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SOLAR FOR COAL SWAPS

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Previous briefs in this series have outlined ways policymakers and utilities can divest themselves from uneconomic coal assets and invest in clean resources while balancing consumer, utility, and environmental outcomes.[1]

In particular, we have explored how financial analysis can reveal plant-level marginal costs of energy,[2] *adjusted depreciation options,*[3] *refinancing equity with lower cost debt,*[4] *and "steel for fuel" investment strategies.*[5] *But none of these depends upon balance sheets of independent investors or renewable developers to finance transition.*

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This issue brief explores "solar for coal swaps" – an emerging alternative model to utility and regulatory mechanisms to refinance the 22.5 GW of existing coal plants that will be uneconomic compared to building new local solar in 2025, as of 2018.

A NEW APPROACH TO THE CLEAN ENERGY TRANSITION

Opportunities to transition economically away from existing coal to new renewables continue growing and are increasingly well documented. But even though 179 gigawatts (GW) of coal plants in the United States were more expensive to operate than new solar in 2018, annual retirement rates are closer to 10 GW.

With so much potential consumer savings at stake, questions for policymakers and utility executives must rapidly focus on how to finance the transition away from uneconomic generation assets while creating earning potential for utility shareholders.

[1] https://americaspowerplan.com/power-transformation-solutions/financial-transition/
[2] https://energyinnovation.org/publication/the-coal-cost-crossover/
[3] https://energyinnovation.org/resource/depreciation-and-early-plant-retirements/
[4] https://energyinnovation.org/resource/debt-for-equity-utility-refinance/
[5] https://energyinnovation.org/resource/steel-for-fuel-opportunities-for-investors-and-customers/

Where utilities and their regulators have not realized that fundamental energy economics have shifted in favor of clean options and against continued reliance on fossil resources, consumers, institutions, municipalities, energy market participants, and others are exploring options to take advantage of clean, low cost electricity.[6] Because fundamental economics have changed, consumer pressure will eventually become relentless, forcing utilities to adapt or risk consumers finding alternatives to limited utility offerings.

This issue brief deals with one such example, in which private capital funds a market option for cooperative retail distribution utilities. The example reveals that local community-level investment with positive economic development benefits can be a feature of the financial transition that moves from fossil to solar. Transition has larger implications as well, including creating a multitude of economic opportunities to invest in additional technologies and approaches that move faster toward carbon neutrality across a range of necessary developments, from grid modernization that engenders load flexibility to electric vehicle charging stations and many others.

The examples featured in this brief suggest that the basic economics for switching from fossil to solar are already in place, and financial innovators stand ready to deploy capital to accelerate this transition. Successful applications of "solar for coal swaps," suggest a much larger set of alternatives.

Solar for coal swaps represent a new approach for supplying replacement generation in the larger electric sector transition from fossil to clean energy. These swaps stand out from other developments in shifting fundamental economics – wind and solar are often cheaper than running old fossil generation plants – as a ***private sector response***, sponsored by innovative energy marketers and developers and profit-driven investors, to changing generation resource economics. As (and if) swapping solar for coal expands beyond the examples discussed here, swaps could drive the transition to cleaner energy faster than is commonly expected.

WHAT ARE SOLAR FOR COAL SWAPS?

Solar for coal swaps involve third parties – an energy marketer, a renewable energy developer, and related investors – purchasing and retiring coal assets from a regulated utility in conjunction with a contract for new solar. The transaction terms include payment for solar power plant output as well as repayment for purchasing and decommissioning coal, and may also include financing for community transition. The underlying motivation for these deals is a combination of consumer preferences, fundamental economic comparisons, and policy pressures (often all three) to retire coal and replace it with renewable energy.

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[6] "As corporate renewable buying surges, innovative PPAs pressure utilities to improve green tariff." https://www.utilitydive.com/news/as-corporate-renewable-buying-surges-new-deals-pressure-utilities-to-impro/547485/***.

