

Prospectus Supplement
(To Prospectus dated March 5, 2024)

\$425,000,000
AEP Transmission Company, LLC

5.375% Senior Notes, Series R, due 2035

Interest on the Senior Notes is payable semi-annually on June 15 and December 15 of each year, beginning on December 15, 2025. The Senior Notes will mature on June 15, 2035. We may redeem the Senior Notes either in whole or in part at our option at any time, and from time to time, at the applicable redemption price described below under “Supplemental Description of the Senior Notes—Optional Redemption” on page S-5 of this prospectus supplement. The Senior Notes do not have the benefit of a sinking fund.

The Senior Notes are unsecured and rank equally with all of our other unsecured and unsubordinated indebtedness from time to time outstanding and will be effectively subordinated to all of our secured debt, to the extent of the assets securing such debt. We will issue the Senior Notes only in registered form in minimum denominations of \$2,000 and integral multiples of \$1,000 in excess thereof.

	<u>Per Note</u>	<u>Total</u>
Public offering price ⁽¹⁾	99.424%	\$422,552,000
Underwriting discount	0.650%	\$2,762,500
Proceeds, before expenses, to AEP Transmission Company, LLC	98.774%	\$419,789,500

⁽¹⁾Plus accrued interest, if any, from May 14, 2025.

INVESTING IN THESE NOTES INVOLVES RISKS. SEE THE SECTION ENTITLED “RISK FACTORS” ON PAGE S-3 OF THIS PROSPECTUS SUPPLEMENT FOR MORE INFORMATION.

Neither the U.S. Securities and Exchange Commission nor any state securities commission has approved or disapproved of the Senior Notes or determined that this prospectus supplement or the accompanying prospectus is accurate or complete. Any representation to the contrary is a criminal offense.

The Senior Notes are expected to be delivered in book-entry form only through The Depository Trust Company for the accounts of its participants, including Clearstream Banking S.A. and Euroclear Bank SA/NV, on or about May 14, 2025.

Joint Book-Running Managers

PNC Capital Markets LLC

Truist Securities

US Bancorp

Co-Managers

Huntington Capital Markets

WauBank Securities LLC

The date of this prospectus supplement is May 12, 2025.

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ABOUT THIS PROSPECTUS SUPPLEMENT

This document is in two parts. The first part is this prospectus supplement, which describes the specific terms of this offering of the Senior Notes and also adds to and updates information contained in the accompanying prospectus and the documents incorporated by reference in this prospectus supplement and the accompanying prospectus. The second part is the accompanying prospectus, which gives more general information, some of which does not apply to the Senior Notes. If the description of the Senior Notes varies between this prospectus supplement and the accompanying prospectus, you should rely on the information in this prospectus supplement.

You should rely only on the information contained or incorporated by reference in this prospectus supplement and in the accompanying prospectus and in any written communication from the Company or the underwriters specifying the final terms of the offering. We have not, and the underwriters have not, authorized any other person to provide you with different information. If anyone provides you with different or inconsistent information, you should not rely on it. You should assume that the information appearing in this prospectus supplement and the accompanying prospectus and the documents incorporated by reference herein and therein are accurate as of the date on their respective covers. Our business, financial condition, results of operations and prospects may have changed since those respective dates.

RISK FACTORS

Investing in the Senior Notes involves risk. Please see the risk factors set forth below and in our Annual Report on Form 10-K for the fiscal year ended December 31, 2024 and our Quarterly Report on Form 10-Q for the period ended March 31, 2025, which are incorporated by reference in this prospectus supplement and the accompanying prospectus. Before making an investment decision, you should carefully consider these risks as well as other information contained or incorporated by reference in this prospectus supplement and the accompanying prospectus. The risks and uncertainties described are those presently known to us.

WHERE YOU CAN FIND MORE INFORMATION

The SEC allows us to “incorporate by reference” the information we file with them, which means that we can disclose important information to you by referring you to those documents. The information incorporated by reference is considered to be part of this prospectus supplement and the accompanying prospectus, and later information that we file with the SEC will automatically update and supersede this information. We incorporate by reference the documents listed below and any future filings made with the SEC under Sections 13(a), 13(c), 14, or 15(d) of the Securities Exchange Act of 1934 (including any documents filed after the date of the initial registration statement and prior to its effectiveness) until we sell all the notes.

- [Annual Report on Form 10-K for the year ended December 31, 2024;](#)
- [Quarterly Report on Form 10-Q for the quarter ended March 31, 2025;](#) and
- [Current Report on Form 8-K filed on January 10, 2025.](#)

You may request a copy of these filings, at no cost, by writing or telephoning us at the following address:

Investor Relations
American Electric Power Service Corporation
1 Riverside Plaza
Columbus, Ohio 43215
614-716-1000

You should rely only on the information incorporated by reference or provided in the accompanying prospectus, this prospectus supplement, or any supplement and in any written communication from us or any underwriter specifying the final terms of the particular offering. We have not authorized anyone else to provide you with different information. We are not making an offer of these notes in any state where the offer is not permitted. You should not assume that the information in the accompanying prospectus, this prospectus supplement, or any supplement is accurate as of any date other than the date on the front of those documents.

USE OF PROCEEDS

The net proceeds from the sale of the Senior Notes will be used for general corporate purposes relating to our utility business. These purposes may include funding our construction program, repaying advances from affiliates and replenishing working capital. We estimate that our construction costs in 2025 will approximate \$1.5 billion. At May 7, 2025, we had approximately \$252 million in advances from affiliates outstanding. If we do not use the net proceeds immediately, we may temporarily invest them in short-term, interest-bearing obligations.

SUPPLEMENTAL DESCRIPTION OF THE SENIOR NOTES

The following description of the particular terms of the Senior Notes supplements and in certain instances replaces the description of the general terms and provisions of the Senior Notes under “Description of the Notes” in the accompanying prospectus. We will issue the Senior Notes under an Indenture, dated as of November 1, 2016, between us and The Bank of New York Mellon Trust Company, N.A., as Trustee (the “Trustee”), as heretofore supplemented and as to be further supplemented as of the issue date for the Senior Notes.

Principal Amount, Maturity, Interest and Payment

The Senior Notes will initially be issued in an aggregate principal amount of \$425,000,000. We may at any time and from time to time, without consent of the holders of the Senior Notes, issue additional notes having the same ranking, interest rate, maturity and other terms (other than the date of issuance, issue price and, in some circumstances, the initial interest accrual date and initial interest payment date) as the Senior Notes. These additional notes, together with the Senior Notes, will constitute a single series of notes under the Indenture; provided, however, that if such additional notes are not fungible with the Senior Notes offered hereby for U.S. federal income tax purposes, such additional notes will not have the same “CUSIP” number as the Senior Notes offered hereby.

The Senior Notes will mature and become due and payable, together with any accrued and unpaid interest, on June 15, 2035 and will bear interest at the rate of 5.375% per year from May 14, 2025 until June 15, 2035. The Senior Notes are not subject to any sinking fund provision.

Interest on each Senior Note will be payable semi-annually in arrears on each June 15 and December 15 (the “Interest Payment Date”) and at redemption, if any, or maturity. The initial Interest Payment Date is December 15, 2025. Each payment of interest shall include interest accrued from May 14, 2025, or the immediately preceding Interest Payment Date, through the day before the next Interest Payment Date. Interest on the Senior Notes will be computed on the basis of a 360-day year consisting of twelve 30-day months.

We will pay interest on the Senior Notes (other than interest payable at redemption, if any, or maturity) in immediately available funds to the registered holders of the Senior Notes as of the Regular Record Date (as defined below) for each Interest Payment Date.

We will pay the principal amount of the Senior Notes and any premium and interest payable at redemption, if any, or at maturity in immediately available funds delivered to the Trustee, and the Trustee will forward such funds to the applicable depository for payments to its participants for subsequent disbursement to the beneficial owners of the Senior Notes. See - *Global Clearance and Settlement Procedures*.

The Senior Notes will be issued in minimum denominations of \$2,000 and integral multiples of \$1,000 in excess thereof.

If any Interest Payment Date, redemption date or the maturity is not a Business Day (as defined below), we will pay all amounts due on the next succeeding Business Day and no additional interest will be paid.

The “Regular Record Date” will be the June 1 or December 1 prior to the relevant Interest Payment Date (whether or not a Business Day).

“Business Day” means any day that is not a Saturday or Sunday or any other day on which banking institutions in New York City are authorized or required by law or regulation to close.

