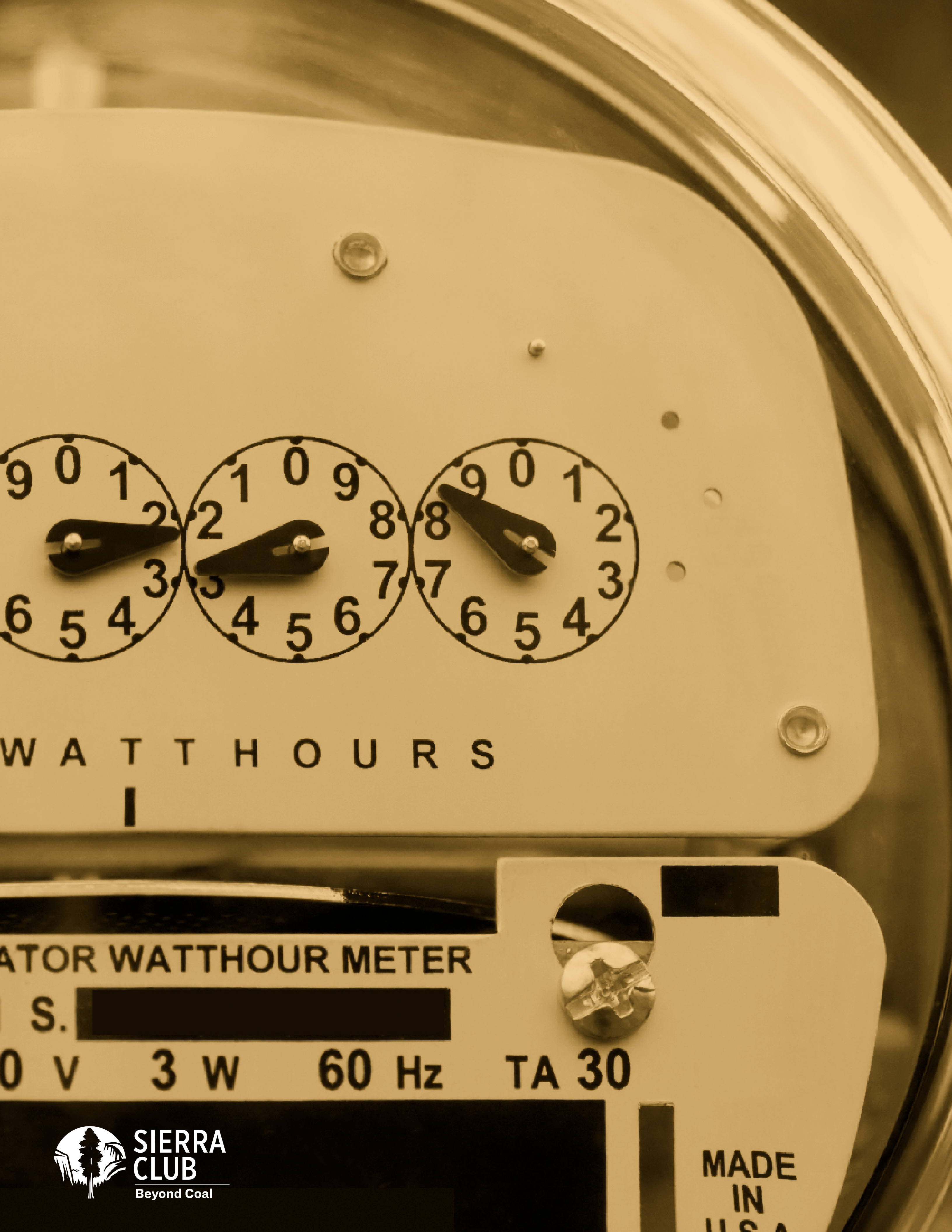
KANSAS PAYS THE PRICE
VOLUME 2

Evergy remains hooked on costly coal while clean energy options are affordable and reliable.

November 2021

SIERRA CLUB



SIERRA CLUB
Beyond Coal

MOVING EVERGY FROM COAL TO CLEAN ENERGY

EXECUTIVE SUMMARY

The Sierra Club's 2019 "Kansas Pays the Price" report demonstrated how Evergy's expensive coal plants were wasting hundreds of millions of ratepayer dollars. Since the release of that report, Evergy has released a new Integrated Resource Plan (IRP) that has failed to lay out a plan to justly and promptly transition Kansas off of coal. In this new report, "Kansas Pays the Price, Volume 2", we present a new analysis that shows how Evergy can retire its Jeffrey and La Cygne coal plants and replace them with clean energy by 2030 while maintaining affordability and reliability. Additionally, we discuss how securitization of remaining debt on these plants could lead to further savings for customers and how increased energy efficiency investments could help address the high energy burden experienced by Evergy's low-income customers.

