

BIG PIVOTS

ENERGY and WATER transitions in Colorado and beyond

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It's getting worse and worse yet on the Colorado River

by Allen Best

The risk of lower and lower water levels in Lake Powell and other reservoirs in the Colorado River Basin keep getting higher and higher.

An analysis by the U.S. Bureau of Reclamation released Sept. 22 finds an elevated risk of 25% to 35% of the water level in Powell falling below the minimum power pool by July 2022.

Minimum power pool is the level below which there is insufficient power to produce electricity.

The drought began in 2000, but as several studies have concluded that drought fails to fully describe what is happening in the river basin. Those studies point to rising temperatures that have produced aridification. Even with the same volume of water falling from the sky, less of it will become river water.

As an Aug. 24 [article in Science magazine](#) pointed out, about 17% of baseline precipitation ended up in the Colorado River in the 1930s and '40s, with a majority of that water coming from Colorado in the form of snowmelt. Today, it's about 14%.

Since July, the Bureau of Reclamation began releasing water from its smaller reservoirs upstream of Powell—Flaming Gorge, Blue Mesa and Navajo—with the hope of augmenting Powell sufficiently. The headwaters states for the Colorado River had an exceptionally dry spring, exactly opposite of what was happening east of the Continental Divide in Colorado. The runoff into Lake Powell was 26% of average, despite near-average snowfall last winter.

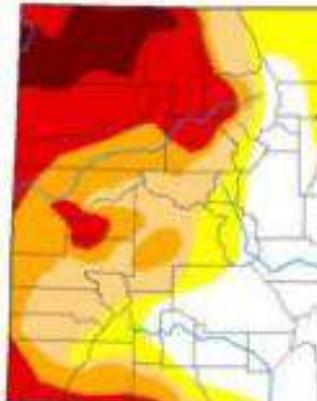
Total storage in the Colorado River reservoirs today is 39% of capacity, down from 49% at this time last year.

John Fleck, writing on his website, [Inkstain](#), called the latest announcement “something remarkable.” The government predictions used something pioneered a decade by Eric Kuhn and Dave

Kanzer of the Glenwood Springs-based Colorado

River District along with John Carron of Boulder-based Hydros Consulting. They thought it not useful to base predictions on the full hydrologic record of the Colorado River going back to 1906. Instead, they said, better would be to use a short-term frame, the last 30 years. They call it the stress test.

“The idea is that the traditional approach—using the entire period of record to model the probabilities of future river flows—is no longer valid because climate change is changing the river,” he explained.



Colorado's latest drought map.



Katharine Hayhoe delivered a lecture in 2015. Photo/Allen Best

Katharine Hayhoe on how to change ‘us’ and ‘them’ in climate into ‘we’

by Allen Best

It’s hard to image the climate scientist Katharine Hayhoe getting grouchy. I’ve seen her twice in person and also in video presentations, most recently on Sept. 23 via a Zoomed video interview sponsored by the [Vail Symposium](#).

She’s bubbly and funny, always brimming with good cheer.

Hayhoe can talk science deeply because, after all, she has a PhD. in atmospheric science. But that’s not what she has become known for.

Her roots were in observational astronomy—studying stars, galaxies and quasars—before she took a class about climate change and was shocked at what

she learned. “I study climate change, one of the most pressing issues we face today,” [she says on her website](#). “I don’t accept global warming on faith; I crunch the data.”

Hayhoe is a woman of faith, though. She was reared in Toronto, among the evangelical group Plymouth Brethren and accompanied her father, who was a church pastor and a science teacher, on missionary assignments in South America.

She landed amid the cottonfields and oil derricks of West Texas, at least in part because of religion. Her husband was offered a position as a linguistics professor at Texas Tech but also was named pastor of a local church. She tagged along, also secured an appointment at the university.

“It was really moving to Texas that set me on this path of figuring out how to communicate about climate change,” she told *The New Yorker*’s Eliza Griswold for a [profile that was posted Sept. 16](#). She was invited to speak, and then again and again.

She recalled being asked to speak at a Baptist church in Lubbock in 2009.

“I was nervous because talking about your faith is just not something that a scientist does,” she said. “It felt very uncomfortable, like pulling your pants down or baring your soul.”

As she spoke about reconciling the science and her religious beliefs, the group became more receptive.

Since then, Hayhoe has emerged as perhaps the premier apostle for climate change communication. The Sept. 21 release of her new book, [“Saving Us: A Climate Scientist’s Case for Hope and Healing in a Divided World,”](#) was presumably tied specifically to the New Yorker profile and the Vail Symposium segment.

The book details her views on how to communicate the threat and instigate action. Action, she told the Vail Symposium audience, can mean deciding to drive across the country on the family vacation instead of flying. Or, as she told The New Yorker, it can mean pushing for policies that shift our energy foundation from fossil fuels. That means lobbying politicians at the local and state level.

After we watched Hayhoe on the Vail Symposium, my companion and I talked about her persona. My companion described her as a Republican—perhaps linking her evangelical faith, which has become co-opted by the political evangelicals. I objected, demanding evidence. Googling the Internet, we could find nothing one way or another.

