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Colorado's map to decarbonization in 17 easy bites*

by Allen Best

The administration of Colorado Gov. Jared Polis on Wednesday issued the draft carbon reduction roadmap, identifying how state officials see Colorado going about decarbonizing the state's economy as required by a 2019 law, HB 19-1261, the Climate Action Plan to Reduce Pollution. Here I deliver the takeaways in bite-size segments:

1) Colorado rocks

There's much quibbling about whether this roadmap will get us where we need to go in a timely manner. Plenty of people think we need to accelerate.

Be very clear that Colorado has set out to create the Big Pivot in how we live and especially in how we produce and consume energy. The goals – 26% fewer economy-wide carbon emissions by 2025 compared to

2005 levels, 50% by 2030 and then 90% by mid-century – reflect the goals of the Paris climate accord. The Paris agreement reflected what scientists say we must do if we want to avoid the far worse impacts from a climate going as crazy as our most recent presidential “debate.”

This is a necessary war.

Why does it make sense for Colorado to embrace these goals when, say, Oklahoma does not? And why should the U.S. do so when India is still building coal plants?

Foolish naysaying. Leadership starts at home, and it will spread. Colorado leads the way in the nation's interior. Colorado is in the front row along with California, New York, Massachusetts, and a few others.

Mostly the leaders of this are younger, but certainly not all, and they universally must be optimistic. During these dark, divisive times we have a new “greatest generation” effort that spans multiple generations.

2) The slow bake

You've read this statistic before, but it bears repeating, as the 100-plus-page roadmap does: Colorado has warmed 2 degrees F on average in the last 30 years.

*** Including why the environmental community is at odds with the Polis administration**

Colorado's recent average summer temperatures are even higher than the extreme heat of the 1930s Dust Bowl. Peak runoff has been coming 1 to 4 weeks earlier. Warming temperatures and drier soils increase the likelihood of larger wildfires.

August was the hottest ever in Colorado, but 30 years from now these same temperatures will likely be viewed as relatively cool.

3) Why so long?

The law that launched this roadmap process was adopted in May 2019. The law spoke to the climate crisis. It demanded brisk action. Why has it taken so long to put this roadmap together?

One crucial task was to lay down the methodology for getting a strong handle on the emissions. The last inventory from 2015 was slippery, involving a lot of guesswork about emissions from the oil and gas sector, agriculture—well most everything except for the relatively few giant smokestacks.

The Air Quality Control Commission in May adopted regulations intended to deliver a clear picture of emissions. The adage behind this is that you can't manage what you can't measure. This closer study has revealed the conclusion that the oil-and-gas sector has been producing far more emissions than had been assumed.

And plans do take time to assemble. Consultants are hired, stakeholder meetings convened, and so forth.

Too long? That's the argument from the environmental community, and we'll get to that.

4) Where is the power?

The legislation delegated much of the power to achieve change to the Air Quality Control Commission and, by extension, the staff of the Colorado Department of Public Health and Environment. Perhaps just as important, if less officially so, is the Colorado Energy Office.

Together these are the main state agencies that put together this roadmap, with smaller if still important roles for the Colorado Department of Transportation, the Department of Agriculture, and others.

No less important, but in a different way, is the Colorado Public Utilities Commission. It has less discretion, but has a huge role in overseeing the decarbonization of electrical generation and also transportation and buildings.

5) Who are the faces?

Three individuals stand out in public presentations. First is Will Toor, who has a Ph.D. in physics but also spent a winter herding sheep in Moffat County. He has great band-width. He directs the Colorado Energy Office after a political career that included being mayor of Boulder and a Boulder County commissioner.

From CDPH&E there is John Putnam, the director of environmental programs, who formerly was managing partner of Kaplan Kirsch Rockwell, one of Denver's major legal firms. Also a key figure, in my read, is Garry Kauffman, director of the Air Pollution Control Division.

I've left out a dozen names here that I'm aware of, and there might well be a dozen more unknown to me that are also crucial.



6) Source of emissions?

Electricity generation—primarily from coal plants—long stood as the No. 1 source, but this has been overtaken by transportation. Oil and gas production has figured in prominently, which is why recent rulemaking before the Air Quality Control Commission matters so much.

7) The crucial choices?

The Polis administration has chosen to be somewhat cautious and methodical. The plan released on Wednesday hasn't changed much in the last two or three months. It sees Colorado retiring most of its coal generation by 2030, even as the state takes rapid steps to electrify transportation and begins the hard work of electrifying, or at least decarbonizing, other sectors.

"Under current policies and with pre-covid assumptions, the state is on a trajectory to achieving approximately half the level of emission reduction needed to meet the 2025 and 2030 reduction goals," the report says. "Additional actions are needed to get all the way there."

Those additional actions are all important, but they amount to tweaking. Getting to the goals can be achieved with existing technologies, the report says.