Key highlights from our analysis:

1. **Clean energy portfolios can affordably and reliably replace the Jeffrey and La Cygne coal plants as soon as 2025 and 2028, respectively.**
2. **The total savings from securitizing the remaining coal debt for Jeffrey and La Cygne coal plants would range from $333 million to $869 million based on the 2023 to 2030 range of retirement dates.**
3. **Energy burden for metropolitan areas within Evergy's service territory showed a stark divide by race, with Black and Hispanic households facing at least twice the average energy burden as that of white households in the Kansas City metropolitan area.**

MOTIVATION AND BACKGROUND

Evergy has lagged far behind other utilities in its plans to retire dangerous, polluting coal plants. At the end of 2020, 52 percent of coal capacity across the United States had been retired or was slated to retire by 2030. In Kansas, however, only 11 percent of coal capacity has a retirement date of 2030 or sooner (see Figure 1). This year, Evergy committed to retire unit 4 of the Lawrence coal plant in 2023, switch Lawrence unit 5 to run on gas, and retire one unit of the Jeffrey coal plant in 2030. Considering these retirement updates, 34 percent of Kansas coal capacity is now scheduled to retire by 2030, but the pace of Evergy's transition away from coal remains well behind the national average.

Figure 1: Percent of coal capacity proposed to retire by 2030

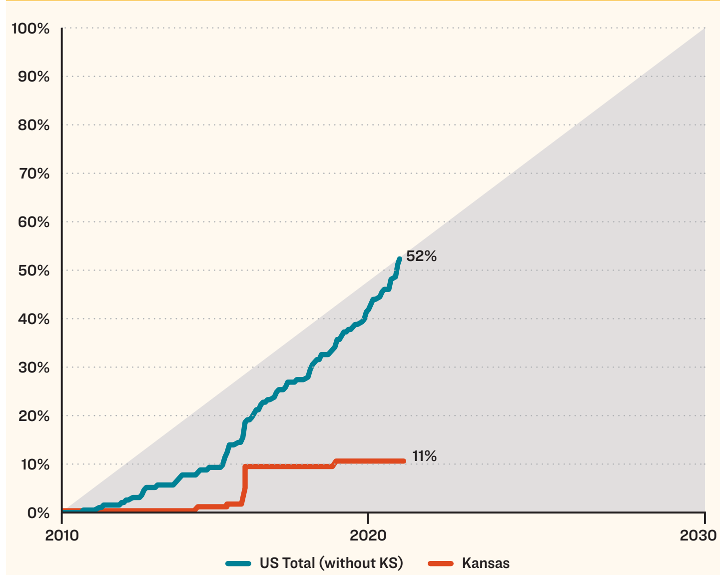


Figure 2: Capacity factor trend for Evergy's KS coal fleet

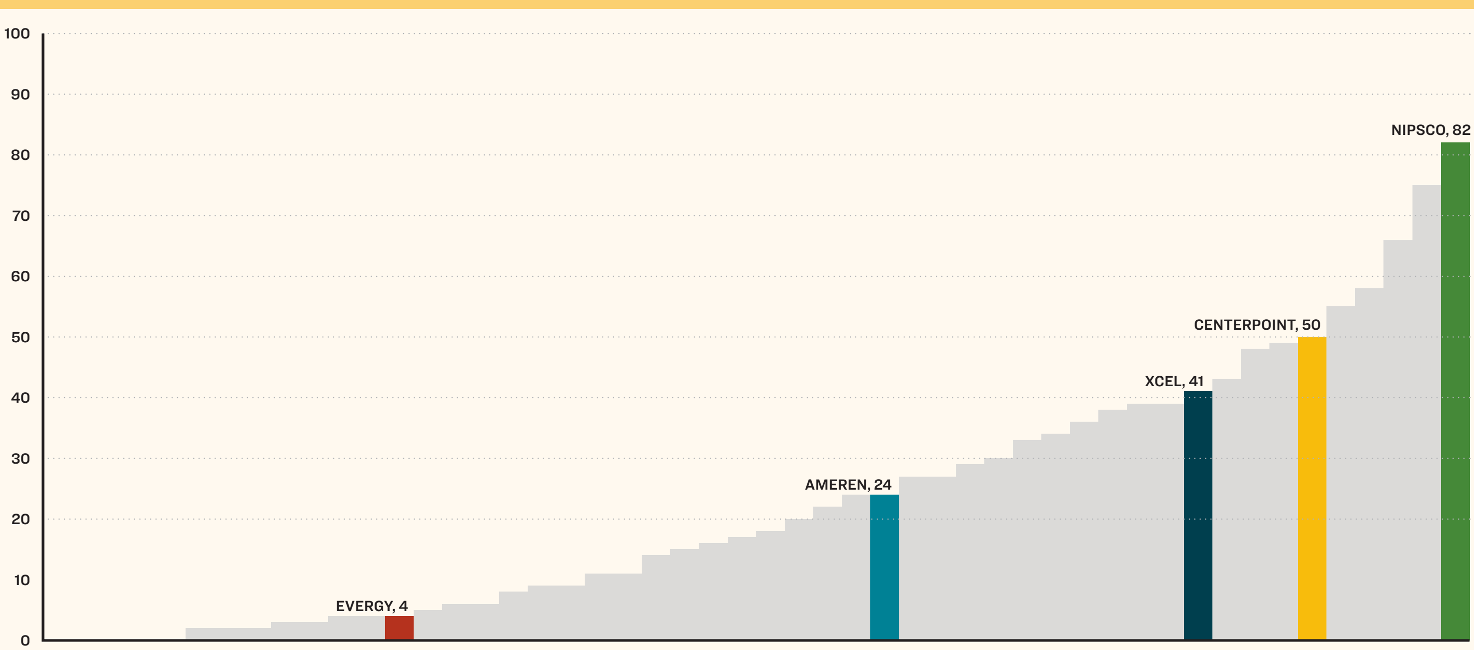
In a 2021 report, "The Dirty Truth About Utility Climate Pledges," Sierra Club analysts gave Evergy a failing grade (4 out of 100) for its refusal to retire its coal plants and build clean energy at the pace that climate science demands. While Evergy's score is expected to improve by the time this report is updated in early 2022, the utility will still lag far behind fellow Midwestern utilities such as Xcel Energy, CenterPoint, and the Northern Indiana Public Service Company (NIPSCO), according to the current IRP. (See Figure 3.)