In the 1990s, if climate change was not a high-profile issue, neither was it polarized. By the time Hayhoe got to Texas, it was. She told the New Yorker about being invited to speak to a geology class about the carbon cycle, the way carbon travels between

water, Earth and the atmosphere. In the last few minutes of her lecture, she described how human activity has increased the amount of carbon in the atmosphere.

Out of the darkness in the windowless lecture hall came a question. “Are you a Democrat?” he asked.

No, she replied, she was a Canadian.

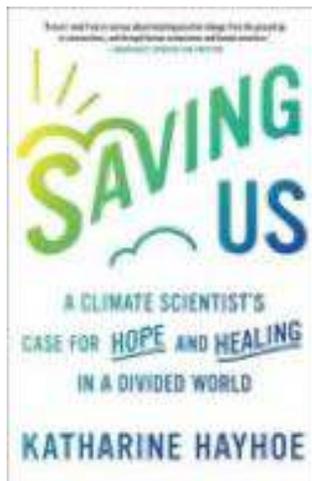
As her profile has grown, so has the hostility directed to her. She gets abusive mail all the time. Some modify her last name to cast aspersions on her morality. In the New Yorker profile, she confided that her name is not on her office door at Texas Tech as a precaution.

Her Christianity is at the root of her activism. She cited the Bible in an [interview with The Washington Post Magazine](#) in February. She cited both Genesis and Revelations, the bookends of the Bible, and other passages between as requiring Christians to care for the smallest and most significant aspect of nature, and about how we are to love others and care for others.

“Well, the poor and vulnerable today are the ones most affected by the impacts of a changing climate,” she said. “In fact, when I connected the dots between poverty, hunger, disease, lack of access to clean water and education and basic equity, and the fact that climate change is making all of those worse, that’s what led me, personally, as a Christian, to become a climate scientist.”

As a climate change communicator, Hayhoe very fundamentally wants to move the conversation from us and them. Instead, she wants a discussion about us and we.

“With climate change, we usually divide the world into two groups of people, us vs. them, the believers and the deniers,” she



told the Vail Symposium audience. Surveys have found more complex belief terrain: 26% alarmed, 29% concerned, 19% cautious, 6% disengaged, 12% doubtful and 8% dismissive.

Those 8% are beyond conversation. “There is no secret to a positive conversation with a dismissive,” she said. “You can’t, and believe me, I’ve tried a few thousand times.”

But with others – the doubtful and the cautious – you can have conversations with the proper approach. That approach seeks to find common ground. In the case of one of her fellow climate scientists, she culled out his love of deep-sea diving – a platform, she said, for talking with others similarly passionate about oceans (where 90% of the heat caused by burning of fossil fuels is found).

With another, she found common ground in their love of skiing. She cited the loss of snow cover at Taos – a logical destination for her ski trips given that it’s a 6-hour drive from her home in Lubbock.

Parenthood is another common denominator. “I have a child, and it just changes you forever.”

Asked if she would advise protecting children from “climate anxiety” by avoiding

discussion of the bad outcomes, Hayhoe counseled a different approach. She recommended having discussions with children, telling them the facts. They’ll hear about it anyway, she said. But in that discussion, children must be told what they, too, can do.

Most of all, she talked about hope. It was, she said, something borne of despair. “Action is the hopeful response to despair.”

Given how much change must happen to address the causes of climate change, there is much to be discouraged about. Fossil fuels have brought our civilization to this level of comfort. Can we really change?

Hayhoe pointed out to massive social movements in the past. Two centuries ago it was acceptable for one human being to own another. In this and other ways, the world has changed profoundly.

And – this is key – she wants people to understand they have power, too.

“It was not because a president or CEO or king or rich person decided. It was because the average, ordinary people of the world decided it should and would be different.”



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How this oil-and-gas man became a lead figure in capture of coal-mine methane

by Allen Best

Tom Vessels was eulogized on Sept. 17 in Denver. As afternoon sunshine streamed through the windows of the City Park Pavilion, stories were told about his backpacking trips, devotion to family, and thirst for adventure, even something ribald he had once said at a beer festival.

Almost nothing was said about Vessels' remarkable turn in business. He had followed his father into oil and gas, then veered course. He wanted to capture methane, the primary constituent in natural gas, as it escaped from coal mines.

Tom Vessels and a painting of his father, Thomas George, circa 2010. Photo/Allen Best

Colorado has hundreds, perhaps even thousands, of old coal mines from Trinidad to Louisville, Oak Creek to Crested Butte. All were dangerous, partly because methane emissions associated with coal along with coal dust could, with just the right spark, produce an explosion that maimed and killed men by the scores, sometimes the hundreds.

Vessels turned his attention to still-working mines and extremely gassy mines near Paonia. He wanted to burn the methane to create electricity instead of allowing it to escape into the atmosphere.

Methane has 84 to 87 times the heat-trapping properties of carbon dioxide as measured over 20 years. This short-term potency matters in a world that feels like a whistling tea kettle. Colorado's temperatures this summer were fourth hottest on record. Those on the Western Slope were second hottest.



Tom Vessels was the driving vision of the methane capture at the Elk Creek Mine. Photo/Allen Best

Vessels chose the then still-working Elk Creek Mine and then solicited partners. The Aspen Skiing Co. was crucial, eager to match its alarm about global warming with action. It agreed to pay a premium price for enough electricity to operate all of its four ski areas and complementary businesses. That gave Holy Cross Energy, the electrical supplier for those ski areas, cause to be involved. Later came California cap-and-trade money.

