BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Joint Application Of American Transmission Systems, Incorporated, Mid-Atlantic Interstate Transmission, LLC, And Trans-Allegheny Interstate Line Company For All Of The Necessary Authority, Approvals, And Certificates Of Public Convenience Required To Lawfully Effectuate (1) The Purchase And Sale Agreement Of An Incremental Thirty Percent Equity Interest In FirstEnergy Transmission, LLC By North American Transmission Company II L.P.; (2) The Transfer Of Class B Membership Interests In Mid-Atlantic Interstate Transmission, LLC Held By FirstEnergy Corp. To FirstEnergy Transmission, LLC; (3) Where Necessary, Associated Affiliated Interest Agreements; And (4) Any Other Approvals Necessary To Complete The Contemplated Transaction	:	Docket Nos. A-2023-_____ A-2023-_____ A-2023-_____ G-2023-_____

Direct Testimony of Toby Bishop

RE:
Economic Benefits of FirstEnergy's Currently Planned Future Capital Investment in Pennsylvania

DIRECT TESTIMONY OF TOBY BISHOP

I. INTRODUCTION AND BACKGROUND

Q. Please state your name and business address.

A. My name is Toby Bishop. I am a Principal at The Brattle Group ("Brattle"). My business address is One Beacon Street, Suite 2600, Boston, Massachusetts 02108.

Q. Please describe your professional background and experience.

A. I have over 25 years of experience consulting in the North American energy industry. My experience includes numerous engagements assisting clients in the United States and Canada with a wide range of issues, including policy and strategic issues, rate and financial matters, market power, asset valuation, litigation/arbitration support and damages, market assessments, and project development. My experience has included numerous state and federal rate proceedings in both the US and Canada, representing a wide variety of clients, including electric, natural gas, and water utilities, utility customers, and natural gas pipelines and storage providers. I have also assisted various clients throughout the United States and Canada with market-related matters and have prepared numerous assessments of market dynamics that have been filed with the Federal Energy Regulatory Commission, used publicly for development initiatives, and used internally by clients for investment decisions.

Q. On whose behalf are you submitting this testimony?

A. I am submitting this testimony before the Pennsylvania Public Utility Commission ("Commission" or "PaPUC") on behalf of American Transmission Systems, Incorporated

("ATSI"), Mid-Atlantic Interstate Transmission, LLC ("MAIT") and Trans-Allegheny Interstate Line Company ("TrAILCo") (collectively, the "Joint Applicants"), all of which are owned by FirstEnergy Transmission, LLC ("FET"). FET is owned by FirstEnergy Corp. ("FirstEnergy") and North American Transmission Company II, L.P.

Q. Have you previously testified before the Commission or other regulatory agencies?

A. Yes, I have provided expert testimony on a number of occasions before federal, state and provincial regulatory agencies in the United States and Canada, including having previously testified in three prior PaPUC proceedings concerning similar topics addressed by my testimony herein. My qualifications are summarized in Appendix A.

Q. Please describe the purpose of your testimony.

A. FirstEnergy is proposing to sell an incremental 30% equity interest in FET to North American Transmission Company II, L.P. ("NATCo II")[1] (the "Transaction"),[2] and, as discussed in the testimony of Mr. Steven Staub, the proceeds from the Transaction will improve FirstEnergy's financial strength and its ability to finance and continue to deploy the necessary investments in its distribution and transmission systems over the next decade. The purpose of my testimony is to provide an estimate of gross economic benefits to Pennsylvania associated with FirstEnergy's future capital investment plan specifically

[1] As discussed in the direct testimony of Jeffrey Rosenthal (Joint Applicants Statement No. 3), NATCo II is a controlled investment vehicle entity of Brookfield Super-Core Infrastructure Partners GP LLC ("Brookfield GP"), an indirect wholly-owned subsidiary of Brookfield Corporation (f/k/a Brookfield Asset Management Inc.) and Brookfield Asset Management Ltd (BAM Ltd). BAM Ltd manages the various investment entities and funding vehicles that are ultimately controlled by Brookfield Corporation (BAM Ltd and Brookfield Corporation, collectively "Brookfield").