In 2021, Evergy pivoted from a goal of 80 percent reduction in carbon emissions by 2050 (from its 2005 baseline) to a goal of achieving net-zero carbon emissions by 2045, following a trend of many utilities across the nation.[1] Even with this new goal, Evergy's commitment stands in stark contrast to the Biden administration's commitment to 100-percent clean electricity by 2035, and to nationwide polling that shows public desire for a 100-percent clean energy transition.[2]

In 2019's "Kansas Pays the Price", the Sierra Club highlighted the worsening economics of Evergy's Kansas coal plants, finding that the utility lost $267 million from 2015 to 2018. The coal plants that Evergy has not committed to taking offline are projected to cost ratepayers $847 million above the market price for energy. The report called on Evergy and Kansas's public utility commission, the Kansas Corporation Commission (KCC), to: 1) assess the economics of the coal plants; 2) allow clean energy to compete on a level playing field with fossil fuels; and 3) investigate whether Evergy dispatched its coal plants at times when the cost of operating the coal plant was greater than the energy market price, thereby wasting its customers' money. [3]

In early 2021, the KCC analyzed Evergy's use of coal-fired power plants in 2018 and "did not find any imprudence in [Evergy's] management of the self-commitment of its coal fleet."[4] But the KCC seems to have cherry-picked its data: it focused on the one year that had higher energy prices, which meant coal power plants lost less money. Our analysis, which spanned 2015 to 2018, found that the bulk of losses occurred from 2015 to 2017. Regardless, Evergy's coal fleet has continued to operate less and less, a sign of its declining competitiveness. As shown in Figure 2, the capacity factor for Evergy's Kansas coal fleet, or the ratio of how much electricity the coal plants produced as compared to the maximum possible production, fell from 70 percent in 2010 to 50 percent in 2018, and fell further to 40 percent in 2020.

Figure 3: Score range for Evergy and 50 parent companies in the Dirty Truth report, with comparable Midwestern investor-owned utilities highlighted



The KCC staff's report criticized the Sierra Club's 2019 analysis for accounting only for the energy market value of the coal plants and not their capacity value, meaning their ability to provide capacity at peak times, such as cold winter mornings or hot summer afternoons. In this report, we directly address this criticism by offering new analysis that accounts for both energy and capacity. As we will unpack in the next section, Evergy can replace its three Kansas coal plants in this decade with only clean energy sources (wind, solar, battery storage, demand response, and energy efficiency), and it can do so without compromising on reliability or affordability.

1. Clean Energy Is a Reliable, Affordable Replacement for Dirty Fuels

Between its four subsidiary utilities (Central, South, Metro, and Missouri West), Evergy holds a supply of roughly 12,500 megawatts (MW) and has a resource adequacy requirement of roughly 11,700 MW (Figure 4). The Lawrence Energy Center was recommended for retirement in Evergy's latest IRP, which makes sense given that it contains the oldest and third-oldest units, and its operating capacity is less than the excess capacity Evergy currently holds.[5] Thus, Evergy is not obligated to replace Lawrence's capacity. Moving forward, Evergy should not prolong burning gas at the facility, which, as Winter Storm Uri showed in early 2021, is unreliable and expensive in an emergency. Evergy should seek to replace all of its coal capacity with clean energy sources. In this section, we demonstrate that it is possible to replace all of Jeffrey and La Cygne coal with only clean energy resources, while maintaining affordable and reliable power for Evergy's customers.

Using RMI's Clean Energy Portfolio (CEP) algorithm, we optimized a portfolio of wind, solar PV, battery storage, energy efficiency, and demand response to meet both the energy and capacity requirements of the Jeffrey and La Cygne coal plants, with results shown in Table 1. Once the algorithm has identified a portfolio that can both meet the top 50 hours of demand in a year as well as the monthly energy requirements of the coal plant, it calculates the cost of building and operating that portfolio. The cost is recalculated for all hypothetical construction years from 2019 to 2030. Our Sources and Methodology section at the end of this report outlines these calculations in more detail.