The mine owner, Bill Koch, of the famous Kansas family, also agreed to participate. It's fair to assume that profit, not global warming, motivated him.

The Aspen Skiing Co.'s Auden Schendler, who had become fast friends with Vessels, wrote a remembrance after Vessels died of melanoma on Sept. 10. He called Vessels the "the leading authority in the United States" in coal-mine methane capture.

If an oil-and-gas man by trade and training, he said, Vessels was a scientist at heart. "Tom didn't worry much about climate change in the first part of his life—

he thought volcanoes emitted more CO₂—until he heard a scientist speak on the subject. And he thought: 'Well then, we've got a problem.'"

Over the years, added Schendler, Vessels often shook his head at the failure of government and even environmental groups to understand the threat posed by methane.

In Denver, the service for Vessels was attended by 200 to 300 people, among them former Colorado Gov. Bill Ritter, whose term from 2005 to 2009 marked the start of Colorado's big pivot in energy. Also there was Christopher Caskey, the managing director for Vessels Carbon Solutions.

Caskey, who has Ph.D. in applied chemistry from the Colorado School of Mines and worked at the National Renewable Energy Laboratory, wants to harness the methane emissions from the Dutch Creek No. 1, a former mine located 8 miles west of Redstone.

After an explosion in 1964 killed 9 men, state officials called Dutch Creek the second

gassiest coal mine in the United States. Another explosion in 1981 killed 15. Mining ceased in 1991.

In terms of global warming potential, according to one estimate, the emissions from this one mine surpass all others combined in Pitkin County, a long and skinny county that includes Aspen but also Dutch Creek. That says a lot. Think of all the private jets flying into Aspen, the mansions, the steady river of cars and trucks.

If Tom Vessels is now gone, he inspires those who follow. He was ahead of his times and, given the potency of methane, an important man of his times.

Dissent in Colorado about how to tamp down emissions of oil and gas sector

The Colorado Air Quality Control Commission on Sept. 17 agreed to move forward on rulemaking that would reduce emissions from the oil and gas sector.

But there is great dissent from some in the environmental community about the approach proposed by the Air Quality Control Division. The division “has not demonstrated how its proposals can be certain to achieve the necessary emission reductions,” wrote Earthjustice in a comment submitted Aug. 31.

Earthjustice and others want direct regulation. They describe the division’s proposal to meet 2030 targets for emissions reduction from the upstream sector of oil and gas extraction an unverifiable and ill-defined methane intensity program..

Instead, Earthjustice wants a package of direct regulations that will assure a 60% reduction by 2030 and use the intensity program as a pilot or backstop. A letter from the group’s Rumela Roy and Alexandra Schluntz said Colorado must “address

significant challenges with respect to measurement, verification, and enforcement.”

The Air Quality Control Commission in October 2020 established a target of 60% reduction from a 2005 baseline for oil and gas fugitive emissions. A law passed in the most recent legislative session, HB 21-1266, memorializes these percentage reductions in statute.

On Sept. 17, in the public comment before the AQCC took up the proposed rulemaking, speakers repeatedly admonished the commission to move faster and farther with regulations.

Representatives of the 36 local governments in the Colorado Communities for Climate Action were conspicuous.

Anita Seitz, the mayor pro temp of Westminster, expressed reservations about the lack of enforceable goals before urging the commissioners to “think bigger and think bolder.”

Others also spoke. Jan Rose, analyst and spokesperson for Colorado Coalition for Livable Climate, a coalition of groups, had this to say afterward:

“The new Regulation 22 rules on establishing a GHG Intensity standard for major- and minor-producers of emissions is another example of too much talk and not



enough action,” she said in an e-mail statement. “The rules are entirely dependent on self-reporting, an approach that has to date resulted in no appreciable reductions in our meeting either the state’s GHG reductions roadmap required by HB1261. Instead, there is a predictable reliance on self-reporting.”

A few bad leaks cause most of oil patch damage

The [Casper-Star Tribune](#) recently sat in on a webinar about methane regulations sponsored by the American Association for the Advancement of Science’s Center for Scientific Evidence in Public Issues.

One take-away is that just a few leaks cause most of the damage.

“Let’s say you have 100 leaks in your oil-and-gas field,” said Arvin Ravikumar, of the University of Texas at Austin. “The top 5 leaks, the highest-emitting 5 leaks out of the hundred, is likely to be responsible for over half of the total methane emissions. The key to addressing methane emissions from the oil-and-gas sector is finding and fixing the super-emitters as quickly and as cost-effectively as possible.”

Finding and repairing every source of emissions, he said, is neither economically nor technologically feasible.

Another takeaway is that methane is hard to track—and hard to regulate. Researchers are still figuring out exactly how much methane is released between extraction and combustion, and how significantly that number varies from operators and regions.

But Ravikumar, a research associate professor of petroleum, said emissions standards are needed now.

“We cannot wait for perfect information to start developing effective methane mitigation strategies, because we know enough about methane emissions from the oil and gas sector.”

He explained that emissions come from three sources: 1) leaks, which can happen randomly anywhere along the supply chain; 2) vents, a standard safety feature that can malfunction and release far more methane than expected; and 3) flaring, an inefficient means of burning excess natural gas

In dark moments

“In the darkest moments, I’m on the verge of panic about the state of water and climatic volatility and climate change overall.”

