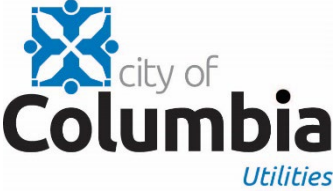




## 2026 Renewable Energy Plan

|                                                                                                      |                                                           |                                                                                       |
|------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|---------------------------------------------------------------------------------------|
|                   |                                                           |  |
| City of Columbia, MO<br>701 E Broadway<br>P.O. Box 6015<br>Columbia, MO 65205<br>573.874.CITY (2489) | Erin Keys<br>Registered Professional Engineer<br>PE-29106 |                                                                                       |
| Approved By:<br><br>_____<br>Director of Utilities                                                   |                                                           | <br><br>_____<br>Date                                                                 |

## Introduction

### City of Columbia Utilities

City of Columbia Utilities' renewable energy portfolio is a diverse combination of wind, distributed and utility solar, and landfill gas resources. This resource mix aims to meet City Ordinances while maintaining reliable, cost-effective service and reducing reliance on non-renewable energy sources.

In November 2004, residents of Columbia approved a renewable energy ordinance for the City's power supply portfolio, directing City of Columbia Utilities to generate or purchase increasing levels of energy from renewable resources through 2029. The Columbia City Council revised the renewable energy ordinance in January 2014 to increase the renewable energy goals. The standard for 2025 was set at 25%.

In 2025, City of Columbia Utilities purchased or generated 284,780 MWH of its total electric usage through renewable energy sources, which was 22.57% of Columbia's adjusted system load. In 2024, Columbia's renewable energy usage was 280,872 MWH, which was 22.82% of the adjusted system load.

The cost of renewable energy was approximately \$459,600 more in 2025 than in 2024.

The rate impact for renewable energy compared to non-renewables was \$3,463,900, which was 72.4% of the rate impact limit of \$4,787,669.

In 2024, the City and the Water & Light Advisory Board reassessed the Renewable Energy Standard and recommended changes to the ordinance. A work session has been scheduled with the City Council to discuss the ordinance in 2026. Utilities also received three unsolicited proposals for solar power purchase agreements that would expand the City's renewable portfolio. Staff is currently evaluating the proposals.

## City of Columbia Ordinance Section 27-106: Renewable Energy Standard

(a) The city shall generate or purchase electricity generated from eligible renewable energy sources at the following levels:

- Two (2) percent of electric retail usage (kWhs) by December 31, 2007;
- Five (5) percent of electric retail usage (kWhs) by December 31, 2012;
- Fifteen (15) percent of electric retail usage (kWhs) by December 31, 2017;
- Twenty-five (25) percent of electric retail usage (kWhs) by December 31, 2022; and
- Thirty (30) percent of electric retail usage (kWhs) by December 31, 2028.

(b) This renewable energy shall be added up to these kilowatt hour levels only to the extent that it is possible without increasing electric rates more than three (3) percent higher than the electric rates that would otherwise be attributable to the cost of continuing to generate or purchase electricity generated from one hundred (100) percent non-renewable sources (including coal, natural gas, nuclear energy and other non-renewable sources).

(c) Eligible renewable energy generation may be provided by wind power, solar energy, bio-energy sources or other renewable sources that meet the environmental criteria approved by the City Council after review by the energy and environment commission and the Water and Light Advisory Board. Electricity produced from on-site renewable energy systems owned by Columbia Water & Light customers ("net-metering") may be included within the calculation of the levels required in subsection (a).

(d) Renewable energy generation sources located within Missouri may receive preferential consideration in the selection process.

(e) Each year prior to February 1, the water and light department shall publicly release a renewable energy plan detailing a proposal for how the city would comply with this section during the following year. The plan will explain the City's due diligence in pursuing renewable energy opportunities and detail all cost assumptions and related utility rate calculations, except with regard to confidential information that may be withheld pursuant to state law. The plan will then be reviewed by the energy and environment commission and the water and light advisory board and submitted to the city council for approval following a public hearing.

(Ord. No. 18196, § 1, 8-16-04; Ord. No. 21935, § 1, 1-6-14)

**Note:** Ord. No. 18196, passed by city council on August 16, 2004, called for election; said ordinance was passed by the voters on Nov. 2, 2004.

**Note:** Ord. No. 024044, passed by city council on October 7, 2019, dissolved the energy and environment commission and replaced it with the Climate and Environment Commission. It is recommended to consider revising all references to the energy and environment commission.

## 2025 Renewable Energy Supply

Columbia Adjusted System Load: 1,261,818 MWH

Renewable Energy Total: 284,780 MWH or 22.57%

Adjusted System Load is determined by adding the amount of electricity produced inside Columbia's distribution system to the metered load provided by outside sources. Basing the renewable percentage on Adjusted System Load more accurately describes the actual electric load in the City's service territory.

In 2025, 22.57% of Columbia's electric portfolio came from renewable sources: wind (17.63%), landfill gas (2.68%), and solar (2.25%). The total amount did not meet the 25% standard for 2025 by 2.43%.

Columbia's total system load continues to grow, which may have a negative impact on the City's renewable energy percentage even if the City achieves an increase in actual MWHs of renewable energy purchased or generated. 2025's renewable energy supply increased by 3,908 MWH when compared to 2024.

### Summary of Significant Events for 2025

- Columbia received a full year of production from Bluegrass Ridge after the wind farm's repower in 2024. The City saw 20,723 MWHs, an increase of 140% over the previous year.
- Because of congestion, the cost of transmission from Crystal Lake fell below the negative production tax credit price, meaning the City would have to pay more than the contracted price. City of Columbia Utilities told Crystal Lake to stop generating in the third quarter, reducing energy by 31% for Contract 1 and by 34% for Contract 2 as compared to 2024.
- The amount of gas received from the Jefferson City Landfill was reduced because of high temperatures and low moisture. Ameresco ran only one or two units during the summer and went temporarily offline in September.
- According to the Grain Belt Express website, construction on the power line that will connect the Iron Star wind project to the City of Columbia is scheduled to begin in 2026 with the system to come online in 2029.
- City of Columbia Utilities received three unsolicited proposed PPAs from solar fields. The City is currently evaluating the proposals.

