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A ton of what-ifs about Colorado's grid in 2030

by Allen Best

TV meteorologist Mike Nelson on June 9 warned that Denver would be 10 degrees warmer than average. It was.

That same day, Eric Blank, chairman of the Colorado Public Utilities Commission, wondered about regional heat waves in 2030, temperatures spiking 8 degrees above average for a full week. How well, he asked, could the electrical infrastructure of Colorado's largest energy utility hold up?

Utility commissioners were engaged in what-iffing a model created to depict future trends. They regulate Xcel Energy, which sells more than 60% of the state's electricity, and Black Hills Energy, also an investor-owned utility. Those utilities must periodically submit plans to show how they intend to meet demands.

This dance between regulators and utilities has become more complex in recent decades. Before, planning mostly meant ensuring enough generation to meet rising demand caused by Colorado's population growth of 10% to 20% a decade and the expanding use for electricity.

Newer and more complex technologies are disrupting old models. Societal concerns have shifted. Xcel Energy's resource planning now being reviewed by state utility regulators reflects those changes. State regulators are charged with protecting public interests.

"Today there are so many more options, so many other policy considerations," says Erin O'Neill, the chief economist on the staff at the Public Utilities Commission.

"It's not just about what costs the least. It's about economic development and jobs—and, in the retirement of coal plants, the community impacts of just transition. Economics and low cost still matter. But there are many other considerations."

Reducing greenhouse emissions ranks highest among priorities. Driven by the plummeting prices of renewables but also state policies, Xcel Energy and nearly all other Colorado utilities are on track to reduce emissions 80% by 2030. But decarbonizing electricity beyond 85% will

be more challenging as all but one of Colorado's coal plants closing during the next 9 years.

Storage looms as an overriding question for Xcel and other utilities. Lithium-ion batteries can store electricity for just a few hours. Utilities may need to draw on storage for days, such as during the mid-February cold snap, or as needed for heat waves of 2030—which don't seem hypothetical at all after this week of century-mark temperatures.

Xcel is studying various alternatives, including hydrogen and molten salt. John Gavan, the utility commissioner from Paonia, wondered what-if Xcel's customers had more storage in their own garages and driveways. Ford next year plans to begin selling an electric pickup, the Ford-150 Lightning, he pointed out. Ford says the batteries will be able to draw electricity from the grid or dispatch electricity to the grid.

In other words, the batteries could absorb electricity when the when the wind blows and the sun shines. Then, when demands on the grid surge or when renewable energy is sparse, the grid could draw on the battery of the pickups when supplies run low. The batteries will be large enough to meet needs of an average house for 10 days if demands are conservative—and provide electricity for other houses, too.

The Ford 150—the model with a gas engine—last year was the top-selling model in metro Denver, as it was in all states contiguous to Colorado.

If Ford sells more than 100,000 of its F-150 Lightnings in Colorado during the next decade, Gavan said, that would create 7.5 megawatts of battery storage inside Colorado garages. "And we all know that cars and trucks are parked 95% of the time," he added.

And if Colorado buys enough electric pickups and other vehicles, they could collectively provide 100 megawatts of storage, he added. That's comparable with a small coal plant.

Demand for electricity will grow, because of electric cars but also replacement of natural gas in buildings. Rising temperatures will also cause spiking demand on summer afternoons.

Colorado has clearly been warming. When Mike Nelson and other meteorologists talk about normal, they are referring to the 30-year average. Every decade, it is revised to reflect the most recent 30 years. Denver's average temperature was 1.1 degrees Fahrenheit higher for the new template of normals issued in May by the National Oceanic and Atmospheric Administration. Precipitation had trended downward. Both trends mostly prevailed across Colorado.

As for the coming decade, the particulars can't be predicted but rising temperatures can. It will get hotter.

The entrance to Winter Park on April 2.

An opportunity in Xcel moratorium on gas to Fraser and Winter Park?

By Allen Best

Tuesday's meeting of the Winter Park Town Council was at times tense, but with no real mention of the elephant in the room.