Harrison Topp, Hotchkiss orchardist, in story by the Denver Post’s Judith Kohler about climate change and Colorado agriculture.

Tri-State’s partial pivot

“What’s clear is that Tri-State now understands that they have to transition away from their uneconomic coal plants, both to keep their member co-ops and to comply with the rules that Colorado and New Mexico have... but whether they do that in a way that just reinforces the fairly centralized, top-down decision-making processes that they’ve historically operated under, or that more empowers their electric cooperative members, the distribution utilities, to do what makes sense for their communities, that’s not clear yet.”

Joe Smyth, Fraser-based writer and Tri-State G&T watchdog, on an [Institute for Local Self-reliance](#) podcast.

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Colorado must lift the bar in response to climate change, says state senator

by Allen Best

Colorado in 2019 adopted an economy-wide decarbonization goal of 90% by 2050. It's not enough, says State Sen. Chris Hansen, a Democrat from Denver. He says Colorado needs to go for 100% by 2040.

"We're running out of time. Everybody here knows that," said Hansen at a fundraiser in Denver on Sept. 14 for Solar CitiSuns Colorado and its parent non-profit, [New Energy Colorado](#). "To cut to the chase, what do we need to do next year? Ninety percent by 2050 is not going to cut it. We have to be net zero by 2040—period."

To achieve that elevated goal, he said, legislators must start bearing down on hard-to-decarbonize economic sectors, most prominently the carbon content of construction materials and agriculture.

"Those really need a lot of attention," he added. "They will get a lot of attention in the next few sessions."

Hansen, a member of the powerful Joint Budget Committee, also suggested state tax policy might be tinkered with to provide incentives by exempting construction materials with low-emission profiles from the state sales tax.

Another possibility is to expand 1974 legislation that classified some activities, such as new or expanded water diversion projects, as being matters of statewide concern and hence subject to state and local regulation. In this case, the statewide concern of the [1041 regulations](#) could be expanded to include building codes, to require local jurisdictions to adopt more recent codes with more exacting requirements for energy efficiency. Until



State Sen. Chris Hansen says Colorado needs to pick up the pace on decarbonization of its economy. Photos ©2021 Dave Bowden / SustainableMedia.net

recently, some towns and counties had no building codes at all.

Election-year legislation agendas tend to be lighter, and Gov. Jared Polis in 2022 will face re-election as will many Democratic legislators. But Hansen and two other state legislators who spoke at the fundraiser said they have no plans to slow down. All three indicated they have fires in their bellies.

“We have to do more. We have to be more aggressive. We have to (more rapidly) decarbonize faster these really hard sectors,” said Hansen.

The fundraiser was held on the deck of a solar supporter in the River North, or RiNo, area, overlooking a parking lot for Coors Field. Admission was \$75 a person, slightly less for couples. Many were seeing each other for the first time in almost two years.

The 2021 legislative session was, in the words of Hansen, “amazingly productive,” an assessment few would disagree with—although some would argue that it was productive in going down an ill-advised path.

See: [“A moderate Republican’s take on what constitutes sensible climate policy for Colorado.”](#)

Hansen says he is proudest of a bill that he got passed with broad bipartisan support that seeks to encourage greater cooperation among utilities in transmission planning and nudge utilities into creating of electricity markets that enable greater sharing. Several chief executives of utilities have said that

City	2021	30-Year Average	Rank	Year
Fort Collins	48	30	3 rd	1885
Boulder	48	33	10 th	1881
Denver	58	43	7 th	1848
Colorado Springs	41	23	4 th	1888
Pueblo	82	71	12 th	1954
Aurora	37	48	13 th	1927
Lamar	74	75	7 th	1881
Walden	78	69	11 th	1867
Dillon	8	8	—	1901
Alamosa	50	4	3 rd	1844
Steamboat Springs	25	6	4 th	1881
Grand Junction	78	68	5 th	1900
Cortez	61	43	3 rd	1881

It was a hot summer! This chart by Peter Bennet Goble of the Colorado Climate Center shows the number of 90-degree days in 2021 through Sept. 19 as compared to the average for the previous 30 years. Note in particular Steamboat Springs.

creation of such markets will be essential to realizing deep decarbonization goals.

Buildings were the focus of several overlapping bills approved by legislators as they sought to put legs under their economy-wide carbon reduction goals. Most salient was the clean-heat bill, which gives gas utilities firm targets of 22% reduction in emissions.

“It will take a lot of (electric) induction stoves. It will take a lot of everything to get there,” said Hansen. “But together we are going to do it, and I think we can surprise ourselves with our success as we look back over the next 5 or 6 years.”



State Rep. Alex Valdez said he intends to continue to bear down legislation to improve air quality. Photo ©2021 Dave Bowden / SustainableMedia.net

State Rep. Alex Valdez, a Democrat, co-sponsored several bills with Hansen, including the beneficial electrification bill that provides incentives for home and building owners to shift from gas to electric.

“One of the things I learned while working on this bill is that there is actually a lobby that goes out and tells people, ‘They are trying to come for our gas stove.’” That’s a narrative we fight each and every day,” he says.