Different variations of this structure are explored below, but basic deal terms include:

1. Offer to substitute new solar for old coal
2. Private sector investor financing underwrites offer
3. Payment to coal owner buys out coal investments
4. Coal plants transferred to new owner
5. New owner retires coal and decommissions plant, with negotiated site remediation
6. Long term environmental liabilities likely stay with original coal owner
7. Coal energy replaced with new solar plus energy and grid services accessed through market purchases
8. Consumers repay coal purchase and solar investment through rates, but pay less due to solar costs that are lower than coal

New solar facilities provide most of the required replacement power when they are substituted for coal plants, paired with a mix of market-sourced resources to meet reliability requirements. The cost difference between new solar and old coal may also cover decommissioning and remediation costs to the extent these costs are agreed between buyer and seller. Contingent and hard-to-quantify long term environmental liabilities beyond those agreed to be transferred are likely to stay with the previous utility owner. Any coal supply contract issues can also potentially be negotiated and included in the deal terms, such as fuel take or pay or liquidated damages provisions in existing fossil fuel supply contracts.

Replacement solar power can be located in proximity to retired fossil plants to take advantage of electric infrastructure such as switchyards and transmission, and to partially replace the tax and employment base provided by the coal plant. For example, when Public Service Company of Colorado (PSCo) recently decided to retire two coal plants in Pueblo, Colorado, PSCo directed solar replacement power bidders to focus their projects in Pueblo County, where the coal plants being retired were located. PSCo also facilitated provision of a behind-the-meter solar installation for Evraz, a large steel fabrication electricity customer in Pueblo. Recent New Mexico legislation similarly required solar projects be located in San Juan County to offset impacts of retiring Public Service Company of New Mexico's (PNM) San Juan power plant.

ROLE OF THIRD PARTY

Examples discussed below involve both a utility and another entity that provides financing, solar development, and access to resources in electricity markets. This party engages non-utility, private sector capital to promote transition for utility capital investments from coal to clean energy. This non-utility provider invests to replace non-performing, uneconomic fossil plants, may offer to retire them, and develops replacement power. It provides services including access to market resources necessary to address reliability concerns and to consistently match loads and generation resources, including various aspects of balancing power which are often referred to as "ancillary services." Ideally, and if needed, the non-utility provider finances transition funding for communities and workers impacted by early fossil plant retirements. A third-party

provider adds value by developing deal terms and a decision package to speed utility decision-making.

Each one of these third-party functions in solar for coal swaps challenges a part of the reason for utilities to exist. In principle, utilities can raise and invest capital; retire, decommission and remediate uneconomic coal plants; develop solar projects; and finance and inspire mitigation plans and financing for impacted workers and communities. If utilities were motivated (or required) to do so, they could increase the speed and extent of the fossil to clean transition, meet rapidly advancing customer and policy expectations, and match solar with complementary resources to provide reliability.