In the midst of a building boom, Xcel Energy began telling builders in early May that there wasn't enough natural gas for all the new units for some time to come. The existing 2-inch high-pressure line to Winter Park and its neighboring jurisdiction, Fraser, was at 95% of capacity. Plans for a replacement were in the works—but the most optimistic projection the utility can muster is a replacement by the end of 2022. That optimistic scenario will require expedited review and, because of the preferred route for the new pipeline, will require a permit from the U.S. Forest Service. Xcel says it is planning a 4-inch pipeline but is evaluating pipelines with diameters up to 8 inches.

Existing commitments will be honored, the utility says. Those already with natural gas will continue to get natural gas—as will those places under construction and with commitments from the company.

Other projects in the development pipeline—well, there's not enough in the gas pipeline for all of them.

Temporary systems, propane and compressed natural gas, were discussed, and there was even a bit of mention about all-electric houses.

But nowhere during the 90-minute meeting was there mention of Colorado's decarbonization goals adopted in 2019. Nor

was there mention of the suite of four bills adopted by Colorado legislators in recent weeks that collectively begin to pivot buildings, which are responsible for 10% of the state's greenhouse gas emissions, away from fossil fuels. As well, the state's Public Utilities Commission has been having discussions about this very issue of installing natural gas infrastructure that may be of little value about the time the 30-year mortgage is paid off.

In Fraser on Wednesday night, though, alternatives were mentioned. "My last house was all-electric, the house I'm about to start is all-electric, and I have 20 units beyond that will also be all-electric," said Town Trustee Andy Miller, a builder.

And a representative of Mountain Parks Electric advised trustees of all-electric opportunities.

Kelly Flenniken, director of community relations for Xcel Energy, said the moratorium had two parents: One, the utility's models that project demand failed to predict the amount of development growth in Winter Park. There has been a boom that defied standard predictions.

Second, Xcel cannot build infrastructure without justification. The Colorado Public Utilities Commission, she said, "limits proactive capital investments."

Kelly Flenniken

In Fraser, Xcel is thinking about a compressed-natural gas station between the Safeway and Holiday Inn. There seem to be no great worries about safety; noise impacts are unclear.

In an interview after the meetings, Keith Riesberg, the town manager for Winter Park, said that the two towns together have issued 90 building permits per year for the last three years. The growth has been linear, he said, not exponential—a clear contradiction to the claims of Xcel.

He also disputed the references to the Roam development as a catalyst for a moratorium. The recently approved project has entitlements to more than 1,000 housing units, but they will take many years to build out, as is also the case with Rendezvous, which has 1,800 units entitled, and Cornerstone in Fraser.

Representatives of Mountain Parks Electric will be presenting all-electrification alternatives at a July 20 workshop, he said.

Mountain Parks, the cooperative serving the communities, has been thinking about aggressive electrification of buildings. In fact, it offers what may be the most attractive rebates and financing terms in Colorado. Central to the inducements are air-source heat pumps, which use the same technology as refrigerators to extract heat from the outside air. The technology costs more upfront but the utility bills are lower over time.

"With the natural gas supply issue of the moment, it's really an opportunity for buildings in the community to learn about heat pumps," says Chris Michalowski, the power use advisor on the staff of Mountain Parks Electric.

Chris Michalowski

Mountain Parks began embracing unfolding opportunities of what the cooperative, like many others, calls Electrify Everything. It's the idea that transportation and buildings that now rely upon fossil fuels can be supplied by electricity derived from renewable sources.

That led to development of 4 pilot projects, 3 houses in Fraser and one in Granby. In these pilots, data were collected, feedback from homeowners was solicited.

"Manufacturers provide specs for the equipment, but we wanted real-world

experience as we have one of the coldest climates in the country and, specifically with the altitude, which affects equipment."

Initial data and feedback from homeowners argue for successful deployment of the heat pumps and associated technologies. From that, the utility has gone on to create incentives that Michalowski believes may be the best in Colorado: $2,000 to $6,000 depending upon the size of the system, and 1% interest 10-year-term loans.

"That really helps people offset the up-front costs of installing the heat pumps," he says.

So far, heat pumps have been installed at one business location, that of a global company with a local presence and commitment to eliminating carbon emissions from its building locations. Michalowski estimates that Mountain Parks has awarded 75 rebates, 9 this year.

The cooperative would like to see more builders take advantage of the offer. "We are going to be in a great place to be a resource for those homeowners and builders who will be going all electric if they want to build in the next 3 years," he says.