Environmental groups fundamentally disagree. They want bold action, either by pushing for decarbonization of electrical generation even more rapidly or by adopting economy wide mechanisms like cap and trade or a carbon tax.



8) Areas of agreement

The Polis administration and environmental groups agree that we will be shifting to a more electrified world in the next 30 years. We will drive electric cars and even electric trucks (although there's perhaps room for hydrogen), and live in

homes absent gas-fired hot-water heaters. But how to get there?

Even within this fundamental agreement there are disagreements about pace.

Consider Xcel Energy, which would seem to be a clear winner in the electrify-everything theme. In fact, it has warned on several occasions against getting in too much of a hurry.

Just a few weeks ago, the National Parks Conservation Association proposed requiring oil and gas companies to electrify engines used in compression. Xcel—backed by the Colorado Rural Electric Association—said that this shift would require more electricity than the infrastructure could provide. It favors a slower pivot.

9) Pick up the pace

Beginning in February, Conservation Colorado and other environmental groups began grumbling that the Polis administration was moving too slowly. In June, WildEarth Guardians filed suit against the Polis administration. Stacy Tellinghuisen from Western Resource Advocates addressed a subcommittee of the Air Quality Control Commission late in the summer.

Their message was consistent: Polis administration, you need to pick up the pace. And Air Quality Control Division in particular, you need to examine some bigger, bolder ideas.

In July, I talked with Pam Kiely, from the Environmental Defense Fund, after a subcommittee of the Air Quality Control Commission had met to kick around what was needed.

"At its essence, this is an air pollution problem," she pointed out. And the law identifying the targets directed the "expert regulatory commission to use its expertise to employ strategies to ensure and guarantee reductions in pollution. It's been over year, and I think it's time for them to get serious."

In these public meetings, John Putnam had frequently cited constraints in staffing.

Kiely conceded the restraints, but argued that the allocated staffing of 6.4 full-time employees only forced the state agencies to “allocate their time wisely,” to “get the most done for the buck.

Kiely cited regulations adopted by the Air Quality Control Commission in June that crimp substantially the hydrofluorocarbons, a small but powerful greenhouse gas emitted from refrigerating units, aerosols, and other applications. Fine, said Kiely. EDF supported this. But by 2030 this secures a reduction of 1.5 million metric tons relative to the gap that needs to be bridged of 45 million metric tons of carbon dioxide equivalent gases. (The draft plan looks to bridge the gap in other ways, too).

She said lacking in the state’s preliminary roadmap were “concrete and enforceable limits.” Those same words were repeated again and again during summer,

and then once again this week as environmental groups reacted to the draft plan.

10) Legislators speak

Several state legislators have spoken before the Air Quality Control Commission—and hence the staff—in May and successive months.

Said House Speaker KC Becker: HB 1261 accompanied by SB 96, both adopted in 2019, provide “expansive authority and clear direction specifically to this Commission to develop the regulations we need... Policies that do not guarantee quantifiable and enforceable emission reductions are not ‘consistent with’ the goals laid out in statute.... the AQCC has the sole responsibility to adopt the backstop regulations to guarantee we hit our targets.”

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Two other legislators, Faith Winter and Dominique Jackson, also spoke at Air Quality Control Commission meetings.

11) Strong backstop

Western Resource Advocates submitted comments to the Colorado Energy Office in late July that adhered to the same theme. These strategies and goals are nice—but they’re not enforceable, said Stacy Tellinghuisen and Erin Overturf.

Instead, WRA and others asked for what is sometimes called a backstop authority, a carbon tax or something similar. Only with that backstop device could there be certainty of the private sector – whether automobiles or coal plants – taking the necessary action to achieve the goals.

Western Resource Advocates, in a July 31 letter, articulated at length the organization’s position. It used the changes in the electricity sector in the last 15 years.

“The renewable energy standard, energy efficiency standard, and legislation to accelerate coal plant retirements have driven the development of new technologies and significantly reduce the cost of clean energy. As a result, today the electricity sector is poised to voluntarily reduce its emissions,” the letter said. “Now, policy is needed to drive similar innovation and cost declines in other sectors of the economy.”

Very specifically, WRA asked for concrete and specific strategies. The group also pointed out that the state lacks the tools to ensure that Tri-State, Platte River Authority, and other providers achieve those 80% reductions. The law only applies to Xcel (which provides more than 60% of the state’s electricity).

12) Speaking of Tri-State...

It closed its plant at Nucla in September 2017 and also one at Escalante, New Mexico, a few weeks ago. And yes, all three units at Craig will be shuttered by 2030, as per an announcement in June.

Will they actually be closed?

The economics of energy suggest that yes, absolutely, Tri-State will close them. How can it afford to keep burning expensive coal when wind and solar are so much cheaper. And that’s one of the assumptions of the roadmap and the officials who put it together.



But there’s a big question mark about imported power into Colorado, particularly from the Laramie River Station in Wyoming.