[2] As part of the Transaction, FirstEnergy will also transfer certain MAIT Class B membership interests to FET in exchange for Special Purpose Membership Interests in FET.

related to its electric distribution and transmission systems in the Commonwealth.[3] Specifically, my analysis estimates the gross economic benefits to Pennsylvania associated with the capital investments that FirstEnergy will, as a result of this Transaction, be better positioned to undertake over the next ten years (*i.e.*, 2023 through 2032; "Estimate Period") associated with the electric distribution systems of its utility operating subsidiaries in Pennsylvania (*i.e.*, Pennsylvania Power Company, Pennsylvania Electric Company, West Penn Power Company, and Metropolitan Edison Company; collectively, the "FE PA Utilities"), as well as the electric transmission infrastructure owned by MAIT in Pennsylvania.[4] Over the Estimate Period, FirstEnergy estimates it will invest approximately $14 billion related to various projects associated with its transmission and distribution systems in Pennsylvania ("Capital Program"). These investments cover a broad range of projects, including upgrading aging infrastructure to enhance reliability, modernizing and strengthening the electrical grid, and supporting the integration of electric vehicles, renewable generation, and emerging technologies as the electric industry transforms over the next few decades.

[3] The term gross economic benefits is used because the analysis estimates economic benefits to Pennsylvania associated with the capital investments that FirstEnergy will be better positioned to undertake over the next ten years associated with its electric distribution and transmission infrastructure in Pennsylvania; however, as discussed later herein, there are also other expected economic benefits that would accrue to Pennsylvania associated with FirstEnergy's capital spending that have not been analyzed and nor has the associated rate impact of those future expenditures.

[4] FirstEnergy currently has an application pending before the Commission that includes, among other things, for the merger of the FE PA Utilities with and into a new entity, FirstEnergy Pennsylvania Electric Company ("Consolidation Application").

Q. Have you analyzed the economic impacts associated with FirstEnergy's future transmission investment opportunities in ATSI and/or TrAILCo?

A. No. Because the majority of TrAILCo's assets are located outside of Pennsylvania and the vast majority of ATSI's infrastructure is also located outside of Pennsylvania, I have not evaluated the economic impacts of future investment opportunities in either of these companies.[5]

Q. Are you sponsoring any exhibits?

Yes. I am sponsoring the following exhibits:

- *Joint Applicants Exhibit TB-1*: Summary of FirstEnergy's current total estimated Capital Program over the next decade, by primary category.
- *Joint Applicants Exhibit TB-2*: Summary of FirstEnergy's current total estimated Capital Program, by primary category, assumed to be spent directly in Pennsylvania.

I. SUMMARY AND CONCLUSIONS

Q. What are the key conclusions of your testimony?

A. Based on an analysis of the economic impacts of FirstEnergy's anticipated Capital Program on the Pennsylvania economy, I conclude the following:

- The investments in the Capital Program that FirstEnergy will be better positioned to undertake over the next decade as a result of the Transaction are expected to provide significant economic benefits throughout Pennsylvania.
- The gross economic benefits that the Capital Program spending would produce within the FE PA Utilities' service territories and elsewhere in Pennsylvania are wide-ranging and substantial. Specifically, over the Estimate Period:

[5] FirstEnergy also owns transmission infrastructure in Pennsylvania through West Penn Power Company, and the anticipated future expenditures reflected in the Capital Program include expenditures for both the distribution and transmission infrastructure of West Penn Power Company. While the West Penn Power Company transmission assets would be transferred to Keystone Appalachian Transmission Company pursuant to the Consolidation Application, such future projected transmission expenditures related to that infrastructure would occur in Pennsylvania.