### 2025 Renewable Energy Production Amounts

| Month                  | Columbia<br>Adjusted<br>Load | Bluegrass<br>Wind | Crystal<br>Lake<br>Contract 1 | Crystal<br>Lake<br>Contract 2 | Columbia<br>Landfill | Jeff City<br>Landfill | Truman<br>Solar | Net-Metered<br>Solar | Columbia<br>Solar | Total<br>Renewable | YTD%<br>of<br>System |
|------------------------|------------------------------|-------------------|-------------------------------|-------------------------------|----------------------|-----------------------|-----------------|----------------------|-------------------|--------------------|----------------------|
| 1-25                   | 118,255                      | 2,225             | 4,358                         | 19,776                        | 1,257                | 767                   | 1,338           | 454                  | 22                | 30,197             | 25.54%               |
| 2-25                   | 103,689                      | 2,000             | 3,525                         | 16,380                        | 1,176                | 1,247                 | 1,222           | 347                  | 15                | 25,912             | 25.28%               |
| 3-25                   | 90,868                       | 2,609             | 4,308                         | 18,928                        | 1,521                | 1,414                 | 2,092           | 774                  | 32                | 31,678             | 28.06%               |
| 4-25                   | 86,023                       | 2,188             | 4,078                         | 17,660                        | 1,617                | 1,164                 | 1,760           | 620                  | 24                | 29,111             | 29.31%               |
| 5-25                   | 92,626                       | 1,474             | 2,390                         | 11,154                        | 1,981                | 1,782                 | 2,387           | 919                  | 36                | 22,123             | 28.29%               |
| 6-25                   | 113,941                      | 1,362             | 2,375                         | 10,444                        | 1,809                | 1,445                 | 1,539           | 822                  | 32                | 19,829             | 26.24%               |
| 7-25                   | 135,433                      | 1,079             | 1,441                         | 6,465                         | 1,682                | 1,299                 | 2,327           | 944                  | 37                | 15,274             | 23.50%               |
| 8-25                   | 123,669                      | 955               | 1,451                         | 6,605                         | 1,533                | 1,316                 | 2,282           | 950                  | 37                | 15,129             | 21.89%               |
| 9-25                   | 107,411                      | 923               | 1,808                         | 8,280                         | 1,243                | 699                   | 1,885           | 823                  | 33                | 15,694             | 21.09%               |
| 10-25                  | 95,476                       | 1,828             | 3,781                         | 16,327                        | 1,227                | 1,390                 | 1,430           | 562                  | 26                | 26,570             | 21.69%               |
| 11-25                  | 88,312                       | 1,920             | 3,273                         | 16,002                        | 1,333                | 1,567                 | 1,004           | 515                  | 21                | 25,635             | 22.25%               |
| 12-25                  | 106,117                      | 2,160             | 3,100                         | 17,889                        | 1,432                | 1,977                 | 654             | 400                  | 16                | 27,628             | 22.57%               |
| <b>TOTAL</b>           | <b>1,261,818</b>             | <b>20,723</b>     | <b>35,888</b>                 | <b>165,911</b>                | <b>17,811</b>        | <b>16,067</b>         | <b>19,920</b>   | <b>8,130</b>         | <b>330</b>        | <b>284,780</b>     | <b>22.57%</b>        |
| <b>% of<br/>System</b> |                              | 1.64%             | 2.84%                         | 13.15%                        | 1.41%                | 1.27%                 | 1.58%           | .64%                 | .03%              | 22.57%             |                      |

The amount of energy is measured in megawatt-hours (MWH)

## 2025 Renewable Energy Portfolio

### Bluegrass Ridge Wind Energy

Columbia started receiving wind power from turbines near King City, Missouri, in September 2007. The Columbia contract is for one-ninth of the electric output of the Bluegrass Ridge Wind Farm from Associated Electric Cooperative. In 2024, Bluegrass Ridge was repowered with updated equipment, which was expected to increase Columbia's allocation to an average of 20,088 MWH annually.

At the maximum output, City of Columbia Utilities receives up to 6.3 MW. In 2025, Columbia received 20,723 MWH of power from this contract or 1.64% of the electric system total.

The amount of wind energy Columbia receives is variable. There is a fixed transmission cost for this energy, so it is more expensive when less energy is received. The average cost for 2025 for wind power from Bluegrass Ridge was \$66.73 per MWH.

The City's contract expires in 2027, which will provide the City an opportunity to evaluate the additional energy production and costs associated with the repower of the generators. Should a future contract renewal become available with this resource, the City will have data to evaluate rate impacts.

### Crystal Lake III Wind

City of Columbia Utilities has two PPAs with NextEra for wind energy produced at the Crystal Lake III wind farm in Northern Iowa. The first PPA, effective February 2012, is for 21 MW of wind. The second PPA, effective December 2016, involves the purchase of energy in two phases. The first is for the production of 27 MW of wind beginning in January 2017 with an additional 18 MW in January 2023.

Both contracts were amended in 2020 and include updated pricing as a result of a turbine repower of the entire site NextEra completed in 2021, with estimates of an additional 40,000 MWHs per year. Table 1.1, detailing updated pricing for the contracts from 2023 through 2040, can be found in the appendix.

Energy from the first contract provided 35,888 MWH in 2025 representing 2.84% of City of Columbia Utilities' system total at a cost of \$16.04 per MWH.

Energy from the second contract provided 165,911 MWH in 2025 representing 13.15% of City of Columbia Utilities' system total at a cost of \$13.42 per MWH.

The City told Crystal Lake to stop generating in the third quarter of 2025 because congestion caused the price to fall below the negative production tax credit price, meaning the City would have to pay more than the contracted price. Utilities curtailed 31% for Contract 1 and 34% for Contract 2 compared to 2024.

Congestion on the electrical system resulted in additional cost increases for transmission on these two contracts.

Analysis from The Prime Group through the Electric Cost of Service Study noted in their Renewable Target Evaluation that:

*Future congestion costs from Crystal Lake will likely grow with the Expansion and Repower taking effect in 2022/2023. These costs could persist for the foreseeable future until MISO Long Range Transmission Plan projects are in service in the late 2020s/early 2030s.*

In 2033, the offtake of power from Crystal Lake for the University of Missouri's electric utility expires, and the City expects to receive that power unless the offtake with the University is extended.

**Note:** In calculating the renewable energy cost for the Crystal Lake contracts, it was discovered that MISO settlements were not included for Contract 1 last year. This was corrected and both Contract 1 and Contract 2 include MISO settlement amounts in the 2025 Resource Cost calculations.

### Columbia Landfill Gas

The Columbia Landfill Gas Energy Plant was constructed in 2008 and uses the gas created from decomposing waste at the Landfill. The amount of energy received from the Columbia Landfill Gas Energy Plant is fairly consistent, aside from times when there is routine maintenance work. Following the Columbia Landfill Gas Energy Plant expansion to four units, the generator capacity increased to 4.2 MW.

In 2025, the Landfill Gas Energy Plant produced 17,811 MWH of energy at a cost of \$46.36 per MWH, which was 1.41% of Columbia's energy system total.

### Jefferson City Landfill Gas

City of Columbia Utilities has a 20-year power purchase agreement with Ameresco for 3.2 MW of energy from the landfill gas plant at the Jefferson City Landfill. Columbia started receiving energy from the plant in April 2009. The total amount of energy received in 2025 was 16,067 MWH, which is 1.27% of the electric system total. The utility paid \$53.25 per MWH for the electricity.

The amount of energy received in the summer was reduced because of high temperatures and low moisture. In addition, Ameresco had only one or two units running most of the time and was offline temporarily for a stretch in September.

### Truman Solar

Truman Solar is a 10 MW solar facility connected to City of Columbia Utilities' 13.8 kV distribution system at the Rebel Hill substation. The solar installation went into operation in May 2021.

The Truman Solar field saw a weather-related decrease in generation in June, which impacted the amount of energy supplied to the City. In 2025, the Truman Solar facility produced 19,920 MWH of energy at a cost of \$44.81 per MWH, which was 1.58% of Columbia's energy system total.

### Net-Metered Customer Production

The Columbia City Council passed an ordinance in 2007 to allow customers to enter into a net-metering agreement with City of Columbia Utilities. A net-metering arrangement is a billing agreement in which customers receive credits for electricity provided to the Columbia system.

During 2025, there were 150 new customer-owned photovoltaic installations or expansions, and the rated capacity grew from 6.16 MW to 7.89 MW.

In 2025, an estimated 8,134 MWH of power was generated by net-metering customers. Of this amount, 4,024 MWH was returned to the grid. Net-metered production represented 0.64% of Columbia's electric portfolio in 2025 at a cost of \$52.55 per MWH.

Analysis from The Prime Group through the Electric Cost of Service Study noted in their Renewable Target Evaluation that:

*If Net Metering continues to grow at similar rates as 2020 and 2021, it will become a substantial renewable cost to the City if credits remain at the current retail rates.*

With the federal investment tax credits ending at the end of 2025, residential solar installation is expected to decrease slightly in 2026. However, commercial installations are expected to remain steady and the residential market is expected to rebound beginning in 2027.

Since growth in the distribution of solar energy sold to the utility and behind-the-meter generation are expected to remain relatively steady, the financial risks from net-metering are not likely to affect the overall renewable energy cost, though they could be significant in the future when considering cost of service.

