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At the spear point of the energy shift when not all solar is of equal value

by Allen Best

Scott Mcdaniel bought a 15-kilowatt solar array for his house in Eagle in 2022.

Now, he's second-guessing that \$43,000 investment. Holy Cross Energy, his local utility, proposes to revamp its rate structure. The new rates would credit him and other owners of roof-top solar less value for electricity they deliver to the local electric grid in a financial arrangement called net-metering. An electrical cooperative, Holy Cross has 48,000 members in the service territory located within the triangle of Vail, Aspen, and Battlement Mesa.

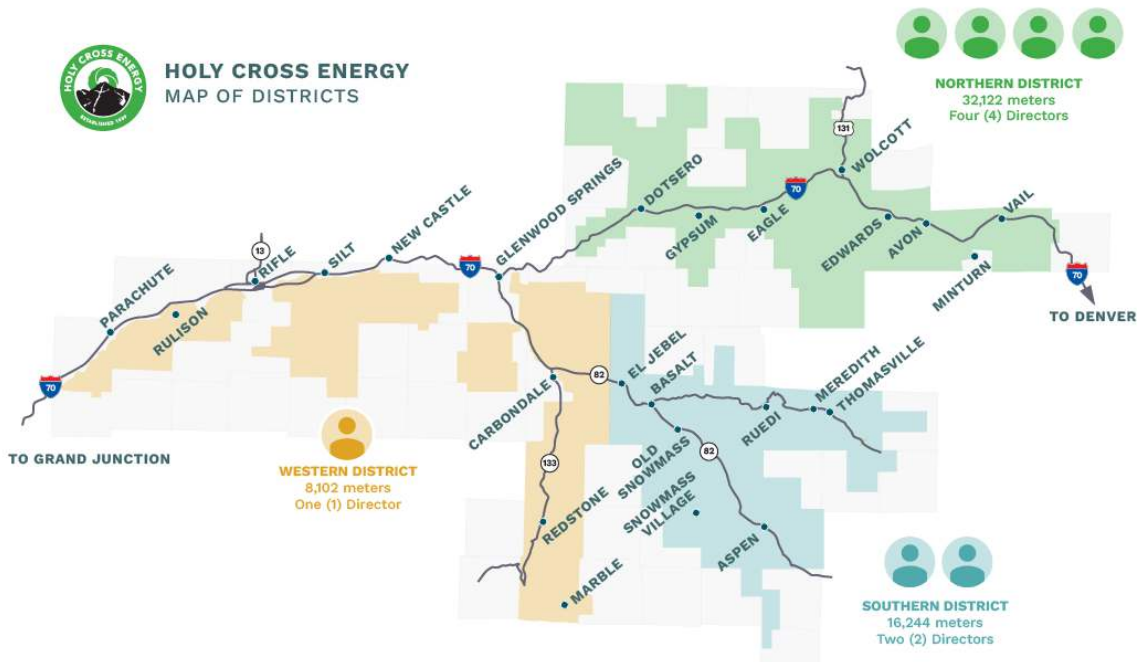
Why solar installers see Holy Cross Energy's proposed rate revision as an existential crisis – and why other utilities are closely watching the debate

At a May 24 meeting in Glenwood Springs, Mcdaniel told directors that he saw his investment in solar panels as a way to prepay his electricity for the next 20 years while also helping create an environmental bonus, reducing the need to burn fossil fuels to create electricity.

Given the proposed rate structure, he told the utility's elected directors, "I probably would have made a different decision," he said. He doesn't regret the investment in batteries at his house. But solar panels is another matter.

The Holy Cross rate proposal has solar installers across Colorado nervous and in some cases angry. Colorado Solar and Storage Association, which represents 75% to 80% of the state's solar companies, with about 9,000 employees among them, insists the proposed rate revision would violate the net-metering law governing electrical cooperatives that was adopted by Colorado in 2008. The Colorado Rural Electric Association, an organization representing Holy Cross and Colorado's 21 other electrical cooperatives, disputes that claim.