Optional Redemption

We may redeem the Senior Notes at our option at any time upon no more than 60 and not less than 10 days’ notice (either by mail or in compliance with the applicable procedures of DTC).

Prior to March 15, 2035 (three months prior to the maturity date (the “Par Call Date”)), we may redeem the Senior Notes at our option, in whole or in part, at any time and from time to time, at a redemption price (expressed as a percentage of principal amount and rounded to three decimal places) equal to the greater of:

- (a) the sum of the present values of the remaining scheduled payments of principal and interest thereon discounted to the redemption date (assuming the Senior Notes matured on the Par Call Date) on a semi-annual basis (assuming a 360-day year consisting of twelve 30-day months) at the Treasury Rate plus 15 basis points less (b) interest accrued to the redemption date; and
- 100% of the principal amount of the Senior Notes to be redeemed,

plus, in each case, accrued and unpaid interest thereon to, but excluding, the redemption date.

On or after the Par Call Date, we may redeem the Senior Notes at our option, in whole or in part, at any time and from time to time, at a redemption price equal to 100% of the principal amount of the Senior Notes to be redeemed, plus accrued and unpaid interest thereon to, but excluding, the redemption date.

For purposes of these redemption provisions, the following term has the following meaning.

“Treasury Rate” means, with respect to any redemption date, the yield determined by us in accordance with the following two paragraphs.

The Treasury Rate shall be determined by us after 4:15 p.m., New York City time (or after such time as yields on U.S. government securities are posted daily by the Board of Governors of the Federal Reserve System), on the third business day preceding the redemption date based upon the yield or yields for the most recent day that appear after such time on such day in the most recent statistical release published by the Board of Governors of the Federal Reserve System designated as “Selected Interest Rates (Daily)—H.15” (or any successor designation or publication) (“H.15”) under the caption “U.S. government securities—Treasury constant maturities—Nominal” (or any successor caption or heading) (“H.15 TCM”). In determining the Treasury Rate, we shall select, as applicable:

- the yield for the Treasury constant maturity on H.15 exactly equal to the period from the redemption date to the Par Call Date (the “Remaining Life”); or
- if there is no such Treasury constant maturity on H.15 exactly equal to the Remaining Life, the two yields—one yield corresponding to the Treasury constant maturity on H.15 immediately shorter than and one yield corresponding to the Treasury constant maturity on H.15 immediately longer

than the Remaining Life—and shall interpolate to the Par Call Date on a straight-line basis (using the actual number of days) using such yields and rounding the result to three decimal places; or

- if there is no such Treasury constant maturity on H.15 shorter than or longer than the Remaining Life, the yield for the single Treasury constant maturity on H.15 closest to the Remaining Life. For purposes of this clause, the applicable Treasury constant maturity or maturities on H.15 shall be deemed to have a maturity date equal to the relevant number of months or years, as applicable, of such Treasury constant maturity from the redemption date.

If on the third business day preceding the redemption date H.15 TCM is no longer published, we shall calculate the Treasury Rate based on the rate per annum equal to the semi-annual equivalent yield to maturity at 11:00 a.m., New York City time, on the second business day preceding such redemption date of the United States Treasury security maturing on, or with a maturity that is closest to the Par Call Date, as applicable. If there is no United States Treasury security maturing on the Par Call Date, but there are two or more United States Treasury securities with a maturity date equally distant from the Par Call Date, one with a maturity date preceding the Par Call Date and one with a maturity date following the Par Call Date, we shall select the United States Treasury security with a maturity date preceding the Par Call Date. If there are two or more United States Treasury securities maturing on the Par Call Date, or two or more United States Treasury securities meeting the criteria of the preceding sentence, we shall select from among these two or more United States Treasury securities the United States Treasury security that is trading closest to par based upon the average of the bid and asked prices for such United States Treasury securities at 11:00 a.m., New York City time. In determining the Treasury Rate in accordance with the terms of this paragraph, the semi-annual yield to maturity of the applicable United States Treasury security shall be based upon the average of the bid and asked prices (expressed as a percentage of principal amount) at 11:00 a.m., New York City time, of such United States Treasury security, and rounded to three decimal places.

Our actions and determinations in determining the redemption price shall be conclusive and binding for all purposes, absent manifest error.

The Trustee shall have no obligation or duty whatsoever to determine, or to verify our calculations of, the redemption price.

Covenants

Consolidation, Merger or Sale

The Company may merge or consolidate with any corporation or sell all or substantially all of its assets as an entirety as long as the successor or purchaser of such assets expressly assumes the payment of principal, and premium, if any, and interest on the Senior Notes.

Limitation on Consolidated Priority Debt

The Company covenants that so long as any of the Senior Notes are outstanding that it will not permit Consolidated Priority Debt to exceed 10% of Consolidated Tangible Net Assets for a period in excess of five consecutive Business Days.

Limitation on Liens

The Company covenants that for so long as any of the Senior Notes are outstanding that it will not create or suffer to exist or permit any of its subsidiaries to create or suffer to exist any Secured Debt,

unless, at the same time, the Senior Notes that are outstanding are also secured by such Lien on an equal and ratable basis; provided, however, the foregoing does not limit

- i. Permitted Liens; and
- ii. Any other Lien not covered in clause (i) as long as immediately after the creation of such Lien the aggregate principal amount of Secured Debt does not exceed 10% of Consolidated Tangible Net Assets.

Covenants Definitions

“Consolidated Priority Debt” means all Priority Debt of the Company and its subsidiaries determined on a consolidated basis eliminating inter-company items.

“Consolidated Tangible Net Assets” means the total of all assets (including revaluations thereof as a result of commercial appraisals, price level restatement or otherwise) appearing on the most recent quarterly or annual, as applicable, consolidated balance sheet of the Company and its consolidated subsidiaries, net of applicable reserves and deductions, but excluding goodwill, trade names, trademarks, patents, unamortized debt discount and all other like intangible assets (which term shall not be construed to include such revaluations), less the aggregate of the consolidated current liabilities of the Company and its consolidated subsidiaries appearing on such balance sheet.

“Debt” means any indebtedness for borrowed money.

“Lien or Liens” means any mortgage, pledge, security interest, or other lien on any utility properties or tangible assets, including, without limitation, the capital stock or comparable equity interests of its subsidiaries, now owned or hereafter acquired by the Company or its subsidiaries.

“Permitted Liens” means

- Liens on property existing at the time of acquisition or construction of such property (or created within one year after completion of such acquisition or construction), whether by purchase, merger, construction or otherwise, or to secure the payment of all or any part of the purchase price or construction cost thereof, including the extension of any Liens to repairs, renewals, replacements, substitutions, betterments, additions, extensions and improvements then or thereafter made on the property subject thereto;
- Any extensions, renewals or replacements (or successive extensions, renewals or replacements), in whole or in part, of Liens permitted by the foregoing clauses;
- The pledge of any bonds or other securities at any time issued under any of the Secured Debt permitted by the above clauses; and
- The creation or existence of leases (operating or capital) made, or existing on property acquired, in the ordinary course of business.

“Priority Debt” means, without duplication, any Debt of the Company’s subsidiaries; *provided* that there shall be excluded from any calculation of Priority Debt, (i) the Debt of any subsidiary owing to the Company or a subsidiary of the Company, and (ii) the Debt of any entity which becomes a subsidiary after

the issuance of the Notes and any extension, renewal or refunding thereof; *provided* that such Debt was not incurred in contemplation of such entity becoming a subsidiary.

“Secured Debt” means any Debt of the Company or any of its subsidiaries secured by a Lien (other than a Permitted Lien).

Global Clearance and Settlement Procedures

Secondary market trading between Clearstream Banking, société anonyme, Luxembourg (“Clearstream”) participants and/or Euroclear Bank SA/NV, as operator of the Euroclear system (“Euroclear”) participants will occur in the ordinary way in accordance with the applicable rules and operating procedures of Clearstream and Euroclear, as applicable.

Cross-market transfers between persons holding directly or indirectly through DTC on the one hand, and directly or indirectly through Clearstream participants or Euroclear system participants on the other, will be effected through DTC in accordance with DTC rules on behalf of the relevant European international clearing system by its U.S. depositary; however, such cross-market transactions will require delivery of instructions to the relevant European international clearing system by the counterparty in such system in accordance with its rules and procedures and within its established deadlines (European time). The relevant European international clearing system will, if the transaction meets its settlement requirements, deliver instructions to its U.S. depositary to take action to effect final settlement on its behalf by delivering or receiving securities in DTC, and making or receiving payment in accordance with normal procedures for same-day funds settlement applicable to DTC. Clearstream participants and Euroclear system participants may not deliver instructions directly to their respective U.S. depositaries.