He pointed to the superior performance of electric induction stoves. “We are not taking anything away. We are enabling the future where people can live and breathe and drink the water,” he said.

Reared in Aurora, Valdez co-founded what has become one of Colorado’s largest solar companies EcoMark Solar, in what was to become known as the River North, or RiNo, district. His district straddles downtown Denver and includes RiNo.

He cited improved air quality in Denver and along the Front Range as a central focus of his energy and climate work next session. “Air quality is why I do this job,” he said.

Valdez also vowed to continue to legislate “until I get Suncor right.” The refinery is near Globeville and other lower-income neighborhoods along I-70. During his legislative career, he has sponsored three bills that got passed. Legislation this year added a second monitor for detecting emissions of “a bunch of crazy stuff like benzene.” He did not share what exactly he has in mind next year.

The greatest opportunity Valdez sees lies in vehicle electrification. Transportation is not the problem. Rather it’s the exhausts from internal combustion engines. “The future lies in taking the engines out of cars. I don’t expect to take people out of cars,” said Valdez, the chairman of the House Energy and Environment Committee. He believes Colorado’s efforts need to be configured around the much greater force of the federal policies, but didn’t share particulars of his legislative plans.

State Rep. Tracey Bernett, a Democrat from Longmont in her first term, said she began work in June, shortly after the 2021

session ended, on bills to be introduced in 2022. But she was even more sparse in the details of what she has in mind.

An engineer by profession with an impressive history of marathons, Bennett was in the middle of several ambitious pieces of legislation—including one that had her talking about concrete on the floor of the House of Representatives at 10 p.m. one Saturday night late in the session.

The process used to create concrete, she explained, produces 14% of greenhouse gas emissions globally. The bill she sponsored directs crucial state agencies to think about the emissions associated with the products being used in buildings and transportation and directs them to use lesser-emission products when available.

For example, a manufacturer located near Florence, along the Arkansas River in south-central Colorado, produces cement with fewer associated greenhouse emissions.

See: [Greening up roads and buildings](#)

Democrats have had majorities in both chambers for the last three sessions. “None of this—zippo—if we didn’t have Democrats in charge of the Senate and House,” said Hansen. “We know that. We tried in 2017 and 2018, and every one of those bills, with a couple of exceptions, didn’t make it” past the Republican-controlled Senate, he said.

Now, Hansen senses a shift in momentum, an even greater appetite for transformative legislation.

“I think we have an opening into conservative circles that we have never had before,” he said. “I think people are seeing these fires, the woods they like to hike in, the trees drying, the ski season a month shorter. You can feel it,” he said, as one of the audience members chimed in with “hurricanes.”

First elected in 2016, Hansen represents a district in southeast Denver. That’s a world apart from the small farming town in western Kansas where he grew up. He showed an interest in politics, as reflected

in the fact he was student body president at Kansas State University while he studied nuclear engineering. He then continued his studies, first at the Massachusetts Institute of Technology and then at Oxford, where he received a Ph.D. in economic geography.

Seven years ago, he said, he was making a comfortable living, traveling the world solving complex energy problems. “I really enjoyed this,” he said. But then he had an epiphany.

“Is this really why I am on this planet, to increase the fiduciary return for my board?” he remembers thinking. “No, this is not really why I am here.” He began knocking on doors, campaigning to become a legislator, “because I wanted to work on climate change. I said, ‘I think I have some ideas that are useful and have some skills that I have worked on for 15 to 20 years that I can bring to the party.’”

A cross-country runner in high school, Hansen likened the skills needed to address climate challenge to those required by decathlon athletes. Decathlon for men has 10 track and field events from sprints to longer distances, pole vaulting to javelin throwing.

“You have to be good on the politics, you have to be good on the campaigns, you have to be good at the nitty-gritty of the policy and technical aspects,” he said.

Hansen vowed determination to keep on the same pace. “We are not going to let up. We are going to do another 15 to 20 bills next year and another 15 to 20 bills after that.”

Slow train or train wreck?

“It’s a slow-moving train coming down the track.”

John Stulp, a Lamar-area farmer and former Colorado ag commissioner and state water czar, talking about the effects of climate change on water supplies in a story by Judith Kohler in the Denver Post.



Water building rapidly taking shape on CSU's new Spur campus

The placement of the final steel beam of the Hydro building at the new Colorado State University Spur campus took place Sept. 16. Focus of activities in the building along Interstate 70 north of downtown Denver will be, as the name suggests, water.

It's a milestone event in a redevelopment project in an industrial part of Denver that once was home to several meat-packing plants and large cattle yards. The site of the new building, one of three rapidly moving toward completion, was the site of a Sigman meat-packing plant until the early 1970s. Since then, the area has languished.

What is now emerging sparkles. Comparisons to what has happened in the last 20 years in the area west of Union

Station are tempting, if a bit of an overstatement. Still, there will be a very different feel to this area near Globeville in the next two years.

The 122,000-square-foot Hydro building will be home to programs that allow the public to connect with and understand the significance of water by inviting experts and researchers and giving visitors an opportunity to connect with those experts.

Denver Water will have its water quality laboratory on the third floor of the building, which is scheduled to open in November 2022. Behind glass, the public will be able to see researchers at work testing for water quality.