In 2025, the estimated potential reduction of revenue to the utility due to power not being sold to customers because of net metering was \$631,180.37.

#### **City of Columbia Utilities Solar Installations**

City of Columbia Utilities staff expanded the Bernadette site in 2015 to a total of 263 kW. This solar resource produced 330 MWH or 0.03% of the electric portfolio at a cost of \$70.73 per MWH.

## Costs of Renewable Energy

To minimize rate impacts on customers that could result from investments in renewable generation, Section 27-106(b) of the Renewable Energy Standard requires that rates will not increase by more than 3% due to the potentially higher cost of renewable energy compared to non-renewable energy.

Costs for renewable energy increased in 2025. The total rate impact of renewable energy in excess of non-renewable energy was \$3,463,900, which is 72.4% of the rate impact limit of \$4,787,669.

With consideration for such fluctuating costs, City of Columbia Utilities implemented a Power Cost Adjustment in October 2023. The PCA balances revenue collection to reflect cost changes in the energy markets. The PCA helps City of Columbia Utilities manage fluctuations in power purchase costs by making adjustments that reflect the true cost of power each month, which will help City of Columbia Utilities avoid reactionary rate increases.

From calendar year 2024 to calendar year 2025, the total amount of renewable energy increased by 3,980 MWH.

While cost is not the only consideration in evaluating power supply options, this metric is important when considering Columbia's Renewable Energy Standard.

### Impact of 2025 Renewable Energy Portfolio

| Renewable Resource                              | Total 2025 MWH | Additional Cost/(Savings) Per MWH | Total Impact on Rates |
|-------------------------------------------------|----------------|-----------------------------------|-----------------------|
| Bluegrass Ridge Wind (Associated Electric)      | 20,723         | \$34.11                           | \$706,862             |
| Crystal Lake Wind Contract 1 (NextEra)          | 35,888         | \$13.30                           | \$477,310             |
| Crystal Lake Wind Contract 2 (NextEra)          | 165,911        | \$10.12                           | \$1,679,019           |
| Columbia Landfill                               | 17,811         | \$12.66                           | \$225,487             |
| Jefferson City Landfill (Ameresco)              | 16,067         | \$17.66                           | \$283,743             |
| Truman Solar (Truman Solar LLC)                 | 19,920         | \$0.66                            | \$13,147              |
| Net-Metered Photovoltaic Production             | 8,130          | \$8.55                            | \$69,511              |
| Columbia Water & Light Solar Production         | 330            | \$26.73                           | \$8,821               |
| <b>Total Renewable Resource Impact on Rates</b> |                |                                   | <b>\$3,463,900</b>    |

## Renewable Portfolio Cost Calculations

The City of Columbia has a fiscal year that does not match the calendar year outlined in the Renewable Energy Standard. Renewable energy costs for this report include information from January through September of the prior fiscal year and October through December of the current fiscal year.

| Revenue Source                          | January – September<br>(FY25) | October – December<br>(FY26) |
|-----------------------------------------|-------------------------------|------------------------------|
| Residential                             | \$53,865,145                  | \$16,021,465                 |
| Commercial/Industrial                   | \$67,841,606                  | \$21,860,759                 |
| Total Revenue During Calendar Year 2025 |                               | \$159,588,975                |
| 3% Impact Limit on Rates                |                               | \$4,787,669                  |

## Calculating Renewable Energy Rate Impact

In 2014, City of Columbia Utilities enlisted the services of Utility Financial Solutions LLC (UFS) to provide guidance on the valuation of renewable generation. As outlined by UFS's [Rate Impacts on Renewables](#) report, City of Columbia Utilities uses a combination of market prices of electricity and avoided cost to determine the cost for renewables and the impact on ratepayers.

Below is the approach and details used by the proposed renewable energy impact methodology:

- Start with total cost of renewable resource
- Subtract the capacity value
- Determine the difference between the renewable resource cost and City of Columbia Utilities' cost of avoided production from the non-renewable resource
- Add the cost of any congestion and losses for each renewable resource relative to City of Columbia Utilities' load
- Multiply by the production from the renewable resource

For 2025, the following factors have been established:

- Columbia's Non-Renewable Avoided Cost — \$29.52/MWH
- The production weighted price of Columbia's Midcontinent Independent System Operator (MISO) Load Node for Crystal Lake Contract One — \$26.78/MWH
- The production weighted price of Columbia's Midcontinent Independent System Operator (MISO) Load Node for Crystal Lake Contract Two — \$26.22/MWH

|                                   | A                      | B                           | C                         | D                      | E                          | F                          | G                             | H                |                            |
|-----------------------------------|------------------------|-----------------------------|---------------------------|------------------------|----------------------------|----------------------------|-------------------------------|------------------|----------------------------|
| Resource                          | Resource Cost (\$/MWH) | Capacity Component (\$/MWH) | Energy Component (\$/MWH) | Energy Impact (\$/MWH) | Resource MISO LMP (\$/MWH) | Cong. & Loss Cost (\$/MWH) | Energy Impact w/ C&L (\$/MWH) | Production (MWH) | Renewable Rate Impact (\$) |
| Bluegrass Ridge Wind              | \$ 66.73               | \$ 3.10                     | \$ 63.63                  | \$ 34.11               | -                          | -                          | \$ 34.11                      | 20,723           | \$ 706,862                 |
| Crystal Lake C1 Wind              | \$ 16.04               | \$ -                        | \$ 16.04                  | \$ (13.48)             | \$ 11.73                   | \$ 26.78                   | \$ 13.30                      | 35,888           | \$ 477,310                 |
| Crystal Lake C2 Wind              | \$ 13.42               | \$ -                        | \$ 13.42                  | \$ (16.10)             | \$ 12.21                   | \$ 26.22                   | \$ 10.12                      | 165,911          | \$ 1,679,019               |
| Columbia Landfill Gas             | \$ 46.36               | \$ 4.18                     | \$ 42.18                  | \$ 12.66               | -                          | -                          | \$ 12.66                      | 17,811           | \$ 225,487                 |
| Jefferson City Landfill Gas       | \$ 53.25               | \$ 6.07                     | \$ 47.18                  | \$ 17.66               | -                          | -                          | \$ 17.66                      | 16,067           | \$ 283,743                 |
| Truman Solar                      | \$ 44.81               | \$ 14.63                    | \$ 30.18                  | \$ 0.66                | -                          | -                          | \$ 0.66                       | 19,920           | \$ 13,147                  |
| Customer Generated PV (Net Meter) | \$ 52.55               | \$ 14.48                    | \$ 38.07                  | \$ 8.55                | -                          | -                          | \$ 8.55                       | 8,130            | \$ 69,511                  |
| CWL Generated PV                  | \$ 70.73               | \$ 14.48                    | \$ 56.25                  | \$ 26.73               | -                          | -                          | \$ 26.73                      | 330              | \$ 8,821                   |
|                                   |                        |                             |                           |                        |                            |                            |                               | <b>284,780</b>   | <b>\$ 3,463,900</b>        |