Because of time-zone differences, credits of Notes received in Clearstream or the Euroclear system as a result of a transaction with a DTC participant will be made during subsequent securities settlement processing and dated the Business Day following the DTC settlement date. Such credits or any transactions in such Notes settled during such processing will be reported to the relevant Euroclear system participant or Clearstream participant on such Business Day. Cash received in Clearstream or the Euroclear system as a result of sales of the Notes by or through a Clearstream participant or a Euroclear system participant to a DTC participant will be received with value on the DTC settlement date but will be available in the relevant Clearstream or the Euroclear system cash account only as of the Business Day following settlement in DTC.

Additional Information

For additional important information about the Senior Notes, see “Description of the Notes” in the accompanying prospectus, including: (i) additional information about the terms of the Senior Notes, (ii) general information about the Indenture and the Trustee, and (iii) a description of events of default under the Indenture.

MATERIAL UNITED STATES FEDERAL INCOME TAX CONSEQUENCES TO NON-U.S. HOLDERS

The following is a summary of material United States federal income tax consequences of the ownership and disposition of the Senior Notes as of the date hereof. This summary deals only with Senior Notes that are held as capital assets (generally, property held for investment) by a non-U.S. holder (as defined below) who acquires the Senior Notes upon original issuance at their initial offering price.

A “non-U.S. holder” means a beneficial owner of the Senior Notes (other than an entity or arrangement treated as a partnership for United States federal income tax purposes) that is not, for United States federal income tax purposes, any of the following:

- an individual citizen or resident of the United States;
- a corporation (or any other entity classified as a corporation for United States federal income tax purposes) created or organized in or under the laws of the United States, any state thereof or the District of Columbia;
- an estate the income of which is subject to United States federal income taxation regardless of its source; or
- a trust if it (1) is subject to the primary supervision of a court within the United States and one or more United States persons have the authority to control all substantial decisions of the trust or (2) has a valid election in effect under applicable United States Treasury regulations to be treated as a United States person.

This summary is based upon provisions of the Internal Revenue Code of 1986, as amended (the “Code”), and regulations, rulings and judicial decisions as of the date hereof. Those authorities may be changed, perhaps retroactively, so as to result in United States federal income tax consequences different from those summarized below. This summary does not address all aspects of United States federal income taxes and does not deal with estate, foreign, state, local or other tax considerations that may be relevant to non-U.S. holders in light of their personal circumstances. In addition, it does not represent a detailed description of the United States federal income tax consequences applicable to you if you are subject to special treatment under the United States federal income tax laws (including if you are a United States expatriate, “controlled foreign corporation,” “passive foreign investment company” or a partnership or other pass-through entity for United States federal income tax purposes). We cannot assure you that a change in law will not alter significantly the tax considerations that we describe in this summary.

If a partnership (or other entity or arrangement treated as a partnership for United States federal income tax purposes) holds the Senior Notes, the tax treatment of a partner will generally depend upon the status of the partner and the activities of the partnership. If you are a partner of a partnership holding the Senior Notes, you should consult your tax advisors.

It is anticipated, and this discussion assumes, that the Senior Notes will not be issued with more than a *de minimis* amount of original issue discount for United States federal income tax purposes.

If you are considering the purchase of Senior Notes, you should consult your tax advisors concerning the particular United States federal income tax consequences to you of the ownership and disposition of the Senior Notes, as well as the consequences to you arising under other United States federal tax laws and the laws of any other taxing jurisdiction.

United States Federal Withholding Tax

Subject to the discussions of backup withholding and FATCA below, United States federal withholding tax will not apply to any payment of interest on the Senior Notes under the “portfolio interest rule,” provided that:

- interest paid on the Senior Notes is not effectively connected with your conduct of a trade or business in the United States;
- you do not actually (or constructively) own 10% or more of the total combined voting power of all classes of our voting stock within the meaning of the Code and applicable United States Treasury regulations;
- you are not a “controlled foreign corporation” for U.S. federal income tax purposes that is related to us through actual or constructive stock ownership;
- you are not a bank whose receipt of interest on the Senior Notes is described in section 881(c)(3)(A) of the Code; and
- either (a) you provide to the applicable withholding agent your name and address on a properly executed Internal Revenue Service (“IRS”) Form W-8BEN or IRS Form W-8BEN-E (or other applicable form), and certify, under penalties of perjury, that you are not a United States person as defined under the Code or (b) you hold your Senior Notes through certain foreign intermediaries and satisfy the certification requirements of applicable United States Treasury regulations. Special certification rules apply to non-U.S. holders that are pass-through entities rather than corporations or individuals.

If you cannot satisfy the requirements described above, payments of interest made to you will be subject to a 30% United States federal withholding tax, unless you provide the applicable withholding agent with a properly executed:

- IRS Form W-8BEN or IRS Form W-8BEN-E (or other applicable form) claiming an exemption from or reduction in withholding under the benefit of an applicable income tax treaty; or
- IRS Form W-8ECI (or other applicable form) stating that interest paid on the Senior Notes is not subject to withholding tax because it is effectively connected with your conduct of a trade or business in the United States (as discussed below under “— United States Federal Income Tax”).

The 30% United States federal withholding tax generally will not apply to any payment of principal or gain that you realize on the sale, exchange, retirement, redemption or other taxable disposition of a Senior Note.

United States Federal Income Tax

If you are engaged in a trade or business in the United States and interest on the Senior Notes is effectively connected with the conduct of that trade or business (and, if required by an applicable income tax treaty, is attributable to a United States permanent establishment), then you will be subject to United States federal income tax on that interest on a net income basis in the same manner as if you were a United States person as defined under the Code. In addition, if you are a foreign corporation, you may be subject to a branch profits tax equal to 30% (or lower applicable branch profits tax rate under an income tax treaty) of your effectively connected earnings and profits, subject to adjustments. Any effectively

connected interest will be exempt from the 30% United States federal withholding tax, provided the certification requirements discussed above in “—United States Federal Withholding Tax” are satisfied.

Subject to the discussion of backup withholding below, any gain realized on the sale, exchange, retirement, redemption or other taxable disposition of a Senior Note (excluding any amount received on such sale or other taxable disposition allocable to accrued and unpaid interest, which generally will be treated as interest and subject to the rules discussed above in “— United States Federal Withholding Tax” and in the preceding paragraph) generally will not be subject to United States federal income tax unless:

- the gain is effectively connected with your conduct of a trade or business in the United States (and, if required by an applicable income tax treaty, is attributable to a United States permanent establishment), in which case such gain will generally be subject to United States federal income tax (and possibly branch profits tax) in the same manner as effectively connected interest as described above; or
- you are an individual who is present in the United States for 183 days or more in the taxable year of that disposition and certain other conditions are met, in which case, unless an applicable income tax treaty provides otherwise, you will generally be subject to United States federal income tax on any gain recognized at a rate of 30% (or such lower rate specified under an applicable income tax treaty), which may be offset by certain United States source capital losses, provided you have timely filed U.S. federal income tax returns with respect to such losses.

Information Reporting and Backup Withholding

Interest paid to you and the amount of tax, if any, withheld with respect to those payments generally will be reported to the IRS. Copies of the information returns reporting such interest payments and any withholding may also be made available to the tax authorities in the country in which you reside under the provisions of an applicable income tax treaty.

Information reporting and, depending on the circumstances, backup withholding will apply to the proceeds of a sale or other taxable disposition of Senior Notes made within the United States or conducted through certain United States-related financial intermediaries, unless you certify under penalties of perjury that you are a non-U.S. holder (and the payor does not have actual knowledge or reason to know that you are a United States person as defined under the Code), or you otherwise establish an exemption.

In general, you will not be subject to backup withholding with respect to payments on the Senior Notes that we make to you provided that the applicable withholding agent does not have actual knowledge or reason to know that you are a United States person as defined under the Code, and such withholding agent has received from you the statement described above in the fifth bullet point under “—United States Federal Withholding Tax.”

Backup withholding is not an additional tax and any amounts withheld under the backup withholding rules will be allowed as a refund or a credit against your United States federal income tax liability provided the required information is timely furnished to the IRS.