A theater space in the building can hold up to 300 people. It's safe to bet this will be a place where conversations about the future of the Colorado River, a major source for Denver Water, will take place in coming years. The venue is located along the South Platte River, Denver's original and still substantial source of water. About half of Denver's water comes from the Colorado River and half from the South Platte.

The building is also relatively close to the Denver Metropolitan Wastewater Treatment Plant. Denver already uses treated sewage directly for irrigation, but has no plans for direct potable reuse. It is permitted to reuse water that it has imported into the South Platte Basin.

“This puts us right in the heart of a new research environment, in a spot where we can work far more closely and readily with academics and other innovators studying a wide spectrum of emerging and current water quality issues and solutions to ensure we can continue to deliver safe, reliable, great-tasting water to the Denver metro area not only today, but also well into the future,” said Tom Roode, chief operations and maintenance officer for Denver Water.

The utility delivers water to 1.5 million people of the metropolitan area’s nearly 3 million residents.

Construction started on the campus in 2020, part of a broader and a longer-term redevelopment of the Denver Western Complex, where the stock show is held every January.

The complex also includes the Denver Coliseum. The CSU Spur campus will also have buildings called Vida and Terra that will be devoted to health and food. The three new buildings altogether will have 300,000 square feet.

The primary goal of the campus will be to appeal to K-12 students and the general public instead of higher education students, a first among CSU campuses and, CSU officials believe, other academic institutions as well. The work was seeded by a \$200 million allocation by the General Assembly in 2015.

The Spur campus is part of a broader redevelopment in the Coliseum and stock show area. See January 2020 story I wrote in Colorado Biz: [Denver’s National Western Center aims for year-round impact](#). And learn more about the Spur campus at the [CSU website](#).

Hearings underway for C-DOT’s proposed rule to address pollution

The Colorado Department of Transportation is holding 8 hearings between Sept. 17 in Grand Junction and Oct. 6 in Firestone about its proposed planning standards.

The rule would modify how C-DOT and the state’s largest metropolitan regions select future transportation projects.

The proposed standard would require C-DOT and the state’s 5 metropolitan planning organizations to determine the total pollution and greenhouse gas emissions increases or decreases that is expected from future transportation projects. The goal is to ensure that greenhouse gas emissions do not exceed set reduction amounts.

[See C-DOT website for details.](#)

A virtual hearing in Colorado Springs on Sept. 24 included these comments.

Ramming into the iceberg

“We need to transform transportation in Colorado to zero-carbon from surface transportation by 2030, and the new rules are a move in the right direction. We are seeing what climate change can do, and we know this is just the tip of the iceberg. And we know it will get much worse. We’re going to ram into the iceberg.”

Paul Culman, Boulder

More non-auto choices

“We should also be strong and do more to encourage more transportation instead of just focusing on automobile travel for so long.”

Cory Sutela, director of the Manitou Springs-based Medicine Wheel Trail Advocates

Study shows warming, drying climate causing fires to climb uphill in Western states

A study published in June by researchers from Boise State and other institutions found that wildfires have been climbing higher on mountain slopes in Western states.

The study published by the National Academy of Science found that between 1984 and 2017 fires had risen a median of more than 250 meters (820 feet).

Higher elevation forests such as those found at Colorado ski resorts (and, for that matter, at California's Heavenly, at South Lake Tahoe) were once described as "asbestos" forests because they were moister and rarely burned, usually with intervals between fires of at least a century and often several centuries.

Climate change appears to be the major driver. The researchers in the study, "[Warming enabled upslope advance in western US forest fires,](#)" say the upslope advancement of higher-elevation fires of 7.6 meters per year compares to the elevational velocity of the vapor pressure deficit of 8.9 meters per year.

Geeked out? This may help: If the [vapor pressure deficit](#) is high, meaning the air is relatively dry, transpiration rates from plants—the flow of moisture from the plants to the air—is higher. Higher temperatures produce higher vapor deficit pressures, all things being equal. This is called aridity.



The researchers estimate that this reduced high-elevation flammability barrier caused by a warming climate has resulted in an additional 11% of Western forests becoming vulnerable to fires.

Another way of saying it is—as was demonstrated by the East Troublesome fire last year in Colorado, there's no mountain too high. That fire leaped across the tundra of the Continental Divide.

This has significant implications of terrestrial carbon storage, snowpack and water quantity and quality, they say.

It also has implications for places like

Vail, Crested Butte and Winter Park, which long thought they had no need to think about the threat of wildfires.

The [Casper-Star Tribune](#) talked with Mojtaba Sadegh, an associate professor in the civil engineering department at Boise State University and one of the authors. He said as temperatures warm, fires that used to be rare will become more frequent—and more severe. He said that thicker, steeper

forests found at higher elevations are especially vulnerable to crown fires, as the flames race through the tree canopies.

He predicted much more study of higher-elevation fires, a relatively recent phenomenon of climate change.

[Another study](#) by Philip Higuera and other researchers at the universities of Montana and Wyoming found that the 2020 subalpine fire season in the Rocky Mountains was the region's worst in 2,000 years.

See also: [Colorado arrives at the dawn of megafires](#)

And: [Our new age of fire](#)



Oil and gas industry thriving today, but will it in the 2030s?

by Allen Best

Like many other conferences, the annual Energy Summit sponsored by the Colorado Oil and Gas Association has downsized during the last two years. The event was cancelled last year and this year was held at the Denver Museum of Nature and Science. That venue, if nicely appointed, is almost diminutive in comparison with the cavernous Colorado Convention Center where I attended 8 to 10 of the industry group's gatherings through the years.