When the cost of building and operating the CEP falls below the cost of operating the coal plant, then there can be a "no regrets" decision to retire the coal plant and build the CEP in its place, regardless of how much remaining debt remains on the coal plant. Based on economic theory, when the total cost of a new plant becomes less than the marginal cost of an existing plant, then the new plant represents the least-cost pathway, regardless of any sunk costs. At that point (the "stranding year"), the existing plant becomes a stranded asset. The "stranding year" occurs when the cost of building and operating the CEP will become less than the base operating cost of the coal plant. Using this principle and the results of the CEP algorithm, **we found that the stranding years for Jeffrey and La Cygne coal plants could occur as soon as 2025 and 2028, respectively (see Figure 5).**[6]

The makeup of the CEPs, both with and without demand-side technologies, can be found below in Table 1.[7] We tested the CEP algorithm with and without demand-side management (DSM) technologies, acknowledging that it takes time for the utility to grow its energy efficiency and demand response programs and that there is still a large, untapped potential for growth in these areas. However, DSM programs can help to further minimize costs for customers and play a key role in an affordable clean energy transition. Ramping up energy efficiency programs (as we discuss in section 3) will reduce the number of solar and wind projects that need to be built, while implementing demand response programs will reduce the amount of battery storage that needs to be built. One key part of Northern Indiana Public Service Company's transition from coal to clean energy is

Figure 4: Current supply and demand balance for Evergy's combined utilities

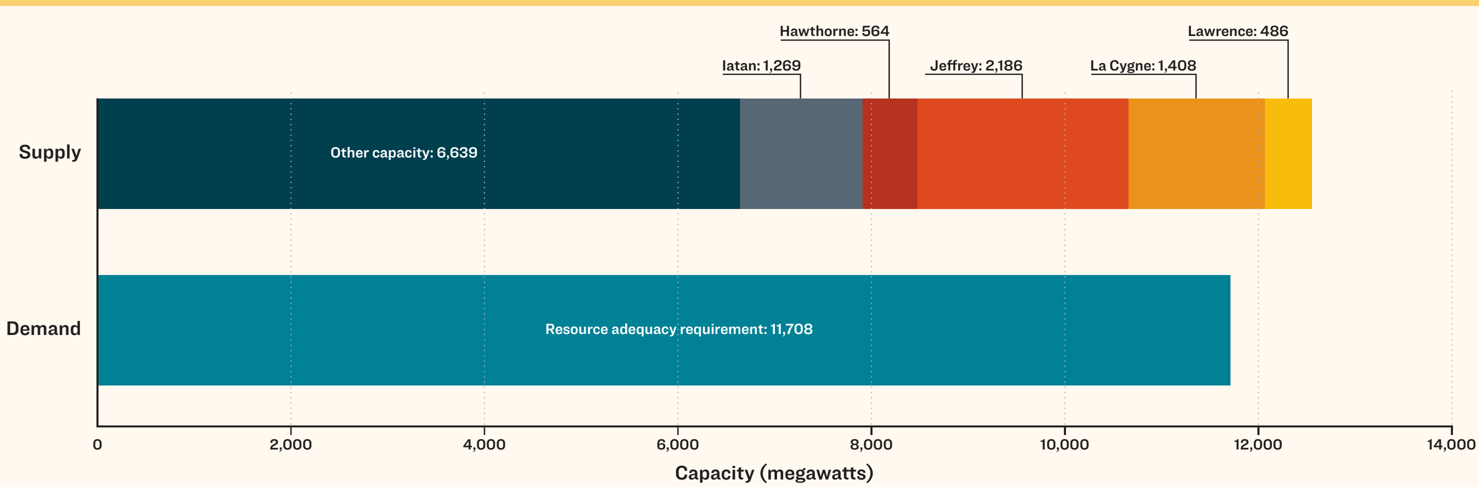
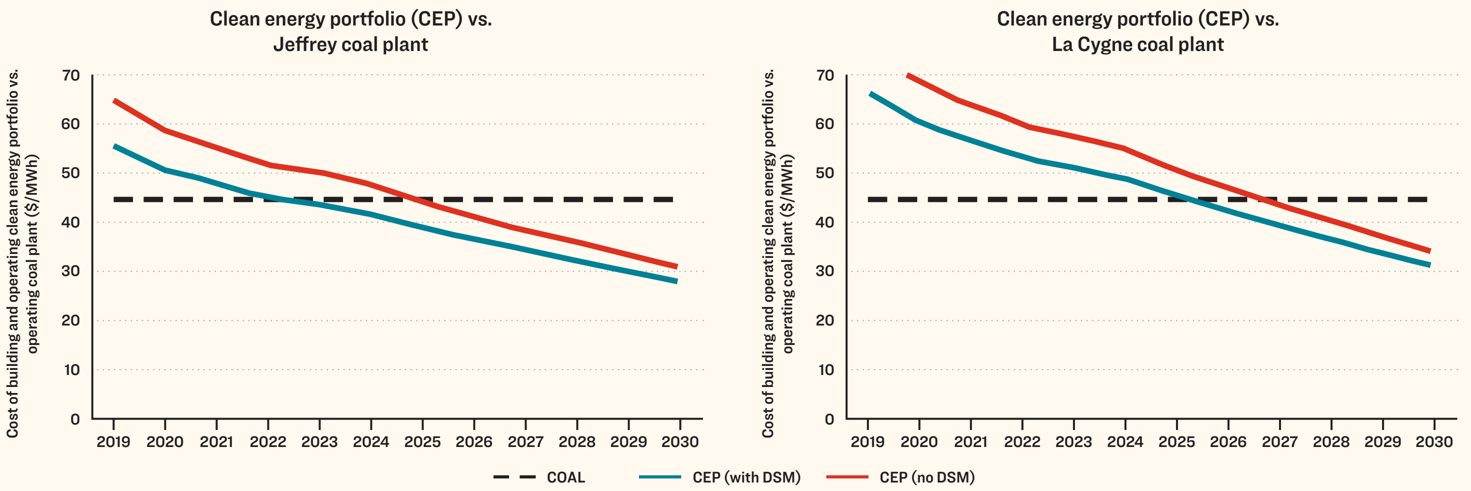


