BIG PIVOTS

ENERGY and WATER transitions in Colorado and beyond

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Coal communities get $15 million in state funds, but big bucks yet to come

by Allen Best

In the final hours of their session, Colorado legislators on May 11 approved an allocation of $15 million for Colorado's just transition efforts for the state's workers and communities with livelihoods and economies based on coal extraction and combustion.

Two-thirds, or $10 million, must go to workers impacted by the transition, to help them retool their skills for new jobs as those in coal mining and coal-fired power plants dwindle during this decade. According to the latest plan, Colorado's last coal plant will close by 2031.

The other third, or $5 million, is to be used for community programs in places like Craig, Nucla, Hayden and even Brush and Paonia, including targeted economic development.

But why the last-minute vote? The simple answer is that it was a last-minute proposed bill. Why?

Proponents in the partnering labor and environmental community wanted $55 million allocated from federal American Rescue Plan Act (ARPA) funds. Just Transition funding didn't make the ARPA budget cut. Labor and environmental proponents noted that the process adopted by legislators wasn't a great fit for what they were advocating.

That left relatively little time to craft the bill that was ultimately adopted.

That outcome — the lesser dollar amount — didn't please everybody.

"It's money that will make a difference, wrote Roger Carver in an op/ed published in the Grand Junction Sentinel. "But it's far short of the $55 million discussed by legislators earlier this year to get coal miners into good-paying, stable jobs and get local communities the resources to invest in their own economic goals."

Carver, who lives in Nucla, near Tri-State Generation and Transmission's shuttered coal-burning plant, is a retired coal miner and former president of United Mine Workers 1281.

Chris Markuson, Western states director for the BlueGreen Alliance, says more funding will almost certainly become available to local communities as a result of the $1 trillion infrastructure bill passed by Congress last November.

Communities will have two major opportunities. First will be from the more than $1 billion in federal funds that will go toward infrastructure in Colorado later this year and early next year. State government will administer the funds, but rural

communities should see some of this funding as they try to position themselves to carve out economies in the future. For example, is there anything that Craig can invest in to support new industries it's working to foster? Or assist the school district in Paonia to make building upgrades now, before its property taxes from the coal plant still in operation decline?

A second potential source will be the same big vat of federal money, but administered by federal agencies in the form of competitive grants. That money will be available for some years to come.

Richard Orf, representing Associated Governments of Northwest Colorado, told legislators at a House committee hearing in April that small, local governments of rural Colorado don't have the bandwidth for the complicated work of grant-writing and monitoring.

Markuson concurs, but points out that the process for coal communities to apply for state transition grants administered by the Office of Just Transition has been defined and is significantly easier. Federal grants will inevitably require more expertise, and the state's Just Transition office funding can be used to assist communities to go after federal funds.

On this year's year's bill, why $10 million to worker programs. Markuson says the thinking was that because communities would have a shot at infrastructure funding from federal money, the state needed to first give priority to needs of workers. This recognizes the 2019 law that firmly set Colorado on the path of a low-carbon future and also created the Just Transition Office. HB 19-1314, "Just Transition from Coal-based Electric Energy Economy," instructed the office to assist workers and communities to prepare themselves for a future beyond coal.

Primary sponsors of the 2022 funding bill approved by legislators were all Democrats, but there was relatively little opposition from Republicans aside from a handful who had by then decided to vote against all bills sponsored by Democrats.

A federal bill proposed by U.S. Sen. Michael Bennet, a Democrat from Colorado, also aims to give coal-based communities more tools for their transitions. Called the National Energy Community Transition Act, the bill proposes to create a $20 billion endowment to support government services and other transition efforts.

A May 11 press release from Bennet's office said the bill was formulated based on meetings with leaders in Northwest Colorado in February 2020.

"Our new school was built leveraging both state grant funding along with a voter-approved $22.3 million bond that is 55% dependent on the Hayden Station, a coal-fired power plant," said Hayden Mayor Zach Wuestewald.

"Our fire district, library district, hospital district, and cemetery district rely on this asset for property taxes that range anywhere from 55%-65% of their total budget. We are deeply concerned about this transition, but we recognize this is a unique opportunity to move forward for our community and lead by example in Northwest Colorado."

An idea being studied in northwest Colorado is an industrial park in Hayden, near the Yampa Valley Regional Airport, 25 miles down-valley from Steamboat.

Jennifer Holloway, executive director of the Craig Chamber of Commerce, says Bennet's bill would provide stable, long-term funding that "would give us the ability to make some long-term plans and know that the revenue would be secure. This concept makes sense for our area as we transition the economy away from fossil fuels. We will need long-term support to make it a success, and this type of investment will keep money coming in which will greatly expand our options to support new industries."

Subterranean Ogallala Blues

A Kansas farm boy goes home to sort through the cultural and political conundrums of aquifer depletion — including those of his own family

by Allen Best

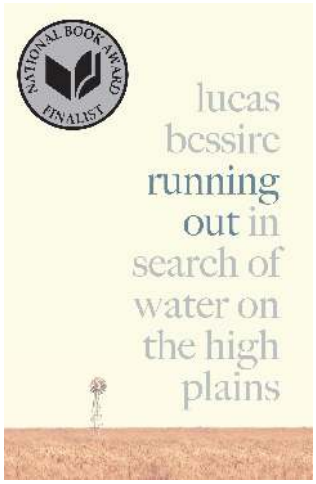
Simple metrics of the Ogallala Aquifer astound. This somewhat interconnected body of water underlying the High Plains accounts for one-third of all irrigation in the United States. It supports one-sixth of the world's annual grain production.