- FirstEnergy's projected expenditures related to the Capital Program are estimated to generate a total of approximately $19.5 billion in economic output in Pennsylvania.
- This economic activity generated by the Capital Program is estimated to create approximately $11.2 billion in gross regional product in Pennsylvania.
- This economic activity also includes approximately $648 million in additional state and municipal tax revenue for local communities in the state.
- Further, the economic activity associated with the Capital Program is also expected to support between approximately 9,500 and 11,200 jobs annually.

II. ECONOMIC IMPACT ANALYSIS

Q. Please briefly describe the Transaction.

A. As described in further detail by each of the Joint Applicants' other witnesses, on February 2, 2023, FirstEnergy and FET entered into an agreement with NATCo II pursuant to which FirstEnergy agreed to sell to NATCo II an incremental 30% equity interest in FET for a purchase price of $3.5 billion. Upon consummation of the Transaction, NATCo II's interest in FET will increase from 19.9% to 49.9% and FirstEnergy will retain the remaining 50.1% ownership interests of FET.

Q. How is the Transaction expected to support FirstEnergy's future investment in Pennsylvania?

A. As discussed in Mr. Staub's testimony, the Transaction will improve FirstEnergy's balance sheet and credit metrics. As a result, FirstEnergy will be better positioned to attract the capital necessary to undertake its planned capital investments in Pennsylvania in order to enhance reliability, modernize the electric grid, accommodate the rapid changes expected in electric utility industry, and finance those future capital investments at a lower cost of debt than it may otherwise have been able to do.

Q. What is FirstEnergy's current Capital Program for Pennsylvania over the Estimate Period?

A. Over the Estimate Period, FirstEnergy anticipates investing approximately $14 billion in the Capital Program, with slightly over half of that investment related to the distribution systems of the FE PA Utilities. As shown in Figure 1, the capital FirstEnergy anticipates investing in the distribution systems in Pennsylvania is focused on enhancing reliability, grid modernization, and supporting additional load. The capital FirstEnergy estimates it will invest in its transmission system in Pennsylvania is largely focused on reliability enhancements, with a smaller proportion associated with system upgrades required by the PJM Interconnection, L.L.C. ("PJM").

Figure 1: FirstEnergy's Total Estimated Capital Program in Pennsylvania, 2023-2032 ($millions)[6]

Distribution		
Reliability	$	6,606
Load	$	409
Grid Modernization	$	597
Subtotal	$	7,611
Transmission	$	6,784
Total	**$**	**14,395**

[6] FirstEnergy's projected Capital Program by year over the Estimate Period is shown in Joint Applicants Exhibit TB-2. Values reflected are in nominal dollars.

Q. Are the capital investment opportunities that FirstEnergy has identified in Pennsylvania over the Estimate Period expected to provide economic stimulus to the Commonwealth?

A. Yes. The significant level of investment associated with the Capital Program proposed by FirstEnergy will drive economic activity within the service territories of the FE PA Utilities and throughout Pennsylvania, including supporting thousands of jobs in the local communities and increasing local and state tax bases. These economic benefits to the local communities served by FirstEnergy and throughout Pennsylvania are in addition to the improvements in safety, reliability and operations that would also result from the proposed Capital Program.

Q. Did you perform an analysis to estimate the economic impacts associated with the investments related to the Capital Program?

A. Yes. I have estimated the economic impacts to Pennsylvania associated with the Company's investments related to the Capital Program using a dynamic macroeconomic forecasting model developed and maintained by Regional Economic Models, Inc. ("REMI").