Figure 5: Comparison of Evergy's Jeffrey and La Cygne coal plants to clean energy portfolio replacements



the use of more than 600 MW of industrial, interruptible load that can be called upon as a reliable, cost-effective capacity resource during peak times.[8] In our CEP with DSM, just over 300 MW of industrial demand response was included, and we believe Evergy should explore this resource through its IRP and other processes.

Table 1: Composition of clean energy portfolio to replace each coal plant by technology and capacity (in megawatts)

Clean energy portfolio with DSM	Solar	Wind	Battery Storage	Energy Efficiency	Demand Response
Jeffrey	2,819	1,117	708	894	186
La Cygne	1,638	762	410	459	120
Total	4,457	1,879	1,119	1,353	306

Clean energy portfolio without DSM	Solar	Wind	Battery Storage	Energy Efficiency	Demand Response
Jeffrey	3,200	1,543	876	NA	NA
La Cygne	1,811	952	495	NA	NA
Total	5,012	2,495	1,371		

While capacity expansion models are the most commonly used model in IRPs, the CEP algorithm allows us to illustrate the full potential for renewables and demand-side management. We urge Evergy to use the latest forecasts for renewable energy costs in its analyses to ensure that renewable energy can compete on a level playing field with fossil fuels. Additionally, we urge Evergy to run models that do not preselect coal retirement dates or new resources, which effectively puts a thumb on the scale in favor of coal plant retention. As noted by the Energy Futures Group in a recent report, Evergy has only done production-cost modeling of hand-selected portfolios in its IRP.[9] This is one of the primary reasons Evergy has thus far shown such anemic commitments to moving off of coal and towards clean energy.

2. Securitization Can Lower Costs for Evergy Customers

Given that Evergy has a large outstanding mortgage on its coal plants, the utility must acknowledge the dual reality that: 1) clean energy will soon be the cheapest source of energy, and just as reliable as fossil resources; and 2) securitization of remaining coal plant debt can offer further savings for customers.

Evergy's overreliance on coal should not be underestimated. Coal power accounted for 58 percent of Evergy's generation portfolio in 2019, compared to the nationwide average of 22 percent for the same year.[10] As such, Evergy has both a large amount of unpaid debt on its coal plants and an overreliance on coal for its earnings. Securitization and capital recycling offer pathways to deal with the problems of stranded coal debt and utility earnings depletion, respectively. These solutions have been widely written about by experts at the Sierra Club, RMI, the Natural Resources Defense Council, and other organizations.[11] RMI estimated that the savings from securitizing all of Evergy's remaining coal debt (across both its Missouri and Kansas service territories) would be $780 million if the plants were retired in 2030, and $1.7 billion if the plants were retired as soon as 2023. The total savings from securitizing the remaining coal debt for Jeffrey and La Cygne coal plants would range from $333 million to $869 million based on the 2023 to 2030 range of retirement dates.[12]

When the Kansas rate studies were completed in 2018 to 2019, one of Evergy's justifications for rising rates was that it had built more capacity than was needed at first, with the idea to export off-system sales to other states and utilities while demand grew in its own service territory.[13] While Evergy has stabilized prices since the merger of Great Plains Energy and Westar in 2018 (see Figure 6), the projected demand growth never took place in Evergy's service territory, with sales remaining very flat over the past decade (see Figure 7).