Water in the underground sands, silts, and gravels stretching from South Dakota to Texas – including parts of eastern Colorado — was deposited over millions of years. Now, in not even a flutter of geologic time, barely more than the lives of the oldest baby boomers, this most precious resource has been mined nearly to extinction across broad swaths of the High Plains.

This is particularly true along its edges, such as in New Mexico, but even in some central portions, including southwestern Kansas. Wells can be drilled deeper, but that can only hasten the reckoning that many seem to want to deny. The seeming plentitude of today manifested in the many circles of hay and alfalfa irrigated by center-

pivot sprinklers simply cannot continue indefinitely. Evidence of precipitous decline abounds.

Lucas Bessire, an anthropologist and native son of southwestern Kansas, explores this depletion in his masterful "Running Out: In Search of Water on the High Plains." For good reason it was a finalist for the 2021 National Book Award.



Depletion of the Ogallala Aquifer has produced several books plus other journalism. Bessire has a more narrow but interesting approach. Instead of trying to tell this across the eight-state region, he focuses on southwestern Kansas through the lens of four generations of his family: a great grandfather who was a pioneer in this new groundwater mining of the mid-20th century, his grandmother who was at its ragged hard-to-reconcile edges, and a father from whom Bessire was at least semi-estranged but who becomes, in this book, a partner in detective work.

Not least, Bessire's book is of his own journey to the place of his upbringing to examine it with new eyes, as if a stranger, and in that way probe his own complicity.

Always in these pages Bessire looks over his shoulder, both to his family but also to the region's history, rife with depletions of earlier times. In this, he seeks to make sense of the present so as to take responsibility for the future. In this struggle to define what it will take to live in a more sustainable way in the world, he takes guidance from his long-departed grandmother. She had in her life struggled to end her dependency on alcohol, drugs, and tobacco. The first step, she wrote in notes now a half-century old, "is to admit that I am not responsible for the past, but that I am accountable to tomorrow."

That observation borne of his grandmother's pain is one for all of those of Ogallala Country – and, although Bessire does not dwell on this, all of humanity.

Working through the many big ideas in "Running Out" never taxes. Every page has sentences to be savored and, in my case, paragraphs to be highlighted in yellow, for later savoring and deepened understandings.

"Running Out" has a dreamy, confusing theme, one clearly intended. In his quest to understand, Bessire finds mazes of depletion, layers of deception, a dried river, and a waterless spring that was part of his family's operation, an area where hydrologists now estimate three-quarters of the water has been removed. There are clouded memories, a strange mist, a numbing vapor, and a ghostly presence.

Always, there is ghost of his grandmother, who in her life was subjected by her handlers to electroshock therapy in an attempt to create amnesia. She spent the rest of her life, says Bessire, trying to recapture the water of her youth that had disappeared.

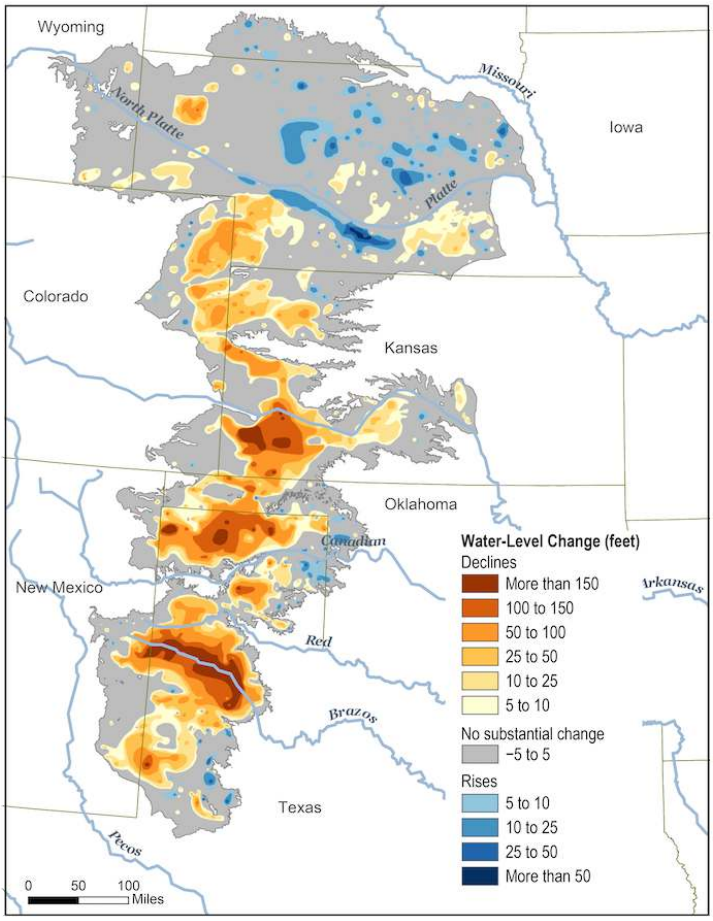
There are also blurred boundaries, conundrums, and contradictions, plus the confounding logic used to justify the depletion. Meetings of the groundwater management districts that he and his father attend showcase this distorted logic.

These districts, under Kansas Law, have authority over the depletion. At one meeting, he attends in expectation of debate about the future of the aquifer, he instead finds blandness, words, and a mood "strangely flattened and trivial, as if veiled behind some gauzy medium that muffled words and distorted time." The gatherings of aging white men he describes as dishonesty disguised by dullness.

At one of these meetings, "John," whom he describes as the official playing the part of emcee, belabors the distinction between "impairment," a word he discourages, and his strong preference, "drawdown allowances." The talk then extends to the solution, imported water.