In a filing at the PUC, Western Resource Advocates concludes that the existing plants will reduce Tri-State’s carbon emissions by only 34% as compared to 2005 levels. Duane Highley, on a recent webinar, said that Tri-State has its work cut out to get beyond 50% renewables. (He sees creation of a regional transmission organization, or something similar, as being crucial; Matt Gerhart from the Sierra Club points out that Colorado Springs Utilities did not predicate closing of its coal plants by 2025 on anything else happening).

13) The soft stick

The state’s roadmap said that achieving the 2025 and 2030 goals will “require additional policies beyond the actions the state has already taken.”

Details get sparse, although on page 25 there’s a paragraph that points to something of a soft stick. SB 19-236 permits any utility to file a Clean Energy Plan with the State’s PUC that proposes to reduce carbon emission 80% by 2030. If so, and the plan is

approved by the PUC, the utility is generated a “safe harbor” from additional regulation by the Air Quality Control Commission.

There are many more ambitions and small steps involving transportation and building electrification, even in the agriculture sector. Some are underway, others only now getting started. But specific proposed actions are largely lacking.

14) Big bang for the buck

On Tuesday, the Sierra Club and the National Resources Defense Council issued a lengthy report that was prepared by Evolving Energy and Grid Lab.

One big takeaway is that the biggest bang for the buck to be had was pushing electric utilities to decarbonize even more rapidly, upwards of 98% and 99% by 2030.

The big question is how. Xcel Energy in 2018 famously pledged 80% reduction by 2030 using existing technologies, a pledge now put into law. There has been much debate about just how close to 100% it, and other utilities, can get during this decade.

The Sierra Club’s Gearhart says the PUC has ample legal authority to require early closure of coal units. Plus, he says, the AQCC has broad legal authority under HB 19-1261, and that authority extends to imposing emission limits and ordering units such as coal units to shut down. So the AQCC could also order coal units to shut down early. The AQCC’s authority extends to all electric utilities in the state, including utilities that are not regulated by the PUC (such as Platte River Power Authority and Colorado Springs Utilities).

I am struck by a comment that State Sen. Chris Hansen made at a recent meeting. An engineer by training, he said he believes it’s possible to get to 90% more easily than has commonly been believed. “I think we will surprise ourselves,” he said.

“I have seen a lot of really great modeling of around 90% to 93% renewable penetration without any significant energy

problem,” he said. “I’m very bullish on getting in the low 90%’s much quicker. It’s the last 5% or 6% that are in question.”

This new report also calls for dramatic changes in transportation, with the majority of new cars and trucks of all weights being electric by 2034, up from fewer than 2% of sales in 2018. The influence of California should be noted. Gov. Gavin Newsom last week announced a ban on most sales of internal combustion vehicles by 2035. Maybe there is hope for Colorado electrifying more rapidly.

This report also calls for decreasing emissions from the building sectors by at least 9 to 14% from 2005 levels by 2030. It calls for 55% of new homes to be all-electric by 2025 and envisions a mandate for all all-electric homes by the early 2030s.

15) What they said

In various ways, most of the environmental groups had much the same thing to say this week. Consider Howard Geller, at the Southwest Energy Efficiency Project. He said the roadmap:

...“correctly identifies energy efficiency and electrification as key tools to cut pollution across Colorado. Reducing energy waste and shifting from fossil fuels to increasingly clean electric power will protect our climate, improve our health, and save us money. However, many of the proposed actions in the Roadmap are not fully fleshed out. We look forward to working with Governor Polis and his appointees to ‘put more meat on the bones’ and strengthen the Roadmap before it is finalized.”

16) Travel brochure

Jeremy Nichols, of WildEarth Guardians, spoke in metaphor in his criticism. “It’s less of a road map and more a destination vacation brochure. It’s great if we get there. But it does not explain to me or to Colorado how we are actually going to get there.”

Nichols said he wants the state to be careful about how it invests its time and energy in trying to deliver complex solutions. He wants to see the effort focused on further scrubbing carbon emission from electricity, much like the Sierra Club/NRDC report advocates.

17) Filling the legislative gaps

Certainly, there are other legislators in Colorado than Chris Hansen interested in energy—and it runs across the aisle. I’m thinking of Kevin Priola, a Republican from Adams County and ardent supporter of vehicle electrification. But Hansen has had his fingers on nearly all the important legislation.

During the last legislative session, Hansen had several bills that got waylaid by covid. One of them involved transmission, another to put a greenhouse gas accounting into the choice of materials used to construct buildings.

Another bill would institute a renewable natural gas standard, similar to that adopted for electricity, to accelerate efforts to capture methane from dairies, landfills, and wastewater treatment plants. This would reduce methane emissions and also supplant a certain amount of demand for natural gas obtained by drilling.

Hansen has a long list, and he’s only one legislator. When I talked to him in July, he also made a point of saying he favors incentive. We at that point were talking about the agricultural sector.