The most curious aspect of heat pumps is that they can cool equally well as heat. Keep in mind that Middle Park—the basin located upstream of the Gore Range—is one of the nation's premier locations for long underwear.

It still gets colder than Denver, to be sure, or even Vail, but not as cold as before. And it can get sort of hot. It was 84 degrees in Fraser on Wednesday.

But now more units are getting air conditioning; you have to if you want high rankings in the Trip Advisors of the world. "Thirty years ago, people would have thought you were crazy," says Michalowski. "Now it's nice to have."

At the Fraser Town Board meeting, Miller didn't call for a curb on natural gas, although he did mention San Francisco's ban last November on natural gas in new construction. "If we really want to get to a sustainable future, it has to be electricity," he said.

Sunsets during August 2020 were usually reddened along the northern Front Range because of smoke from the nearby Cameron Peak Fire. Photo/Allen Best

With wildfire risk rising, utilities bet on solar + storage

by Allen Best
Energy News Network

As drought and wildfire risks intensify across the Southwest, utilities are turning to solar, storage, and microgrids to bolster electric grid resiliency.

In Taos, New Mexico, Kit Carson Electric Cooperative has two major solar-storage projects in progress that it hopes will provide electrical resilience to nearby customers in case of wildfires.

"This could be the driest summer that we have had on top of the other dry summers," said Luis Reyes Jr., chief executive of the cooperative. That drought is heightening fire risks and in turn improving the financial case for distributed energy that can operate despite transmission disruptions.

In Taos, the Kit Carson Electric Cooperative is constructing multiple solar and storage projects to provide local generation and backup power in the event of transmission lines being disrupted.

Kit Carson serves electricity to 29,000 members in Taos and two other counties along the Colorado border. Included are four ski areas and the Taos and Picuris pueblos. It's a place of small towns and roads that penetrate the Sangre de Cristo Mountains like veins and arteries. The cooperative, named for the famed fur trapper and guide who is buried near the central plaza of Taos, has 9 customers per mile of electrical line,

compared to perhaps 400 per mile of investor-owned utilities.

Wildfires were uncommon when Reyes was growing up in Taos in the 1960s and 1970s. They remained scarce even after he returned with a degree in electrical engineering in 1984.

Now, as temperatures rise—0.8 degrees overall in just the last 30 years at Taos—wildfires pose a more menacing risk. Last October, a blaze charred 10,000 acres just outside the Kit Carson service territory. This year, winter produced a subpar snowpack and runoff has been a relative trickle, with many creeks already dry. The remaining snowpack for the Rio Grande, which flows past Taos, was 51% of normal as of May 25.

Drought maps tell the same parched story or worse across the Southwest. Most of California, Nevada, Utah, Colorado, New Mexico and Arizona were already in drought by late last month, and 38% of that area was already classified as exceptional drought compared to none at this time a year ago. Chuck Maxwell, predictive services manager for the Southwest Coordination Center, predicted above-normal fire potential that was rated as "significant."

Reyes said the potential for Kit Carson's electrical lines to start fires is what most keeps him up at night. "It would devastate our tourism economy," he said of the wildfires. Kit Carson crews work year-round to clear trees along power lines. "If we're going to break the budget, let's break the budget on tree trimming, so we can sleep at night," he said.

Fires will likely happen anyway. That has driven Kit Carson's strategy of creating microgrids. At a site just outside Taos, near a famous bridge across the Rio Grande, 15 megawatts of solar and 12 megawatts of storage are being installed.

Reyes said the location was chosen because it's near a substation but also because of the value the batteries can provide for critical circuits serving a hospital, firefighters, and other important community services in the Taos area.

The second component, 6 megawatts of solar and 4.5 megawatts of storage will be at Angel Fire, a four-season resort community located 25 miles from Taos. It has a population of 900 that doubles or triples during peak ski and summer seasons. As with the Taos Mesa batteries, Kit Carson hopes to learn how to use them to maximum advantage. In both cases, the battery packs are from Tesla.

Kit Carson may add more storage in the coming years. It depends upon lower prices, improving technology, and negotiations that seek to put a price on resiliency. For example, what is the value of the Taos Ski Area having certainty of electricity nearly 100% of the time?