Another meeting produces more fuzzy logic: Imposing limits on pumping does not provide an answer because it would force the transition of irrigated land to less valuable non-irrigated farm land and hence a yanking of the economic platform for the region. As such, depletive irrigation must continue. Again, the answer to the inevitable lies in importing water from elsewhere, presumably with the federal government footing the bill for a canal (and pumps) from the Mississippi River.

That solution is only slightly less improbable than the giant machines that some envision for sucking carbon dioxide out of the atmosphere.



Bessire says the federal government played a role in creating this mess through its insurance programs for crops that favor irrigation. Even more clearly he blames corporate agriculture, the majority owners of the land in this county of southwestern Kansas and the mostly hidden influence that makes the groundwater districts forums for doublespeak. A few farmers use disproportionate amounts of water, and those farmers advocating for restraint in pumping have little voice. The exploitation, he says, is anti-democratic.

The four chapters in "Running Out" – Lines, Bones, Dust, Clouds – are carefully crafted, at least partly a result of Bessire's year-long fellowship at Harvard University. The prose constantly delights. Driving in the night with his father, he observes "the spinning pivots, under the turning stars." On another trip through "towns with courthouse squares and false fronts" he sees "emptied houses (that are) falling down in arrested motion."

Exploitation, extinction, and extermination are subthemes to his focus on depletion. He tells of the killing of the once vast bison herds that virtually disappeared in a burst of gluttony in 1872-74. The buffalo bones at the railroad siding in Granada, in southeastern Colorado, were 12 feet high, 12 feet wide, and a half-mile long. Most of the buffalo hunters made no money, he observed – a metaphor, if you will, for the farmers depleting the aquifer today.

The buffalo extermination was also a somewhat conscious decision, a way to force Native American tribes off the land so it could be farmed and ranched.

A center-pivot sprinkler waters a circle of corn near Holyoke, Colo. Photo/Allen Best

Part of this was the Sand Creek Massacre, whose site in Colorado, just across the border from Kansas, he visited in the company of his grandmother in the 1990s. He wonders at his own lack of understanding of this history that was prelude to his existence there, a child of the plains. "We lived among the rubble of genocide and dispossession in a landscape that had been transformed," he says.

No mention is made of critical race theory, but this conclusion does invite comparisons.

The book has no spare baggage. It has disciplined focus reflected in its relative brevity that belies enormous research. There's no fat here. The bibliography cites more than 400 books and other sources. His telling of the Sand Creek Massacre, something I have ready deeply about, illustrates this depth.

One might have wished for just a bit more in two areas. A groundwater district in northwestern Kansas in 2017 voluntarily adopted restrictions on the pace of decline. Bessire explains this but does not identify what was different there, why corporate interests did not prevail.

The second element is about the end result of the water pumping. Most crops grown with Ogallala drafting feed livestock. Bessire addresses this – really, it's at the heart of his book:

"The scale of industrial farming is staggering," he says. "Southwest Kansas is home to some of the nation's largest corporate feeders, beef- and poultry-packing plants, slaughterhouses, dairies, milk-drying plants, and hog farms. Multinational meat-packing companies operate slaughterhouses that process several thousand cattle each day. All are billion-dollar businesses. They drive farmers' choices to produce corn, silage, sorghum, or alfalfa. Their profits depend on aquifer deletion. In other words, there is a multibillion-dollar corporate interest to prevent regulation and to pump the water until it's gone."

Trucks wait in line to deliver their harvest goods to a feedlot near Imperial, Neb. ***Photo/Allen Best***

I might have liked to have seen this livestock story developed more fully, another full chapter, actually. Maybe it's another book, a sequel.

The cost of eating meat is heavily, heavily subsidized and cannot continue at its current pace. We are borrowing against the opportunities of future generations with no clear way to pay that debt. I am, by the way, a meat-eater.

This conclusion was derived in part from my own research into the Ogallala in the context of eastern Colorado. My work has been marginal. My commissioned assignments have been to extol the efforts made to innovate. I was not given a blank check to investigate, nor did I take a second-mortgage on the house while I asked the hard questions that Bessire did (he camped out in the barn of his father).

But I sensed what Bessire explains in his opening, that "depletion of the High Plains aquifer is a defining drama of our times. Within it, planetary crises of ecologies, democracy, and interpretation are condensed. It demands a response."

To that I will note one of my recent interviews with a farmer who is also a water district official. He said Ogallala farmers are ultimately selling water. As such, he said, they should be mining the groundwater for high-value crops.

Truth searching rarely comes easily. Geology can be very complex, too. In his opening passage, Bessire tells us about the difficulty of working through the politics and cultures of depletion.

"The sediments are vertically stacked in layers. They are patchy and unevenly spread. Repetitive themes run between them: memory and amnesia, homelands and exile, holding on and letting go. At times, the layers flow together and connect. At others, they are interrupted and blocked."

That he emerged with a book worthy of being considered for the nation's top book-writing award testifies to his success in navigating these physical and other subterranean passages.

Carbon capture and storage at ethanol plants in Colorado?

by Allen Best

Might carbon capture be attempted at two ethanol plants in northeastern Colorado?

Carbon America, a company based in metropolitan Denver, issued an embargoed press release in early May that announced agreements with Sterling Ethanol and Yuma Ethanol to develop carbon capture that would store 95% of the carbon dioxide emissions per year from the fermentation processes at the two plants.

The release scheduled for May 12 publication said Carbon America would finance, build, own, and operate the carbon capture and sequestration, or CCS, at the two plants. The CO_2 is to be transferred via new pipelines to be sequestered a mile underground at an unidentified site.

The projects, said the release, will be the first two commercial CCS projects in Colorado.

The company's website says it has a mission of creating projects from ethanol, cement, and power plants across the United States.