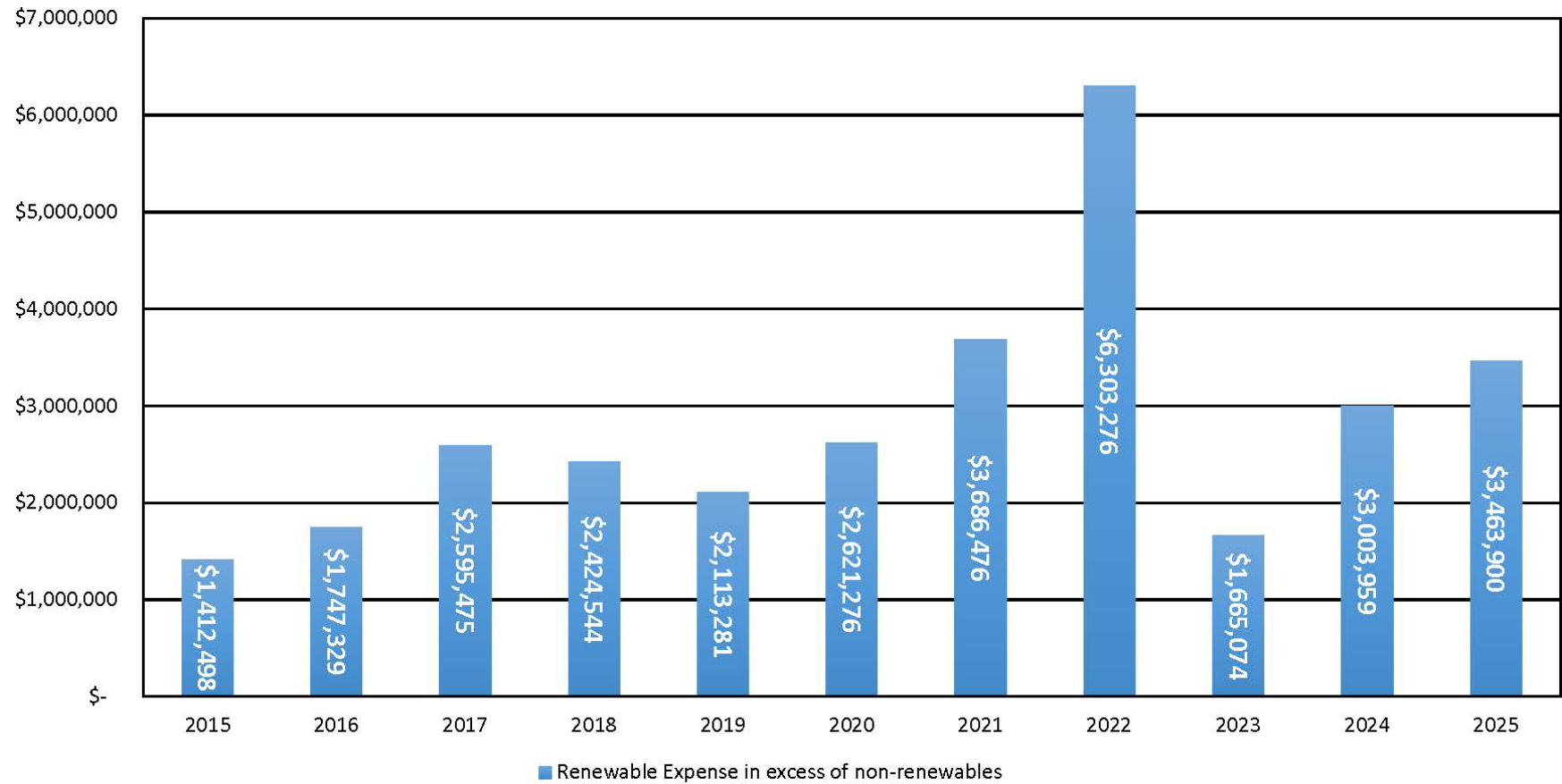
- Column A - Total cost of the Renewable resource
- Column B - Amount of total cost that is determined to be providing capacity value, as outlined in the Utility Financial Solutions report
- Column C - Amount of total cost that is determined to be providing energy value (Column A minus Column B)
- Column D - Cost impact of the renewable resource energy above the incremental cost of City of Columbia Utilities' non-renewable resource cost (Column C minus \$29.52)
- Column E - Production weighted MISO LMP at the point of resource connection to the MISO system for the Crystal Lakes wind contracts
- Column F - Resource congestion and losses as compared to City of Columbia Utilities' load Wind Resources (Contract 1 cost of \$38.51 minus Column E; Contract 2 cost of \$38.43 minus Column E)
- Column G - Energy Impact plus congestions and losses for the resource (Column D plus Column F)
- Column H - Resource Annual Production
- Renewable Rate Impact – Column G times Column H

## Renewables Cost Impact by Year

The City Ordinance states that the renewable energy integrated into Columbia's electric portfolio shall not increase electric rates more than 3% higher than the rates for electricity generated from 100% non-renewable resources. For calendar year 2025, the additional expense of renewable energy in excess of non-renewable energy was \$3,463,900.

The chart on the following page depicts the additional expense of renewable energy over the cost of non-renewables over the past 10 years.

## Additional Cost for Renewables



## Planning for the Future of Renewables

City of Columbia Utilities' Renewable Energy Plan is based on the revised 2014 Renewable Energy Standard, and the future of renewable energy planning is informed through the 2021 Integrated Electric Resource and Master Planning process and TEA's 2023 study on meeting 100% renewable energy.

One factor to be taken into consideration is that with the City's current power purchase agreements, once the Iron Star Wind project is generating, the City will be obligated to purchase more energy than the City's load requires. This places the Utility at financial risk because the energy must be sold on the open market. Awarding additional power purchase agreements would increase that risk.

With this information building the framework, staff worked with the Water & Light Advisory Board to adapt the Renewable Energy Standard with a goal of moving renewable energy acquisition forward in a responsible way. The board and staff have planned a work session with the City Council in 2026.

The proposed recommendations included setting an incremental goal of 40% renewable energy by 2035.

This target matches TEA's recommendation for setting short-term goals:

*There is value in setting incremental renewable goals rather than a single goal at a specified year. Renewable PPA prices are changing over time, this presents a risk when investing in a large volume of PPAs in just one year.*

TEA's assessment is that the cost of new renewables is not expected to come down until approximately 2030.

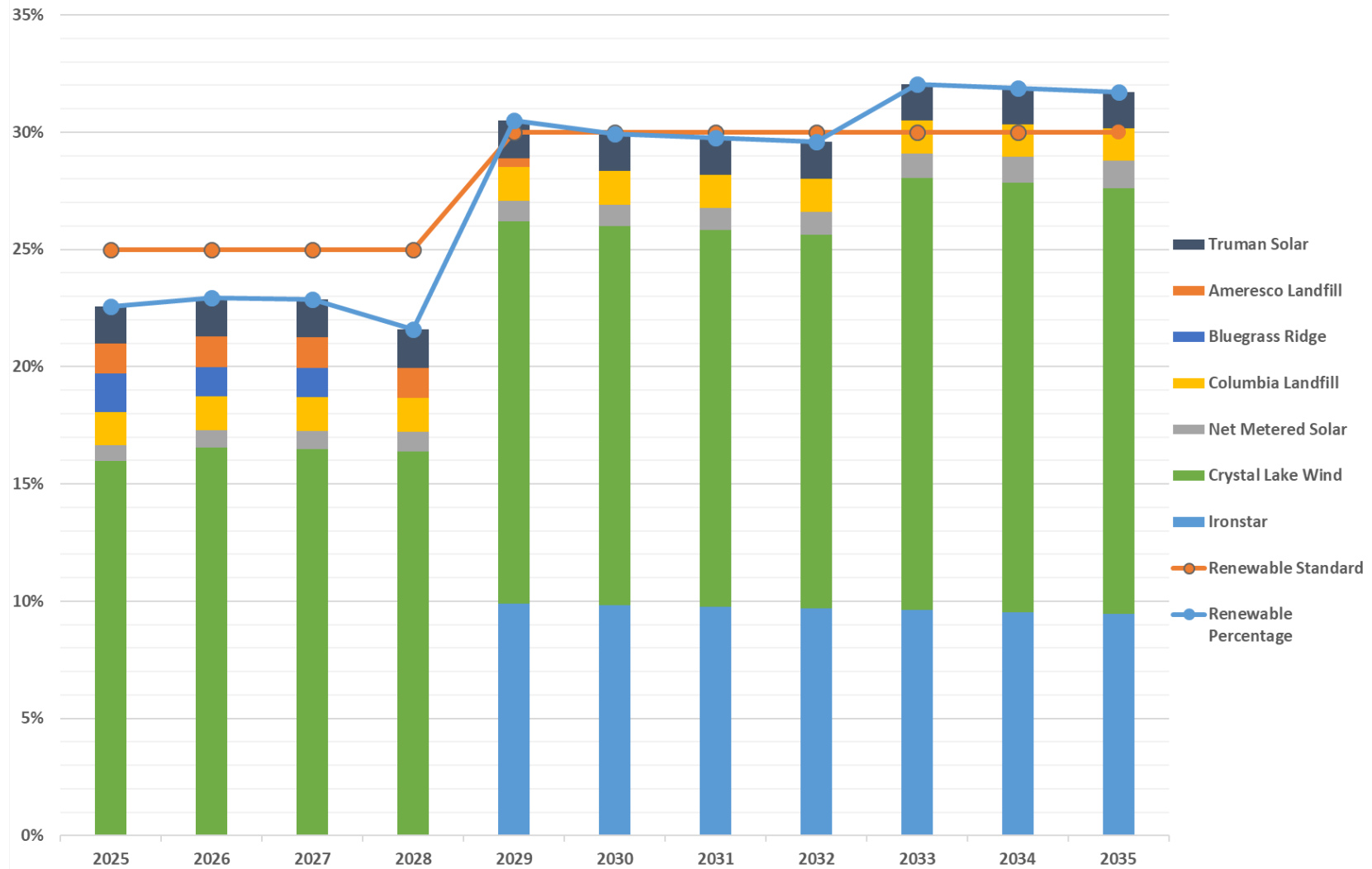
In 2026, TEA is working with City of Columbia Utilities on an updated Integrated Resource Plan. TEA will collaborate with Utilities staff to define the City's goals for a renewable resource portfolio, including market load, resiliency, and capacity requirements consistent with Utilities' strategic objectives.