Foreign Account Tax Compliance Act

Under sections 1471 through 1474 of the Code (such sections commonly referred to as “FATCA”), a 30% United States federal withholding tax generally will apply to any interest on a Senior Note paid to

(i) a “foreign financial institution” (as specifically defined in the Code) which does not provide sufficient documentation, typically on IRS Form W-8BEN-E, evidencing either (x) an exemption from FATCA, or (y) its compliance (or deemed compliance) with FATCA (which may alternatively be in the form of compliance with an intergovernmental agreement with the United States) in a manner which avoids withholding, or (ii) a “non-financial foreign entity” (as specifically defined in the Code) which does not provide sufficient documentation, typically on IRS Form W-8BEN-E, evidencing either (x) an exemption from FATCA, or (y) adequate information regarding certain substantial United States beneficial owners of such entity (if any). We will not pay additional amounts or “gross up” payments to holders of the Senior Notes as a result of any taxes or withholding imposed under FATCA. Under certain circumstances, a holder may be eligible for a refund or credit of such tax or withholding. You should consult your tax advisors regarding these rules and whether they may be relevant to your ownership and disposition of the Senior Notes.

UNDERWRITING

PNC Capital Markets LLC, Truist Securities, Inc. and U.S. Bancorp Investments, Inc. are acting as representatives of the underwriters named below with respect to the Senior Notes. Subject to the terms and conditions of the underwriting agreement, we have agreed to sell to each of the underwriters named below and each of the underwriters has severally and not jointly agreed to purchase from us the respective principal amount of Senior Notes set forth opposite its name below:

Underwriter	Principal Amount of Senior Notes
PNC Capital Markets LLC	\$127,500,000
Truist Securities, Inc.	127,500,000
U.S. Bancorp Investments, Inc.	127,500,000
Huntington Securities, Inc.	21,250,000
WauBank Securities LLC	21,250,000
Total	\$425,000,000

In the underwriting agreement, the underwriters have agreed, subject to the terms and conditions set forth therein, to purchase all of the Senior Notes offered hereby if any of the Senior Notes are purchased.

The expenses associated with the offer and sale of the Senior Notes, excluding underwriting discount, are expected to be approximately \$963,000 and will be payable by us.

The underwriters propose to offer the Senior Notes to the public initially at the public offering price set forth on the cover page of this prospectus supplement and may offer the Senior Notes to certain dealers initially at that price less a concession not in excess of 0.40% per Senior Note. The underwriters may allow, and those dealers may realow, a discount not in excess of 0.25% per Senior Note to certain other dealers. After the initial public offering, the public offering price, concession and discount may be changed. The offering of the Senior Notes by the underwriters is subject to receipt and acceptance and subject to the underwriters' right to reject any order in whole or in part.

Prior to this offering, there has been no public market for the Senior Notes. The Senior Notes will not be listed on any securities exchange or automated quotation system. Certain underwriters have advised us that they intend to make a market in the Senior Notes. The underwriters will have no obligation to make a market in the Senior Notes, however, and may cease market making activities, if commenced, at any time. There can be no assurance of a secondary market for the Senior Notes, or that the Senior Notes may be resold.

We have agreed to indemnify the several underwriters against certain liabilities, including liabilities under the Securities Act of 1933, as amended, or contribute to payments that each underwriter may be required to make in respect thereof.

In connection with the offering, the underwriters may purchase and sell the Senior Notes in the open market. These transactions may include over-allotment and stabilizing transactions and purchases to cover syndicate short positions created in connection with the offering. Stabilizing transactions consist of certain bids or purchases for the purposes of preventing or retarding a decline in the market price of the Senior Notes and syndicate short positions involve the sale by the underwriters of a greater number of Senior Notes than they are required to purchase from us in the offering. The underwriters also may impose a penalty bid, whereby selling concessions allowed to syndicate members or other broker dealers

in respect of the securities sold in the offering for their account may be reclaimed by the syndicate if such Senior Notes are repurchased by the syndicate in stabilizing or covering transactions. These activities may stabilize, maintain or otherwise affect the market price of the Senior Notes, which may be higher than the price that might otherwise prevail in the open market, and these activities, if commenced, may be discontinued at any time. These transactions may be effected in the over-the-counter market or otherwise.

The underwriters and their respective affiliates are full service financial institutions engaged in various activities, which may include sales and trading, commercial and investment banking, advisory, investment management, investment research, principal investment, hedging, market making, brokerage and other financial and non-financial activities and services. In the ordinary course of their various business activities, the underwriters and their respective affiliates have made or held, and may in the future make or hold, a broad array of investments including serving as counterparties to certain derivative and hedging arrangements, and may have actively traded, and, in the future may actively trade, debt and equity securities (or related derivative securities), and financial instruments (including bank loans) for their own account and for the accounts of their customers and may have in the past and at any time in the future hold long and short positions in such securities and instruments. Such investment and securities activities may have involved, and in the future may involve, securities and instruments of the Company.

If any of the underwriters or their affiliates have a lending relationship with us, certain of those underwriters or their affiliates routinely hedge, and certain other of those underwriters or their affiliates may hedge, their credit exposure to us consistent with their customary risk management policies. Typically, these underwriters and their affiliates would hedge such exposure by entering into transactions which consist of either the purchase of credit default swaps or the creation of short positions in our securities, including potentially the Senior Notes offered hereby. Any such credit default swaps or short positions could adversely affect future trading prices of the Senior Notes offered hereby. The underwriters and their affiliates may also make investment recommendations and/or publish or express independent research views in respect of such securities or financial instruments and may hold, or recommend to clients that they acquire, long and/or short positions in such securities and instruments.

Some of the underwriters or their affiliates engage in transactions with, and have performed services for, us and our affiliates in the ordinary course of business and have, from time to time, performed, and may in the future perform, various financial advisory, corporate trust, commercial and investment banking services for us, for which they received, or will receive, customary fees and expenses.

Selling Restrictions

Notice to Prospective Investors in the European Economic Area (“EEA”)

The Senior Notes are not intended to be offered, sold or otherwise made available to and should not be offered, sold or otherwise made available to any retail investor in the European Economic Area. For these purposes, a retail investor means a person who is one (or more) of: (i) a retail client as defined in point (11) of Article 4(1) of Directive 2014/65/EU (as amended, “MiFID II”); or (ii) a customer within the meaning of Directive (EU) 2016/97 as amended, where that customer would not qualify as a professional client as defined in point (10) of Article 4(1) of MiFID II; or (iii) not a qualified investor as defined in Regulation (EU) 2017/1129 (as amended, the “Prospectus Regulation”). Consequently, no key information document required by Regulation (EU) No 1286/2014 (as amended, the “PRIIPs Regulation”) for offering or selling the Senior Notes or otherwise making them available to retail investors in the EEA has been prepared and therefore offering or selling the Senior Notes or otherwise making them available to any retail investor in the EEA may be unlawful under the PRIIPs Regulation. This prospectus supplement and the accompanying prospectus have been prepared on the basis that any offer of the Senior Notes in any member state of the EEA will be made pursuant to an exemption under the Prospectus Regulation from the

requirement to publish a prospectus for offers of the Senior Notes. Neither this prospectus supplement nor the accompanying prospectus are prospectuses for purposes of the Prospectus Regulation.

Notice to Prospective Investors in the United Kingdom

The Senior Notes are not intended to be offered, sold or otherwise made available to and should not be offered, sold or otherwise made available to any retail investor in the United Kingdom (“UK”). For these purposes, a retail investor means a person who is one (or more) of: (i) a retail client, as defined in point (8) of Article 2 of Regulation (EU) No 2017/565 as it forms part of domestic law by virtue of the European Union (Withdrawal) Act 2018 (“EUWA”); (ii) a customer within the meaning of the provisions of the Financial Services and Markets Act 2000 (as amended, the “FSMA”) and any rules or regulations made under the FSMA to implement Directive (EU) 2016/97, where that customer would not qualify as a professional client, as defined in point (8) of Article 2(1) of Regulation (EU) No 600/2014 as it forms part of domestic law by virtue of the EUWA; or (iii) not a qualified investor as defined in Article 2 of Regulation (EU) 2017/1129 as it forms part of domestic law by virtue of the EUWA (the “UK Prospectus Regulation”). Consequently, no key information document required by Regulation (EU) No 1286/2014 as it forms part of domestic law by virtue of the EUWA (the “UK PRIIPs Regulation”) for offering or selling the Senior Notes or otherwise making them available to retail investors in the UK has been prepared and therefore offering or selling the Senior Notes or otherwise making them available to any retail investor in the UK may be unlawful under the UK PRIIPs Regulation.