Obviously, for Colorado to reach its mid-century carbon reduction goals, projects like this must go forward. Most of those who have deeply studied the future of energy believe that CCS, still a fringe player, must become viable.

"Projects like these will help the ethanol industry decarbonize and contribute to global emissions reductions needed to reach net-zero by 2050," said Brent Lewis, the chief executive of Carbon America, in a press release.

The press release went on to say that the sequestration site is rigorously designed to comply with Federal Class VI and California Air Resource Board Low Carbon Fuel Standard permanency requirements, and Carbon America is working closely with the U.S. Environmental Protection Agency and multiple Colorado regulatory agencies to ensure the project meets all environmental regulations. Carbon America expects the projects to be fully operational in 2024.

But what is the revenue stream—now or anticipated?

The statement about California suggests that credits available through that state's market may be a consideration. Keep in mind that one of the funding partners for the project near Paonia that takes methane from a coal mine to create electricity has gained revenue from the California market.

Here, background may be useful. I was contacted in advance of the press release and asked if I wished to interview Brent Lewis, the chief executive of Carbon America. The company has an office about a mile from where Big Pivots is produced next

to Sun Run, the solar company where Lewis had previously worked. This is in Arvada.

I said yes, and a Zoom conference was scheduled. Then the interview was cancelled by the PR handler with a request for other available times. Communication then ended. I inquired several times, but received no response.

Surely, the local papers carried the story – if there was a story. The Sterling Journal-Advocate website has had no mention.

I drove by the office location, and Carbon America signs are there.

What happened? I have no way of knowing. Had I been given an interview, I would have asked about the revenue stream.

Carbon America in December did announce $30 million in Series A funding had been secured. Among the five investors identified was Energy Impact Partners.

"Carbon capture technology has been around for a long time," said Hans Kobler, the firm's founder and managing partner in the announcement.

"What's been missing is the ability to finance, build and operate carbon capture projects, at scale, in an efficient cost-effective way. We think Carbon America has cracked the code on how to deploy CCS projects at scale with their vertically integrated model backed by technical expertise and look forward to seeing emission reductions from these projects."

Another investor was Canada Pension Plan, which manages investments for 20 million contributors and beneficiaries.

"As a long-term investor, we believe carbon capture will have an important role to play in the world's transition to address climate change," said Bruce Hogg, managing director of the Sustainable Energy Group of the pension group.;

Workshop on community choice energy on June 13

A two-hour information meeting about Colorado's potential for community choice aggregation has been scheduled for 3 to 5 p.m. on June 13.

Community choice energy, also called aggregation, is an alternative to the for-profit electric utility model. Nine states have authorized it and Maryland launched a pilot in 2021.

In HB21-1269, Colorado legislators last year directed the Public Utilities Commission to investigate how this might work best if authorized by Colorado. The PUC has retained the Great Plains Institute to help prepare its report to legislators by Dec. 15.

Larry Miloshevich of Lafayette, a booster of the concept, reports that the most informative comments to the PUC (docket # 22I-0027E) have unsurprisingly come from out of state, because that's where the expertise and experience lie.

Among those making useful comments was the Minneapolis-based Institute for Local Self-Reliance. "Community choice energy does not always live up to its potential," says the report. The report, however, describes how a public entity can "better manage energy efficient programs, support the expansion of distributed energy resources, and align with local self-interests."

Solar layoffs predicted, but will retirement of coal plants be delayed?

Nearly three-quarters of Colorado's roughly 350 solar companies predict they will be laying off employees this summer as a result of a federal investigation about tariffs.

In New Mexico, the investigation and other supply chain issues have delayed retirement of a coal-burning unit amid warnings of rolling blackouts spurred by lack of resource adequacy. Colorado utilities have issued no such warnings, but some of those closely monitoring Colorado's energy transition warn of growing concerns.

First, the tariff issue. Responding to a complaint by a manufacturer of solar panels in California, the U.S. Department of Commerce in March began investigating claims that China was exporting its panels through four other countries in southeast Asia to circumvent U.S. tariffs first imposed under the Obama administration.

A 2021 Washington Post story said that fewer than 1% of solar panels in the United States are being produced domestically, down from 13% in 2004. Conversely, China's share grew from 1% to 67%.

Mike Kruger, president of Colorado Solar and Storage Association, a trade group, told The Denver Post that these job losses come during a time when "consumer demand continues to be through the roof."

The tariff issue is part of a more complex issue of supply chain challenges for the solar sector. In February, the Associated Press's Susan Montoya Bryan reported problems in New Mexico. A utility was "struggling to get enough solar-generated electricity as it prepares to shut down a coal-fired power plant amid supply chain disruptions, one of the problems threatening to delay or cancel projects around the world as pressure mounts to reduce carbon emissions and tackle climate change," she reported.

The San Juan Generating Station near Farmington was slated to close in June. New Mexico regulators required the utility to replace the lost generation with solar and storage — absent the natural gas the company had wanted. The plant was given a 3-month extension, to September.

The Albuquerque Journal on May 12 reported problems beyond September. The tariff and the background supply chain issues threatened the projected power supply for summer of 2023 by Public Service Co. of New Mexico. This raised the specter of potential blackouts in 2023.

Nearly half the 950 megawatts of solar generation and battery storage scheduled to be fully online in New Mexico by early next year won't be available until after summer 2023.

The company early this year said it was facing potential rolling blackouts this summer and again in summer of 2023, largely because of pandemic-induced supply-chain constraints that set back two solar projects. The continued coal plant operations resolve those issues for this summer, but now comes the tariff investigation.

Nineteen governors, both Republican and Democrat, including Colorado Gov. Jared Polis and New Mexico Gov. Michelle Lujan Grisham, have called on President Joe Biden to hurry the tariff investigation. So did members of Congress, including Democrats in New Mexico and Colorado.