The City is also monitoring MISO's Long Range Transmission Plan Tranche 2.1 portfolio. Approved by the MISO board in December 2024, Tranche 2.1 will add approximately 176 miles of transmission lines in Missouri to come online between 2032 and 2034. The project would help MISO handle load growth, reduce locational marginal pricing and relieve congestion.

According to a Jan. 7, 2025 [Utility Dive](#) article: "[T]ransmission expansion can improve access to generation resources across the footprint, something especially important given the (Midwest's) abundant energy sources."

The chart on the following page depicts the 10-year outlook for renewable energy supply in Columbia. City of Columbia Utilities has renewable energy provided by wind, solar, and landfill gas resources.

## Renewable Energy Generation Production by Percentage of Load (2025-2035)



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## 2026 City of Columbia Utilities Renewable Energy Plan

calendar year 2025 data & forecast for 2026

## Planned Additions to the Renewable Energy Portfolio

While Utilities believes it is important for the City to seek affordable and viable options to increase renewable energy generation sources, it is important that the City moves forward in a fiscally responsible way. Market forces will impact the City's renewable energy portfolio, presenting new and unforeseen challenges. It will be important that the City remains adaptable to these market forces as City of Columbia Utilities transitions to an energy future that includes more renewable energy sources.

Transitioning the power supply to renewable energy from traditional sources requires long-term planning to ensure all utility and customer needs are met. To address Columbia's future renewable energy needs, City of Columbia Utilities is working on the following projects:

## 2026 Estimated Renewable Energy Percentage

### Customer Net-Metered Solar (ongoing)

Customer-owned distributed generation has continued steady growth since 2008. After the expiration of the federal solar tax credits, market analysis predicts a temporary decrease in residential installations in 2026. However, commercial installations are expected to remain steady and the residential market is expected to rebound beginning in 2027. For the purposes of the Renewable Energy Plan, City of Columbia Utilities has projected conservative growth in this area as many factors can impact the customer-owned solar market, including regulation changes, economic growth or recession, component pricing and rates.

### Future Power Purchase Agreement (ongoing)

City of Columbia Utilities received three unsolicited proposals for PPAs from solar fields. The City is currently evaluating the proposals.

The City is drafting a revised renewable energy ordinance based on the guidance of the WLAB and the City Council.

### Bluegrass Ridge contract renewal (2027)

In 2024, Bluegrass Ridge wind farm was repowered with updated equipment, which will lead to an increase in generation and capacity. Columbia's contract calls for an 11.1% allocation, which, based on the last six years, is anticipated to be an average of 20,088 MWH annually — an increase of approximately 79%.

The contract expires in 2027, which will provide the City an opportunity to evaluate the additional energy production and costs associated with the repower of the generators. Should a future contract renewal become available with this resource, the City will have historical data to evaluate rate impacts.

### Ironstar Wind (2029)

In June 2017, the City Council approved a contract with the Missouri Joint Municipal Electric Utility Commission for the purchase of 35 MW of wind energy from western Kansas. Delivery of this energy depends upon the construction of the Grain Belt Express transmission line and a converter station in northeast Missouri. Invenergy Transmission was continuing work on eminent domain acquisitions in Missouri and Kansas, with the majority of those easements being in place as of 2023.

As a result of a need to amend their Certificate of Convenience and Necessity due to the converter station changing locations, this project was returned to the Missouri PSC in 2023. This change has pushed back the anticipated delivery date to 2029. According to the Grain Belt Express website, construction is scheduled to begin sometime this year and be completed by 2028, barring complications.

Under City of Columbia Utilities' current agreement, Ironstar Wind is expected to have an annual energy production estimated around 122,640 MWH per year, which would be 9.4% of the projected electric system total in 2029.

Utility staff has notified the MJMEUC of the City's interest in expanding takeoff from Ironstar Wind based on additional energy being available. City of Columbia Utilities has requested up to an additional 18 MW for delivery, bringing the total purchase potential to 53 MW of wind energy.

### 2026 Estimated Renewable Energy Percentage

In order to meet the City's Renewable Energy Standard, City of Columbia Utilities utilizes an array of renewable energy sources including wind, solar, and landfill gas. Based on a metered system energy forecast of 1,219,896 MWHs and similar renewable energy production levels, it is estimated that 23.5% of Columbia's electric portfolio will come from existing renewable resources in 2026.

|                                 | Location           | Amount of Energy   | % of System Load | Cost        |
|---------------------------------|--------------------|--------------------|------------------|-------------|
| Bluegrass Ridge                 | King City, MO      | 20,723 MWH         | 1.7%             | \$66.73/MWH |
| Crystal Lake Contract #1        | Hancock County, IA | 36,831 MWH         | 3%               | \$16.04/MWH |
| Crystal Lake Contract #2        | Hancock County, IA | 164,681 MWH        | 13.5%            | \$13.42/MWH |
| Jefferson City Landfill gas     | Jefferson City, MO | 18,725 MWH         | 1.5%             | \$53.25/MWH |
| Columbia Landfill gas           | Columbia, MO       | 14,325 MWH         | 1.2%             | \$46.36/MWH |
| Net-Metered Customer Production | Columbia, MO       | 9,434 MWH          | .77%             | \$52.55/MWH |
| West Ash Solar                  | Columbia, MO       | 334 MWH            | 0.03%            | \$70.73/MWH |
| Truman Solar                    | Columbia, MO       | 21,784 MWH         | 1.8%             | \$44.81/MWH |
| <b>TOTAL</b>                    | —                  | <b>286,837 MWH</b> | <b>23.5%</b>     | —           |

## Summary

City of Columbia Utilities strives to provide reliable, cost-effective service while achieving City of Columbia environmental and renewable energy goals. In 2025, City of Columbia Utilities did not meet the goal of providing 25% renewable energy. However, 2025's renewable energy supply increased by 3,908 MWH when compared to 2024. If the Grain Belt Express transmission line was currently constructed, the City would be exceeding the current Renewable Energy Standard.