18) And local governments?

I called Jacob Smith, the former mayor of Golden who now leads the Colorado Communities for Climate Action. That group has had a strong presence of local officials testifying from metropolitan Denver to the Western Slope at AQCC meetings.

Without the state actually knowing how it will achieve the targets, he said, the Polis administration is taking tools off the table

such as the idea of cap-and-trade, a device that has been used by California.

“We hear the state talking about wanting to go back to get more clarity (from the Legislature), and the response you hear from legislators is that you don’t need more clarity. The language is very clear. You have the responsibility and the authority to take the state to the targets.”

On Tuesday, the Colorado Communities for Climate Action sent a letter to Polis that had none of the strong language of Smith, but did have signatures of more than 100 members of town and city councils and county commissions from the Front Range westward, among them:

Earle Bidez, Minturn mayor pro tem; Todd Brown, Telluride mayor pro tem; Hilary Cooper, San Miguel commissioner; Thomas Davidson, Summit County commissioner; Kim Langmaid, Vail mayor pro tem; Sonja Macys, Steamboat Springs City Council; Dave Munk, chair of the Holy Cross Energy Board of Directors; Greg Poschman, Pitkin County commissioner; Teak Simonton, Eagle County treasurer; Lauren Simpson, Arvada City Council; and Torre, mayor of Aspen.

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Polis won't reappoint chair of Colorado PUC

Jeffrey Ackermann, the chairman of the Colorado Public Utilities Commission, is not being reappointed by Gov. Jared Polis.

At the PUC's weekly meeting on Sept. 23, Ackermann advised that leadership on several current or future electric resource projects will necessarily be led by others.

"As I sit here, I have about 100 days left on my term, and I will no longer be on the commission. So we need to plan for this transfer."

Polis offered no explanation.

"We thank Jeff for his work and commitment while serving on the Public Utilities Commission," said Shelby Wieman, deputy press secretary. "As with each administration, appointments to boards and commissions are at the Governor's discretion."

Less than two years into his term, Polis has made clear that he prefers to have his own appointees on boards and commissions, only occasionally making reappointments. He also likes to diversify the faces. The PUC has had a number of women in recent years, but little racial diversity.

Ackermann brought much to the board, as he had worked for Xcel early in his career and then at the PUC as a staff member before directing the Colorado Energy Office for several years in the Hickenlooper administration.

Having legal chops helps, and, of course, understanding the energy landscape. Being on board with the climate change legislation adopted by legislators and a centerpiece of the Polis platform will be crucial. And, unlike Susan Perkins, the first appointee of Polis to the PUC last winter, this new appointee



Jeff Ackermann

must register no strong objections from Senate legislative leaders. Perkins, who had been critical of Black Hills Energy, was opposed by Senate President Leroy Garcia. He comes from Pueblo, the fiefdom of Black Hills in Colorado.

By statute, no more than two members can be of the same political party. Gavan is a registered independent.

Finally, as just a political reality, Polis's appointee probably can't be from the Western Slope, as both John Gavan (Paonia) and Megan Gilman (Edwards) are from the Western Slope. That rules out one possible nominee in my mind.

All this said, I'm guessing that the leading candidates are either KC Becker, the speaker of the House (until January), and Dominique Jackson, a state representative and a member of the House

Transportation and Energy Committee.

Becker has extensive engagement in energy and climate issues and, I am guessing, would get the nod of her soon-to-be-former legislative leaders.

I have no inside knowledge on this, so consider these as guesses—and not my kiss of death. I also had the Denver Nuggets upsetting the Los Angeles Lakers.



Dominique Jackson

No rush on Platte River's decision about gas plant

Directors of Platte River Power Authority have put off a decision on whether to tentatively plan a new natural gas plant until October.

But even then, this decision is hardly binding. Rather, it's intended to complete a resource plan as required every four or five

years by the Western Area Power Authority, the supplier of hydroelectricity to the Fort Collins-based utility.

Platte River had a goal of closing its Rawhide power plant by 2030, but it's not quite sure how to get there. The idea of a new natural gas plant has been presented as a back-up plan, in case technology and other advances don't move along as rapidly as needed.

At the August meeting of directors, chief executive Jason Frisbie pointed out that this won't be the last resource plan before 2030. In 2016, the last time Platte River did such planning, the utility predicted achieving 400,000 megawatts of wind and solar power by 2024. Now, Platte River predicts it will have 1.4 million megawatts of wind and solar power by 2024.

Right now, however, the technology and other components necessary to deliver electricity reliability and affordability are not there.

Two more plans are due to WAPA before a decision must be made about whether the gas plant is truly needed. "That gives us a lot of time to see how technology matures or emerges, which may make the need for the new (natural gas) unit(s) a moot issue," said Steve Roalstad, spokesman for Platte River.