"Everybody talks about resilience. What do we pay for resilience?" Reyes said. "That is the discussion we're having."

In most cases, storage will be coupled with solar, as in the deployments this year. Kit Carson began investing in solar in 2005 when it was still relatively expensive and, said Reyes, dismissed by many as "hippie power, so to speak."

By 2016, when Kit Carson gained its independence from wholesale supplier Tri-State Generation and Transmission, solar was becoming a mainstream technology. Kit Carson, aided by its new wholesale supplier, Guzman Energy, set out to harvest power from the sunlight that has drawn artists to Taos for more than a century. The goal was to meet full daytime needs by 2022. With these two new solar farms, Kit Carson will hit that mark nine months early.

Storage has been a more difficult argument. Prices have now fallen enough that, with multiple benefits, the batteries can be justified. One benefit is from shaving peak demand. Daytime demand peaks of 40 megawatts grow to 65 megawatts in evening hours, which can at

least partly be met by drawing on the new batteries. That saves the higher cost of imported energy during evening hours.

Through Guzman, Kit Carson also expects to sell electricity into the market established by the California Independent System Operators, or CAISO. Then there is the benefit in the case of disruptions to supplies such as in the case of high winds or last year's wildfire.

A well-designed microgrid needs to place stored energy proximate to demand, points out Bryan Hannegan, the chief executive at Holy Cross Energy, a cooperative serving about 43,000 members in the Aspen-Vail-Glenwood Springs area of Colorado.

"Storage has to be co-located not only with the solar PV but with the load/demand it is serving to be truly resilient," Hannegan said. "Solar plus storage—even a few miles away—isn't resilient if the wildfire cuts the power line connecting it to you. The closer the resources, the more resilient it is."

Holy Cross has had good cause to think hard about resilience. A wildfire in 2018 nearly caused an economic maelstrom. Firefighters got to a wooden pole during the Lake Christine wildfire of 2018 just as fire was beginning to burn it. Had it burned, the last transmission to Aspen would have been severed, darkening the resort town during its Fourth of July weekend.

Last year brought more mayhem to the Holy Cross service territory: a 33,000-acre human-caused fire called Grizzly Creek. Transmission lines were not seriously threatened, but the fire caused Interstate 70, Colorado's major east-west artery, to be closed through Glenwood Canyon for 13 days during the height of summer travel season.

With a goal of 100% renewable generation by 2030, Holy Cross plans to import wind from the Great Plains while also buying solar in its mountain valleys. Three projects announced this year include both solar and storage: one for 4.5 megawatts of solar and 15 megawatts of battery storage at the Colorado Mountain College Spring Valley campus, and then two more projects that together will add 20 megawatts of renewable generation and 40 megawatts of storage in Parachute and Silt, towns located along Interstate 70.

They were inspired by the pioneering work in Hawaii, Hannegan said. There, in early 2019, Kaua'i Island Utility Cooperative went online with 28 megawatts of solar and 100 megawatts of 5-hour storage capacity. Like Kaua'i Island, Holy Cross has a goal of achieving 100% renewable energy. In all cases, said Hannegan, storage makes solar easier to absorb into a utility system, especially when there is lots of solar already on the grid.

But lithium-ion batteries cannot store power for long periods. A paper published in the June 16, 2021, issue of the energy journal Joule laid out the challenge for Holy Cross and other utilities. "We are going to need more than batteries to address diurnal and seasonal challenges of operating a power system entirely on clean energy," Hannegan said.

In northern Colorado, the Poudre Valley REA doesn't aspire to 100% renewables by 2030. It does want microgrids, perhaps at all 12 fire stations in its service territory that stretches between exurbs and farms along the Poudre River to the Continental Divide in Rocky Mountain National Park.

The library at Red Feather Lakes had requested help in maintaining reliable electricity as part of its function as a community hub 45 miles northwest of Fort Collins. The Red Feather area is served by one 145-kilovolt transmission line. Grants and other assistance yielded a 20-kilowatt solar system and 140 kilowatts in batteries able to meet the needs of the hamlet of 40 homes and businesses for 8 hours.

In early 2021, the microgrid went live. It's already proving valuable in shaving electrical needs during evening hours, when electricity to Poudre Valley from its wholesale supplier, Tri-State, costs the most.