In the UK, this prospectus supplement and the accompanying prospectus are being distributed only to, and is directed only at, and any offer subsequently made may only be directed at persons who are “qualified investors” (as defined in the UK Prospectus Regulation) (i) who have professional experience in matters relating to investments falling within Article 19 (5) of the Financial Services and Markets Act 2000 (Financial Promotion) Order 2005, as amended (the “Order”) and/or (ii) who are high net worth companies (or persons to whom it may otherwise be lawfully communicated) falling within Article 49(2)(a) to (d) of the Order (all such persons together being referred to as “relevant persons”). This prospectus supplement and accompanying prospectus must not be acted on or relied on in the UK by persons who are not relevant persons. In the UK, any investment or investment activity to which this prospectus supplement and accompanying prospectus relates is only available to, and will be engaged in with, relevant persons.

Each underwriter has represented and agreed that:

- it has only communicated or caused to be communicated and will only communicate or cause to be communicated an invitation or inducement to engage in investment activity (within the meaning of Section 21 of the FSMA) received by it in connection with the issue or sale of the Senior Notes in circumstances in which Section 21(1) of the FSMA does not apply to the Company; and
- it has complied and will comply with all applicable provisions of the FSMA with respect to anything done by it in relation to the Senior Notes in, from or otherwise involving the UK.

Notice to Residents of Canada

The Senior Notes may be sold only to purchasers purchasing, or deemed to be purchasing, as principal that are accredited investors, as defined in National Instrument 45-106 Prospectus Exemptions or subsection 73.3(1) of the Securities Act (Ontario), and are permitted clients, as defined in National Instrument 31-103 Registration Requirements, Exemptions and Ongoing Registrant Obligations. Any resale of the Senior Notes must be made in accordance with an exemption from, or in a transaction not subject to, the prospectus requirements of applicable securities laws.

Securities legislation in certain provinces or territories of Canada may provide a purchaser with remedies for rescission or damages if this prospectus supplement (including any amendment thereto) contains a misrepresentation, provided that the remedies for rescission or damages are exercised by the purchaser within the time limit prescribed by the securities legislation of the purchaser's province or territory. The purchaser should refer to any applicable provisions of the securities legislation of the purchaser's province or territory for particulars of these rights or consult with a legal advisor.

Pursuant to section 3A.3 of National Instrument 33-105 Underwriting Conflicts (NI 33-105), the underwriters are not required to comply with the disclosure requirements of NI 33-105 regarding underwriter conflicts of interest in connection with this offering.

Notice to Prospective Investors in Hong Kong

The Senior Notes may not be offered or sold by means of any document other than (i) in circumstances which do not constitute an offer to the public within the meaning of the Companies Ordinance (Cap.32, Laws of Hong Kong), or (ii) to "professional investors" within the meaning of the Securities and Futures Ordinance (Cap.571, Laws of Hong Kong) and any rules made thereunder, or (iii) in other circumstances which do not result in the document being a "prospectus" within the meaning of the Companies Ordinance (Cap.32, Laws of Hong Kong), and no advertisement, invitation or document relating to the Senior Notes may be issued or may be in the possession of any person for the purpose of issue (in each case whether in Hong Kong or elsewhere), which is directed at, or the contents of which are likely to be accessed or read by, the public in Hong Kong (except if permitted to do so under the laws of Hong Kong) other than with respect to Senior Notes which are or are intended to be disposed of only to persons outside Hong Kong or only to "professional investors" within the meaning of the Securities and Futures Ordinance (Cap. 571, Laws of Hong Kong) and any rules made thereunder.

Notice to Prospective Investors in Japan

The Senior Notes have not been and will not be registered under the Financial Instruments and Exchange Law of Japan (the Financial Instruments and Exchange Law) and each underwriter has agreed that it will not offer or sell any Senior Notes, directly or indirectly, in Japan or to, or for the benefit of, any resident of Japan (which term as used herein means any person resident in Japan, including any corporation or other entity organized under the laws of Japan), or to others for re-offering or resale, directly or indirectly, in Japan or to a resident of Japan, except pursuant to an exemption from the registration requirements of, and otherwise in compliance with, the Financial Instruments and Exchange Law and any other applicable laws, regulations and ministerial guidelines of Japan.

Notice to Prospective Investors in the Republic of Korea

The Senior Notes have not been and will not be registered with the Financial Services Commission of Korea under the Financial Investment Services and Capital Markets Act of Korea. Accordingly, the Senior Notes have not been and will not be offered, sold or delivered, directly or indirectly, in Korea or to, or for the account or benefit of, any resident of Korea (as defined in the Foreign Exchange Transactions Law of Korea and its Enforcement Decree) or to others for re-offering or resale, except as otherwise permitted by applicable Korean laws and regulations. In addition, within one year following the issuance of the Senior Notes, the Senior Notes may not be transferred to any resident of Korea other than a qualified institutional buyer (as such term is defined in the regulation on issuance, public disclosure, etc. of securities of Korea, a "Korean QIB") registered with the Korea Financial Investment Association (the "KOFIA") as a Korean QIB and subject to the requirement of monthly reports with the KOFIA of its

holding of Korean QIB bonds as defined in the Regulation on Issuance, Public Disclosure, etc. of notes of Korea, provided that (a) the Senior Notes are denominated, and the principal and interest payments thereunder are made, in a currency other than Korean won, (b) the amount of the securities acquired by such Korean QIBs in the primary market is limited to less than 20 percent of the aggregate issue amount of the Senior Notes, (c) the Senior Notes are listed on one of the major overseas securities markets designated by the Financial Supervisory Service of Korea, or certain procedures, such as registration or report with a foreign financial investment regulator, have been completed for offering of the securities in a major overseas securities market, (d) the one-year restriction on offering, delivering or selling of securities to a Korean resident other than a Korean QIB is expressly stated in the securities, the relevant purchase agreement, subscription agreement, and the offering circular and (e) the Company and the underwriters shall individually or collectively keep the evidence of fulfillment of conditions (a) through (d) above after having taken necessary actions therefor.

Notice to Prospective Investors in Singapore

This prospectus supplement has not been registered as a prospectus with the Monetary Authority of Singapore. Accordingly, this prospectus supplement and any other document or material in connection with the offer or sale, or invitation for subscription or purchase, of the Senior Notes may not be circulated or distributed, nor may the Senior Notes be offered or sold, or be made the subject of an invitation for subscription or purchase, whether directly or indirectly, to persons in Singapore other than (i) to an institutional investor under Section 274 of the Securities and Futures Act, Chapter 289 of Singapore (the “SFA”), (ii) to a relevant person, or any person pursuant to Section 275(1A), and in accordance with the conditions, specified in Section 275 of the SFA or (iii) otherwise pursuant to, and in accordance with the conditions of, any other applicable provision of the SFA.

Where the Senior Notes are subscribed or purchased under Section 275 by a relevant person which is: (a) a corporation (which is not an accredited investor (as defined in Section 4A of the SFA)) the sole business of which is to hold investments and the entire share capital of which is owned by one or more individuals, each of whom is an accredited investor; or (b) a trust (where the trustee is not an accredited investor) whose sole purpose is to hold investments and each beneficiary is an accredited investors, securities (as defined in Section 239(1) of the SFA) of that corporation or the beneficiaries’ rights and interest in that trust shall not be transferable for 6 months after that corporation or that trust has acquired the senior notes under Section 275 except: (1) to an institutional investor or to a relevant person defined in Section 275(2) of the SFA, or any person pursuant to Section 275(1A) or Section 276(4)(i)(B) of the SFA; (2) where no consideration is or will be given for the transfer; or (3) where the transfer is by operation of law.

Singapore Securities and Futures Act Product Classification-Solely for the purposes of its obligations pursuant to sections 309B(1)(a) and 309B(1)(c) of the SFA, the Company has determined, and hereby notifies all relevant persons (as defined in Section 309A of the SFA) that the Senior Notes are “prescribed capital markets products” (as defined in the Securities and Futures (Capital Markets Products) Regulations 2018) and Excluded Investment Products (as defined in MAS Notice SFA 04-N12: Notice on the Sale of Investment Products and MAS Notice FAA-N16: Notice on Recommendations on Investment Products).

Notice to Prospective Investors in Switzerland

This prospectus supplement is not intended to constitute an offer or solicitation to purchase or invest in the Senior Notes. The Senior Notes may not be publicly offered, directly or indirectly, in Switzerland within the meaning of the Swiss Financial Services Act (“FinSA”) and no application has or

will be made to admit the Senior Notes to trading on any trading venue (exchange or multilateral trading facility) in Switzerland. Neither this prospectus supplement nor any other offering or marketing material relating to the Senior Notes constitutes a prospectus pursuant to the FinSA, and neither this prospectus supplement nor any other offering or marketing material relating to the Senior Notes may be publicly distributed or otherwise made publicly available in Switzerland.