By metric of 90-plus days, a record hot summer in Denver

Denver has a new dubious superlative. On Sept. 19, the National Weather Service reported the city had 74 days of 90 degrees or more for the year, eclipsing the old record of 73 that was set in 2012.

The top five years since 1872 are:

2020: 74 days

2012: 73 days

2002: 61 days

1994: 60 days

2018: 59 days

Using a different metric, that of days of 100-plus heat, Denver has had much worse

heat. The record was set in 2013 with 13 days of 100-plus temperatures. By that measure, 2020 ranked 11th with just two days. See more at [National Weather Service](#).



Cheyenne Ridge 500-MW wind farm goes on line

Xcel Energy has completed construction of the 500-megawatt Cheyenne Ridge wind farm on Colorado's eastern plains.

The utility told The Denver Post that the 229 turbines between Cheyenne Wells and Burlington, a few miles from the Kansas border, will generate enough electricity to satisfy needs of 270,000 homes.

Two years ago, Xcel completed [Rush Creek](#), a 300-turbine, 600-megawatt wind farm that sprawls across five counties in the area east of Colorado Springs, near Limon and Hugo. Rush Creek delivers the electricity to markets in metro Denver. Xcel Energy in February completed a new 125-mile [transmission line](#).

The Post reports that Cheyenne Ridge will generate \$107 million in lease payments for landowners and \$29 million in new tax revenue.



Why Colorado needs something called an RTO to more easily meet climate goals

by Allen Best

If you're interested in how Colorado will achieve its climate change goals, prepare to wrap your mind around the concept of an RTO, or regional transmission organization.

Colorado in 2019 set economy-wide carbon reduction goals of 50% by 2030 and 90% by 2050. Getting there will require electrifying many uses that now depend upon fossil fuels. Think cars and then trucks, but eventually houses, too, and more.

This only works if emissions are largely removed from the production of electricity. Colorado legislators in 2019 understood that. They set a target of 80% fewer

emissions by 2030 among electrical utilities. They did not tell utilities how to get there.

On a September morning in which smoke was wafting eastward across the Great Plains from the wildfires in the Rocky Mountains and the West Coast, I sat in a cabin near Nebraska's Lake McConaughy to hear representatives of Colorado's two largest electrical utilities and one state legislator explain how they thought Colorado might get an RTO or its close relative, an ISO.

The former once again stands for regional transmission organization, and the latter an independent system operator. The function in both cases is much the same. These organizations pool electrical generation resources and also consolidate transmission.

Colorado currently has neither an RTO nor an ISO, although it has been talking about it for several years. Instead, the state remains composed of fiefdoms. These utilities do share electricity to a point, but the system is archaic, little more advanced than one utility calling a neighboring utility

and asking if they have a little extra sugar to share.

Now think more broadly of Western states and provinces. There are wide open spaces, the stuff of calendars and posters. That's the image of the West. The reality in which 80% or more of Westerners live lies in the dispersed archipelagoes of urban development: Colorado's Front Range, Utah's Wasatch Front, and Arizona's Phoenix-Tucson, the mass of Southern California, and so on.

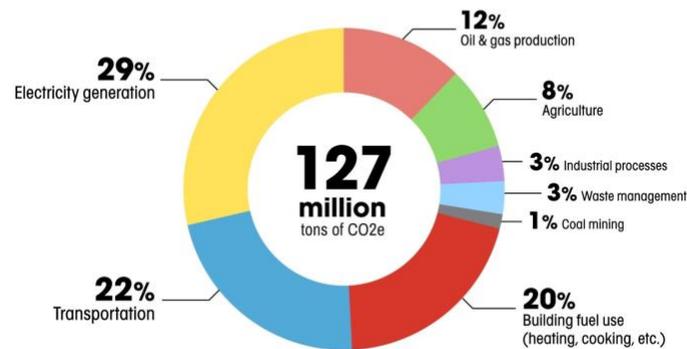
These islands define and determine the West's electrical infrastructure. You can see them in the nighttime photographs taken from outer space, including this [2012 image from the NASA Earth Observatory/NOSAA NGDC](#). These 38 islands represent more-or-less autonomous grids, only loosely connected to the other islands and archipelagoes.

RTOs pool commitments and dispatch of generation, creating cost savings for participating utilities. An RTO also consolidates transmission tariff functions under one operator, resulting in more efficient use of high-voltage transmission.

In the 20th century, this pattern of loosely linked islands worked well enough. Each island had its big power plants, most of them coal-fired generation. The intermittency of renewables was not an issue, because there were few renewables. And, of course, there was less need for transmission. In keeping with the fiefdom theme, transmission providers levied charges for electricity that moves through those wires.

Much has changed. Renewables have become the lowest-cost generation. Prices of wind and solar, plus batteries, too, dropped 90% in the last 10 to 15 years. Utilities have figured out how to integrate wind and solar into their resource mix. Xcel Energy, in its Colorado operations, has used

Sources of Colorado's Greenhouse Gas Emissions, 2015



more than 70% of wind at certain times, for example.