The microgrid would have been even more useful last year. A wildfire called Cameron Peak torched 209,000 acres, the most in recorded Colorado history between Aug. 13 and Dec. 10, burning 224 homes and 220 outbuildings. None were at Red Feather Lakes, but power to the community was severed for 8 to 10 hours as a precaution when flames approached.

"This allows us to ensure the resilience for that area," said Jeff Wadsworth, the chief executive of Poudre Valley REA. It's not just wildfires, he pointed out. Car and truck accidents along transmission lines can cause power outages. So can snow and other storms. A funnel cloud near Red Feather Lakes was reported in 2014.

While Poudre Valley works with several national labs and Tri-State in how to manage this microgrid, it is also examining prospects for future deployments of batteries. One criterion, said Wadsworth, would be the locations of the 12 fire stations in the cooperative's service territory.

Kit Carson wants to invest in more storage, likely at all 14 substations. Reyes is unsure when to pull the trigger. Many utilities, like Kit Carson, have begun buying Tesla battery packs now. But will an even better storage technology emerge in the next few years?

Whether it's chasing 100% renewable goals or confronting the prospect of far bigger, more dangerous wildfires, it's the question being asked in many places in the Southwest.

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Aspen police have no suspects in Christmas natural gas sabotage

Aspen police still have no idea who shut off natural gas deliveries to 3,500 homes in Aspen as well as businesses at Christmas.

Sabotage occurred at three locations on Dec. 26, two outside of Aspen and one inside the town. In those outside the town, the saboteur or saboteurs wrote "Earth First!" on pipes protruding from the ground.

Was this the work of an eco-saboteur? The group Earth First! has not taken responsibility, nor has anybody else.

The sabotage was not a matter of turning just one valve; it required turning the valves in a way that de-pressurized the entire system. Because of that, Aspen police wondered if gas company employees, current or former, who might have had a grievance, were responsible.

Evidence so far has failed to emerge to substantiate either hypothesis. "We don't have any active suspects right now," Aspen Police Sgt. Rick Magnuson told Jason Auslander of the Aspen Times.

The outage lasted for three days while temperatures dived to single digits at nighttime, leaving homes without heat, hot water and, for some, the ability to cook.

Black Hills Energy, the natural gas utility at Aspen, estimates it cost $3.4 million to restore service. The expense was caused by the need to draw on gas-distribution technicians from a broad area of the Wet and Midwest to manually turn off gas meters at each individual building, re-pressurize the system, test it, then individually return to each home and business to turn on the meters.

Keystone XL and the end of the golden age of oil

By Allen Best

The age of oil is not over, nor will it be soon. The energy density of oil is fabulous, the resource remains relatively abundant, and it can be transported easily. For these reasons and more, it has been called liquid gold. But I see a chapter ending with last week's announcement by TC Energy Corp. The Canadian company said it has ended the quest to build the Keystone XL pipeline from Alberta across the midsection of the United States. The golden era for oil has ended.

Because history isn't as tidy as we would like, maybe the next chapter actually starts with something that had happened the prior week in June. Three new directors were elected to the board of Exxon Mobil. A hedge fund that owned a mere 0.02% of the shares of the oil giant had gained the support of three other funds that collectively own 20%. These new directors want to accelerate the oil giant's effort to decarbonize.

The New York Times reported that analysts said the impact of Exxon's defeat on other corporations around the country was hard to overstate. There was also this curious fact: Exxon's stock price actually rose after the insurgency.

In Big Pivots during coming weeks I hope to publish an essay by a contributor with far greater expertise than my own in the matter of using corporate investments to steer climate policy. However, I suspect we'll also be talking for more years about the relative role of Exxon and other oil companies vs. the suppliers of China, India, and other countries.

About the Keystone XL, I have some knowledge. In 2010 I visited the Athabascan oil sands near Fort McMurray, the largest deposits in the world of the substance called bitumen. Development began in 1978 by a company called Suncor. You may recognize the name. It operates the refinery north of downtown Denver.

Near Fort McMurray, we saw the humongous trucks rumbling with their payloads of the hydrocarbon-soaked rock. We also visited a location of in situ extraction, in which the hydrocarbons are drawn from the subterranean as is the case in 80% of the Athabascan deposits, much like contemporary oil and natural gas extraction.