Figure 6: Evergy's average retail price of electricity by customer class

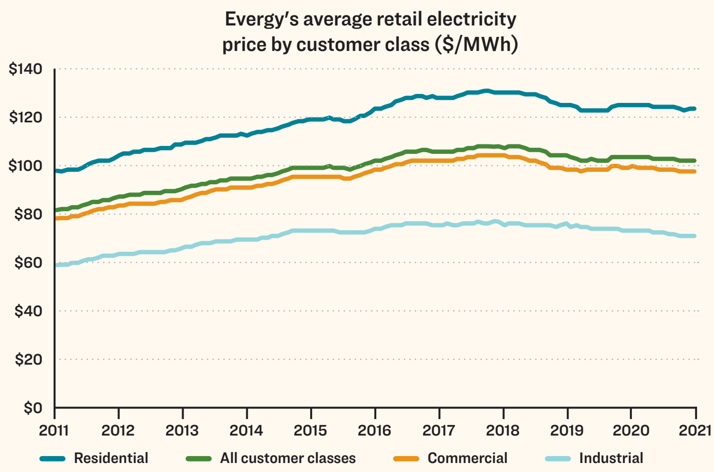
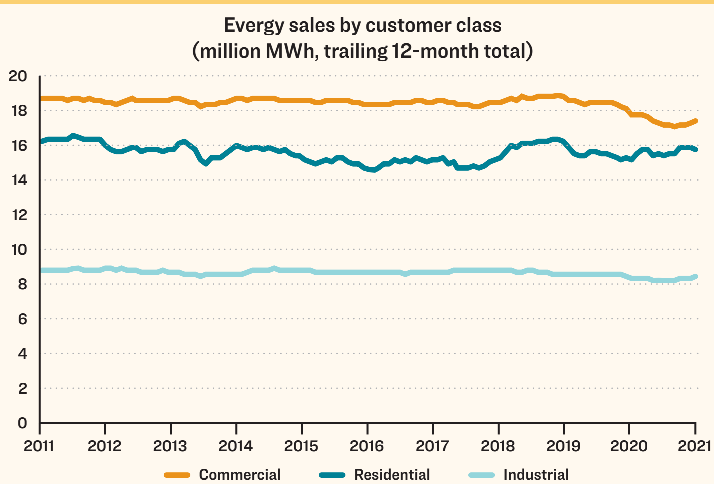


Figure 7: Evergy retail sales by customer class



Now that Evergy has stabilized prices, the key is to keep them stable while transitioning from coal to clean energy. Securitization is one important tool for maintaining affordability. Addressing energy burden through targeted energy efficiency investment is another important tool that we turn our attention to in the next section.

3. Further Investment in Energy Efficiency Is Needed to Help Address Energy Burden

High achievement in energy efficiency is a critical piece of an affordable, low-carbon transition, as it means that less clean energy must be built as we electrify parts of the economy. Higher levels of energy efficiency will not only make energy bills more affordable, but can also help create headroom for electrification of buildings and vehicles.

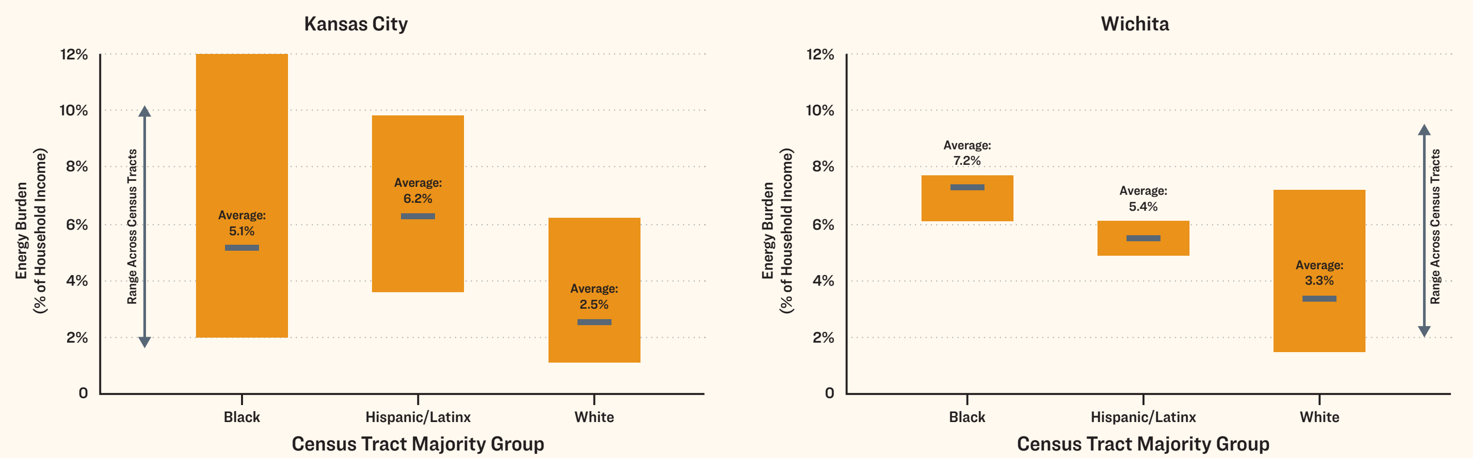
In the Sierra Club's 2021 report, The Dirty Truth About Utility Climate Pledges, we found that the biggest vertically integrated utilities are only achieving the equivalent of 0.7 percent of their retail sales in energy efficiency measures. An energy efficiency achievement of 0.7 percent is equivalent to a company that sells 1 million MWh of electricity helping its customers implement energy savings measures that save 7,000 MWh per year. The states that lead the nation in energy efficiency — such as New York and Massachusetts — have an energy efficiency standard of 2 percent or higher. Evergy Missouri West reported an efficiency achievement of 1.5 percent among residential customers and 1.2 percent among commercial customers in 2019, while Evergy Metro reported 0.8 percent and 0.7 percent among residential and commercial customers, respectively. Evergy's Kansas utilities did not report their achievement data.[14]

"Energy burden" is a commonly used measure for affordability, defined as the proportion of household energy expenditures (electric, gas, and other heating fuel) to total household income. An energy burden greater than 6 percent of income is considered high, while an energy burden of greater than 10 percent is considered severe. A high energy burden can threaten a household's ability to pay for energy, and leads to an increased risk of disconnection, forcing some households to choose between paying energy bills and paying rent or buying food.