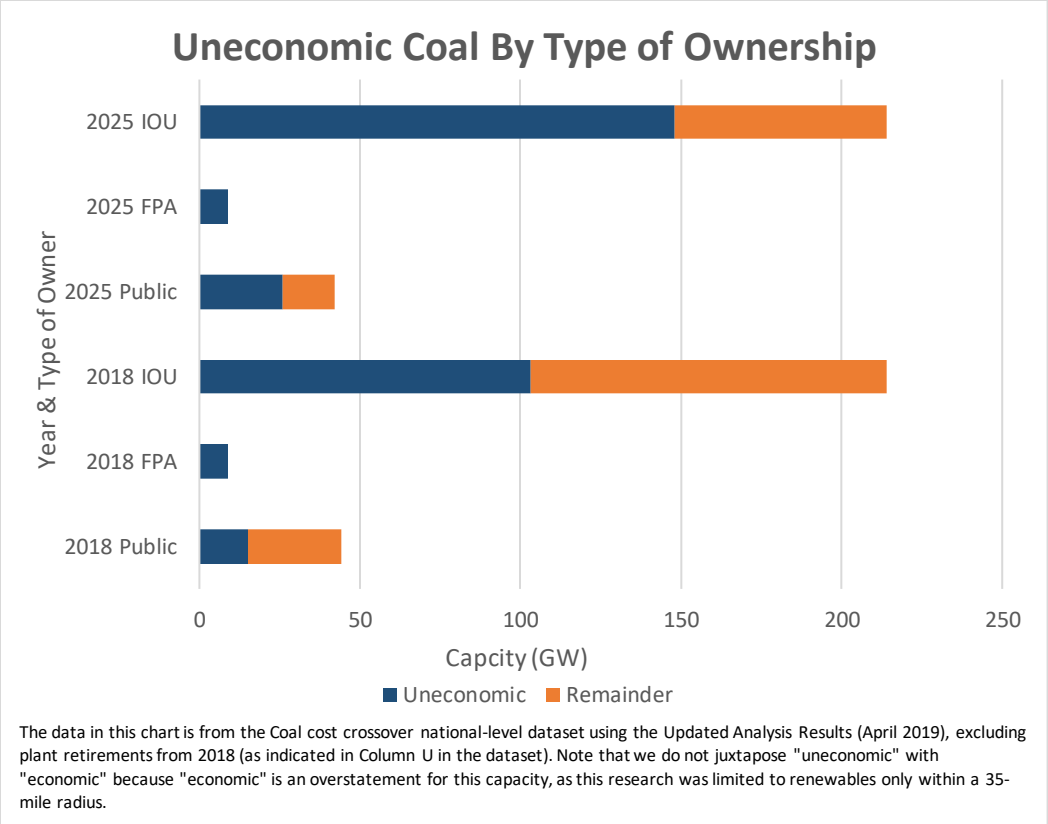
In many ways, the emergence of this third-party financing and market approach reflects competitive pressure on existing utility business models where utilities have failed to adapt. Similar dynamics emerge when large industrial or commercial customers, such as large casinos in Nevada, or communities or institutions with zero carbon or 100 percent renewables goals seek to procure clean energy resources for themselves directly at savings and lower risk than incumbent utilities can provide. While this brief explores third-party finance applications for utilities (mainly consumer-owned cooperatives) similar pressures are emerging from large customers, local governments, and a variety of institutions with enough buying power to renegotiate terms meeting their requirements for cleaner and less costly energy supplies with their monopoly utilities.

That third parties see potential profits from providing these services to utilities speaks to utilities' lack of motivation to undertake these tasks. A critical question is whether utilities will engage in productive negotiations with these third-party investors and marketers. Delays and objections from utilities could suggest resistance to engaging with third party providers – they challenge utilities' reasons to exist. As we will see in the examples below, utility resistance is a real barrier to financing the transition away from coal.

SIZING UP THE SOLAR FOR COAL SWAPS MARKET

Municipal and publicly owned utilities own 44 GW of uneconomic coal. These utilities are typically not under state utility commission regulation, but rather are subject to control by their boards of directors or municipal or special district officials.

Transactions that are analyzed in the following sections of this brief suggest that these "solar for coal" swaps could be particularly advantageous for municipal and publicly owned utilities that could benefit from financial, technology, and market innovations provided by third parties.



The data in this chart is from the Coal cost crossover national-level dataset using the Updated Analysis Results (April 2019), excluding plant retirements from 2018 (as indicated in Column U in the dataset). Note that we do not juxtapose "uneconomic" with "economic" because "economic" is an overstatement for this capacity, as this research was limited to renewables only within a 35-mile radius.

According to a 2019 analysis by Vibrant Clean Energy and Energy Innovation, 15 gigawatts (GW), or 34 percent of municipal or cooperative-owned coal assets were uneconomic to operate compared to local wind or solar replacement energy in 2018.[7] By 2025, the economics of renewables improve such that 26 GW or 59 percent of these plants are uneconomic.