Notice to Prospective Investors in Taiwan

The Senior Notes have not been and will not be registered with the Financial Supervisory Commission of Taiwan pursuant to relevant securities laws and regulations and may not be sold, issued or offered within Taiwan through a public offering or in circumstances which constitute an offer within the meaning of the Securities and Exchange Act of Taiwan that requires a registration or approval of the Financial Supervisory Commission of Taiwan. No person or entity in Taiwan has been authorized to offer, sell, give advice regarding or otherwise intermediate the offering and sale of the Senior Notes in Taiwan.

Notice to Prospective Investors in the United Arab Emirates

The Senior Notes have not been, and are not being, publicly offered, sold, promoted or advertised in the United Arab Emirates (including the Dubai International Financial Centre) other than in compliance with the laws of the United Arab Emirates (and the Dubai International Financial Centre) governing the issue, offering and sale of securities. Further, this prospectus supplement and the accompanying prospectus do not constitute a public offer of securities in the United Arab Emirates (including the Dubai International Financial Centre) and are not intended to be a public offer. The prospectus supplement and the accompanying prospectus have not been approved by or filed with the Central Bank of the United Arab Emirates, the Emirates Securities and Commodities Authority or the Dubai Financial Services Authority.

Settlement

We expect to deliver the Senior Notes against payment for the Senior Notes on or about the date specified in the last paragraph on the cover page of this prospectus supplement, which will be the second business day following the date of the pricing of the Senior Notes. Under Rule 15c6-1 under the 1934 Act, trades in the secondary market generally are required to settle in one business day, unless the parties to a trade expressly agree otherwise. Accordingly, purchasers who wish to trade the Senior Notes on the date of pricing will be required, by virtue of the fact that the Senior Notes initially will settle in T+2, to specify alternative settlement arrangements to prevent a failed settlement. Purchasers of the Senior Notes who wish to trade the Senior Notes on the date of pricing should consult their own advisors.

LEGAL OPINIONS

Certain legal matters with respect to this offering of the Senior Notes will be passed on for us by David C. House, Esq., Associate General Counsel, or William E. Johnson, Esq., Senior Counsel, or Ryan F. Aguiar, Esq., Senior Counsel, of American Electric Power Service Corporation, our service company affiliate. Certain legal matters with respect to the offering of the Senior Notes will be passed on for the underwriters by Hunton Andrews Kurth LLP, New York, New York. From time to time, Hunton Andrews Kurth LLP acts as counsel to our affiliates for some matters.

EXPERTS

The consolidated financial statements of AEP Transmission Company, LLC incorporated in this Prospectus Supplement by reference to the AEP Transmission Company, LLC Annual Report on Form 10-K for the year ended December 31, 2024 have been so incorporated in reliance on the report of PricewaterhouseCoopers LLP, an independent registered public accounting firm, given on the authority of said firm as experts in auditing and accounting.

PROSPECTUS

AEP TRANSMISSION COMPANY, LLC
1 RIVERSIDE PLAZA
COLUMBUS, OHIO 43215
(614) 716-1000

UNSECURED NOTES TERMS OF SALE

The following terms may apply to the notes that we may sell at one or more times. A prospectus supplement or pricing supplement will include the final terms for each note. If we decide to list upon issuance any note or notes on a securities exchange, a prospectus supplement or pricing supplement will identify the exchange and state when we expect trading could begin.

- Mature 9 months to 60 years
- Fixed or floating interest rate
- Remarketing features
- Certificate or book-entry form
- Subject to redemption or repayment
- Not convertible, amortized or subject to a sinking fund
- Interest paid on fixed rate notes monthly, quarterly or semi-annually
- Interest paid on floating rate notes monthly, quarterly, semi-annually, or annually
- Issued in multiples of a minimum denomination

INVESTING IN THESE NOTES INVOLVES RISKS. SEE THE SECTION ENTITLED “RISK FACTORS” ON PAGE 2 FOR MORE INFORMATION.

The notes have not been approved or disapproved by the Securities and Exchange Commission or any state securities commission, nor have these organizations determined that this prospectus is accurate or complete. Any representation to the contrary is a criminal offense.

The date of this prospectus is March 5, 2024.

THE COMPANY

We are the holding company of seven regulated transmission-only electric utilities. We are an indirect wholly-owned subsidiary of American Electric Power Company, Inc. (“AEP”). We develop and build new transmission facilities at the request of the regional transmission organizations in which AEP operates and replace and upgrade facilities, assets and components of the existing AEP transmission system as needed to maintain reliability standards and provide service to AEP’s wholesale and retail customers. Our subsidiaries operate in Indiana, Kentucky, Michigan, Ohio, Oklahoma and West Virginia. Neither we nor our subsidiaries have any employees. Instead, our service corporation affiliate and certain AEP utility subsidiaries provide the services required by these entities. Our principal executive offices are located at 1 Riverside Plaza, Columbus, Ohio 43215 and our telephone number is (614) 716-1000.

PROSPECTUS SUPPLEMENTS

We may provide information to you about the notes in up to three separate documents that progressively provide more detail: (a) this prospectus provides general information some of which may not apply to your notes; (b) the accompanying prospectus supplement provides more specific terms of your notes; and (c) if not included in the accompanying prospectus supplement, a pricing supplement will provide the final terms of your notes. It is important for you to consider the information contained in this prospectus, the prospectus supplement and any pricing supplement in making your investment decision.

RISK FACTORS

Investing in the notes involves risk. Please see the risk factors described in our most recent Annual Report on Form 10-K for the fiscal year ended December 31, 2023, which is incorporated by reference in this prospectus. Before making an investment decision, you should carefully consider these risks as well as other information contained or incorporated by reference in this prospectus. The risks and uncertainties described are those presently known to us.

WHERE YOU CAN FIND MORE INFORMATION

This prospectus is part of a registration statement we filed with the Securities and Exchange Commission (“SEC”). We also file annual, quarterly and special reports and other information with the SEC. You may examine our SEC filings through the SEC’s website at <http://www.sec.gov>.

The SEC allows us to “incorporate by reference” the information we file with them, which means that we can disclose important information to you by referring you to those documents. The information incorporated by reference is considered to be part of this prospectus, and later information that we file with the SEC will automatically update and supersede this information. We incorporate by reference the documents listed below and any future filings made with the SEC under Sections 13(a), 13(c), 14, or 15(d) of the Securities Exchange Act of 1934 (including any documents filed after the date of the initial registration statement and prior to its effectiveness) until we sell all the notes.

- Annual Report on Form 10-K for the year ended [December 31, 2023](#).

You may request a copy of these filings, at no cost, by writing or telephoning us at the following address:

Investor Relations
American Electric Power Service Corporation
1 Riverside Plaza
Columbus, Ohio 43215
614-716-1000

You should rely only on the information incorporated by reference or provided in this prospectus or any supplement and in any written communication from us or any underwriter specifying the final terms of the particular offering. We have not authorized anyone else to provide you with different information. We are not making an offer of these notes in any state where the offer is not permitted. You should not assume that the information in this prospectus or any supplement is accurate as of any date other than the date on the front of those documents.

USE OF PROCEEDS

Unless otherwise stated in a prospectus supplement, the net proceeds from the sale of the notes will be used for funding our construction program and for other general corporate purposes relating to our utility business. These purposes may include redeeming or repurchasing outstanding debt (including the repayment of advances from affiliates) and replenishing working capital. If we do not use the net proceeds immediately, we will temporarily invest them in short-term, interest-bearing obligations. We estimate that our construction costs in 2024 will approximate \$1.3 billion. At February 27, 2024 we had approximately \$267 million in advances from affiliates outstanding.

DESCRIPTION OF THE NOTES

General

We will issue the notes under an Indenture dated as of November 1, 2016 (as previously supplemented and amended, the “Indenture”) between us and The Bank of New York Mellon Trust Company, N.A., as trustee (the “Trustee”). This prospectus briefly outlines some provisions of the Indenture. If you would like more information on these provisions, you should review the Indenture and any supplemental indentures or company orders that we have filed or will file with the SEC. See *Where You Can Find More Information* on how to locate these documents. You may also review these documents at the Trustee’s offices at 311 South Wacker Drive, Suite 6200B, Floor 62, Chicago, Illinois 60606.

The Indenture does not limit the amount of notes that may be issued. The Indenture permits us to issue notes in one or more series or tranches upon the approval of our board of directors and as described in one or more company orders or supplemental indentures. Each series of notes may differ as to their terms. The Indenture also gives us the ability to reopen a previous issue of a series of notes and issue additional notes of such series.