Coal earlier this year remained the source of 40% of electrical generation in Colorado, but will decline rapidly in the next five years. Two coal-fired units at Pueblo, two in or near Colorado Springs, and one at Craig will cease production by 2025.

Beyond 2025, more closings yet will occur. Tri-State Generation & Transmission, Colorado's second largest electrical supplier, will close the two remaining plants it operates in Craig by 2030. Xcel Energy, Colorado's largest utility, will almost certainly have closed additional units, either Hayden or Pawnee, conceivably both, by 2030. Platte River Power Authority also plans to shutter its Rawhide plant north of Fort Collins.

To take advantage of low-cost renewables but also ensure reliable delivery of electricity, utilities will have to do more sharing. That was the common theme of the webinar sponsored by the Colorado Rural Electric Association on Sept. 14.

The subject of RTOs was "a very important topic, and one that the average voter knows absolutely nothing about, in my experience," said State Sen. Chris Hansen, an engineer who has a Ph.D. in economic geography from Oxford University. He has been involved with most of Colorado's most important energy legislation of recent years.

Hansen pointed out that 80% of energy use in the West is aligned with decarbonization goals. He foresees a \$700 billion investment in the next 20 years needed to reinvent electrical generation, transmission, and distribution across the Western grid, including British Columbia and Alberta.



Chris Hansen

“If we stay with 38 unintegrated grids, I just don’t think we can physically get there (to achieve climate targets) without a hugely expensive overbuild of wind and solar, and nobody wants that,” said Hansen on the webinar.

While decarbonizing the grid, an RTO will deliver strong economic benefits. “Just leave climate change aside for the minute—which is hard to do as fires rage across the West—we are looking at a minimum \$4 billion in savings in the West if we have an integrated grid,” he said.

What’s the snag? As Hansen has pointed out, the smart phone took only two years from introduction into the market to broad adoption.

The short answer is that creating markets in the West is relatively new and this stuff gets very, very complicated, as was pointed out by Carrie Simpson, who looks after markets for Xcel’s Colorado operations.

She cited the devilish details involving charges on electricity transmission, how utilities make money, who makes the money and who doesn’t, and then a massive rejigging of the electrical grid through invention of sophisticated software intended to deliver lowest-cost electricity while keeping the lights on.

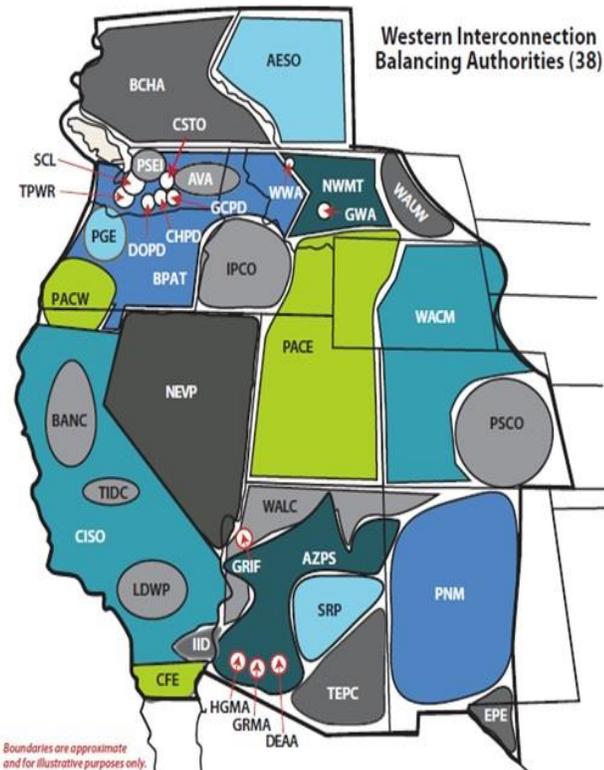
Hansen was asked by webinar host Thomas Dougherty, an attorney for Tri-State Generation and Transmission, whether Colorado’s utilities might expect legislative direction in the coming session.

He prefaced his answer by pointing to the ability of an RTO or ISO to reduce needed reserves to ensure reliability. Currently, utilities need backup generation of 16% or 17%. With an RTO, said Hansen, that could be lowered to 10% or 11%. It’s like needing 9 pickups in your fleet instead of 10.

“You could easily take 5% out of reserve margins in Colorado,” he said. “That is worth more than \$100 million dollars per year.”

“I think you will see the Legislature really try to push this, because there is so much at stake for the ratepayers,” Hansen replied.

Later, in an email interview, Hansen confirmed his plans to introduce legislation next winter that “will address both the near-term and longer-term issues in CO around transmission. I believe we need a clear policy direction for Colorado to join a well-



structured RTO or ISO and transmission owners. To accomplish that goal, we may need incentives and disincentives for operators.”

Hansen also confirmed that he believes even existing coal plants are less foundational than they once were.