The constraint of using local resources makes the analysis quite conservative, but cooperatives and munis concerned with local economic development will likely find it attractive. If specifically considering a solar-for-coal swap, 11.2 GW of these plants were uneconomic compared to local solar in 2018 and 22.5 GW will be uneconomic compared to local solar in 2025.

Since 2018, solar and wind cost declines have exceeded forecasts, making 2018-vintage estimates of 2025 costs closer to 2020's reality. In other words, more than half of cooperative- or muni-owned coal plants are likely uneconomic compared to local wind or solar assets, with that number growing if non-local clean replacements are considered.

[7] This dataset is publicly available. See Gimon, E. et al. *The Coal Cost Crossover: Economic Viability Of Existing Coal Compared To New Local Wind And Solar Resources*. Vibrant Clean Energy & Energy Innovation. 2019. Dataset and report available at: https://energyinnovation.org/publication/the-coal-cost-crossover/.

SOLAR FOR COAL SWAPS IN PRACTICE

KIT CARSON COOPERATIVE

Kit Carson Cooperative (KC) in New Mexico paid $37 million to its wholesale power supplier, Tri State Generation and Transmission Cooperative (Tri State), to exit its "all requirements" power contract.[8] Guzman Energy[9] helped KC finance its Tri State exit fee and has contracted to supply Kit Carson with power, including a locally sited solar plant, so economic development benefits accrue to the Taos area where KC serves.[10] Even with high exit fees, KC predicts that departing Tri-State will save its cooperative member-owners $50-70 million.[11]

Having experienced 106 percent rate increases from Tri-State, from $39.06 per megawatt-hour (MWh) in 2000 to $79.17 in 2016, KC was motivated to find a lower cost supplier.[12] In their new ten-year contract with Guzman, KC's rates will average $75 per MWH from 2019 to 2022 while they pay off their $37 million exit fee, and rates will then decline to $47 until 2026.[13]

Another motivating factor for KC was Tri State's all requirements power supply contract and policies that limited KC to obtaining no more than five percent of their power outside that contract. Tri State generates most of its power from coal and owns coal mines that supply its plants. Tri State's reliance on coal has become controversial as lower cost wind and solar have become available and its member cooperative customers seek to limit environmental damage associated with their power purchases and promote local economic development through solar.[14] Guzman is developing solar power locally for KC, but as part of the contract will provide supplemental power obtained from local or regional wholesale suppliers.[15]

The impact of this transaction on the economics of Tri State's coal fleet is beginning to be felt, as Tri State has announced a "Responsible Energy Plan" that will lead it to eliminate coal by 2050,

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[8] An "all requirements contract" binds the retail cooperative to buy all its power, save five percent allowed to be purchased from local sources, from its wholesale supplier. https://www.utilitydive.com/news/seeking-more-renewables-kit-carson-co-op-exits-relationship-with-tri-state/421719/

[9] See, Guzmanenergy.com. The firm describes itself as "a regional full-service wholesale power provider focused on the bilateral markets of the Western United States."

[10] https://pagosadailypost.com/2018/03/02/opinion-kit-carson-electric-cooperative-responds-to-tri-state-debate/

[11] Jaffe, Mark. "Fight over prices, renewable energy spurs second rural cooperative to leave Tri-State Generation." The Colorado Sun, Oct. 18, 2018, www.coloradosun.com/2018/10/18/dmea-breakup-tri-state-renewable/ Accessed April 2019.