The notes are unsecured and will rank equally with all our unsecured unsubordinated debt. For current information on our debt outstanding see our most recent Form 10-K and Form 10-Q. See *Where You Can Find More Information*.

The notes will be denominated in U.S. dollars and we will pay principal and interest in U.S. dollars. Unless an applicable pricing or prospectus supplement states otherwise, the notes will not be

subject to any conversion, amortization, or sinking fund. We expect that the notes will be “book-entry,” represented by a permanent global note registered in the name of The Depository Trust Company, or its nominee. We reserve the right, however, to issue note certificates registered in the name of the noteholders.

In the discussion that follows, whenever we talk about paying principal on the notes, we mean at maturity or redemption. Also, in discussing the time for notices and how the different interest rates are calculated, all times are New York City time and all references to New York mean the City of New York, unless otherwise noted.

The following terms may apply to each note as specified in the applicable pricing or prospectus supplement and the note.

Redemptions

If we issue redeemable notes, we may redeem such notes at our option unless an applicable pricing or prospectus supplement states otherwise. The pricing or prospectus supplement will state the terms of redemption. We may redeem notes in whole or in part by delivering written notice to the noteholders no more than 60, and not less than 30, days prior to redemption. If we do not redeem all the notes of a series at one time, DTC (as defined below), in the case of notes represented by a global security, will select the particular notes or portions thereof for redemption from the outstanding notes not previously redeemed in accordance with applicable procedures of DTC. If note certificates are outstanding, the Trustee selects the notes to be redeemed by lot or in such other manner it determines to be fair.

Remarketed Notes

If we issue notes with remarketing features, an applicable pricing or prospectus supplement will describe the terms for the notes including: interest rate, remarketing provisions, our right to redeem notes, the holders’ right to tender notes, and any other provisions.

Book-Entry Notes - Registration, Transfer, and Payment of Interest and Principal

Unless otherwise stated in a prospectus supplement, book-entry only securities of a series of notes will be issued in the form of a global note that the Trustee will deposit with the Depository Trust Company (“DTC”), New York, New York. This means that we will not issue notes to each holder. One or more global notes will be issued to Cede & Co. (DTC’s partnership nominee) or such other name as may be requested by an authorized representative of DTC who will keep a computerized record of its participants (for example, your broker) whose clients have purchased the notes. The participant will then keep a record of its clients who purchased the notes. Unless it is exchanged in whole or in part for a note certificate, a global note may not be transferred, except that DTC, its nominees, and their successors may transfer a global note as a whole to one another.

Beneficial interests in global notes will be shown on, and transfers of global notes will be made only through, records maintained by DTC and its participants.

DTC, the world’s largest securities depository, is a limited-purpose trust company organized under the New York Banking Law, a “banking organization” within the meaning of the New York Banking Law, a member of the Federal Reserve System, a “clearing corporation” within the meaning of the New York Uniform Commercial Code, and a “clearing agency” registered pursuant to the provisions of Section 17A of the Securities Exchange Act of 1934, as amended. DTC holds and provides asset servicing for over 3.5

million issues of U.S. and non-U.S. equity issues, corporate and municipal debt issues, and money market instruments (from over 100 countries) that DTC's participants ("Direct Participants") deposit with DTC. DTC also facilitates the post-trade settlement among Direct Participants of sales and other securities transactions in deposited securities, through electronic computerized book-entry transfers and pledges between Direct Participants' accounts. This eliminates the need for physical movement of securities certificates. Direct Participants include both U.S. and non-U.S. securities brokers and dealers, banks, trust companies, clearing corporations, and certain other organizations. DTC is a wholly-owned subsidiary of The Depository Trust & Clearing Corporation ("DTCC"). DTCC is the holding company for DTC, National Securities Clearing Corporation and Fixed Income Clearing Corporation, all of which are registered clearing agencies. DTCC is owned by the users of its regulated subsidiaries. Access to the DTC system is also available to others such as both U.S. and non-U.S. securities brokers and dealers, banks, trust companies, and clearing corporations that clear through or maintain a custodial relationship with a Direct Participant, either directly or indirectly ("Indirect Participants"). The DTC Rules applicable to its Participants are on file with the SEC. More information about DTC can be found at www.dtcc.com.

Purchases of notes under the DTC system must be made by or through Direct Participants, which will receive a credit for the notes on DTC's records. The ownership interest of each actual purchaser of each note ("Beneficial Owner") is in turn to be recorded on the Direct and Indirect Participants' records. Beneficial Owners will not receive written confirmation from DTC of their purchase. Beneficial Owners are, however, expected to receive written confirmations providing details of the transaction, as well as periodic statements of their holdings, from the Direct or Indirect Participant through which the Beneficial Owner entered into the transaction. Transfers of ownership interests in the notes are to be accomplished by entries made on the books of Direct and Indirect Participants acting on behalf of Beneficial Owners. Beneficial Owners will not receive certificates representing their ownership interests in notes, except in the event that use of the book-entry system for the notes is discontinued.

To facilitate subsequent transfers, all notes deposited by Direct Participants with DTC are registered in the name of DTC's partnership nominee, Cede & Co., or such other name as may be requested by an authorized representative of DTC. The deposit of notes with DTC and their registration in the name of Cede & Co. or such other DTC nominee do not effect any change in beneficial ownership. DTC has no knowledge of the actual Beneficial Owners of the notes; DTC's records reflect only the identity of the Direct Participants to whose accounts such notes are credited, which may or may not be the Beneficial Owners. The Direct and Indirect Participants will remain responsible for keeping account of their holdings on behalf of their customers.

Conveyance of notices and other communications by DTC to Direct Participants, by Direct Participants to Indirect Participants, and by Direct Participants and Indirect Participants to Beneficial Owners will be governed by arrangements among them, subject to any statutory or regulatory requirements as may be in effect from time to time. Beneficial Owners of notes may wish to take certain steps to augment the transmission to them of notices of significant events with respect to the notes, such as redemptions, tenders, defaults, and proposed amendments to the notes documents. For example, Beneficial Owners of notes may wish to ascertain that the nominee holding the notes for their benefit has agreed to obtain and transmit notices to Beneficial Owners. In the alternative, Beneficial Owners may wish to provide their names and addresses to the registrar and request that copies of notices be provided directly to them.

Redemption notices shall be sent to DTC. If less than all of the notes are being redeemed, DTC's practice is to determine by lot the amount of the interest of each Direct Participant in such issue to be redeemed.

Neither DTC nor Cede & Co. (nor any other DTC nominee) will consent or vote with respect to the notes unless authorized by a Direct Participant in accordance with DTC's MMI Procedures. Under its usual procedures, DTC mails an Omnibus Proxy to us as soon as possible after the record date. The Omnibus Proxy assigns Cede & Co.'s consenting or voting rights to those Direct Participants to whose accounts the notes are credited on the record date (identified in a listing attached to the Omnibus Proxy).

Payments on the notes will be made to Cede & Co., or such other nominee as may be requested by an authorized representative of DTC. DTC's practice is to credit Direct Participants' accounts upon DTC's receipt of funds and corresponding detail information from us or the Trustee on the payable date in accordance with their respective holdings shown on DTC's records. Payments by Participants to Beneficial Owners will be governed by standing instructions and customary practices, as is the case with notes held for the accounts of customers in bearer form or registered in "street name", and will be the responsibility of such Participant and not of DTC, the Trustee or us, subject to any statutory or regulatory requirements as may be in effect from time to time. Payment of redemption proceeds and distributions to Cede & Co. (or such other nominee as may be requested by an authorized representative of DTC) is our responsibility, disbursement of such payments to Direct Participants will be the responsibility of DTC, and disbursement of such payments to the Beneficial Owners will be the responsibility of Direct and Indirect Participants.

A Beneficial Owner shall give notice to elect to have its notes purchased or tendered, through its Participant, to the Tender/Remarketing Agent, and shall effect delivery of such notes by causing the Direct Participant to transfer the Participant's interest in the notes, on DTC's records, to the Tender/Remarketing Agent. The requirement for physical delivery of the notes in connection with an optional tender or a mandatory purchase will be deemed satisfied when the ownership rights in the notes are transferred by Direct Participants on DTC's records and followed by a book-entry credit of tendered notes to the Tender/Remarketing Agent's DTC account.

DTC may discontinue providing its services as depository with respect to the notes at any time by giving reasonable notice to us. Under such circumstances, in the event that a successor depository is not obtained, note certificates are required to be printed and delivered.