"Additional delays to the four replacement solar projects caused by the uncertainty created by this case will further exacerbate the existing resource inadequacy challenges facing New Mexico," said the letter from New Mexican.

Also see: Washington Post, "White House alarmed that Commerce probe is 'smothering' solar." And The Hill: "Tariffs won't build a robust US solar industry."

Alice Jackson steps up to assemble the big picture view for Xcel's energy future

Alice Jackson has stepped up to lead Xcel Energy's planning to deliver net-zero energy by 2050 across the company's service territories in eight states.

Her replacement as head of Xcel's operations in Colorado will be Robert Kenney, who arrives in Denver after seven years most recently with California's Pacific Gas and Electric.

Alice Jackson

Jackson, who will remain in Denver, has been overseeing the Public Service Co. of Colorado, as Xcel's subdivision is formally known, since 2018. She will wear the title of senior vice president, system strategy, and chief planning officer. In this position she is to lead the company's focus on developing and executing integrated plans for generation, transmission, and distribution on the electric and natural gas systems.

"This innovative approach to strategic planning is transformational for our industry, and Alice is the perfect person to lead the charge as a proven business leader who has engaged employees, communities and stakeholders to deliver on our nation leading clean energy vision," said Bob Frenzel, chairman, president and chief executive of Xcel Energy.

Kenney currently leads Pacific Gas and Electric Company's regulatory strategy and execution with the California Public Utilities Commission and the Federal Energy Regulatory Commission. He's also responsible for the company's governmental affairs and community relations efforts, including oversight of PG&E's charitable giving and corporate foundation.

He has 30 years' experience in the industry.

Prior to joining PG&E, Kenney served as chair of the Missouri Public Service Commission, where he led a 190-person agency. He presided over a number of complex regulatory proceedings and was actively involved in national energy policy as a member of the National Association of Regulatory Utility Commissioners Board of Directors and president of the Organization of Midcontinent Independent System Operator States.

Robert Kenney

Kenney joins Xcel Energy on June 6, as Jackson transitions to her new role.

Tri-State has eye on 2025 in request for proposals

Wholesale supplier Tri-State Generation & Transmission has issued a request for proposals from developers of renewable and carbon-free resources. The new resources are targeted for use beginning in 2025, although in some cases projects going on line in 2026.

What's most interesting is what Tri-State will not consider: natural gas.

What will be considered are wind, solar, hydroelectric, geothermal, and biomass, but also storage: standalone battery systems, pumped-storage hydroelectric, compressed air energy storage systems. Also considered will be renewable resources co-located with thermal or battery storage.

Tri-State intends to close the bidding this summer. Within five months, it will file with the Colorado Public Utilities Commission an analysis of 5 or 6 different portfolios – including the one that Tri-State prefers.

Setting the stage for this RFP was a settlement agreement reached in April among two-dozen parties, including environmental groups, member cooperatives, state agencies and others. Unlike with the settlement agreement regarding Xcel's electric resource plan, there was no dissension.

Tri-State has been pivoting rapidly from coal generation in the last several years. It added 204 megawatts of wind power in 2021 and plans to add 734 megawatts of solar in 2023 and 2024.

Today, 34% of energy consumed by Tri-State's 42 member cooperatives in Colorado and three adjoining states is non-carbon. By 2024, that number will have grown to 50%. Tri-State has promised to reduce emissions from its electrical generation at least 80% by 2030 as compared to 2005 levels.

Mountain Parks Electric among 3 cooperatives that want partial requirements

Four member cooperatives of Tri-State Generation and Transmission have applied to get partial requirements contracts. This is in addition to La Plata and San Miguel, which both previously applied and have pending contracts with Tri-State.

The names of the four have not been released, but one of them includes Mountain Parks Electric, which serves the Winter Park, Kremmling, and Walden areas of Colorado. Directors unanimously supported an application for 20 megawatts, which would supply about a third of the cooperative's demand.

Tri-State had initially announced availability of 300 megawatts of capacity. After that first go-around, 97 megawatts of capacity were left available for this second round.

Boulder considers asking voters to increase tax for climate mitigation work

Boulder's city councilors will be deciding this summer whether to ask voters to expand funding for the city's climate efforts. The proposal being considered would expand the current funding of $3.9 million to $5 million per year.

The money is used to assist homeowners and others to upgrade energy efficiency, develop local solar energy, and expand electrification of transportation. It is also used in policy formulation, regulatory reform and other programs.

One component of that existing $3.9 million in funding, a tax on electric bills that provides $1.8 million annually, will expire in March 2023. The other tax applies to both electric and gas bills.

The plan being considered by the city council would consolidate the two taxes and expand them but with a different reconfiguration. Residential customers that currently average $43 per month would see a slight reduction to $38, while commercial customers would see an increase from the current $241 per month to almost $375. Industrial customers would see an even larger leap, from $705 to $1,390.

Earlier this year, the city council indicated they favored the plan but did not take formal action. The city has begun surveying registered voters. Another survey, this one for businesses, will also be conducted.

See more at the City of Boulder website.

RMI's Mike Henchen electrifying buildings and what he learned while in Afghanistan

Mike Henchen works on furthering carbon-free buildings as a principal with the Rocky Mountain Institute.

Working from RMI's Boulder office, he has been the lead author on two key reports: "The Impact of Fossil Fuels in Buildings," which RMI describes as a crash course in building emissions, and "The Economics of Electrifying Buildings."

He holds a bachelor's degree in mechanical and aerospace engineering from Princeton University and a master's in business administration from Stanford University. Prior to joining RMI, he also worked primarily in the electric power service on behalf of McKinsey and Co. in San Francisco as an engagement manager.