Moreover, conference attendees this year had the choice of attending in person or monitoring the presentations by video.

The result was fewer than a hundred or so people in attendance at the one session I attended in person, compared to perhaps a thousand or more at the prior conferences along with an adjacent room full of vendors hawking their services and technologies.

Was this downsizing purely a reflection of the uncertainty and still-potent threat posed by covid and perhaps an effort to trim some extravagances? Or was it, I wonder, reflective of an industry's decline? Fifteen years ago, coal producers were fat and sassy. Now even the major companies are fleeing. Can this sector tack a different course?

Production remains strong, as evident in the drilling now underway from the outskirts of metropolitan Denver north and east. This last week, Will Toor, executive director of the Colorado Energy Office, in his presentation to the Air Quality Control Commission, noted that the [Greenhouse Gas Pollution Reduction Roadmap](#) that was issued in January, projects production actually increasing through 2030.

In Colorado, the oil and gas industry remains a powerful sector, but less so than in Wyoming and New Mexico. Colorado has an economy that is so much larger and more diverse. It still matters, though. Politicians have frequently shown up at the conference to speak and say hello.

In 2018, Jared Polis was campaigning for governor. He felt it necessary to proclaim his opposition to a voter-initiated setback requirement for drilling that the industry – I think with justification – found onerous. (Polis got thunderous applause—and also provoked a woman to stomp out from the conference amid shouts of what I am guessing were protest. I don't think she was part of the industry).

In the last 15 years, the industry in Colorado has faced increasingly robust regulation. I wasn't there, but I remember the reporting after Bill Ritter was elected governor in 2006. The Ritter administration wanted to impose greater regulation on operators. Through the lens of 2021, those regulations were laughably restrained. Some operators at the time seethed at the insult. State government was going to regulate them?

More regulation has followed. Notable were the rules adopted in 2014 that set a national standard for efforts to contain methane emissions from production and transportation. Another milestone was in 2020, when state legislators inverted the mission of the Colorado Oil and Gas Conservation Commission. Instead of being an accessory to production, the state agency now has a mission to control impacts.

More is coming. On Sept. 17, the Air Quality Control Commission took up a proposal to impose even greater regulations in an effort to further reduce methane emission from the extraction, processing, and transport of oil and gas.

The agenda this year of the [Colorado Oil and Gas Association](#) reflected the

challenges of the industry. As in many years before, they talked about climate change. But as is true with many industry organizations, there was a cheerful, promotional element to the agenda design.

One session was titled “Mitigating GHGs: Challenges, Opportunities and a Realistic Path Forward.” [Occidental Petroleum's](#) low-carbon policy advisor, Ryan Edwards, pointed to the recent report from the International Panel on Climate Change, which, he said, “again showed that we need to reduce emissions really quickly.” It included the short-term importance of addressing methane. Containing methane emissions, he said, presents a business opportunity.

Matt Fry, of the [Great Plains Institute](#), talked about the need to develop legislation to create the legal framework for pore space in underground formations. Such legislation is necessary for advancing carbon capture and sequestration, sometimes also called utilization.

Wyoming, Montana and North Dakota have done this, but so far, Colorado has not.

Natural gas is now under fire because of its core component, methane, a powerful greenhouse gas.

I was surprised to learn that the Southern Utes had been capturing methane from an outcrop of the coal-bearing Fruitland formation south of Durango from 2008 to 2018. A partnership with an academic from Stanford University to gather this naturally-venting methane, preventing it from reaching the atmosphere, yielded the Utes 420,000 metric tons of carbon credits, said Kourtney Hadrick, the [Southern Ute Growth Fund](#) program manager.

(See footnote at the about this).

She said once the industry acknowledges problems and devotes resources to solving it, it can go a long way. “Some folks, I don't think we will ever

convince,” she said. “I don’t think this industry is dying. I just think it’s changing.”

In the day’s last session, the industry linked arms with directors of allied trade groups—the auto dealers, homebuilders, and the Farm Bureau—to boast and complain, just a bit of both.

They’re doing good work, the speakers said, but in various ways they all pushed back at Colorado’s aggressive actions intended to reduce greenhouse gas emissions dramatically in the next 30 years. The new oil and gas regulations have already cost producers \$200 million. Efforts to further tamp down methane emissions during extraction will soon get underway at the Air Quality Control Commission.

Matt Groves, representing 260 new-car dealers that comprise the [Colorado Auto Dealers Association](#), talked about “extremely clean” new models of cars, but also warned about mandates on manufacturers. “At the end of the day, you can’t transition unless people are willing to buy those vehicles,” he said.

Ted Leighty, chief executive of the [Colorado Association of Homebuilders](#), talked about changing too fast. “We are doing our part. We know we can continue to do more,” he said. “But the technology has to be there. The economics of scale have to be there. Otherwise the costs just shoot up.”

He cited HB21-1261, the new law that requires buildings of 50,000 square feet or larger to start benchmarking exercises, in order to start taking measures to reduce emissions. He said one fiscal analysis revealed a cost of \$845 million to comply. He suggested the stakeholder process in the creation of that and other laws is more window dressing than meaningful. But he did give points to the governor. “Polis understands things to an extent,” he said.

