the Front Range—Denver metro, Pueblo, Colorado Springs, Fort Collins—the technology works very well. Now, when you get to higher elevations with colder snaps in the winter, you may need some backup heating. That's fine, that technology already exists. And that's really what we're trying to do with the bill is allow flexibility to get the right system in the right place, to electrify heating, cooling services as fast as we can.”

In its first legislative review on Feb. 8, in the Senate Transportation and Energy Committee, witnesses from the Natural Resources Defense Council, the Colorado Coalition for a Livable Climate, and other organizations said the tax incentives would chip away at the existing price disparity. The technology exists but the market has yet to catch up, they said.

The Colorado Rural Electric Association also blessed the bill on behalf of the state's

22 electrical cooperatives, some of whom also offer incentives for heat pumps, said corporate counsel Tim Coleman. Gary Arnold, of the Denver Pipefitters union, also endorsed it at a later committee hearing.

Hansen, responding to a question from Sen. Rachel Zenzinger, said his research had shown that this technology had the greatest bang for the buck. “There's just a massive payback for these heat-pump systems,” Hansen answered.

Natural gas furnaces, though, require natural gas pipelines. Extending those lines to homes in new subdivisions costs an average \$2,400 per housing unit, said Brad Smith, the city of Fort Collins project manager for building energy codes, in a January webinar.

“The majority of Colorado's population lives along the Front Range, which mostly lies within climate zone 5,” he explained in the webinar sponsored by the Northern Colorado Renewable Energy Society chapter. “In that zone the lowest temperatures are likely to be between zero and 10 degrees Fahrenheit. Most air-source heat pumps can handle temperatures—with diminished effectiveness—to even lower temperatures.”

Standard gas furnaces and heat pumps have comparable lifespans.

Mike Missimer, president of MGI Mechanical Services, who spoke on the same webinar, says that heat pumps, if

more costly, can be a great alternative to traditional gas furnaces because of lower energy costs over time.

“When comparing the cost of a gas furnaces vs. an air-source heat pump, you really need to compare the heat pump system with a gas furnace with air conditioning, because they have similar components,” he says.

Missimer advises that heat pumps are best in new construction. They have specific



Basalt Vista began using air-source heat pump technology in 2018.

requirements that may not work well with existing duct or electrical system. gas-fueled furnaces.

Heat pumps, though, are the technology of the future in most buildings, he says.

A final benefit that Hansen outlines is the potential for the technology to dovetail with Colorado's renewable energy production. "Right now we curtail about 7% of the wind turbines in the state, because there is no place for that electricity to go," he said. The bill, he told Senate Finance Committee members, will enable that electricity to be deployed to homes and businesses for storage or for use when the production of electricity would otherwise be curtailed.

Because of the rebated sales and income taxes, Colorado would come up short of \$7.4 million a year by fiscal year 2024-25, according to a Feb. 28 staff memo from the Legislative Council. The report projects a slow growth in acquisition of the technology to 5,415 air-source units in '23-24. This assumes an average price of \$6,000 for air source heat pumps, \$20,000 for ground-source heat pumps, and \$3,000 for heat-pump water heaters.

Opening the door to energy services

This Hansen-Sirota bill has yet another provision that might actually be the most powerful. It would allow utilities regulated by the Public Utilities Commission to ask commissioners to be allowed to offer energy services. This would be unlike the current model, where their income is derived from sales of commodities as measured in BTUs of natural gas or kilowatt-hours of electricity. Instead of selling gas to be burned, the utility would sell heat.

Amory Lovins, co-founder of the Rocky Mountain Institute, decades ago talked about energy services. His famous example was that you really don't care what it took to make your beer cold, only that it's cold.

Hansen said he has talked about this concept with Lovins many times.

In this case, it could allow utilities to explore a new business model where they provide heating and cooling services, not electricity or natural gas. This would open the door for utilities to offer district service, such as for apartment buildings, commercial buildings, or even residential districts. They could, for example, have a field of heat pumps.