We were also taken to an idyllic rumple of land where buffalo grazed in the distance on reclaimed land.

We saw little of Fort McMurray itself, but even then it was swelling to a population of 80,000. Presumably that

Bitumen on the move near Fort McMurray, October 2011. ***Photo/Allen Best***

figure did not include the men whom I saw at the airport. They were from Nova Scotia, along the Atlantic Coast of Canada, where work was scarce. They were returning to their families after a two-week stint at Fort McMurray.

Jobs, good-paying jobs, were plentiful. It was a sector that had made Alberta wealthy. Downtown Calgary, part of that same trip sponsored by the Canadian government, was full of gleaming new towers.

In Canada, the bitumen and heavy crude oil of the Athabascan and other deposits were always described as "oil sands." Back home in Colorado, when I went to programs sponsored by environmental groups, it was always "tar sands."

It was also "tar sands" in Nebraska the following spring of 2011, where I spent most of a week in what was perhaps the most plum reporting assignment I have ever received. I was commissioned by a magazine called Planning, which gave me enough money to dawdle, as necessary, which you need for good reporting. The editor—nearing retirement—wanted to reward me and understood how big this story was going to be. I was ahead of the folks from NPR and others.

I followed the route of the existing shoulder-high Keystone pipeline in east-central Kansas to Steele City, Neb., the destination of the proposed Keystone XL. Then I drove diagonally toward the Sand Hills. One evening I sat in a library of one of these small farming towns to hear a pitch from an organizer of opposition. The men stood in the back, most with their billed hats still firmly on their heads.

Two days later, I walked with one of those ranchers on his cow pasture overlooking the Niobrara River. He talked about his efforts to avoid over-grazing, about past failures—and about his worries about a potential pipeline spill wrecking his efforts to be a good steward of his land.

Nebraska rancher Karl Connell in May 2012. ***Photo/Allen Best***

Under this anti-Keystone tent were seemingly incongruous allies: conservative Nebraska ranchers, climate activists, and Native Americans of the northern Great Plains. Their grievances varied, but what struck me as interesting then was that the first Keystone pipeline had not provoked such opposition.

The backstory was the enormous spill from a ruptured pipeline in Michigan. Then, it seemed that everywhere I looked were spills, mostly small. Along with this came the swelling evidence that the climate science was fundamentally sound—and we had to figure out how to reduce emissions.

You can't talk about Keystone XL without mentioning Bill McKibben. He made opposition to the Keystone XL pipeline a central part of his climate activism. I went to Boulder when he spoke at the Glenn Miller Ballroom in 2012, and it was standing room only.

It was part of his "Do the Math" tour, which came after his essay in Rolling Stone magazine: "Global Warming's Terrifying New Math." His take-home was that there was no way that all of the fossil fuels "owned" and theoretically available for development could in fact be developed if we hope to avoid a temperature increase of more than 2 degrees C. That essay, almost a decade later, is required reading for understanding what's happening now.

Included in that essay is this paragraph:

"The paths we have tried to tackle global warming have so far produced only gradual, halting shifts. A rapid, transformative change would require building a movement, and movements require enemies. As John F. Kennedy put it, 'The civil rights movement should thank God for Bull Connor. He's helped it as much as Abraham Lincoln.' And enemies are what climate change has lacked."

And with that, McKibben went on to define the "enemy:"

"Given this hard math, we need to view the fossil-fuel industry in a new light. It has become a rogue industry, reckless like no other force on Earth. It is Public Enemy Number One to the survival of our planetary civilization. … According to the Carbon Tracker report, if Exxon burns its current reserves, it would use up more than seven percent of the available atmospheric space between us and the risk of two degrees. BP is just behind, followed by the Russian firm Gazprom, then Chevron, ConocoPhillips and Shell, each of which would fill between three and four percent. Taken together, just these six firms, of the 200 listed in the Carbon Tracker report, would use up more than a quarter of the remaining two-degree budget."

McKibben didn't mention Keystone XL in that essay. That essay, however, was the spark for creation of 350.org. Less than a decade later, it's an organization able to make some noise in Colorado, where it is now branded as 350 Colorado, and other states. (The 350 refers to the parts per million of carbon dioxide that scientists say we could safely have topped out at. At the time McKibben wrote that essay, the accumulations were at 396; this year they're at 420. We're barreling toward 500 ppm where all bets go off the table).