New analysis by the Sierra Club, using Department of Energy and Census Bureau datasets, found that the energy burden for metropolitan areas within Evergy's service territory showed a stark divide by race, with Black and Hispanic households facing at least twice the average energy burden as that of white households in the Kansas City metropolitan area extending across both Kansas and Missouri.[15] For example, majority Black and majority Hispanic census tracts in the Kansas City metropolitan area faced an average energy burden of 5.1 and 6.2 percent respectively, while majority white census tracts only faced a median energy burden of 2.5 percent. In Wichita, the largest metropolitan area wholly within the state of Kansas, the average was 7.2 percent and 5.4 percent for majority Black and Hispanic census tracts, respectively, compared to 3.3 percent for majority white census tracts.

As shown in Figure 7, Evergy's load has been flat for at least a decade. Evergy should study whether it could achieve even lower load growth with cost-effective energy efficiency. Evergy has achieved flat net sales, in part, through energy efficiency programs in Missouri, and it can likely achieve additional customer savings by pursuing additional and robust energy efficiency measures in Kansas. Simply put, achieving lower load benefits customers by avoiding the need to maintain or build expensive generation resources.

Figure 8: Average and range of energy burden by race for two metropolitan areas in Evergy's service territory



RECOMMENDATIONS

Sierra Club calls on Evergy to willingly adopt (or the Kansas Corporation Commission to order Evergy to adopt) the following recommendations:

1. Update the IRP process by 2022 to model scenarios, using capacity expansion modeling, with increased levels of demand-side management, renewable energy, and storage, and to stop pre-selecting coal retirement dates;
2. Analyze and quantify how securitization can be used to support cost-effective accelerated retirement of coal generation assets while also channeling the savings into cost-effective investments such as demand-side management, wind and solar generation, and storage.
3. Develop public plans to increase the deployment of energy efficiency and local renewable energy in a manner that alleviates high energy burden and involuntary disconnects for low-income ratepayers.

SOURCES AND METHODOLOGY

Clean Energy Portfolio

Given that continuing to run these coal units would be a net cost to customers compared with the energy market, the next step in the analysis is to investigate whether they can be cost-effectively replaced with clean energy — and if so, on what timeline. For this analysis, we used RMI's Clean Energy Portfolio's algorithm from its 2019 report, "The Growing Market for Clean Energy Portfolios," to identify a suite of clean energy technologies (wind, solar, storage, energy efficiency, and demand response) that could replace the services of Evergy's Jeffrey and La Cygne coal plants.

A clean energy portfolio, or CEP, is a combination of renewable energy, storage, and demand-side management (DSM) projects that meet the needs of the grid and a utility's customers. We use the term DSM to collectively refer to energy efficiency projects (which lead to a reduction in load) and demand response projects (which lead to the shifting or temporary reduction of load). The use of CEPs differs from traditional resource planning, which typically focuses on a specific technology. Instead, a CEP looks at how a range of available clean energy resources could contribute to supply in each hour of the year, and finds the combination that meets the unique needs of customers at the lowest feasible cost. In this study, the CEPs are constructed to match the energy, peak capacity, and ramping characteristics of the Jeffrey and La Cygne coal plants. Portfolios are optimized to satisfy these needs at the lowest cost possible.

The CEPs are conservatively designed to meet peak capacity needs in the top 50 hours of the year in the Southwest Power Pool (SPP), the grid region where Evergy and its coal plants operate. Some of the 50 peak hours occur when solar output is high, and some of the hours occur when solar output is low. As such, the CEP must not rely on solar alone, but rather a complement of wind, solar, storage, and demand-side management technologies. The CEP also must meet the monthly energy requirement of the coal plant's total generation in each month of the year, having averaged monthly capacity factors for 2018, 2019, and 2020. The CEP algorithm errs on the side of caution, in the sense that other grid resources (like existing gas plants or market purchases) play no role in the replacement, but those resources are typically included in production cost or capacity expansion models that utilities use in portfolio analysis. In other words, the CEP algorithm accounts for an energy and capacity replacement of the coal plant without the benefit of any other existing grid resources. We assume that energy efficiency and demand response could only account for up to 25 percent of the replacement energy and capacity of replacement portfolios, respectively. The efficiency measures used in the modeling were for residential lighting, commercial lighting, and residential space heating. The storage identified in the model was a mixture of 1-hour, 2-hour, and 8-hour storage. In Table 1, the total storage capacity was represented as if the entire energy storage requirement was built as an 8-hour storage battery.

We populated the RMI model framework with storage and renewable cost assumptions from the National Renewable Energy Laboratory's ATB 2020 advanced case. In addition, the modeling includes a 10-percent investment tax credit for solar PV, wind, and battery storage. Any excess energy that renewables produced above and beyond the coal plant was valued at $15/MWh, which was the off-peak average price in the SPP in 2019–2020. The levelized costs of the CEPs were compared against the average Levelized Cost of Energy (LCOE) calculated for the coal units, as explained below.