Q. Could you please provide a brief description of the REMI model?

A. The REMI model generates year-by-year estimates of the total local, state, and national effects of any specific policy initiative such as, in this circumstance, a projected investment plan. The model forecasts the future of a regional economy, and it predicts the effects on that same economy based on estimated changes to inputs into the model (*e.g.*, FirstEnergy's

Capital Program).[7] The model analyzes how dollars injected into one sector of the economy are subsequently spent and re-spent in other sectors, generating what is known as economic multiplier effects that demonstrate how spending and investments flow within an economy. Using actual historical spending patterns of households, businesses and government agencies, and the interrelationships between those spending patterns, the model incorporates projected economic interrelationships to estimate the effect of an economic "event" (*e.g.*, an expenditure leading to the production of goods or services) and analyzes how and where the dollars associated with that event will be spent. The model estimates the economic impact of the event for the specified regional economy in terms of both economic output and employment supported by the economic output.

Q. What is the region that is used for your economic analysis?

A. For this analysis, I have evaluated the gross economic impacts of the expenditures associated with FirstEnergy's proposed Capital Program for Pennsylvania as a whole. Given that FirstEnergy's subsidiaries provide electric service to a significant portion of Pennsylvania, but not to the entire state, the economic benefits estimated reflect benefits to be experienced in the local communities served by FirstEnergy subsidiaries and elsewhere within Pennsylvania.

[7] REMI models have been used throughout the world for a wide range of issues, including economic development, environmental, energy, transportation, and taxation policies and for forecasting, and planning. For further details, see remi.com. The version of the model used here is REMI's PI+ model.

Q. Does the model assume that all of the dollars that are expended related to a specific economic event provide economic benefits within the region being evaluated?

A. No. The model recognizes that not all dollars associated with the Capital Program will be directly spent or indirectly re-spent on goods and services within Pennsylvania. Those dollars, which are termed "leakage," refer to the portion of investment dollars that are estimated to be either placed into savings by households and businesses or spent on goods and services outside of the study region. In subsequent rounds of spending, income generated will also be taxed at the federal level, resulting in another source of leakage. In essence, the model assumes a portion of the dollars injected into the economy will not contribute to the overall economic activity in the region being evaluated as a result of these leakages.[8]

Q. What types of economic impacts does the model capture?

A. For a particular event, the model captures the direct, indirect, and induced economic effects of dollars injected into an economy. The direct effects result from an economic event (*e.g.*, the Capital Program), which will then also lead to indirect and induced effects in the local economy being studied.

Q. What are the direct economic effects?

A. Direct effects are the economic impacts resulting from dollars spent directly in the local economy resulting from an economic event (*e.g.*, a construction project). In this case, the

[8] While outside the scope of this analysis, it is my understanding that there are significant capital investment programs similar to what is being undertaken by FirstEnergy in Pennsylvania elsewhere in FirstEnergy's other service territories. Leakages associated with the investments related to those programs would also provide a benefit to the businesses and households within Pennsylvania just as the leakage dollars associated with its Capital Program provide benefit to both the communities in Pennsylvania not served by FirstEnergy, as well as outside of Pennsylvania.

direct effects refer to the economic activity generated from FirstEnergy's investments in goods and services within Pennsylvania related to the Capital Program. For example, direct economic effects would include FirstEnergy's purchases of materials and equipment to facilitate the Capital Program and the costs associated with the labor required to implement the Capital Program.

Q. What are the indirect economic effects?

A. The indirect effects are defined as the supply chain, inter-industry, or business-to-business impacts resulting from the direct effects of an economic event. In other words, beyond the direct effect of dollars being injected into an economy, there is also an indirect economic effect associated with the incremental economic activity resulting from subsequent spending by businesses in the local economy to produce additional goods and services to meet the demand created by the direct spending (*i.e.*, the economic ripple effect of the direct spending). In this case, the indirect impacts are the economic effects resulting from subsequent rounds of spending by the businesses within the regional economy from whom goods or services are purchased by the businesses that received the direct effects associated with the initial dollars invested by FirstEnergy associated with the Capital Program.

Q. What are the induced economic effects?

A. The induced effects, which are also referred to as income effects, are defined as the economic impacts of household spending resulting from either the direct or indirect impacts in the economy in the study region being evaluated. In other words, the induced effects relate to the spending of wages earned by the individuals employed in jobs supported by the direct and indirect economic effects resulting from an economic event.