[12] https://weown.it/sites/default/files/story_resource/files/Rural%20Electrification%202%20report%20v5.pdf

[13] Cates, Karl and Feaster, Seth. "Case Study: How Kit Carson Electric Engineered a Cost-Effective Coal Exit." Institute for Energy Economics and Financial Analysis, April 2019, www.ieefa.org/wp-content/uploads/2019/04/How-Kit-Carson-Electric-Engineered-a-Cost-Effective-Coal-Exit_April-2019.pdf. Accessed April 2019

[14] Dyson, Mark, and Alex Engel. "A Low-Cost Energy Future for Western Cooperatives: Emerging Opportunities for Cooperative Electric Utilities to Pursue Clean Energy at a Cost Savings to Their Members." Rocky Mountain Institute, 2018, https://rmi.org/wp-content/uploads/2018/08/RMI_Low_Cost_Energy_Future_for_Western_Cooperatives_2018.pdf. Accessed April 2019. Financial concerns about Tri State: Clean Cooperative, Feb. 22, 2019, www.cleancooperative.com/news/la-plata-electric-concerned-tri-state-debt-will-lead-to-higher-rates. Accessed April 2019. Also see https://rmi.org/wp-content/p-ccontent/uploads/2018/08/RMI_Low_Cost_Energy_Future_for_Western_Cooperatives_2018.pdf

[15] In Taos, Colfax, and Rio Arriba counties, New Mexico: https://www.guzmanenergy.com/portfolio-item/guzman-energy-kit-carson-reveal-new-solar-array-at-eagle-nest/ More coverage: https://mountaintownnews.net/2018/08/15/another-solar-farm-on-the-renewable-wall-6186/

adding new renewable energy to replace it.[16] KC was a relatively small part of Tri State's load, but larger Tri State customers, like Delta Montrose, have followed its lead. Tri State's economic situation could quickly become dire as larger customers depart in favor of lower cost renewable energy supplies.[17] It is not unreasonable to connect these events with Tri State's January 2020 announcement that it will retire its New Mexico and Colorado coal fleets by 2020 and 2030, respectively.[18]

KC's example provides an opportunity to explore questions about some of the deal terms that might apply elsewhere:

- Access to attractive financing and reduced complexity for transitioning utilities.
- Availability of lower cost renewables to replace old coal investments while saving consumers money on power bills.
- Opportunities and funding for renewable development to make contributions to local economic development.
- Meeting consumer demand for local, cheaper clean power.
- Attracting new customers in search of low-cost clean power.
- Reducing risks associated with failure to adapt more quickly to fundamental economic transition and state or federal policy shifts.

HOLY CROSS ENERGY

Holy Cross Energy (HCE) is a Colorado retail cooperative with approximately 58,000 meters, serving communities in three Western Slope Colorado counties that include Aspen and Vail. Prior to its new arrangements with Guzman Energy, HCE's power supplies were provided by Public Service Company of Colorado (PSCo), a large regulated, investor owned utility. HCE's power supplies included an 8 percent stake in capacity and energy output from PSCo's Comanche 3 coal plant.

HCE and Guzman Energy developed a swap where HCE sold Guzman its ownership share of energy from PSCo's Comanche 3 coal plant in exchange for Guzman supplying HCE with a new 100 megawatt (MW) wind plant, along with a blend of wholesale market supplies of energy.[19] By including larger amounts of lower cost renewable energy and renewable energy credits than those available to HCN from PSCo, HCN keeps rates stable while helping to meet its 70 percent

[16] https://www.tristategt.org/ep-1 . And see: https://www.denverpost.com/2020/01/15/tri-state-clean-energy-plan/

[17] Other Tri State members pursuing options: https://energynews.us/2018/04/06/west/colorado-co-ops-consider-dropping-their-energy-provider/ and see https://www.cleancooperative.com/news/delta-montrose-electric-members-vote-for-new-financing-options-supporting-a-potential-buyout-of-tri-state-contract and see https://durangoherald.com/articles/218565 La Plata and Union RECs are seeking an exit fee cost estimate from Tri State: https://www.utilitydive.com/news/delta-montrose-files-restraining-order-against-tri-state-as-others-examine/558143/ and see: https://www.utilitydive.com/news/colorado-tri-state-ruling-could-provide-co-op-exit-template-amid-rising-ten/577624/ More: https://coloradosun.com/2020/05/18/tri-state-generation-finances-united-power-la-plata/. Applications to set an exit fee filed at the Colorado PUC by Union and La Plata have been heard, resulting in a decision recommended to the PUC by an administrative law judge: Colorado PUC Decision No. R20-0502, July 10, 2020.