Coal Plant Cost

In order to calculate LCOE for Jeffrey and La Cygne, we constructed a model to project future costs. All of the assumptions and projections are derived from publicly available information. As we note in several places below, many of these estimates are conservative; the actual performance of the unit may be less favorable to customers than our estimates. To build our model, we created starting assumptions or built projections for the following values:

- **Capacity factor:** The capacity factor stays fixed for a 10-year period at its 2018–2020, 3-year average of 44 percent for La Cygne and 43 percent for Jeffrey.
- **On- and off-peak generation:** On-peak generation was assumed to account for 45 percent of operating hours, representative of 9 a.m. to 5 p.m. on weekdays. The remaining generation was assumed to be off-peak.
- **Fuel costs:** The 2019 fuel costs as reported on EIA-923 for these plants were used as a starting point. From there, the costs were inflated in line with the EIA AEO 2020 reference coal price forecast for the West North Central region. We assumed a heat rate of 10,717 British thermal units (btu)/kilowatt hour (kWh) for La Cygne, and 11,880 btu/kWh for Jeffrey.
- **Variable and fixed O&M expenses:** The 2019 variable and fixed O&M costs were used as a starting point and inflated by 2 percent per year, in line with standard inflation. Variable and fixed operations and maintenance (O&M) data were pulled from FERC Form 1 filed by Evergy in 2019. For variable O&M, the following categories of FERC reporting were included: Steam Expense, Electric Expense, and Miscellaneous Power Expenses. For fixed O&M, the following categories were included: Operating Supervision and Engineering, Maintenance Supervision Expense, Maintenance of Structures, Maintenance of Boiler Plant, Maintenance of Electric Plant, and Maintenance of Other Plants.
- **Annual capital expenses:** Ongoing annual capital additions were calculated according to an equation found in EIA's Annual Energy Outlook methodology. EIA found a generalized equation (listed below) that describes how much coal plant owners spend on capital expenditures on average per year, as a function of coal plant age and whether or not the coal plant had flue gas desulphurization (FGD). For coal plants across the U.S., the range for ongoing capital expenditure (CapEx) is $19 to $30/kW-year. For Jeffrey and La Cygne, the average ongoing CapEx is on the higher end of the range at $27/kW-year (in 2017 dollars), as the plants both have FGD and the units range from 40 to 50 years in age. From here, we inflated this figure by 2 percent per year to account for normal inflation:

$$CAPEX = 16.53 + (0.126 * age) + (5.68 * FGD)$$
$$where\ FGD = 1\ if\ a\ plant\ has\ an\ FGD,\ 0\ if\ a\ plant\ does\ not\ have\ FGD$$

Finally, the LCOE was calculated by taking an annualized payment of the net present value of all costs (using a discount rate of 8 percent) and dividing it by annual generation.

ENDNOTES

1. Evergy comments submitted in advance of STP workshop, May 20, 2021, p. 26. Docket No. 21-EKME-088-GIE.
2. Yale Program on Climate Change Communication. "Poll Shows 82% of Voters Support 100% Clean Energy." Nov. 4, 2020.
3. For further discussion on non-economic dispatch, see: Fisher, Jeremy, Al Armendariz, Matthew Miller, Brendan Pierpont, Casey Roberts, Josh Smith, Greg Wannier. *Playing With Other People's Money: How Non-Economic Coal Operations Distort Energy Markets* (The Sierra Club, 2019).
4. KCC staff's report and recommendation filed In the Matter of the Joint Application of Westar Energy, Inc. and Kansas Gas and Electric Company for Approval of Their Annual Energy Cost Correction Adjustment Factor, Jan. 12, 2021, p. 1, Docket No. 19-WSEE-380-ACA.
5. *2021 Southwest Power Pool Resource Adequacy Report*, June 15, 2021.
6. The stranding years indicated above are from our model run without DSM, which only uses wind, solar, and battery storage.
7. Battery storage capacity here is represented by the amount of capacity (MW) to be built if only 8-hour storage units were used. In the appendix, we explain the storage results of the model in more detail.
8. *2018 Integrated Resource Plan,* Northern Indiana Public Service Company, LLC (NIPSCO). https://www.nipsco.com/docs/librariesprovider11/rates-and-tariffs/irp/2018-nipsco-irp.pdf?sfvrsn=15
9. Energy Futures Group. Evaluation of Triennial Resource Planning Filing of Evergy Metro and Evergy Missouri West, prepared for the Council for the New Energy Economics. Filed September 2021..
10. This calculation includes both the electricity generated by Evergy's owned assets and the assets with which Evergy has a power purchase agreement. Data supplied by S&P Global Market Intelligence.
11. Varadarajan, Uday, David Posner, Jeremy Fisher. *Harnessing Financial Tools to Transform the Electric Sector* (Sierra Club, 2018).
12. KS Securitization Savings Projections: RMI, Exhibit B, Sierra Club's comments on Evergy's STP, filed April 16, 2021, Docket No. 21-EKME-088-GIE.
13. Kansas Electric Rate Review. *KCP&L-Westar Energy Regional Rate Analysis and Conclusions,* p. 19-21. January 2019.
14. *Annual Electric Power Industry Report* (Energy Information Administration/EIA-861, 2019).
15. For this calculation, Kansas City is the metropolitan area spanning both Kansas and Missouri.

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