Q. What is the capital investment that you have used as a basis to evaluate the economic impact of FirstEnergy's proposed Capital Program?

A. I have started with FirstEnergy's Capital Program, which is organized into four broad categories as follows:

- *Reliability*: FirstEnergy's investments in Pennsylvania to enhance the reliability of its distribution system, which includes investments associated with its replacement programs of poles, circuits, substations, and transformers for the distribution system, as well as investments in distribution communications and controls equipment.

- *Load*: FirstEnergy's investments in Pennsylvania to enhance the capability of the distribution system to meet the additional future electric load requirements, which includes investments in incremental transformers to add capacity, resiliency, and operational flexibility.

- *Grid Modernization:* FirstEnergy's investments in Pennsylvania to enhance the capability of the distribution system to rebuild existing outdated distribution circuits with lower voltage to current voltage levels, as well as investments to optimize and enhance the efficiency of the operation of the distribution system.

- *Transmission:* FirstEnergy's investments related to its transmission systems in Pennsylvania associated with MAIT and West Penn Power, which includes investments that are comprised of PJM, North American Electrical Reliability Corporation, and state required projects, as well as projects to upgrade, rebuild, and replace aging lines and equipment to improve reliability, to add redundancy and system features to react more quickly to changing grid conditions, and to add operating flexibility such as network communication and cyber/physical security to strengthen the system.

Joint Applicants Exhibit TB-1 summarizes the gross amount of projected capital investment relied on for the economic impact analysis.

Q. From these primary categories, did you further differentiate the gross amount of projected capital investments in Pennsylvania?

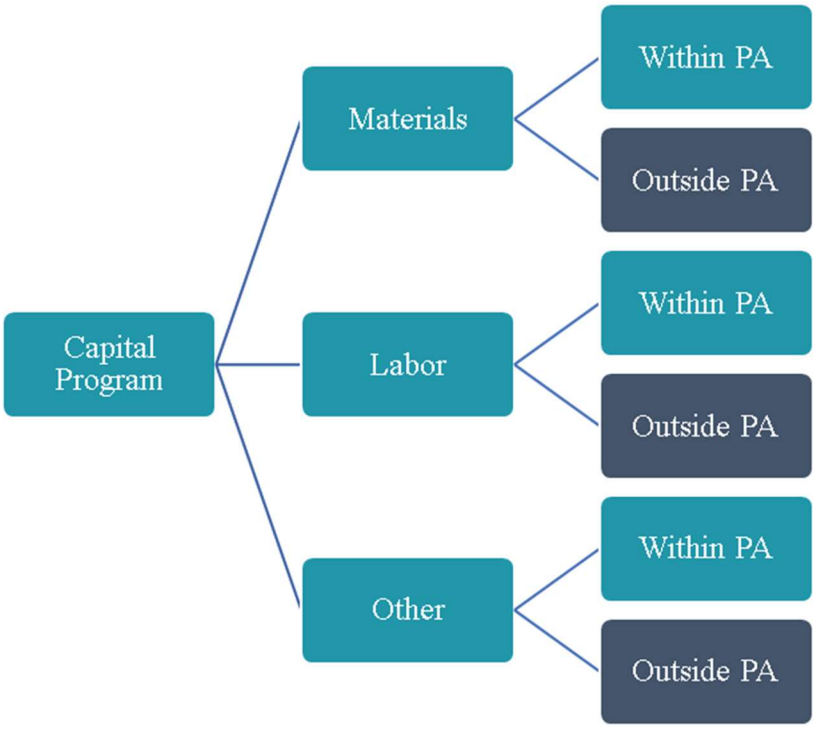
A. Yes. The gross amount of projected investments was further separated into materials/equipment, labor, and overheads/other cost components based on the Company's

estimate of the proportion of those costs based on prior spending on similar types of capital projects. FirstEnergy has provided an estimate of the breakdown of the proportion of its estimated investment, by category, that would be related to materials, labor, and other project costs. In total, approximately 35% of the Capital Program expenditures is assumed to be related to materials and equipment, 40% is related to labor, and the remaining 25% is related to construction overheads and other general project costs.