[18] https://tristate.coop/tri-state-announces-retirement-all-coal-generation-colorado-and-new-mexico

[19] HCE kept its capacity share of Commanche III to meet its reliability responsibilities. Presumably, Guzman will use its energy share of Commanche III to profit by supporting its client's energy requirements.

renewable energy goal.[20] The motivation for HCE to enter this deal with Guzman was driven by its Board and members expressing their preference for more clean energy while holding the line on power supply costs at the utility. Like Kit Carson, HCE expects its members to see cost savings from this transaction but the specific deal terms are not available.

In this case, HCE's default wholesale energy supply contracts with PSCo allowed HCE flexibility to optimize its resource mix, which its new arrangement with Guzman helps to accomplish. That flexibility stands in contrast to the KC situation, where KC's Tri State contract limited flexibility to 5 percent of its wholesale power requirements, restricting options for local projects with favorable local economic development potential.

DELTA MONTROSE ELECTRIC ASSOCIATION

Delta Montrose Electric Association (DMEA), another cooperative distribution company served by Tri State, and a prominent, long time dissident within the Tri State family of distribution cooperatives, also pursued the model established by KC. DMEA has desired alternatives to Tri State to give it more discretion to add local renewable energy beyond Tri State's five percent limit.

In October, 2018, DMEA held an election, asking its members to allow it to qualify a new membership category, for new members that provide financing rather than take power. The successful election shows that DMEA's member owners support their cooperative's energy transition strategy with new financing members, like Guzman Energy, allowed to join DMEA.[21]

DMEA challenged Tri State both at the Federal Energy Regulatory Commission (FERC)[22] and the Colorado Public Utilities Commission (COPUC),[23] seeking a reasonable exit fee from Tri State. DMEA and Tri State reached an agreement on an exit fee, which has not been disclosed, and DMEA dropped its FERC and COPUC challenges.[24]

TRI STATE OFFER

In June, 2019, trade press reports detailed dueling press releases from Guzman Energy and Tri State. Guzman had made a $500 million offer to Tri State to accelerate retirement of about 50 percent of Tri State's remaining coal fleet, substituting a new generation portfolio comprised of more than 70 percent renewable energy. It promised lower consumer costs while maintaining reliability and Tri State's system control, along with "tens of millions" in transition mitigation

[20] https://www.guzmanenergy.com/portfolio-item/holy-cross-energy-inks-deal/

[21] https://www.cleancooperative.com/news/delta-montrose-electric-members-vote-for-new-financing-options-supporting-a-potential-buyout-of-tri-state-contract

[22] At FERC, DMEA challenged Tri State's exemption from FERC jurisdiction and asserted that the 1978 Public Utilities Regulatory Policies Act (PURPA), as a federal law, overruled the limits Tri State put on DMEA's acquisition of renewable energy. https://www.ferc.gov/whats-new/comm-meet/2015/061815/E-14.pdf and see https://www.nrel.gov/state-local-tribal/blog/posts/ferc-ruling-paves-way-for-increased-local-renewable-energy-generation.html

[23] At the Colorado COPUC, DMEA pursued a commission order setting a reasonable exit fee from its Tri State contract https://www.google.com/search?client=firefox-b-1-d&q=DMEA+Colorado+PUC. A settlement of this dispute has been reached.

[24] https://www.utilitydive.com/news/tri-state-delta-montrose-reach-potential-settlement-on-buyout-costs/558921/

funding for workers and communities. Guzman suggested that the proposal would require "collaboration" with Tri State's management to evaluate the offered terms.