Hansen cites the example of the steam that Xcel Energy delivers to large commercial buildings in downtown Denver. "Imagine a similar sort of setup where you've got hot and cold loops that are being controlled by heat pumps," he told Big Pivots. "And you can get the hot or the cold services to the building or facilities at whatever level that is needed.

"That's a great business model for something like utilities because you get this big capital investment that they can amortize over the service life. I think that holds a huge promise for the state of Colorado."

Hansen's bill cleared its first two committee hurdles, the first the Senate Transportation Committee by a somewhat surprising unanimous 7-0 vote and then the Senate Finance Committee 5-0.

"I think there is a fair amount of consensus across the political spectrum that whenever you have a chance to do something better, cheaper, faster, then let's do it," said Hansen. "And I think that's what we're looking at with this technology."

HB22-????:

Three levels of building codes

Another bill, which still has not been introduced (hence the questions marks), is coming from Rep. Tracey Bernett, a Democrat from Longmont now in her second legislative year, and likely others. She promises introduction of the bill yet in March.

It's an ambitious three-tiered proposal to use building codes during the coming decade to tamp down emissions. The bill will have three major components.

Staying current on building codes

The first will ratchet up adoption of the most recent building energy codes issued by the International Code Council by towns, cities, and counties that have building codes (some jurisdictions are too small to have building departments). Those codes are updated every three years. In the 21st century, they have dramatically increased energy efficiency requirements about 50%. That includes a 9% improvement in the most recent iteration of the International Building Code that became effective in 2021.

Current law requires local jurisdictions to adopt one of the last three codes that has been revised during the previous nine years. This bill would require jurisdictions to adopt at least the 2021 version by the year 2025 and incorporate recent advances such as the 240-volt wiring needed to accommodate heat pumps and charging of electric vehicles. They're the sorts of things that would be very expensive to do if you had to call an electrician later. Building codes commonly apply just to new homes being constructed and to remodels.

Net-zero by 2030

The second element requires local jurisdictions to achieve net-zero emissions standards for buildings by 2030. The Colorado Energy Office would be instructed to develop a model, using the existing national codes as a platform, so that each jurisdiction would not have to do so on their own.

Bernett says there will be choices. Buildings don't have to be completely absent natural gas. Mixed-fuel buildings will be possible. But residents, builders, and developers will have to think through how they are going to achieve net-zero. "This is

the Colorado way of doing things," said Bernett in a January interview.

"If I were a resident building a new house, I would want my builder or developer to be forward thinking because the lifecycle costs of an all-electric building are less than that of natural gas. The upfront costs are a little bit more to put in an air-source heat pump, but the savings over the life cycle you get back in (saved) energy costs," said Bernett, an engineer by profession.

The challenge in shaping the bill, says Will Toor, executive director of the Colorado Energy Office, was to make sure it remains truly focused on energy and carbon performance as opposed to identifying favored technologies.

"This bill would have a pathway for both buildings heated by natural gas and by electricity. It is designed to have performance standards that need to be met regardless of whether it's dual-fuel gas-electric or an all-electric building," he says.

To meet net-zero, a house might require a larger solar system or perhaps other approaches that reduce emissions. Bottom line is net zero, however that is achieved.

A stretch green code

Can't get better than net-zero? Think again. This bill also proposes a third level, once again to be developed by the Colorado Energy office. This green stretch code is to go beyond energy, to consider things like water, air quality, and sustainable building materials.

The thinking is that this stretch code can be adopted by jurisdictions that want to reach further. But by creating a model state code, it provides consistency that can save money for jurisdictions like Louisville, a city of 21,000 now itching to rebuild in the wake of the Marshall Fire.

"It's not just Louisville," says Bernett, whose district includes that city. "Denver is interested, Boulder and many others whose

residents want that. How can the state foster this?

The Polis administration wants this bill to move forward. “From our perspective, we see this as a high priority for both assuring that the building sector will be on a pathway to meet the climate target and provide direct benefits, even lowering long-term costs of energy,” says Will.

Bernett promises to introduce the bill before the in end of March This was at least partly the result of a more rigorous



“stakeholder” process.