The arguments along the I-70 corridor have also drawn the attention of state officials. Days before the May meeting, Will Toor, executive director of the Colorado Energy Office, asked Holy Cross to delay implementation of the new rates, which were scheduled to take effect in September, until January. Holy Cross directors agreed.

The first meeting of the state-convened discussions among COSSA, Holy Cross and a few others begins today, June 26.

Other utilities in Colorado are intently observing the Holy Cross case as many expect to eventually have the same conversation themselves. If the solar industry is right, new legislation may be needed.

The case reveals how complex electricity generation and demand has become as utilities deepen the penetration of wind and solar energy at very low cost. Solar prices have dropped almost 10-fold since

2008 when Colorado’s net-metering law for electrical cooperatives was adopted.

The supply-and-demand equation is overlaid with questions of equity. Very specifically, are those with solar collectors paying their fair share to keep the electrical grid reliable and delivering electricity at lowest cost? Holy Cross estimated that non-solar members of Holy Cross paid \$2.6 million in 2021 in what amounts to a cross-subsidy to members with rooftop solar.

Bryan Hannegan, the chief executive of Holy Cross, emphasized that issue of equity as he explained why he believes new rates will be necessary as Holy Cross briskly moves toward achieving its goal of 100% emissions-free energy by 2030. Leaders of at least some other electrical cooperatives in Colorado concur.

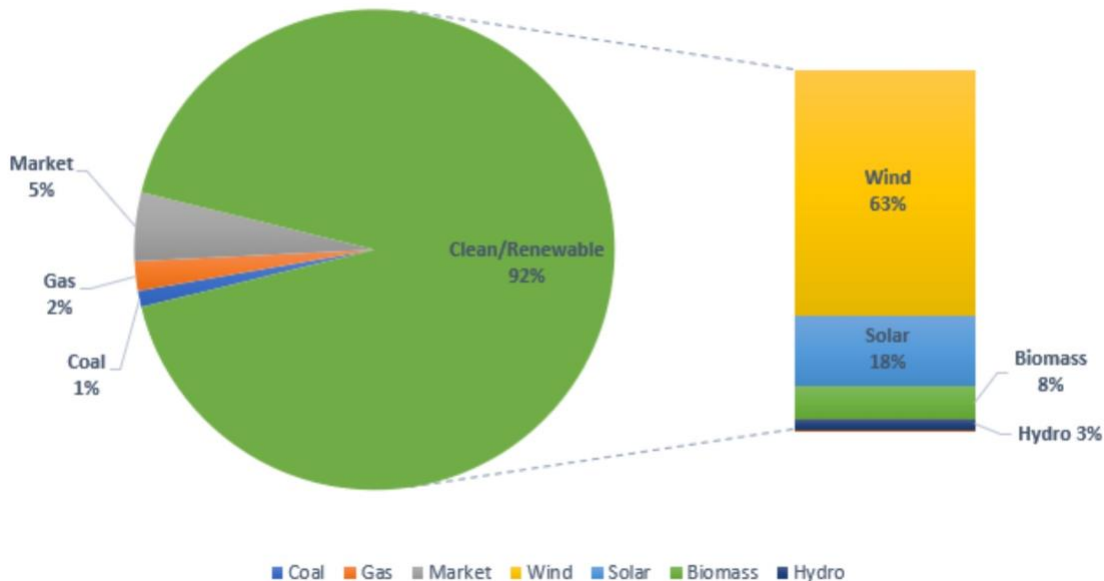
The solar Industry counters that this view short-changes the value of solar.

Toor told Big Pivots on June 22 that and he and his staff want to guide conversations that can explore productive outcomes.

“There will be times as soon as next year when we will have more electricity flowing into the system than we have demand.”