Big Pivots interviewed Henchen by e-mail.

Big Pivots: Let's talk about Afghanistan. How and why did a Princeton grad become an officer in the U.S. Army's 101st Airborne Division in 2008-2009?

Mike Henchen: I grew up in an Army family and going into the Army myself felt natural. But more importantly, the Army was ready to pay full tuition for me to go to an expensive school, and I was happy to accept. So I signed up for Army ROTC when I graduated from high school just a few months after 9/11, and I was all set. Then after college I went through some training courses, got assigned to the 101st and was off to Afghanistan in 2008 for a 15-month deployment.

Pivots: The Army paid you to go to Princeton University?

Henchen: Yes, through the ROTC program. And they guaranteed me a job after graduation! I had a good experience in ROTC and think it's a great leadership

development program for young people interested in national service.

Pivots: What did you do in Afghanistan? What do you wish that more of us understood about Afghanistan?

Henchen: I deployed to Afghanistan in 2008-09 at the height of the US counterinsurgency strategy. We were on a large base (Bagram Airfield) and my unit had two missions: 1) securing the main entry points onto the base, and 2) executing that counterinsurgency strategy in the communities in our local district.

For us, this meant trying to build relationships with community leaders, direct funding to local infrastructure projects, and understand and counter Taliban threats in the area.

Being there only 15 months, it was hard to wade through cultural differences and really make those relationships matter. But I experienced great hospitality from people deeply rooted in their communities and cultural heritage. I hope people in the US can understand that Afghanistan is a beautiful country with wonderful people, and that nearly 40 million people there are living under an unpopular and repressive regime in the Taliban. And there may be hundreds of Afghan refugees recently arrived in your community who need support making a new life here in the US.

Pivots: At Princeton, did you have a seminal experience that helps inform how you ended up at RMI working on building decarbonization?

Henchen: I took an engineering course from Professor Rob Socolow called "Energy in a Carbon-Constrained World," which was my eye-opening introduction to climate change and clean energy.

This was in 2004, after Professor Socolow had published a prominent paper showing how a portfolio of existing technologies could be deployed to address climate change without any major new scientific breakthroughs. It was a prescient piece that is still true today!

I was inspired by the opportunity that clean energy technology could provide. I also learned that we have the tools at hand to address climate change and just need to put them into action to achieve great things.

Pivots: What made you want to join RMI?

Henchen: I wanted the opportunity to work full time on climate change and the energy transition, and specifically to find a sense of purpose and shared mission with my colleagues – something I felt I missed from the Army.

Pivots: Why do you think RMI decided they wanted you?

Henchen: Well, my colleagues tell me it's the funny memes I make about our work (LOL). But I think it was the fact I had worked as a consultant to utilities in my prior job, and RMI wanted to increase its engagement with utilities at the time. Utilities are such an esoteric industry with hard-to-understand concepts and jargon. It's helpful to find someone with experience in that space. (Side note – still looking for someone to explain AFUDC to me in detail!)

Pivots: OMG! SMH. WTF(ox) is AFUDC

Henchen: Ha! AFUDC, along with its cousin CWIP, are examples of utility acronyms that hardly anyone understands but can actually matter for your energy bills. They are basically ways for utilities to charge customers for projects in construction that aren't operating yet. For a tale of how this can go wrong, read about the abandoned V.C. Summer nuclear expansion in South Carolina.

Pivots: Besides learning what AFUDC (Allowance for Funds Used During Construction) stands for, what else did you learn about utilities while you were with McKinsey out of San Francisco?

Henchen: That they're big and complicated, and it's hard for utilities to lead transformative change like decarbonizing our country. They are heavily regulated and have to operate in a very specific way that's different than any other business, which makes it hard for them to be nimble or innovative.

There's always a push and pull between utility management needing to return profit to shareholders, largely by building more infrastructure, and regulators and customers wanting to keep rates down, while also keeping the system reliable. It's hard for everyone to layer climate goals onto that system, and utilities are slow to change.

Pivots: Why did RMI assign you to the carbon-free buildings team?

Henchen: We got this idea that electrifying buildings would be a big thing as a climate solution. Our inspiration was actually from a utility in Vermont, Green Mountain Power, which made electrification a major part of their strategy.

We thought, if they can get customers heating with electric heat pumps and clean electricity in a cold place like Vermont, this could be a big solution nationwide. So we started researching the issue, learning from others who were doing similar work, and set out a vision for clean heating without fossil fuels nationwide.

We later learned this is a big health issue too, and that burning fossil fuels in the home is a potent hazard to human health. That all turned into a big body of work and is an important part of RMI's strategy for carbon-free buildings across the country, along with things like improving energy efficiency and demand flexibility.

Pivots: How does RMI hope to effect change in this arena? Working with utilities? Participating in regulatory cases?

Henchen: Yes, and more. We want to analyze and understand as much as we can about eliminating emissions from buildings, communicate that publicly, participate directly in regulatory cases, and engage with anyone we can who can influence change – businesses, health professionals, advocates, policymakers. An important first step is just awareness – a lot of people don't think about natural gas as a fossil fuel, or that their home is a contributor to climate change. We want to make people aware but also show that solutions are achievable and worth pursuing.

Pivots: Where we are in this major, long-term pivot in Colorado to electrification of buildings?

Henchen: We are off to a good start but we need acceleration. There is growing support for electrification through utility programs and state and city funding.

Denver's new incentives for heat pumps are a great example. We also see new Colorado-based businesses like Helio Home or Elephant Energy – new companies working to be the one-stop shop for homeowners aiming to get off fossil fuels — emerging to take on this challenge from the entrepreneurial side.