While Utilities believes it is important for the City to seek affordable and viable options to increase renewable energy generation sources, it is important that the City move forward in a fiscally responsible way.

With the City's current purchase power agreements, once the Iron Star Wind project is generating, the City will be obligated to purchase more energy than the City's load requires. This places the Utility at financial risk because the energy must be sold on the open market. Awarding additional power purchase agreements would increase that risk.

It will be important that the Electric Utility remains adaptable as the City navigates unforeseen challenges presented by an energy future that includes more renewable energy sources. Additionally, the City continues to encourage customer-owned distributed generation to help reduce demand on the system.

City of Columbia Utilities anticipates the City will not reach renewable energy percentage goals within the next few years because of project delays of Grain Belt/Ironstar. In addition, Columbia's total system load continues to grow, which may have a negative impact on the City's renewable energy percentage even if the City achieves an increase in actual MWHs of renewable energy purchased or generated.

Renewable energy prices increased in 2025 from 2024; however the cost of renewable energy remained below the 3% impact limit on rates.

To continue the trend of increasing renewables in an ever-changing environment, it will require significant commitment and planning. As the City of Columbia looks to the future of energy supply, long-term goals laid out in the Renewable Portfolio Standard, Climate Action and Adaptation Plan and the 2026 TEA Integrated Resource Plan in future planning and resource selection.

In a rapidly changing market and environment, City of Columbia Utilities will continue to provide customer-focused, reliable and cost-effective service that meets today's needs while planning for the future of the community.

## Appendix

### Glossary

**Climate Action and Adaptation Plan** is Columbia's strategy to address risks posed by climate change and to contribute to international efforts to reduce greenhouse gas emissions.

**Climate and Environment Commission** is a public board that reports to City Council on the implementation of CAAP strategies.

**IERMP** stands for Integrated Electric Resource & Master Plan.

**kV** means kilovolt, and is a standard unit for electromotive force. It is used to describe the infrastructure of the transmission and distribution systems.

**kW** means kilowatt, and is a unit of measurement for the rate of power an electrical device or load uses.

**kWh** means kilowatt-hour(s), and is common unit for electric energy. Note that 1,000 kWh equals 1 MWH.

**LMP** stands for Locational Marginal Price. This is the hourly price that City of Columbia Utilities buys or sells energy into the MISO marketplace.

**MISO** stands for Midcontinent Independent System Operator and is the regional transmission organization that Columbia Water & Light is a member.

**Missouri Public Service Commission** is a utility regulating body that oversees investor-owned utilities.

**Missouri Public Utility Alliance** is a service organization that represents municipality-owned utilities.

**MWH** means megawatt-hour(s), and is a common unit for utility-scale electrical energy.

**MW** means megawatt(s), and is a common unit for utility scale electrical power.

**Power Purchase Agreement** is a contract between an electricity generator and the utility, during which time the utility buys energy at a pre-negotiated price.

**Request for Proposal** is an open request for bids from a potential contractor to complete a project.

**TEA** stands for The Energy Authority, an energy trading and risk management firm, whose services include advanced analytics, renewable solutions, and advisory services.

**Table 1.1: Crystal Lake III Amended Price Chart**

| <b>Period</b>                                 | <b>Fixed Rate<br/>(\$/MWH)</b> |
|-----------------------------------------------|--------------------------------|
| Repower Completion Date through Dec. 31, 2022 | 26.21                          |
| January 1, 2023 through December 31, 2023     | 25.11                          |
| January 1, 2024 through December 31, 2024     | 25.37                          |
| January 1, 2025 through December 31, 2025     | 25.63                          |
| January 1, 2026 through December 31, 2026     | 25.89                          |
| January 1, 2027 through December 31, 2027     | 26.16                          |
| January 1, 2028 through December 31, 2028     | 26.43                          |
| January 1, 2029 through December 31, 2029     | 26.71                          |
| January 1, 2030 through December 31, 2030     | 27.01                          |
| January 1, 2031 through December 31, 2031     | 27.30                          |
| January 1, 2032 through December 31, 2032     | 22.61                          |
| January 1, 2033 through December 31, 2033     | 22.00                          |
| January 1, 2034 through December 31, 2034     | 22.44                          |
| January 1, 2035 through December 31, 2035     | 22.89                          |
| January 1, 2036 through December 31, 2036     | 23.35                          |
| January 1, 2037 through December 31, 2037     | 23.81                          |
| January 1, 2038 through December 31, 2038     | 24.29                          |
| January 1, 2039 through December 31, 2039     | 24.78                          |
| January 1, 2040 through December 31, 2040     | 25.27                          |

## Historical Renewable Energy Data

For reference, Renewable Energy Data from the previous five years are included here. For all the data charts dating to 2005, visit [CoMo.gov/wp-content/uploads/2021/12/2022-Renewable-Report-Yearly-Production-Charts-1.pdf](https://CoMo.gov/wp-content/uploads/2021/12/2022-Renewable-Report-Yearly-Production-Charts-1.pdf).

## 2024 Renewable Energy Production Amounts

| Month                  | Columbia<br>Adjusted<br>Load | Bluegrass<br>Wind | Crystal<br>Lake<br>Contract 1 | Crystal<br>Lake<br>Contract 2 | Columbia<br>Landfill | Jeff City<br>Landfill | Truman<br>Solar | Net-Metered<br>Solar | Columbia<br>Solar | Total<br>Renewable | YTD%<br>of<br>System |
|------------------------|------------------------------|-------------------|-------------------------------|-------------------------------|----------------------|-----------------------|-----------------|----------------------|-------------------|--------------------|----------------------|
| <b>1-24</b>            | 119,006                      | 704               | 3,022                         | 13,582                        | 456                  | 1,425                 | 835             | 270                  | 14                | 20,308             | 17.06%               |
| <b>2-24</b>            | 89,238                       | 937               | 3,623                         | 16,031                        | 458                  | 1,219                 | 1,762           | 588                  | 31                | 24,649             | 21.59%               |
| <b>3-24</b>            | 89,478                       | 1,191             | 4,588                         | 19,982                        | 798                  | 1,900                 | 2,059           | 708                  | 35                | 31,261             | 25.60%               |
| <b>4-24</b>            | 86,515                       | 1,208             | 4,714                         | 20,543                        | 1,373                | 2,046                 | 2,185           | 755                  | 36                | 32,859             | 28.39%               |
| <b>5-24</b>            | 98,880                       | 393               | 3,025                         | 13,406                        | 1,400                | 1,732                 | 2,507           | 823                  | 38                | 23,324             | 27.41%               |
| <b>6-24</b>            | 119,270                      | 149               | 2,915                         | 12,850                        | 1,326                | 1,686                 | 2,778           | 891                  | 40                | 22,632             | 25.74%               |
| <b>7-24</b>            | 121,793                      | 0                 | 1,662                         | 7,221                         | 1,394                | 1,628                 | 2,282           | 775                  | 34                | 14,995             | 23.48%               |
| <b>8-24</b>            | 123,369                      | 0                 | 1,914                         | 8,384                         | 1,052                | 1,636                 | 2,390           | 766                  | 34                | 16,175             | 21.97%               |
| <b>9-24</b>            | 102,730                      | 2                 | 2,458                         | 10,614                        | 1,220                | 1,684                 | 1,967           | 625                  | 27                | 18,598             | 21.55%               |
| <b>10-24</b>           | 92,018                       | 624               | 3,748                         | 16,423                        | 1,407                | 1,602                 | 2,095           | 694                  | 32                | 26,625             | 22.20%               |
| <b>11-24</b>           | 87,028                       | 1,552             | 3,654                         | 15,831                        | 1,313                | 1,560                 | 1,021           | 382                  | 18                | 25,332             | 22.74%               |
| <b>12-24</b>           | 101,297                      | 1,878             | 3,326                         | 14,695                        | 1,324                | 1,751                 | 817             | 307                  | 15                | 24,112             | 23.80%               |
| <b>TOTAL</b>           | <b>1,230,621</b>             | <b>8,638</b>      | <b>38,649</b>                 | <b>169,560</b>                | <b>13,521</b>        | <b>19,869</b>         | <b>22,698</b>   | <b>7,584</b>         | <b>354</b>        | <b>280,872</b>     | <b>22.82%</b>        |
| <b>% of<br/>System</b> |                              | 0.70%             | 3.14%                         | 13.78%                        | 1.10%                | 1.61%                 | 1.84%           | 0.62%                | 0.03%             | 22.82%             |                      |