Bryan Hannegan
chief executive
Holy Cross Energy

2024 Projected Energy by Fuel



“We were looking at reactions from the solar industry, and it seemed like there was potential for significant conflict and the potential for perhaps less than complete conversation from our perspective,” he said. “We reached out to everybody involved to take a step back and have a broader conversation about the future of net-metering and how it may need to evolve over time as the percentage of renewables on the grid grows.”

The discussions among stakeholders convened by his agency will start small and perhaps expand over time to include more voices. Keith Hay, the senior director of policy for the energy office, will oversee the discussions.

Colorado has three types of electrical utilities. Xcel Energy and Black Hills Energy, the state’s two investor-owned utilities, were responsible for 56% of all electrical sales in 2018, the most recent year for which figures are available.

The state also has 29 municipal utilities, most in small towns but with Fort Collins, Longmont, and Colorado Springs among the

largest ones. Collectively they deliver about 19% of power.

That leaves the 22 electrical cooperatives, including Holy Cross, which were created with aid of low-cost loans after Congressional approval of the Rural Electrification Act [in 1936](#). The law provided federal assistance for the creation of self-governing cooperatives to deliver electricity to rural areas where homes and businesses were too dispersed to draw investment by the profit-driven private companies. In co-ops, customers are also members, and members elect directors in springtime elections. They deliver about 26% of electricity in Colorado.

Holy Cross has pivoted hard in recent years. It had acquired an 8% interest in Comanche 3, the coal plant in Pueblo that went online in 2010, but by 2020 directors were ready to adopt the most ambitious decarbonization goal of any Colorado utility: 100% by 2030, with no qualifying footnotes attached.

Guiding this pivot has been Hannegan, who arrived at Holy Cross in 2017 after four years at the National Renewable Energy Laboratory, six years at the Electric Power Research Institute and three years at a high-

level post in the energy and transportation sector in the White House of George W. Bush..

Hannegan has often said that getting to 80% to 90% penetration of renewables will be relatively easy as compared to the last 10% to 15%. This case illustrates part of that challenge.

A big and relatively easy step occurred during the last year as Holy Cross pushed ahead of 50% generation from renewables. Part of this advance resulted from completion of a 4.5-megawatt solar farm coupled with 15 megawatt-hours of storage amid the pinyon and juniper forest near Glenwood Springs.

This next year will be even more impressive.

The utility has under contract 150 megawatts of wind and 30 megawatts of solar from projects located east of Denver.

It is also developing two 10-megawatt solar farms coupled with 20-megawatt-hour storage components along Interstate 70 in the Rifle-Battlement Mesa area.

When all this gets done sometime in 2024, Holy Cross expects to be 92% emissions-free electricity.

Of this power, 63% will come from wind, 18% from solar, 8% from biomass, and 3% from hydro. That leaves 3% from natural gas, 1% from coal, and 5% from other market sources that are likely to be fossil fuel generation. The final 1% will come from burning methane escaping from a closed coal mine near Paonia. (Because of rounding, the percentages add up to 101).

This will give Holy Cross the deepest penetration of renewables among any utility in Colorado save for Aspen and Glenwood Springs, both of which have purchased renewable energy certificates to achieve 100% carbon-free goals. Holy Cross plans no such purchases.

This triumph also brings challenges.

“There will be times as soon as next year when we will have more electricity flowing into the system than we have demand,” explained Hannegan at the May 24 meeting.

That time will most frequently come during the mid-day hours, when solar panels are being remarkably efficient in converting sunshine into electricity.

“Conversely, several hours later, when solar production from panels goes down and people come home and start cooking dinner and plugging in their (electric vehicles), we will be in a deficit mode,” he continued.

“And we will have to go and get power from the regional grid. You might not be surprised that the (power from the regional suppliers) will be more expensive and more carbon-based than what we provide.”

To understand the Holy Cross perspective, the utility’s budget must also be understood. Two years ago, \$71 million, of its \$134 million in operating expenses incurred went to power generation.