“There’s been a ton of stakeholder work” says Christine Brinker, senior buildings policy manager for the Southwest Energy Efficiency Project. Homebuilders, architects, engineers, labor, and environmental justice groups have all participated in calls in which Bernett and the state energy office have been trying to work out problems in advance of introduction.

“Some good suggestions came out of these stakeholder meetings,” says Brinker. One example is that the bill will be clear that the Colorado Energy Office will use existing codes as the foundation for the near-zero 2030 code.

Another concern was that this will be an all-electric requirement. It is not, although those with natural gas will have to put extra effort into energy efficiency or alternative energy, such as solar panels.

Cost is a major concern—likely to be a point of contention when the bill does get debated by legislators. This is an argument about the short-term and the long-term costs, and it’s an argument already underway in Louisville and Superior as those communities create the templates for rebuilding from the Marshall Fire.

Brinker’s organization, SWEEP, wants Colorado policy to take the long view. The upfront costs of a more efficient house may rise, but the fuel costs will be far lower over the lifetime of the infrastructure.

“Of course, everyone is concerned about housing affordability,” she says. “But there’s a lot of misinformation and misunderstanding about the net cost of these codes.”

She points to a study by the Pacific Northwest National Laboratory for Louisville and Superior that found the upfront cost is only \$5,000—and this during a time of 19% inflation and for a larger-than-average house. The study found that savings on energy bills more than offset any increase in mortgage payments. The study, originally published in December, was updated specifically for consultation by Louisville and Superior.

HB22-1218

Wiring for electric cars

This bill by Rep. Alex Valdez, “Concerning Resource Efficiency Related to Constructing a Building for Occupancy,” proposes to require commercial and multi-family buildings of 25,000 or more square feet to include electric vehicle charging for at least 10% of the parking spaces, with requirements bumped up to 50% if the building is part of a larger complex of 40,000 square feet or more.

Next issue of Big Pivots: Air quality, microgrids, agriculture and other energy and climate bills.

Inaugural board members of transmission authority in Colorado appointed

The inaugural members of the new Colorado Electric Transmission Authority have been identified.

The board was created by a 2021 law, SB21-072 [“Public Utilities Commission Modernize Electric Transmission Infrastructure.”](#) It was authorized to select a transmission operator to finance, plan, acquire, maintain, and operate eligible electric transmission and interconnected storage facilities.

This new authority has been called the “transmission builder of last resort.” It’s preferable that utilities build transmission, but if they don’t, Colorado may have reasons for wanting the transmission.

This may become important as Colorado looks to build out renewable energy in more difficult places currently lacking transmission. One such place is the San Luis Valley, rich with solar potential, among the best in the nation, but lacking transmission capacity. Louis Bacon, who owns large land amounts in the area of La Veta Pass, the logical corridor for export, blocked plans by Tri-State Generation & Transmission in years past.

Another potential application is from Craig to Wyoming, the better to integrate Colorado’s electric resources into a regional transmission organization, or RTO, and tap the resources of other areas.

A third application may be in the cases of small utilities who need transmission but do not have the capacity to build it themselves. The vulnerability of Holy Cross Energy, for example, was exposed in 2018 when the Lake Christine Wildfire came within one already-burning wooden



transmission pole of being able to provide power to Aspen during the July 4th weekend, typically one of the busiest of the year in that resort community.

The law specifies that the 9-member board is to consist of:

- 2 members appointed by the governor with the consent of the Senate;
- the director of the Colorado Energy Office or his/her designee;
- 3 members appointed by the president of the Senate;
 - 3 members appointed by the speaker of the House

The law also requires expertise among the appointees. For example, one must represent the interests of organized labor, another must have knowledge of renewable energy development, and one must represent the interests of commercial or industrial customers of electric utilities.

Those appointed to 4-year terms are:

- **Chris Caskey** melds science and business in innovative new ways. He has a Ph.D. in applied chemistry from the Colorado School of Mines and worked at the National Renewable Energy Laboratory for a few years.

It gets more interesting yet. He now operates Delta Brick Co. and has a lead role in Vessels Coal Gas, the company that operates the methane-to-electricity operation near Paonia. [His resume](#) is far more diverse than even this suggests. Oh, and he assisted a man attacked by an octopus.