Tri State's initial response was to postpone consideration of Guzman's offer until after implementation of new laws in New Mexico and Colorado or late 2020 at the soonest. In its press release, Tri State, called the Guzman "verbal" proposal "imaginative and creative," but emphasized that it believed at this initial stage that its not-for-profit cooperative business model was more likely to meet customer goals for clean power at lower cost. Guzman energy drives profits for investors, in contrast to TS's not-for-profit business model, which for better or worse has seen costs balloon rapidly. TS noted that it would not be in its best interests to be locked into a single negotiation, since it has many options to consider.[25] Meanwhile, Guzman's approach to negotiation by press release appears to have failed, for now.[26]

Still, the scale and audacity of Guzman's bid to refinance and retire most of Tri State's uneconomic coal generation fleet shows the potential of renewable for coal swaps to scale and meaningfully impact the pace of financial transition from coal to clean. Clearly capitalists of the hard-eyed variety are willing to back solar against coal on a large-scale basis, and it is likely other financiers would sponsor this kind of investment. The ubiquity of solar and wind costs falling below coal operating costs means underlying drivers of these deals will increase.[27] Recently, Tri State has announced that it will exit coal mining and coal generated electricity production by 2050, in alignment with Colorado climate goals and in stark contrast to their previous strategy.[28]

RECOMMENDATIONS

Publicly-owned and municipal utility governing boards can consider solar for coal swaps to accelerate transition away from uneconomic coal, with the following considerations:

- Consumer savings or rate stability can be achieved along with transition to cleaner resources that satisfies consumer demand
- Local economic development options can be created through solar for coal transactions
- Pressure created on recalcitrant utilities by these new options can result in striking changes in their strategy and outlook
- Private sector financial, technology, and market capabilities can be brought to bear on behalf of utilities who might not have these levels of expertise on staff

Regulated investor-owned utilities should take note that these transactions have wide application for their largest customers, including municipalities and large corporations. Facilitating customer demands for lower-cost renewables can preempt private capital whose innovations will provide

[25] Tri State Statement on Guzman Energy Proposal, May 28, 2019. See https://www.tristategt.org/tri-state-statement-guzman-energy-proposal

[26] https://www.guzmanenergy.com/portfolio-item/guzman-announces-large-scale/

[27] https://energyinnovation.org/wp-content/uploads/2019/03/Coal-Cost-Crossover_Energy-Innovation_VCE_FINAL.pdf http://ieefa.org/ieefa-u-s-solar-plus-storage-is-undermining-the-economics-of-existing-coal-fired-generation/

[28] https://www.denverpost.com/2020/01/09/tri-state-coal-plants-closing/

increasing options for large customers to rely less and less on utility supply for cost-effective service.

CONCLUSIONS

While examples discussed here are all related to solar and coal costs in the limited physical and institutional geography of Colorado, New Mexico, and Tri State, at least in concept, their application could be imagined in many other circumstances. When fundamental economics shift – building solar at lower cost than running old coal plants, for example – new economic relationships are likely to emerge. The level of attention focused in trade and popular press on these examples suggests that creative responses to solar available at less cost than existing coal have only begun to be explored.

As more low cost solar and wind resources are added to utility generation portfolios, coal plants will be used less, and cycled more, resulting in higher coal marginal cost of energy.[29] Using more solar will also result in additional manufacturing and development process scale economies, so solar costs would be expected to continue to decline as the solar market expands.[30] As more solar enters markets, less perceived investor risk could follow, with attendant lower cost of capital for additional solar development. Since solar and wind generation projects are comprised of almost completely capital costs (no fuel costs and negligible operating costs), lower cost capital is a key element supporting trends toward lower solar and wind costs. As fossil and renewable cost differentials widen, more swaps make could make sense in more places.

[29] Phillip Graeter & Seth Schwartz, "Recent Changes to U.S. Coal Plant Operations and Current Compensation Practices." Prepared for the National Association of Regulatory Utility Commissioners. January 2020. https://pubs.naruc.org/pub/7B762FE1-A71B-E947-04FB-D2154DE77D45.

[30] See https://atb.nrel.gov/.