Other chunks of the utility costs were incurred by its 120 miles of high-voltage transmission lines, the 3,100 miles of smaller-capacity distribution lines to individual homes and businesses, and its 165 employees. Depreciation and interest, administration, and member services were also large budget items.

Holy Cross reports that non-solar customers subsidize the solar customers at a cost of \$2.6 million per year.



Bryan Hannegan

“Holy Cross Energy is not against roof-top solar,” said Hannegan. “We absolutely need it, just as we need smart buildings, battery storage, electric vehicles. We need all of these things to get where we want to be as a society.”

The cooperative just doesn’t want to pay for the output from roof-top solar at the same rate, crediting customers at 11.2 cents a kilowatt-hour for the electricity they deliver to Holy Cross when the electricity, at certain times has little value. Holy Cross says the rates approved by directors in February much better align cost with value.

“Rates are misaligned with costs,” said a PowerPoint page in Hannegan’s May presentation. The proposed rates are more complex, more layered. New is a “delivery charge” that is assessed whenever electricity is delivered to a member. “For our solar net-metering members,” this includes energy purchased and energy pulled from your kWh bank,” Holy Cross explains.

Also new will be a peak-demand charge, which Holy Cross says will cover the resources “required to build and maintain a system that can provide our maximum capacity demands, in the case of Holy Cross (and unlike the Front Range), from 4 to 9 p.m.

“Just like a water utility must build a system that can support the maximum

amount of water pressure demanded from its users at any given point, we must build and maintain an electric grid that can support the maximum amount of electricity demanded from our members at any given point,” Holy Cross explains.

But all members – including current net-metering members – can reduce their costs by reducing consumption between the evening hours. They can also sign up for a program called Peak Time Payback, which rewards members for reducing use.

Hannegan describes this proposed rate structure as both nimble and flexible and gives customers opportunities to respond to price signals in ways that the current rate structure does not.

California is often first with problems and sometimes with solutions. It has already experienced this problem. In 2012, this imbalance between supply and demand was given a name, [the duck curve](#), because of the shape of the curves that reflect this imbalance between supply and demand. This graphic created by Vox for a 2018 article [“This ‘duck curve’ is solar energy’s greatest challenge.”](#) was created to help illustrate the concept.

Holy Cross proposes to deliver a soft-landing for its existing net-metering customers. It is offering two options that it says will hold existing solar owners harmless from the delivery charge impact for 10 years.

But instead of getting paid 11.22 cents per kWh, small resident members will get paid 3.8 cents by 2025. [For many more details, see the Holy Cross website.](#)

For the two or three solar installation companies in the Aspen-Vail area, this proposal of a rate increase that would gut the net-metering concept has been received like somebody who uses a New Year’s gathering to announce that they have a life-threatening illness. Some installers have said this policy will lengthen the payback on solar investments from 11 years to 22 years. That makes for a harder sale pitch.

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Mike Kruger leads the solar association, working from an office in the Alliance Center, located a block from Union Station in Denver. He began his professional life as a middle-school teacher but then became an aide on Capitol Hill in Washington D.C. He had never been to Colorado when he applied for the job of directing the solar organization. "I thought all of Colorado was like Buena Vista," he says.

Now, he knows Colorado from the rolling sagebrush hills of northwest Colorado to the wheat fields of its eastern prairies. Solar panels will almost certainly cover some of those places in the next decade.

Kruger says he first became aware of the plans by Holy Cross when Hannegan invited him to lunch in autumn 2022. "This is really interesting," Krueger says he remembers thinking. He was not concerned because he believed that rates would leave payback on solar installations at 8 to 12 years.

When COSSA's two attorneys studied the written proposal, though, they reached a different conclusion. "It didn't pass master," says Kruger.

"Both of them looked at it and were like, 'This is definitely not legal.' And I was like, 'C'mon guys.' They're like, 'No, no, let us tell you the ways this is definitely not legal.'"

In May, the organization issued a 43-page report with that being the take-away message. To make their case, the attorneys had gone back to listen to committee hearings from 2008, when the net-metering law governing cooperatives was passed.