Chris Caskey

- **Karl Rabago** is the principal of Rabago Energy, a consulting firm. Before 2019 he directed the Pace Energy & Climate Center. His [experience in energy](#) goes back decades

and includes such diverse stints as being a public utility commissioner in Texas to being an energy program manager for the Environmental Defense Fund.

- **Roger Freeman** is an attorney who [specializes in energy and environmental law](#). He is the chair of the board of directors for the Colorado Solar and Storage Association among other organizations. His father, the late S.



Roger Freeman

David Freeman, was a seminal thinker in the energy transition, and Roger Freeman has had pieces published in both the Sacramento Bee and in Big Pivots.

- **Michelle Zimmerman** directs development at SunShare, with [previous experiences](#) in the renewable energy sector.

- **Rich Meisinger** is the business manager for the International Brotherhood of Electrical Workers Local 111. He told [Public Utilities Fortnightly Magazine](#) in 2020 that the union has 4,225 members.

- **Leia Guccione** is an engineer and now is the managing director of the Rocky Mountain Institute's Carbon-Free Electricity division.



Leia Guccione

The RMI website says this: "Leia currently leads a body of work to inform utility regulators of policy solutions for a clean energy future, as well as provide them with unique process design and facilitation as they develop and execute reform initiatives to implement these solutions."

Oh, and before joining RMI, she served in the U.S. Navy as a nuclear-trained surface warfare officer. She continues to serve in the Navy Reserves.

- **Will Toor** manages the Colorado Energy Office. He has the authority to designate another individual from within his agency to be part of the authority's activities. A physicist by training with a Ph.D., Toor previously worked for the Southwest Energy Efficiency Project, managing that organization's transportation program, and before that was a Boulder County commissioner and mayor of Boulder. His life's travels included spending part of one very cold winter in Moffat County as a shepherd.

- **Kathleen Staks** recently became director of the [Western Freedom](#), a group advocating for a regional transmission grid.



Kathleen Staks

Staks was most recently had a public relations company and before that was director of external affairs for Guzman Energy, a new and disruptive wholesale power provider. Before that, she was executive director of the Colorado Energy Office during the administration of Gov. John Hickenlooper. She also held other posts in Colorado state government.

- **Tom Figel** is the senior director of policy and business development at [GRID Alternatives](#), a national organization devoted to the renewable energy transition as a way to drive economic growth and environmental benefits in communities most impacted by



Tom Figel

underemployment, pollution, and climate change. He manages the community solar program and leads utility relations and advocacy efforts for GRID Colorado. He has prior experience in marketing, strategy, and utility relations for software and battery storage startups.

Tri-State G&T submits plan for \$186 million in transmission for eastern Colorado

by Allen Best

Tri-State Generation and Transmission has filed an application with Colorado regulators to build two new transmission lines that would cover a combined 130 miles in the state's eastern plains.

The two transmission lines, both with capacity of 230-kV, would complement a new transmission line already under construction and an existing line being upgraded.

Tri-State, Colorado's second largest electrical provider, says that it expects these two new lines and the two other lines with work underway all to be completed by late 2028. Work on the four lines will cost a cumulative \$185.6 million.

"By strategically and cost-effectively interconnecting three new transmission lines into our existing network and improving an existing transmission line, we will ensure power reliability, eliminate

bottlenecks in our system, and support significant clean energy additions as part of our transformative Responsible Energy Plan," said Duane Highley, chief executive of Tri-State.

In addition to the 17 member electrical cooperatives in Colorado, Tri-State delivers electricity to 25 other cooperatives in Nebraska, Wyoming, and New Mexico.

Highley noted that Tri-State's electric resource plan now before the Colorado Public Utilities Commission calls for an additional 2,000 megawatts of renewable capacity.