Duane Highley, the chief executive of Tri-State, has practical experience in the benefits of regional markets. A veteran of 38 years in electrical cooperatives in the Midwest, he recalled being in Arkansas a few years ago when he drew on the power of the Midwest Independent System Operator, or MISO, to deliver wind power from Iowa during winter to Arkansas customers.

This enabled coal-fired power plants to be shut down. He called it “decommitting” of resources.

Tri-State must decommit coal resources in coming years to meet Colorado’s decarbonization targets. The utility, Colorado’s second largest, behind Xcel, has started shifting from coal. It closed one small plant in Colorado, at Nucla, in September 2019, and Escalante, in New Mexico, in September 2020. The three much larger units at Craig, of which Tri-State shares ownership with other utilities, will close between 2025 and 2030.

On the flip side, Tri-State is adding 1,000 megawatts of renewable generation before the end of 2024. That will get Tri-State to 50% renewables across its four-state operating area. It then has plans for more than 2,000 megawatts of additional renewable generation from 2025 to 2030.

That won’t be enough to get Tri-State to the 80% emission reduction by 2030 that Colorado lawmakers want to see. In preliminary filings with the PUC, Tri-State

has not shown its cards about how it intends to get there. Environmental groups have started making noise. In a filing with the PUC, Western Resource Advocates pointed out that current plans will get Tri-State to only a 34% reduction in carbon emissions by 2030 as compared to 2005 levels.

Crucial will be what Tri-State intends to do with its share of two other coal-fired power plants, the Laramie River Station in Wyoming and the Springerville plant in Arizona.

Highley, in the webinar, did not acknowledge the critique directly. He did, however, say that Tri-State needs an RTO to get across the finish line.

“We see a strong need for an RTO to get us past that 50% renewable level as we try to integrate larger and larger amounts of renewables,” he said.

Colorado and its neighbors in the Rocky Mountains currently operate bilateral markets. Highley described it as getting “on the phone and calling your neighbors. That’s sort of the way the West operates. It’s very inefficient,” he said.

Utilities in Colorado in 2017 began getting together in an ad hoc organization called the Mountain West Transmission Group to talk about how to do it more efficiently. That effort fell apart in spring 2019 when Xcel pulled out. The company said the benefits weren’t obvious relative to the cost.

Tri-State, which delivers about roughly a quarter of electricity in Colorado, and Xcel, which has more than 60% of market share, have gone their separate ways. Both have led efforts to create energy imbalance markets, or EIMs. These are best described as the first step toward an RTO or ISO, with smaller risk and smaller rewards.

Only five months after arriving from Arkansas to chart a new course for Tri-State, Highley in September 2019 announced formation of an energy imbalance market, or EIM, in conjunction



Duane Highley

with the Western Area Power Authority, the federal agency that delivers electricity from federal dams. The federal government makes the low-cost hydroelectric power available to co-operatives and municipal utilities, but not to Xcel and other investor-owned utilities.

Think of an energy imbalance market, or EIM, as being like a 100-level class in energy markets. It is a low-cost, low-gain endeavor. RTOs are a graduate-level course.

With an EIM, utilities can share power, but on a somewhat limited basis. There is sub-hourly balancing, but not the day-ahead planning that begins to deliver big benefits.

“We wanted to get something going. It may not be the ultimate solution for the West, but we can recover the cost from the savings in three years. Maybe this is the first step toward an ultimate market or restarting the Mountain West conversation,” Highley said.

This new EIM will go on-line in February 2021 and will be administered through the Arkansas-based Southwest Power Pool.

Xcel and its three partners—Platte River, Colorado Springs Utilities, and Black Hills Energy—are looking west. Are you ready for more alphabet soup? They will have CAISO creating an EIM for them. CAISO stands for California Independent System Operator. It was established in 1998. An ISO, like an RTO, is motivated to produce efficiency. They’re often compared to air traffic controllers, because they independently manage the traffic on a power grid that they don’t own, much like air traffic controllers manage airplane traffic in the airways and on airport runways. CAISO has advanced services to utilities north and east. This, however, will not be an RTO.

Highley said that the “real prize will be getting the RTO,” and then he threw down a spade in the conversation.

“About 90% of transmission (in Colorado) is controlled by Tri-State and our partner, the Western Area Power Authority,” he said. “We are key to what

Alphabet soup

RTO: Regional Transmission Organization, which allows pooling of generation and dispatch and management of transmission to smooth out costs and avoid congestion. Can also schedule energy sharing through a broader market.

ISO: Independent System Operator, which provides much the same as an RTO.

EIM: Energy Imbalance Market. Very limited costs and benefits, 10% to 20% as compared to an RTO.

SPP: Southwest Power Pool, an RTO based in Arkansas that pools resources across several states in the Great Plains. Wants to move west into the Rocky Mountains.

CAISO: California Independent System Operator, which operates California’s grid. Wants to move east to the Rockies.