The rate restructure proposed by Holy Cross Energy "to bundle its traditional kilowatt-hour (kWh) energy charge into two new separate 'energy' and 'delivery' charges, and to compensate net-metered customers only for a portion of kWh charge is a throwback to a rate design that the legislature outlawed with the passage of House Bill 08-1160," said the May 4 report by COSSA submitted to Holy Cross.

"Today, all co-ops in Colorado must offer full retail kilowatt-hour compensation for energy produced by an on-site solar, or solar

plus storage, system. But Holy Cross's proposal would not ..."

This, declared COSSA, is illegal.

For two typical customers with the exact same use patterns, a solar customers will experience a 421% increase in their bill, whereas a non-solar customer will experience a 4% increase, the report says.

The proposed soft landing for net-metering members proposed by Holy Cross will not be so soft, in the read of COSSA.

The organization also faults the rate proposal's demand charges, which it describes as "hard for residential customers to understand, track, and respond to."

Holy Cross, Kruger concluded in his summary letter in the report, "cannot and should not reinterpret the law and 15 years of Colorado solar policy without clear direction from the legislature."

COSSA also contends that had Holy Cross not committed to buying the 30 megawatts of solar east of Denver, it might not have so much mid-day solar on its system by next year. It didn't couple that power-purchase with a storage requirement.

"Just because Holy Cross decided to buy a bunch of wind or solar doesn't mean that they then get to kind of cut the legs out from anybody else who wants to make the same purchasing decision," says Kruger, "And I think that's what the legislators all the way back in 2008 sort of realized."



Mike Kruger

COSSA worries that Holy Cross's proposed rates, if allowed to go forward, will encourage other utilities to do the same.

"I had multiple co-ops come to me and say, are you going to contest this Holy Cross rate? Because if not, we're going to adopt it. "Definitely a lot of folks are looking at Holy Cross as a leader and they're happy to follow."

Kruger believes that if Holy Cross wins, other co-ops will soon follow. And then so will the municipal providers and eventually it will show up in a rate case for Xcel Energy or Black Hills before the Public Utilities Commission.

Kruger argues against the proposed rate schedule at another level. He says that the proposed rates are not the right answer to the problem that Holy Cross describes. Those problems can be addressed in other ways, such as demand management strategies.

And there's another presumption in the Holy Cross plan that Kruger challenges. He says that Holy Cross assumes no additional growth in demand. That, on the face of it, is hard to comprehend, given the rapid growth of electric vehicles that is now occurring.

The bottom-line story he sees at Holy Cross is that they don't want more renewables. Why else this policy?

What is most perplexing is that COSSA, like many others, saw Holy Cross as among the very best, forward-looking utilities. It was not, said Kruger, a utility that had to be "brow-beaten into doing the right thing."

Now, obviously, there is a very much a dispute about what constitutes the right thing.

Managers of at least two other electrical cooperatives in Colorado similarly see the need for change in net-metering policies. They just don't see the same need quite yet.

"Baby steps" is how Jessica Matlock, the general manager at Durango-based La Plata Electric describes how her cooperative plans to work with solar installers in adjustments.

"I would say we are headed in the same direction."

Matlock arrived in Durango in 2019 after being an energy fellow in the U.S. Senate and then holding several positions in the Pacific Northwest. The issue of how to correctly price solar existed almost 20 years ago there, she says.

The fundamental issue is of equity, how to make sure those with roof-top solar are paying their fair share of the total system costs. At the same time, roof-top solar does deliver benefits. Figuring out the exact formula is "really tough."

United Power would seem to have an even more imminent need to address the net-metering law. It has 108,000 members strung out from the foothills west of Arvada to the oil and gas fields of Weld County. In late May, it also surpassed 10,500 members with roof-top solar, or over 10%. That may give it the highest penetration of rooftop solar of any utility in Colorado.