The amount of energy is measured in megawatt-hours (MWH)

### 2023 Renewable Energy Production Amounts

| Month                  | Columbia<br>Adj. Load | Bluegrass<br>Wind | Crystal<br>Lake<br>Contract 1 | Crystal<br>Lake<br>Contract 2 | Columbia<br>Landfill | Jeff City<br>Landfill | Truman<br>Solar | Net-Metered<br>Solar | Columbia<br>Solar | Total<br>Renewable | YTD %<br>of System |
|------------------------|-----------------------|-------------------|-------------------------------|-------------------------------|----------------------|-----------------------|-----------------|----------------------|-------------------|--------------------|--------------------|
| <b>1-23</b>            | 104,703               | 1,048             | 3,035                         | 13,631                        | 1,303                | 1,361                 | 879             | 245                  | 15                | 21,517             | 20.55%             |
| <b>2-23</b>            | 90,670                | 1,144             | 3,774                         | 16,976                        | 1,224                | 1,944                 | 1,537           | 419                  | 24                | 27,043             | 24.85%             |
| <b>3-23</b>            | 96,751                | 1,193             | 3,563                         | 15,595                        | 1,397                | 2,143                 | 1,551           | 441                  | 24                | 25,906             | 25.49%             |
| <b>4-23</b>            | 85,150                | 1,534             | 4,574                         | 19,557                        | 1,293                | 1,275                 | 2,494           | 678                  | 35                | 31,441             | 28.07%             |
| <b>5-23</b>            | 98,468                | 543               | 3,481                         | 14,537                        | 1,351                | 1,932                 | 2,659           | 703                  | 35                | 25,241             | 27.57%             |
| <b>6-23</b>            | 112,162               | 425               | 1,526                         | 6,965                         | 1,177                | 1,358                 | 2,775           | 725                  | 34                | 14,986             | 24.86%             |
| <b>7-23</b>            | 125,294               | 302               | 1,308                         | 6,105                         | 733                  | 1,849                 | 2,457           | 678                  | 31                | 13,462             | 22.38%             |
| <b>8-23</b>            | 126,252               | 434               | 1,963                         | 8,765                         | 653                  | 1,555                 | 2,308           | 654                  | 29                | 16,360             | 20.96%             |
| <b>9-23</b>            | 103,040               | 613               | 2,463                         | 10,750                        | 574                  | 1,924                 | 2,195           | 478                  | 28                | 19,026             | 20.69%             |
| <b>10-23</b>           | 91,568                | 1,001             | 3,211                         | 14,613                        | 642                  | 1,727                 | 1,658           | 482                  | 21                | 23,355             | 21.11%             |
| <b>11-23</b>           | 88,277                | 1,007             | 3,652                         | 16,092                        | 646                  | 1,615                 | 1,380           | 467                  | 25                | 24,883             | 21.67%             |
| <b>12-23</b>           | 94,900                | 893               | 3,405                         | 14,986                        | 651                  | 1,556                 | 840             | 299                  | 16                | 22,647             | 21.84%             |
| <b>TOTAL</b>           | <b>1,217,234</b>      | <b>10,137</b>     | <b>35,955</b>                 | <b>158,572</b>                | <b>11,644</b>        | <b>20,239</b>         | <b>22,733</b>   | <b>6,269</b>         | <b>317</b>        | <b>265,866</b>     | <b>21.84%</b>      |
| <b>% of<br/>System</b> |                       | 0.83%             | 2.95%                         | 13.03%                        | 0.96%                | 1.66%                 | 1.87%           | 0.52%                | 0.03%             | 21.84%             |                    |

The amount of energy is measured in megawatt-hours (MWH)

### 2022 Renewable Energy Production Amounts

| Month                  | Columbia<br>Adj. Load | Bluegrass<br>Wind | Crystal<br>Lake<br>Contract 1 | Crystal<br>Lake<br>Contract 2 | Columbia<br>Landfill | Jeff City<br>Landfill | Truman<br>Solar | Net-Metered<br>Solar | Columbia<br>Solar | Total<br>Renewable | YTD%<br>of System |
|------------------------|-----------------------|-------------------|-------------------------------|-------------------------------|----------------------|-----------------------|-----------------|----------------------|-------------------|--------------------|-------------------|
| 1-22                   | 114,255               | 1,180             | 2,967                         | 7,856                         | 1,137                | 2,124                 | 1,261           | 301                  | 24                | 16,850             | 14.75%            |
| 2-22                   | 99,995                | 1,283             | 3,653                         | 10,037                        | 1,160                | 1,875                 | 1,505           | 299                  | 23                | 19,836             | 17.12%            |
| 3-22                   | 94,465                | 1,452             | 4,328                         | 11,958                        | 1,376                | 1,970                 | 1,907           | 398                  | 29                | 23,418             | 19.47%            |
| 4-22                   | 86,861                | 1,472             | 4,827                         | 12,612                        | 1,421                | 2,023                 | 2,046           | 482                  | 33                | 24,916             | 21.49%            |
| 5-22                   | 100,378               | 1,039             | 3,834                         | 9,701                         | 1,311                | 1,543                 | 2,273           | 500                  | 33                | 20,234             | 21.22%            |
| 6-22                   | 117,760               | 751               | 2,603                         | 6,963                         | 1,250                | 1,497                 | 2,817           | 597                  | 38                | 16,516             | 19.84%            |
| 7-22                   | 130,699               | 489               | 2,060                         | 5,416                         | 1,350                | 1,767                 | 2,506           | 539                  | 34                | 14,161             | 18.26%            |
| 8-22                   | 128,406               | 309               | 1,877                         | 4,993                         | 1,328                | 1,819                 | 2,608           | 557                  | 35                | 13,526             | 17.12%            |
| 9-22                   | 102,853               | 730               | 2,750                         | 7,238                         | 1,296                | 2,027                 | 2,303           | 511                  | 33                | 16,888             | 17.05%            |
| 10-22                  | 87,400                | 1,071             | 3,393                         | 9,049                         | 1,317                | 1,637                 | 1,964           | 459                  | 29                | 18,919             | 17.43%            |
| 11-22                  | 92,478                | 1,560             | 4,703                         | 12,322                        | 1,241                | 2,148                 | 1,362           | 362                  | 23                | 23,721             | 18.09%            |
| 12-22                  | 108,065               | 1,355             | 4,268                         | 11,158                        | 1,332                | 1,299                 | 741             | 221                  | 13                | 20,387             | 18.15%            |
| <b>TOTAL</b>           | 1,263,615             | 12,691            | 41,261                        | 109,305                       | 15,519               | 21,729                | 23,293          | 5,226                | 347               | 229,371            | 18.15%            |
| <b>% of<br/>System</b> |                       | 1.00%             | 3.27%                         | 8.65%                         | 1.23%                | 1.72%                 | 1.84%           | 0.41%                | 0.03%             | 18.15%             |                   |