BA: Balancing authority, of which the Western Interconnection Grid has 38.

happens regionally and not just in the state of Colorado.”

It’s been conventional wisdom that an RTO will look either east or west. There are problems in both directions.

One challenge is that of political control. Do you think for a second that Wyoming will allow control of its electrical grid in the hands of appointees of the governor of California? Colorado, which of late has aligned more comfortably with California in its politics, nonetheless has its own hesitancy about that sort of arrangement. It’s not a hypothetical example. California legislators in 2019 refused to put administration of CAISO into independent hands. In other words, the better acronym for CAISO would be CASO. Forget about Independent.

Highley, coming from Arkansas, toots the horn of the Southwest Power Pool. “It would make sense in some ways for us to help SPP to move west, and CAISO, of



The portal between the Western and Eastern grids lies southwest of Scottsbluff, Neb. Some of the long-necked locals.

course, is moving east. Think of it like the great railroad days.”

The golden spike completing the transcontinental railroad was hammered down in the salt flats along the Great Salt Lake in 1869. Highley describes a different geography, with a fortune yet to be made – or costs reduced – depending upon who can get wind-generated electricity of the Great Plains to markets.

“There’s an extremely large amount of wind in SPP area that needs to go somewhere, and it has negative pricing now at some points in time. And they haven’t built all the wind that will be built in Kansas yet,” he said. “It’s going to be an opportunity for whoever manages the DC ties to better tie together the grids east and west. Everything east of those ties is currently managed by SPP,” said Highley.

The DC stands for direct-current. The DC ties provide portals between the Eastern



Interconnection Grid and the Western Interconnection, which hum along not quite on the same tune and both on alternating current. (Surely you have experience with this part of the alphabet soup). Think of narrow gates along a very tall fence. There are eight such DC portals between Artesia, N.M., and Miles City, Mont. One is north of Lamar, Colorado. There are also two in the Nebraska panhandle.

The afternoon of the webinar, I drove to the one near Stegall, Neb., which is about 35 minutes southwest of Scottsbluff. How would I not? I had been hearing about this for near 40 years. You leave the valley of the North Platte River and its fields of corn and climb into the landscape out of a Remington

painting. There was a flock of wild turkeys and then, just over the hill, the focus of all the electrical lines: the David Hamil Tie.

It's owned and operated by Tri-State, but used exclusively to get electricity from the Laramie River Station at Wheatland, about an hour to the west, to its customers in the Eastern grid. I was neither thrilled nor disappointed by what I saw. An electrical engineer probably understood what was evident to the eye, but I did not.

There has been much talk about creating greater permeability between this giant electrical wall just beyond eyesight of the Rocky Mountains and the energy resources of the Great Plains. A study by the National Renewable Energy Laboratory was devoted to that idea, with the goal being to integrate greater quantities of renewables. It was called the Seams study, but it got smothered by Trump administration officials. It is likely to re-emerge.

"Yes, that study will be very helpful in guiding our policy discussions in this area, as will the DoE study being done by Utah on western grid options," said Hansen in an e-mail after the webinar.

These portals currently can accommodate transmission of 1,300 megawatts. Highley suggested – but did not go into details – about figuring out creating wider gates at these portals.

"Who best could manage those DC ties and optimize them than possibly SPP," he asked rhetorically, referring to the Arkansas-based Southwest Power Pool.

(The Colorado Public Utilities Commission will host an information meeting devoted specifically to transmission on Oct. 22, and I would be shocked if this is not addressed. I also expect much discussion of the infamous Seams Study squelched by the coal-happy Trump administration.)

Highley said the real benefit of renewables will be realized by creating opportunities to move them east and west – and in different time zones. "The person

who sits on the seams will have the opportunity to either make a lot of money or lower prices, however you look at it," he said.

Much has been made about seams in Colorado (including a story I did that was published in March). "I do think there will be a seam somewhere," Highley said. Too much has been made of seams, too much "fear" expressed. "If you look east of us, there are seams all over the place. This problem has been solved any number of times. We can figure this out, too."

Simpson, representing Xcel, suggested a third option for an RTO, one that does not explicitly look either east or west but instead



Carrie Simpson

uses Colorado as a focal point. But, she said, Colorado alone cannot deliver the market efficiencies. The footprint must be somewhat larger, but she did not specify exactly how large.

When may Colorado become part of an RTO? That was the parting question, and all three panelists answered much alike,

"Five years might be a little quick, but I would love to see this happen in the 2025-2028 time-frame," said Hansen.

Xcel's Simpson largely agreed. "Five years may be a little aggressive, but I do think that the EIM will open up new opportunities for us to learn about our system and how we can interact with the rest of the West more efficiently."

Tri-State's Highley was the most sporting. He offered to bet a bottle of wine that a quicker pace can occur, delivering an RTO by the end of 2025.

"I will keep that wine bottle bet out there," he said.

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