Mark Gabriel, the chief executive, supports the revision of rates to better reflect the value of rooftop solar. He readily concedes it will make sales more challenging for solar companies.

"If I were selling solar panels, I would have a hell of a lot harder time in doing so, because it makes for a much more complex

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conversation,” says Gabriel. “But as we know, electricity has different values on different times of the day and different times of the year.”

In his relative youth, Gabriel was a ski racing journalist and a publisher of various magazines. Then he got involved in energy and like Hannegan, earned a Ph.D. Neither makes prominent mention of their academic credentials.

In 2007 Gabriel published a book called [“Visions for a Sustainable Energy Future.”](#) He got some things wrong in his vision, he says, but mostly what he saw coming was on target.

Later, working as a consultant for Arizona Public Service Co., Gabriel studied the impact of solar on power generation. The company was paying 15.4 cents kWh for solar at a time when the Palo Verde nuclear power plant was producing it for 3 cents and various other providers were delivering it for 6 or 7 cents.

“It was a huge subsidy,” he says. “This is not a brand-new issue.”

Don’t we want to reward homeowners for providing solar? Yes, says Gabriel.

But energy costs vary. Net metering assumes a constant.

On the Friday afternoon in late May that we spoke, he estimated that the cost of a kilowatt-hour was probably 4.5 cents. On hot afternoons in August, he said, it would probably be worth 40 cents.

Gabriel explains his thinking with analogies. One is how we pay for roads. We long have paid for new highways and upkeep of existing ones in the tax levied on each gallon of gasoline or diesel. That is increasingly outmoded as we switch to electric vehicles. Colorado has made a start to equity, but much more will have to be done.

What Gabriel sees is a web of energy and financial transactions divorced from concepts of the past. Counter-intuitively, customers will have a greater ability to generate and store their own energy—even as they become more interdependent.

In a 2018, when he was regional administrator of the Western Area Power Administration, the agency responsible for distribution of hydropower from federal dams, Gabriel gave a speech in which he predicted that the “California duck curve is going to waddle across the West.”

Part of the impetus, he said, was that it was “becoming less expensive to install new renewable generation facilities than to maintain existing fossil fuel plants.”

Microgrid will become more common, he said. In fact, they are. These are like islands — still connected to the mainland of the electrical grid but capable, through storage and self-generation, of being disconnected at some times.

Camp Carson, the military base near Colorado Springs, has a microgrid. On a much smaller scale, so does Red Feather Lakes northwest of Fort Collins. Holy Cross is planning such a microgrid centered on a solar and storage system near the Aspen/Pitkin County Airport.

Counter-intuitively, Gabriel also sees greater connectedness between these islands. Transmission and distribution systems “will become more important, not less important, in a connected future,” he says.

“I think the opportunity and challenge are the same for all of us in this business, and that is to be a network provider and plan to manage the generating resources, whether those resources are two miles away or 200 miles away.”



Mark Gabriel

An alternative for those in Eagle or in Basalt, Firestone or Brighton, is for somebody to add solar and enough battery storage that they can truly be independent of the need for their local utility. That day may come as storage technologies improve, but those islands amid electrical grids remain exceedingly rare.

Gabriel also predicts that load profiles—“load “in the electrical world means “demand”— will shift dramatically and it would be deeper, quicker, sooner and have greater impact than most people expected.

That’s essentially what Holy Cross is trying to plan for with its rate structure.

What is needed—what is already happening, he says—is adoption of AMI, or advanced metering infrastructure. Some people call it “smart meters,” notes Gabriel, a phrase he dislikes. He says the word “smart” has been used too much in too many applications—and, by the way, isn’t particularly new, as the phrase was first used when the first meter was imported from England into the United States in 1906.

Such technology—which he thinks is imminent—can fairly compensate the owner of a rooftop solar system for the value of their energy. Not less, of course, but also not more.

That gets to the value of the interconnectedness. Just because somebody with rooftop solar uses fewer kilowatt-hours supplied by the electrical cooperative does not mean they do not have obligations to pay for the system operation.