We may decide to discontinue use of the system of book-entry only transfers through DTC (or a successor securities depository). In that event, note certificates will be printed and delivered to DTC.

The information in this section concerning DTC and DTC's book-entry system has been obtained from sources that we believe to be reliable, but we take no responsibility for the accuracy thereof.

Note Certificates-Registration, Transfer, and Payment of Interest and Principal

If we issue note certificates, they will be registered in the name of the noteholder. The notes may be transferred or exchanged, pursuant to administrative procedures in the Indenture, without the payment of any service charge (other than any tax or other governmental charge) by contacting the paying agent. Payments on note certificates will be made by check or by wire transfer to an account located in the United States maintained by the person entitled thereto as specified in the security register.

Interest Rate

The interest rate on the notes will either be fixed or floating. The interest paid will include interest accrued to, but excluding, the date of maturity or redemption. Interest is generally payable to the person in whose name the note is registered at the close of business on the record date before each interest

payment date. Interest payable at maturity or redemption, however, will be payable to the person to whom principal is payable.

Unless an applicable pricing or prospectus supplement states otherwise, if we issue a note after a record date but on or prior to the related interest payment date, we will pay the first interest payment on the interest payment date after the next record date. We will pay interest payments by check or wire transfer, at our option.

Fixed Rate Notes

A pricing or prospectus supplement will designate the record dates, payment dates and the fixed rate of interest payable on a note. We will pay interest monthly, quarterly or semi-annually, and upon maturity or redemption. Unless an applicable pricing or prospectus supplement states otherwise, if any payment date falls on a day that is not a business day, we will pay interest on the next business day and no additional interest will be paid. Interest payments will be the amount of interest accrued to, but excluding, each payment date. Interest will be computed using a 360-day year of twelve 30-day months.

Floating Rate Notes

Each floating rate note will have an interest rate formula. The applicable pricing supplement will state the initial interest rate or interest rate formula on each note effective until the first interest reset date. The applicable pricing or prospectus supplement will state the method and dates on which the interest rate will be determined, reset and paid.

Events of Default

“Event of Default” means any of the following:

- failure to pay for three business days the principal of (or premium, if any, on) any note of a series when due and payable;
- failure to pay for 30 days any interest on any note of any series when due and payable;
- failure to perform any other requirements in such notes, or in the Indenture in regard to such notes, for 90 days after notice;
- certain events of bankruptcy or insolvency; or
- any other event of default specified in a series of notes.

An Event of Default for a particular series of notes does not necessarily mean that an Event of Default has occurred for any other series of notes issued under the Indenture. If an Event of Default occurs and continues, the Trustee or the holders of at least 33% of the principal amount of the notes of the series affected may require us to repay the entire principal of the notes of such series immediately (“Repayment Acceleration”). In most instances, the holders of at least a majority in aggregate principal amount of the notes of the affected series may rescind a previously triggered Repayment Acceleration. However, if we cause an Event of Default because we have failed to pay (unaccelerated) principal, premium, if any, or interest, Repayment Acceleration may be rescinded only if we have first cured our default by depositing with the Trustee enough money to pay all (unaccelerated) past due amounts and penalties, if any.

Subject to certain exceptions, the Trustee must within 90 days after a default occurs, notify the holders of the notes of the series of default unless such default has been cured or waived. We are required to file an annual certificate with the Trustee, signed by an officer, concerning any default by us under any provisions of the Indenture.

Subject to the provisions of the Indenture relating to its duties in case of default, the Trustee shall be under no obligation to exercise any of its rights or powers under the Indenture at the request, order or direction of any holders unless such holders offer the Trustee security or indemnity satisfactory to it. Subject to the provisions for indemnification, the holders of a majority in principal amount of the notes of any series may direct the time, method and place of conducting any proceedings for any remedy available to, or exercising any trust or power conferred on, the Trustee with respect to such notes.

Modification of Indenture

Under the Indenture, our rights and obligations and the rights of the holders of any notes may be changed. Any change affecting the rights of the holders of any series of notes requires the consent of the holders of not less than a majority in aggregate principal amount of the outstanding notes of all series affected by the change, voting as one class. However, we cannot change the terms of payment of principal or interest, or a reduction in the percentage required for changes or a waiver of default, unless the holder consents. We may issue additional series of notes and take other action that does not affect the rights of holders of any series by executing supplemental indentures without the consent of any noteholders.

Consolidation, Merger or Sale

We may merge or consolidate with any entity or sell substantially all of our assets as an entirety as long as the successor or purchaser expressly assumes the payment of principal, and premium, if any, and interest on the notes.

Legal Defeasance

We will be discharged from our obligations on the notes of any series at any time if:

- we deposit with the Trustee sufficient cash or government securities to pay the principal, interest, any premium and any other sums due to the stated maturity date or a redemption date of the note of the series; and
- we deliver to the Trustee an opinion of counsel stating that the federal income tax obligations of noteholders of that series will not change as a result of our performing the action described above.

If this happens, the noteholders of the series will not be entitled to the benefits of the Indenture except for registration of transfer and exchange of notes and replacement of lost, stolen or mutilated notes.

Covenant Defeasance

We will be discharged from our obligations under certain restrictive covenants applicable to the notes of a particular series if, among other things, we perform both actions described above. See *Legal Defeasance*. If this happens, any later breach of that particular restrictive covenant will not result in Repayment Acceleration. If we cause an Event of Default apart from breaching that restrictive covenant, there may not be sufficient money or government obligations on deposit with the Trustee to pay all amounts due on the notes of that series. In that instance, we would remain liable for such amounts.

Governing Law

The Indenture and notes of all series will be governed by the laws of the State of New York.

Concerning the Trustee

We and our affiliates use or will use some of the banking services of the Trustee and other services of its affiliates in the normal course of business.

PLAN OF DISTRIBUTION

We may sell the notes (a) through agents; (b) through underwriters or dealers; or (c) directly to one or more purchasers.

By Agents

Notes may be sold on a continuing basis through agents designated by us. The agents will agree to use their reasonable efforts to solicit purchases for the period of their appointment.

The agents will not be obligated to make a market in the notes. We cannot predict the amount of trading or liquidity of the notes.

By Underwriters

If underwriters are used in the sale, the underwriters will acquire the notes for their own accounts. The underwriters may resell the notes in one or more transactions, including negotiated transactions, at a fixed public offering price or at varying prices determined at the time of sale. The obligations of the underwriters to purchase the notes will be subject to certain conditions. The underwriters will be obligated to purchase all the notes of the series offered if any of the notes are purchased. Any initial public offering price and any discounts or concessions allowed or re-allowed or paid to dealers may be changed from time to time.

Direct Sales

We may also sell notes directly. In this case, no underwriters or agents would be involved.

General Information

Underwriters, dealers, and agents that participate in the distribution of the notes may be underwriters as defined in the Securities Act of 1933 (the “Act”), and any discounts or commissions received by them from us and any profit on the resale of the notes by them may be treated as underwriting discounts and commissions under the Act.

We may have agreements with the underwriters, dealers and agents to indemnify them against certain civil liabilities, including liabilities under the Act or to contribute to payments that each underwriter, dealer or agent may be required to make in respect thereto.

Underwriters, dealers and agents and their respective affiliates may engage in transactions with, or perform services for, us or our affiliates in the ordinary course of their businesses.

LEGAL OPINIONS

David C. House, Esq., Associate General Counsel of American Electric Power Service Corporation, one of our affiliates, William E. Johnson, Esq., Senior Counsel of American Electric Power Service Corporation, or Ryan F. Aguiar, Esq., Senior Counsel of American Electric Power Service Corporation, will issue an opinion about the legality of the notes for us. Hunton Andrews Kurth LLP, New York, NY will issue an opinion for the agents or underwriters. From time to time, Hunton Andrews Kurth LLP acts as counsel to our affiliates for some matters.

EXPERTS

The financial statements of AEP Transmission Company, LLC incorporated in this Prospectus by reference to the AEP Transmission Company, LLC Annual Report on Form 10-K for the year ended December 31, 2023 have been so incorporated in reliance on the report of PricewaterhouseCoopers LLP, an independent registered public accounting firm, given on the authority of said firm as experts in auditing and accounting.

\$425,000,000

AEP TRANSMISSION COMPANY, LLC

5.375% Senior Notes, Series R, due 2035

PROSPECTUS SUPPLEMENT

May 12, 2025

Joint Book-Running Managers

PNC Capital Markets LLC

Truist Securities

US Bancorp

Co-Managers

Huntington Capital Markets

WauBank Securities LLC