In 2015, President Barack Obama vetoed a permit for the pipeline, saying it would undercut American leadership on climate change. Donald Trump, reversed that veto, Joe Biden in January reaffirmed it.

This veto doesn't mean the oil won't make it to market. A State Department report even before Obama's veto had

Bill McKibben in Denver, April 2019. ***Photo/Allen Best***

pointed out that the oil would find its way to markets in other ways.

The Toronto Globe and Mail last week emphasized that point. Two major pipelines are under construction from the oil/tar sands deposits. The $12.7 billion Trans Mountain expansion underway seeks to deliver hydrocarbons to a Pacific Ocean port in northern British Columbia. From there, it can be delivered to refineries in Southern California, to Asia and beyond. Oil – even relatively expensive oil, as is the case with this produce from bitumen —is easily shipped around the globe. To the east, the Enbridge Line 3 replacement would deliver the bitumen and heavy crude oil to refineries in the American Midwest.

Denver's Suncor Refinery. ***Photo/Allen Best***

Writing in the New York Times on Saturday, McKibben pictured the Keystone XL defeat as only a tentative victory. "The question now is whether it will be a one-off victory or a template for action going forward—as it must, if we're serious about either climate change or human rights," he wrote.

Perhaps McKibben is right to reserve judgment. My gut is that this is a chapter ending, the ending of the golden age of oil. Oil transformed life in America – and that across much the world. It gave us vast freedom, creating a literary art form of the road trip from the typewriters of Jack Kerouac or Hunter Thompson, and will soon be the largest source of emissions in Colorado and many other places.

Cheap oil plays to our self-indulgence. The late Randy Udall, in one of his standard lectures, used to paint this picture of luxury enabled by oil by talking about Cleopatra. I forget how many Egyptian slaves he said it took to power her boats as she glided up and down the Nile. His punch line that now every woman with an SUV could live like Cleopatra, because of cheap, easy oil.

Oil made many fortunes. Even today, you scratch very far below the surfaces of places like Aspen and Vail and there's likely to be an oil fortune in somebody's familial closet. It's part of my more modest resources. My aunt worked at Conoco in downtown Denver and part of my inheritance came from her stocks in that oil company. Even today I own a sliver of mineral rights in Colorado's Weld County and in the Marcellus shale of Pennsylvania.

In Colorado, oil is still a big player. Somewhere I read that the average wages from the oil sector in Colorado are $180,000. Driving in the Wattenberg field I see mini-castles with four-car garages. Dollars to donuts, there's oil money there.

But new and better technology has started arriving. Electric cars are becoming affordable and the charging infrastructure is getting put in place. Colorado is at 35,000 EVs now but hopes to be near 1 million within a decade. We may end up some real problems in our need for lithium. But even the wealthy emirates of the Middle East recognize that the golden age of oil is ending.

Again, I'm reminded of Wyoming, of my visit to Gillette in 2011, when there was still much scoffing about renewables. Now where are we?

Oil will take longer. It's an extraordinary resource. It's not so extraordinary that the Keystone XL will get built to Steele City. The golden age of oil is over.

Energy markets beat storage as Colorado utilities decarbonize

By Allen Best

A long-awaited report commissioned by the Colorado Public Utilities Commission confirms what executives of many of the state's utilities have been saying: Colorado needs to be part of an organized market for electricity.

The study, which was conducted by Siemens and posted June 11, said that as utilities continue to add renewables in line with the state's goals of 80% by 2030, they will have to invest much more heavily in storage in order maintain reliability of electrical supplies.

> "Colorado can benefit from a reduced need for energy storage systems with participation in larger markets."

But storage capacity will be less, according to the study, if the utilities join regional markets that allow sharing of electricity resources across much broader geographic areas. And this will mean cost savings for the utilities and their customers.

The Siemens report examined four market alternatives, but concluded that the cost savings would be greatest through larger regional market participation in a regional transmission organization, or RTO.

This report's conclusions echo statements made by executives of several utilities in Colorado. To achieve deep, deep decarbonization, they have said, will require creation of broad markets, especially an RTO. Colorado's largest utility, Xcel Energy, has resisted.