And the Colorado PUC is working through the hard stuff, creating a whole

new framework for how gas utilities plan for the future to reduce their customer's emissions.

And yet there's so much further to go. The state's GHG roadmap did the math – by 2030 the large majority of heating equipment sold needs to be electrified, for instance. The trends we see are positive, but we've got a long way to go to reach that level of transformation.

Pivots: Who is doing really interesting work, in Colorado or elsewhere?

Henchen: I mentioned a couple new companies, but there are also a couple dozen energy efficiency service providers in a group called Energy Efficiency Business Coalition of Colorado who are coordinating to increase their capacity for electrification projects.

Holy Cross Energy is really expanding their efforts to help their customers and the communities they serve electrify, and we're looking forward to expanded programming from Xcel as well.

On the policy and regulatory side, great groups like Western Resource Advocates and SWEEP are designing the innovations that will move the whole state forward. And local governments are taking leadership as well, from Denver to Fort Collins to Breckenridge, developing new strategies to support their residents. Here in Superior and Louisville, new building codes will set the stage for more efficient and more electrified buildings.

Pivots: Is there a danger of moving too fast?

Henchen: The biggest danger, by far, is moving too slowly to move away from fossil fuels. We are suffering the consequences of this now, from the ever-present air quality alerts all summer across the Front Range to the Marshall Fire destroying over 1,000 homes on Dec. 30. In fact, what we need most is speed and scale. So if anyone reading needs a new water heater or heating appliance, consider going with an electric heat pump!

Pivots: Can we build non-carbon electricity generating capacity and related infrastructure rapidly enough to keep pace with our growing demands on the grid?

Henchen: Absolutely. Across the country, the energy delivered on the electric grid increased about 2.5% each year in the '80s and '90s, but has been roughly flat the last 15 years. Even if we need to double the energy delivered on the grid by 2050, this would just require going back to the same rate of growth we saw in the '80s and '90s.

That's not to say it will be easy, or won't require effective planning and management. It will, along with things like improved energy efficiency of buildings, flexible demands like ensuring electric vehicles charge off-peak, and high performing heat pumps that are suited to Colorado's climate.

Colorado's grid demands today are higher in summer than winter, meaning we have headroom to grow winter heating loads for some time before we need to have major grid infrastructure upgrades ready. We can do it, we just need to keep accelerating!

Pivots: One final question, Mike. What feeling did you have seeing the last helicopters leaving Kabul?

Henchen: To be honest, it was devastating. Seeing so many people in absolute despair as they tried to get out of Kabul and knowing most would not be able to leave. Then seeing 13 Marines and over 150 Afghans killed in the Abbey gate attack. I'm proud of my service in Afghanistan but it's been hard to see the US effort there end this way.

Net-zero buildings, a revised Colorado River Compact and other thoughts

by Allen Best

So I'm off to Glen Canyon, to prowl in the innards of that concrete beast, which looks ever more like the hydraulic equivalent of a mastodon since the waters of Lake Powell keep dipping, dipping, dipping – now sitting at 3,527.7 feet above elevation.

Powell is a tad over 25% full.

My mission has to do with the loss of hydroelectric generation. I began thinking about this six or seven years ago, and now it seems we're on the cusp, although as many have lately noted, the hydro generation has already dropped off significantly. Powell is 37 feet above that minimum power pool level. The Bureau of Reclamation earlier in May announced it will release less water to the lower basin states from Powell, to keep water levels up. It's getting harder and harder to make the hydraulic empire of the American Southwest work as designed.

Now comes what one Colorado River expert describes as a "huge" declaration. Bruce Babbitt, the governor of Arizona from 1978 to 1987 and secretary of Interior during the Clinton presidency, says it's time for a more substantial rethinking of the Colorado River Compact, single most important agreement governing the Colorado River.

"While I once thought that these aridification scenarios were kind of abstract and way out in the future, I don't think that anymore," Babbitt said in an interview with the Los Angeles Times' Ian James.

"It's absolutely urgent that we start thinking now, while there's time, about how we adjust the compact, the regulations, the necessary reductions, in the most careful

way so that we limit the damage, which can really be extreme."

Climate change models had predicted a warming Southwest. The resulting aridification – as opposed to the more ephemeral drought – has been well documented in the 21st century. This winter provides yet another example of at least modestly good snows followed by a runoff substantially below average. As the dry winds blow and the temperatures warm, the moisture gets sucked up, instead of going downstream.

I mused about this after a Thanksgiving trip to Santa Fe that included a side trip to the Bishop's Lodge, site of the 1922 crafting of the Colorado River Compact among the seven basin states. Their assumptions were badly misaligned with hydrologic reality, as became increasingly evident in the 20th century.

See: Visiting Bishop's Lodge and the Colorado River Compact

Still, the conventional wisdom has been that the compact was difficult to achieve during a time of assumed plenty. Why would anybody want to open it up now? There was just too much risk, too much potential for inviting paralyzing acrimony.

Instead, in a new era of cooperative, water managers in the 21st century has created end-around agreements. The most recent iteration of end-around is the 2019 Drought Contingency Plan. It is being followed by another such plan, to be ready by 2026, requiring harder decisions, more compromises, greater recognition of the water supplies that are little more than half of that were assumed 100 years ago.

More will be needed, said Babbitt. "We can no longer just kind of muddle along. We really have to think big, because we're going to have to create a new regulatory framework. And it doesn't mean that we have to start over from scratch," Babbitt told the LA Times.

"The Colorado River Compact has worked for 100 years. But there is now a future scenario in which the fixed delivery obligation — from the Upper Basin states at Lees Ferry to California, Arizona and Nevada — simply doesn't work."