Chad Vorthmann, from the [Colorado Farm Bureau](#), talked about “heavy-handed mandates,” and said agriculture can achieve carbon reduction goals without being

required to do so. But as for electrifying farm implements, he said he has doubts about a battery being created sufficient to power a wheat combine. “I look forward to the day that a combine runs on a battery,” he said. “But I can’t imagine how big that battery is going to be.”

He also had this to say: “The negativity and the sky-is-falling has to stop.” What is needed to have “people stand up and say it’s a really darned good time.”

Dan Haley, the chief executive of [COGA](#), wove through this thicket of reactions. He talked about the wonderful things Colorado is doing, suggesting bends in the path but no hard, fundamental decisions.

“We don’t want people dying during summer because of the lack of air conditioning,” he said. And, he added, Colorado wants to be like neither Texas nor California.

It strikes me that Haley has one of the most interesting and perhaps most difficult jobs among Colorado’s many trade groups. He has to move his industry forward in a state that has in many areas become more questioning. Even those who recognize our dependency on oil and gas have become skeptical as damning evidence has arrived of the dishonesty of multinationals like ExxonMobil, who have suppressed information and quietly and dishonestly pursued policies that favor short-term profits in the tradeoff with the stupendous long-term costs of climate change. Some, such as Colorado 350, want to see the industry gutted—and quickly.

See also: [Two Western states act to control methane](#).

[Oil in New Mexico back in a big way, mostly in Colorado, too, but less in Wyoming](#)

Oil and gas in Colorado have become divisive and polarized. I see that from many angles. On a sunshine-rich February day in 2020, I wandered into a drilling area about 30 miles from where I grew up in

northeastern Colorado. As I moseyed on these county roads north of Riverside Reservoir, I got out my camera, as is my habit. I made the mistaken of getting too far off the county road, and the company guard was on me like a hawk. I kept moseying down another county road, but now there were two guards, who hemmed me in with their giant pickups.

We had words, nothing more, but the oil field cops did overstep their legal bounds and even more so the bounds of politeness. I am reminded of the swagger of the coal industry in the months and years before its fall, guard station cops hollering at me to get off the public road at the entrance to the coal stations.

For the full story, see: [The day two aging baby boomers became suspects while on a Sunday drive to Pawnee Buttes](#)

Many see drilling altogether as evil. The word fracking—misused, I believe—has become an appellation, kind of like mother-frackers. In this view, there should be no conversation.

The morning of the conference I received an e-mail from Friends of the Earth. It said Colorado’s senators, Michael Bennet and John Hickenlooper, needed to decide which side they were on. They wanted the senators to boycott the event along with their staff members. “We are worried that our senators won’t be able to glad-hand with oil bosses one day and vote to repeal fossil fuel subsidies the next,” said Maryah Lauer, Colorado grassroots organizer.

I had been there for some of those appearances by the politicians. That same year that Polis spoke, Bennet was interviewed on stage along with Cory Gardner, then Colorado’s second senator. I don’t remember what Bennet said except that it made sense, unlike what Gardner said, which was taken straight from the knuckle-dragging playbook, something about renewable energy being unaffordable

to poor people in rural areas. (When Gardner was a state senator, he sang a different tune, talking the virtues of economic development from wind farms in his rural district).

Such rhetoric is less than useful. Those who have to seriously move Colorado forward recognize that oil and gas drilling will be with us for awhile, just as internal combustion engines and natural gas in our houses. But it’s not forever.

Just 11 years ago, Colorado added a new coal plant at Pueblo and Tri-State Generation & Transmission was still plodding ahead with its plans for a massive coal plant in Kansas. The latter never happened—thankfully for Tri-State members—and it looks that by 2030 just the former, Comanche 3, will still be operating, although for how long and at what capacity remain in doubt.

Oil and gas extraction will be with us far longer, but I can easily imagine a day maybe a decade hence when the drilling rigs that are now commonplace will become scarce.

P.S. Intrigued by the methane capture project near Durango, I conducted

I found the [report of a 2019 outing](#) by the Four Corners Geological Survey that told of 28 wells used to intercept and collect methane gas that would otherwise enter the atmosphere. The gas is piped to a compressor station, which ties into an existing gas pipeline used for regional methane production. The high price of natural gas in around 2007 helped justify the expense, but the carbon credits later offset the low price of natural gas.

Mark Pearson, of the San Juan Citizens Alliance, told me the story goes deeper yet. “The dewatering of the aquifers to allow for coal-bed methane extraction allows the methane to also migrate toward the outcrop and hence vent into the atmosphere.” He said the methane was killing vegetation, bubbling into springs, and potentially domestic water wells.



SLOWLY TAKING SHAPE IN PUEBLO. In June, I stopped by Alta Vista North on the edge of Pueblo to see how the project with no plans for natural gas hookups was shaping up. Roads had been bladed into the prairie but nothing more. On Labor Day, I did so again, this time to find curb and gutter.

Meanwhile, the Colorado Public Utilities Commission this week is finalizing its schedule for how to implement new Colorado laws that require decarbonization of buildings. Look for a story in the next issue of Big Pivots. —Allen Best

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