"A transition to a clean generating portfolio of primarily intermittent resources carries with it a requirement to ensure energy sufficient, generally using battery energy storage systems," says the report in its conclusion. "Colorado can benefit from a reduced need

for energy storage systems with participation in larger markets."

This gets wonky to the X degree. It's not an easy story, like shutting down Coal Plants X and Y. But architects of Colorado's strategy to reduce emissions are in almost complete agreement that this is terribly important stuff. If you care about climate change, bear with me.

The report was triggered by state legislators in 2019. That session's takeaway energy and climate legislation established economy-wide decarbonization goals, including 50% by 2030. Additional laws adopted that session were complementary, including the Colorado Transmission Coordination Act. The law directs the Public Utilities Commission to evaluate participation of Colorado utilities in:

- energy imbalance markets;
- RTOs (regional transmission organizations);
- power pools, or
- joint tariffs.

This report sets the stage for public testimony, as required by the 2019 law. The hearing is scheduled for Thursday, June 24th, from 9 a.m. to 5 p.m. Once again as per the law, the utility commissioners must issue a ruling no later than Dec. 21 whether participation by utilities in these markets are in the public interest.

If the PUC decides yes, it is in the best interests of the public for utilities to join one of these market types, the commissioners shall direct utilities to take appropriate action in that regard.

It's useful to look back to 2019 and also to the 2021 legislative session.

First the prelude: utilities had been meeting for some time in 2017 and 2018 as part of the Mountain West Transmission Group. Xcel Energy pulled out in 2018, dooming the effort.

In 2019, Tri-State Generation & Transmission and its partners, most notably the Western Area Power Administration, forced the issue by going in with the Southwest Power Pool to start an energy imbalance market among primarily Colorado and Wyoming utilities. This is best understood as a baby step.

Xcel Energy and partnering utilities along the Front Range partnered with an energy imbalance market aligned with the California-based CAISO, or California Independent System Operators.

Colorado Springs aligned with the latter at first but has since switched to the former, i.e. Southwest Power Pool.

Now comes a bill, SB21-072, from the recently concluded legislative session. The bill will be easily overlooked in the arcane world of energy and climate legislation. It creates a state electric transmission authority, an agency that will be sort of the overseer of new electric transmission. In effect, it will force Xcel and other utilities to work together, with the intent of doing what is best for Colorado altogether. The interests of the individual utilities and the state can coincide, but not necessarily so.

The bill also sets a deadline for utilities that own and control transmission facilities to join an organized wholesale market. The original bill language said an RTO. This definition leaves the door open for something else.

Notable are the prime sponsors of this bill: State Sen. Chris Hansen and Rep. Jerry Valdez, both Democrats from Denver with deep backgrounds in energy; and also two Republicans, Sen. Don Coram and Rep. Marc Caitlin, both members of the Delta-Montrose Electric Association, the cooperative that broke away from Tri-State, partly in a dispute about the cost of electrical transmission.

Look for more about SB21-072 in the next issue of Big Pivots.

Wow! Just wow! Next issue, a closer look at the torrent of bills that came from Legislature

Where to start with this recently concluded session of the Colorado Legislature?

That a quartet of bills, to become law, collectively represent what may be the most comprehensive effort anywhere in America to start suppressing emissions from buildings?

That several of the bills have what may be a first in these United States, the "social cost of methane?"

That the goals of environmental justice were explicitly embraced in so many of the bills, an effort to right past wrongs as Colorado conducts this giant—well, of course I'm going to call it Big Pivot—from carbon-based energy?

That Colorado will soon have a transmission authority and give clear direction to the state's utilities that they will play nice in the sandbox of transmission planning and participate in regional electricity markets?

That the noble concept of "just transition" identified in 2019 will in fact have some short, stubby legs, with details to be worked out in another session?

"Without question, this has been the most consequential session of the General Assembly for climate change legislation in history," said Jan Rose, of the Climate Reality Project, in her session summary on Tuesday.

I've interviewed close to a dozen people so far—legislators, state employees, environmental groups, and others—for a story that I hope to get out by late June. I aim to deliver the best story you'll read on this session as regards climate and energy legislation.