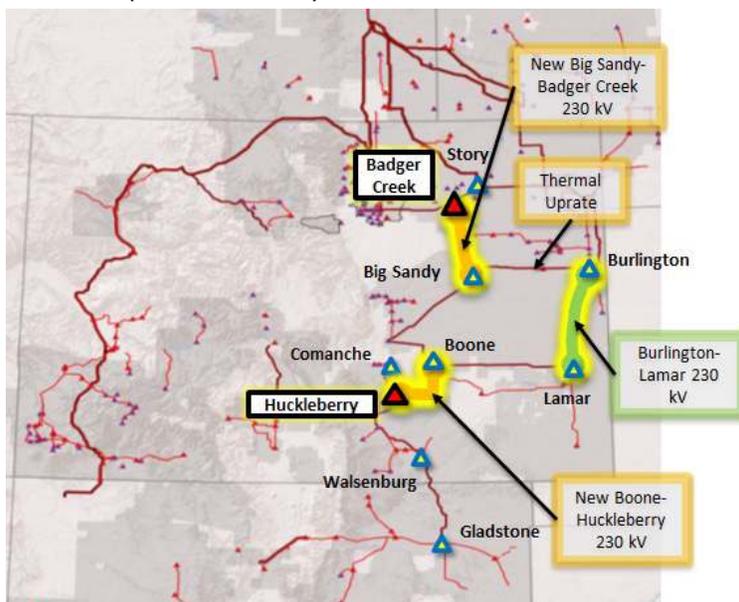
"These transmission upgrades will help us achieve our aggressive greenhouse gas emission reductions goals," he added.

Will Tri-State need this new transmission if United Power and other members leave? Tri-State responded to this question saying that if departure of any member is firm, then planning for that future can begin—but not until then.

"With a firm, unconditional notice to withdraw from membership in Tri-State, we would begin our planning on all issues related to a member's departure," said a statement from the company in response to a question from Big Pivots. "We cannot and will not plan any changes to our business with non-firm, conditional notices of withdrawal."

Tri-State plans to close the three coal units it operates in Colorado, all at Craig, the last by 2030. It is targeting an 80% reduction in emissions of carbon dioxide associated with its electricity sales in Colorado by 2030.

Xcel Energy, more than double the size of Tri-State, aims higher, an 86% reduction by 2030 as compared to 2005. It has transmission plans that dwarf those of Tri-State. Those plans, called Colorado's Power Pathway, could cost



nearly \$2 billion. They include 560 miles of 345-kV transmission in eastern Colorado with a possible 90-mile extension.

See: [On the brink of yes in Colorado](#)

The PUC commissioners concluded that Xcel has proven the need for the permit, which is formally called a certificate of public convenience and necessity. The commissioners are being asked to make a similar determination about Tri-State's plans.

Tri-State's studies have found Xcel's and Tri-State's proposed transmission systems will not interfere with each other. Instead, they will together help achieve Colorado's renewable energy and greenhouse gas emissions reduction goals.

In creating the transmission plan, Tri-State assembled 60 stakeholders representing 24 entities to help evaluate alternatives during six months of 2021. This was in conjunction with the [Colorado Coordinated Planning Group](#), a consortium created in 1991 to help ensure a high degree of reliability in the planning, development, and operation of the high-voltage transmission system in the Rocky Mountain region.

The proposed projects emerged as those among the 15 alternatives studied best able to meet Tri-State's needs at the lowest cost. Stakeholders who took part in the analysis were from regional utility services providers, Colorado state government, the environmental community, the legal community, renewable energy developers, and related energy business and consulting communities.

Of the new power lines, one is a 30-mile segment east of Pueblo, and the second is an 80-mile line from near Limon to a switching station south of Fort Morgan.

Tri-State is also constructing a previously approved transmission line between substations near Burlington and Lamar. Another existing line, Big Sandy-Burlington, is being modified.

Tesla building adding a showroom and support center in Vail-Aspen area

Tesla has submitted a plan to local government authorities for a \$5.2 million, sales, service, and delivery center to be located adjacent to the Eagle County Regional Airport.

The Vail Daily reports that the automaker hopes to open the sales location early next year.

From the location in Gypsum, the Tesla dealership will be 35 minutes from Vail, about an hour and 20 minutes from Aspen and an hour and 45 minutes from Steamboat.

Tesla currently has 6 locations along the Front Range.

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