The amount of energy is measured in megawatt-hours (MWH)

### 2021 Renewable Energy Production Amounts

The Truman Solar 10 MW facility began operation in May. The Water & Light Advisory Board and the City Council recommended against the purchase of Renewable Energy Credits.

| Month                  | Columbia<br>Adj. Load | Bluegrass<br>Wind | Crystal<br>Lake<br>Contract 1 | Crystal<br>Lake<br>Contract 2 | Columbia<br>Landfill | Jeff City<br>Landfill | Truman<br>Solar | Net-Metered<br>Solar | Columbia<br>Solar | Total<br>Renewable | YTD %<br>of System |
|------------------------|-----------------------|-------------------|-------------------------------|-------------------------------|----------------------|-----------------------|-----------------|----------------------|-------------------|--------------------|--------------------|
| 1-21                   | 105,250               | 970               | 2,291                         | 5,401                         | 1,522                | 2,208                 | —               | 143.7                | 13.3              | 12,548             | 11.92%             |
| 2-21                   | 108,774               | 602               | 1,808                         | 5,134                         | 1,724                | 1,675                 | —               | 164.8                | 14                | 11,121             | 11.06%             |
| 3-21                   | 88,380                | 1,363             | 2,610                         | 4,213                         | 2,091                | 2,198                 | —               | 379.9                | 31.2              | 12,886             | 12.09%             |
| 4-21                   | 83,807                | 1,154             | 3,095                         | 6,805                         | 1,933                | 2,163                 | —               | 469.8                | 37                | 15,657             | 13.52%             |
| 5-21                   | 88,215                | 925               | 3,154                         | 8,133                         | 1,666                | 1,733                 | 1,226           | 414.7                | 31.6              | 17,283             | 14.65%             |
| 6-21                   | 113,121               | 504               | 2,270                         | 5,989                         | 1,929                | 2,015                 | 2,560           | 496.0                | 37.0              | 15,799             | 14.52%             |
| 7-21                   | 122,265               | 351               | 1,425                         | 3,927                         | 1,855                | 2,013                 | 2,548           | 495.1                | 36.6              | 12,651             | 13.80%             |
| 8-21                   | 129,083               | 670               | 1,855                         | 4,837                         | 1,331                | 1,385                 | 2,466           | 508.3                | 38.4              | 13,090             | 13.24%             |
| 9-21                   | 107,649               | 1,016             | 2,463                         | 6,585                         | 1,119                | 1,374                 | 2,148           | 480.7                | 36.7              | 15,222             | 13.34%             |
| 10-21                  | 90,711                | 996               | 2,967                         | 7,809                         | 1,060                | 1,287                 | 1,322           | 295.5                | 22.7              | 15,759             | 13.69%             |
| 11-21                  | 87,076                | 1,206             | 4,426                         | 11,557                        | 921                  | 2,203                 | 1,265           | 323.0                | 25.5              | 21,927             | 14.58%             |
| 12-21                  | 93,983                | 1,232             | 2,301                         | 6,026                         | 1,215                | 2,168                 | 1,048           | 267.6                | 21.6              | 14,279             | 14.63%             |
| <b>TOTAL</b>           | <b>1,218,313</b>      | <b>10,989</b>     | <b>30,664</b>                 | <b>76,414</b>                 | <b>18,365</b>        | <b>22,422</b>         | <b>14,583</b>   | <b>4,439</b>         | <b>346</b>        | <b>178,223</b>     |                    |
| <b>% of<br/>System</b> |                       | <b>0.90%</b>      | <b>2.52%</b>                  | <b>6.27%</b>                  | <b>1.51%</b>         | <b>1.84%</b>          | <b>1.20%</b>    | <b>0.36%</b>         | <b>0.03%</b>      | <b>14.63%</b>      |                    |

The amount of energy is measured in megawatt-hours (MWH)

## 2020 Renewable Energy Production Amounts

Free Power Company LLC defaulted on its lease agreement with the City.

| Month                  | Columbia<br>Adj. Load | Bluegrass<br>Wind | Crystal<br>Lake<br>Contract 1 | Crystal<br>Lake<br>Contract 2 | Columbia<br>Landfill | Jeff City<br>Landfill | Free<br>Power<br>Solar | Net<br>Metered<br>Solar | Columbia<br>Solar | Total<br>Wind<br>RECs | Total<br>Renewable | YTD %<br>of System |
|------------------------|-----------------------|-------------------|-------------------------------|-------------------------------|----------------------|-----------------------|------------------------|-------------------------|-------------------|-----------------------|--------------------|--------------------|
| 1-20                   | 103,904               | 929               | 3,110                         | 7,848                         | 1,151                | 2,277                 | 8.11                   | 138.71                  | 7.73              | —                     | 15,469             | 14.89%             |
| 2-20                   | 96,923                | 856               | 3,213                         | 8,696                         | 1,589                | 2,131                 | 13.88                  | 149.71                  | 17.14             | —                     | 16,666             | 16.00%             |
| 3-20                   | 86,776                | 881               | 3,301                         | 8,471                         | 2,135                | 2,235                 | 20.84                  | 245.34                  | 29.71             | —                     | 17,319             | 17.20%             |
| 4-20                   | 76,639                | 704               | 3,080                         | 7,810                         | 1,247                | 2,158                 | 26.40                  | 314.18                  | 36.82             | —                     | 15,376             | 17.80%             |
| 5-20                   | 82,741                | 625               | 2,672                         | 6,507                         | 1,011                | 1,859                 | 26.10                  | 319.75                  | 36.32             | 10,676                | 23,732             | 19.81%             |
| 6-20                   | 109,963               | 581               | 3,025                         | 7,080                         | 1,396                | 2,094                 | 32.10                  | 397.08                  | 43.66             | 9,324                 | 23,973             | 20.21%             |
| 7-20                   | 126,435               | 228               | 1,222                         | 3,186                         | 748                  | 2,062                 | 28.97                  | 356.77                  | 38.55             | —                     | 7,870              | 17.62%             |
| 8-20                   | 115,374               | 388               | 2,198                         | 5,594                         | 578                  | 1,993                 | 28.83                  | 369.81                  | 39.09             | —                     | 11,189             | 16.47%             |
| 9-20                   | 94,957                | 634               | 2,522                         | 5,452                         | 469                  | 1,702                 | 24.20                  | 348.62                  | 34.54             | —                     | 11,186             | 15.98%             |
| 10-20                  | 88,430                | 1,010             | 1,908                         | 4,196                         | 1,337                | 1,845                 | 11.73                  | 280.43                  | 27.79             | —                     | 10,616             | 15.62%             |
| 11-20                  | 84,537                | 1,313             | 3,211                         | 6,340                         | 1,791                | 1,816                 | 0.00                   | 253.24                  | 24.95             | —                     | 14,749             | 15.76%             |
| 12-20                  | 99,725                | 890               | 2,006                         | 4,397                         | 1,975                | 2,118                 | 0.00                   | 226.65                  | 21.93             | —                     | 11,635             | 15.41%             |
| <b>TOTAL</b>           | <b>1,166,405</b>      | <b>9,039</b>      | <b>31,467</b>                 | <b>75,578</b>                 | <b>15,427</b>        | <b>24,290</b>         | <b>221.2</b>           | <b>3,400</b>            | <b>358.2</b>      | <b>20,000</b>         | <b>179,780</b>     | <b>15.41%</b>      |
| <b>% of<br/>System</b> | —                     | <b>0.77%</b>      | <b>2.70%</b>                  | <b>6.48%</b>                  | <b>1.32%</b>         | <b>2.08%</b>          | <b>0.02%</b>           | <b>0.29%</b>            | <b>0.03%</b>      | <b>1.71%</b>          |                    | —                  |

The amount of energy is measured in megawatt-hours (MWH)