Gabriel illustrates this with a story about his daughter when she was 16 and wanted a car. She had a job and could pay for the gas, she said. Her father reminded her that there

was far more to owning a car than buying gas: insurance, tire replacement, oil changes and on and on.

“If I am a homeowner with no solar, I am paying for all those pieces,” says Gabriel, describing transmission, distribution and so forth.

Where does that leave people of lower incomes who cannot afford the upfront costs of solar or those, such as people in apartments, who do not have roofs? They’re pulling more of the common weight than the rooftop owner.

It’s an equity issue, which Hannegan emphasized in his report at the May meeting. He made no mention of trailer courts, but it’s obvious: Why should people living in the trailers at Edwards or at El Jebel pay more for upkeep of the Holy Cross electrical grid than residents of Snowmass or of Beaver Creek who have solar on their roofs?

United doesn’t have any plans for reformed rates, although Gabriel expects it will feel the need. He said it’s also a matter of principle that lies beyond the gains of emission-free electricity delivered by rooftops.

“I heartily support that. But when somebody is struggling to pay their bills and can’t afford solar panels or a battery storage or drive an electric vehicle, how do we make sure that part of society is properly taken care of?”

This issue posed at Holy Cross, says Gabriel, is already a national issue. So why is Holy Cross first, at least in Colorado? It likely has to do with how close Holy Cross is getting to its 100% clean-energy goal. Hannegan “is just at the cutting edge and decided to go for it and resolve something sooner,” says Gabriel.

Even many of those who supported net-metering 15 years ago recognize that the times have changed. Solar then was struggling. Costs of PV since then have declined ten-fold.

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“The law was very good for its time in 2008,” says Ron Sinton, who operates [Sinton Instruments](#), a 31-year-old company based in Boulder that specializes in solar cell development and manufacturing.

“Net-metering was as good as we could do at the time, and the cost to the public was insignificant,” says Ken Regelson, a Boulder technologist who has been engaged in the energy transition for 20 years, partly through a group called [Energy Should Be](#).

“Electricity rates are never perfectly fair. It’s too complicated,”

If COSSA has read the law accurately, though, it will have to be honored or changed. At the energy office, Toor refuses to affirm that.

“I think it is premature to know the answer,” he said when asked if a resolution will require a change in law. He did affirm that the study group will see how other states have addressed net-metering policies.

Both Hawaii and California have preceded Colorado in taking up this issue. The struggles in those states to come to terms with the glut of solar during peak days may inform Colorado’s discussion.

California has addressed net-metering twice. In 2016, the first decision by state regulators produced a net-metering policy called NEM 2.0. That policy produced three key changes to the original policy: interconnection fees, monthly charges, and time-of-use energy plan, [reported CNET in an February 2023 story](#). CNET noted that the number of solar installers declined initially but eventually ramped back up and reached record-breaking numbers in 2022.

In April, a new net-metering policy went into effect that decreases the value of solar energy credits by 75% and should

encourage customers to purchase battery storage if they purchase solar.

In Eagle, Scott Mcdaniel says he can understand why Holy Cross wanted to make changes in its rates. He can see the need for peak-demand rates.

“I don’t live in a fantasy world where they cannot charge for the kilowatts that they need to charge,” he says. “That’s unrealistic.”

By the same token, if he can produce electricity for Holy Cross when it has higher value, shouldn’t he be reimbursed, he believes. But by being nicked for the distribution charge, it doesn’t work out as well, he says.

Bottom line for Mcdaniel is that had he known Holy Cross was considering revised rates, he might have made a different decisions about where he invested his money. As it stands now, the solar on his roof is less valuable than he thought it was.

Can a softer landing than what Holy Cross has proposed be achieved? That will be the substance of the stakeholder process that launched today.

Lots of utilities in Colorado, the 22 coops but the others, too, will be paying close attention. And you bet that solar installers will.



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