In this, Babbitt alludes to a clause in the compact, Article III(d), which requires Colorado and other upper-basin states to not cause the river to flow less than 75 million acre-feet over the course of every 10 years. But what if the river is only producing 9 million acre-feet?

Does that mean Denver can't divert water? Or the Colorado Big-Thompson? Even in Fort Morgan, people drink Colorado River water.

We're in for a rude reckoning still in Colorado, regardless of how this shakes out on the Colorado River Compact. New landscaping I see in Arvada, where 72% of water comes from the Colorado River Basin, fails to recognize this future. Hurrah for the mayor of Aurora, Mike Coffman, who said it's time to ban new turf golf courses – just as Las Vegas has decided.

But the language of the compact might be interpreted to say that the Colorado, Utah, Wyoming and New Mexico will absorb nearly all the reality of climate change. Babbitt is saying no, it shouldn't be.

This interview reverses what Babbitt said in an op-ed published in the Arizona Republic in July 2021. "We have not

reached that point," he said of reconsidering the compact.

Babbitt may have been responding to a paper written by Eric Kuhn, the former general manager of the Colorado River Water Conservation District, and several others, including Jack Fleck, a New Mexico-based writer and co-author with Kuhn of a book called "Science be Dammed."

See my March 2020 review here.

"Our basic argument is that climate change has undermined the basic purpose of the compact – an 'equitable division' of the use of the waters of the river between the two (upper and lower) basins," Kuhn explained to me by e-mail.

"I'm surprised (and pleased) how quickly a revered figure like Governor/Secretary Babbitt has come to the conclusion as well. My optimistic view remains that we're looking at a collective interpretation of the compact that if climate change, not Upper Basin depletions, is the reason that the upper basins can't meet the 75 million acre-feet every 10 years, there is no compact violation. The chance of a formal amendment to the compact ratified by seven state legislatures and Congress is still very remote."

I'll be closely watching where this conversation goes. It would be a huge pivot for the Southwest.

Building decarbonization may be just as difficult a pivot. I have attended several meetings on this topic in the last two weeks as a hidden member in the Zoom audience. These included two meetings about Colorado's clean-heat planning. I'll summarize it this way: It's very, very complicated, the many and varied issues regarding the accounting as Colorado tries to cleanse methane from wells to homes and even from abandoned coal mines, such as one in Pitkin County.

Easier to follow was the PUC's May 13 information meeting about beneficial electrification. In a way, this meeting looked at the same elephant from a different direction, most precisely that of buildings, most of which depend upon methane, the primary ingredient in natural gas.

The lineup of speakers was impressive. I had expected much from Bryan Hannegan from Holy Cross Energy. He exceeded my expectations, delivering a spellbinding 20-minute overview of efforts by one of the nation's most inventive utilities to reinvent the energy used by buildings — and, oh, by the way, electricity altogether. I knew a lot already about Holy Cross, but was enrichened.

That same afternoon included a disclosure from Gene Meyers, who has been a noteworthy figure in Colorado in the decarbonization of buildings. He mentioned the involvement of his company, Thrive Home Builders, in a new project being planned for farm fields around the Budweiser plant north of Fort Collins. It's for 5,000 units.

Should we be impressed? The simple number impresses me. Thrive has a history of success. This is unlike a project on the northern outskirts of Pueblo that I have been monitoring for several years. North Vista Highlands has received considerable publicity for the no-natural-gas vow of a project developer, but the construction pace does not impress. Last year, it started getting streets. Streets had been paved when I visited in late April and one house was more or less finished and a wall was being erected at a second house. That was it on a spring morning.

Slo-mo by Colorado standards.

See also: Colorado on cusp of market transformation in buildings.

Montava, the 1,000-acre project in Fort Collins, looks to have energy. In his remarks to the PUC, Myers said the master developer plans a net-zero community of 5,000 units with construction starting this fall.

The Montava website lists Thrive Home Builders, Wonderland Homes, and McStain Neighborhoods as its "special home builders."

Look for more on this and other aspects of this energy transition in buildings in coming issues of Big Pivots. I'm just skimming the surface here.

Also, U.S. Energy Secretary Jennifer Granholm will be at NREL's Flatirons Campus on Wednesday morning (May 25) to announce a "major new initiative to fully decarbonizing DOE National Laboratories."

Finally, I draw your attention to a PUC information meeting this Wednesday (May 25) from 1 to 4 called "Investigation into Climate Change & Extreme Weather Impact."

This comes just after a late spring snowstorm that left more than 40,000 Xcel Energy customers without electricity. That had Cathy, my companion and first-order editor, and I talking about resilience in such events as well as the heat waves such as occurred last summer in the Pacific Northwest. How well would we survive heat of 116 degrees? In Portland. it literally basked people to death.

Even my house, with its R-56 insulation in the attic and full-house fan, would become uninhabitable in such heat, I surmised.

The PUC commissioners and staff this past year began probing weather extremes, asking for modeling about how Xcel Energy, for example, would be able to accommodate electrical demand if the temperature reached XXX degrees or even XXX degrees in the summer of 2030.

That's why what Holy Cross Energy is doing is so interesting, beginning the layout of Tesla Powerwall batteries in homes (with a long waiting list of members wanting theirs, too). Home batteries will be part of our future very soon, helping deliver power in spring snowstorms or the oven-like temperatures of June and July.

To bring this full circle, we may not have hydropower from the Colorado River dams when this heat wave arrives as it did last summer in the Pacific Northwest.

I sound fatalistic, but the climate models have, if anything, been cautious and conservative.

Postscript: I hope you find something in this issue of Big Pivots that you want to share with associates and friends on social media or directly with e-mail. Muchas gracias.