Q. Will the entirety of the expenditures associated with the Capital Program have an economic impact within Pennsylvania?

A. No. While the distribution and transmission infrastructure associated with the Capital Program, and the resulting improvements in safety, reliability, and operations would be specifically in Pennsylvania, the dollars spent to design and construct that infrastructure will not be related to goods and services entirely sourced in Pennsylvania (*e.g.*, purchases of materials outside of Pennsylvania even though those materials will be installed and operated within Pennsylvania). Since the focus of this analysis is the impact of the capital spending on the Pennsylvania economy, I have adjusted the level of FirstEnergy's Capital Program to reflect only the dollars that are estimated to be spent directly on goods and services in Pennsylvania as opposed to outside of Pennsylvania. Specifically, as shown in Figure 2, I reduced the expenditures over the Estimate Period associated with the Capital Program that are estimated to be spent on goods and/or services outside of Pennsylvania based on discussions with FirstEnergy regarding its prior spending on projects similar to the investment opportunities reflected in the Capital Program.

Figure 2: Allocation of Capital Program for Estimating Economic Impacts in Pennsylvania



Q. What is an example of spending that that would be outside of Pennsylvania?

A. One example would be the cost of materials associated with FirstEnergy's distribution utility pole replacement program. The materials costs related to the pole replacement initiative are largely associated with the cost of wooden utility poles. Based on discussions with FirstEnergy, it is my understanding that while some of the parts and equipment FirstEnergy acquires for its pole replacement initiatives have been sourced from distributors within Pennsylvania, which would reflect an economic stimulus to the Pennsylvania economy, the majority of the poles are acquired outside of Pennsylvania. In contrast, the labor and other expenditures associated with replacing and installing new poles would predominantly reflect local spending within Pennsylvania.

Q. What is assumed for purposes of modeling as to the proportion of the future investments that would be related to spending on goods and service within Pennsylvania versus outside of Pennsylvania?

A. Based on prior investments in its distribution and transmission systems, FirstEnergy estimates the expenditures on materials and equipment will largely be associated with goods and services outside of Pennsylvania, while the expenditures associated with labor, overheads, and other general project matters would largely be on goods and services within Pennsylvania.

Q. Although you are excluding certain of the costs associated with the Capital Program that would be spent outside of Pennsylvania, are there still economic benefits that would result from those expenditures made by FirstEnergy?

A. Yes, there would still be significant economic benefits associated with those expenditures that will occur elsewhere in the United States. For example, the manufacture of the wooden utility poles necessary to be installed within FirstEnergy's service territory will create economic benefits in the locations in those states where the poles are manufactured. Because these economic benefits are outside of Pennsylvania, they have not been accounted for in my analysis; however, the dollars to purchase those poles will help support jobs, tax revenues, and increased economic output in those other communities.[9] This economic activity serves to assist numerous businesses and individuals located outside of Pennsylvania.

[9] Likewise, as noted previously, there will be economic benefits experienced within the FE PA Utilities' service territories associated with economic activity occurring elsewhere in Pennsylvania (*e.g.*, due to other utility investment programs) and outside Pennsylvania; however, the analysis herein does not model or account for such effects.

Q. Does the spending reflected in FirstEnergy's existing Capital Program represent the actual dollars that will be spent in the future related to its distribution and transmission infrastructure in Pennsylvania?

A. No, not necessarily. The Capital Program represents a current estimate of spending in Pennsylvania. However, there are a multitude of factors that will undoubtedly influence the actual level of capital investment and the timing of that investment over the next decade. For example, capital market changes, supply chain issues, labor availability, regulatory changes, and weather-/storm-related events can all influence the amount and timing of future investments. It is my understanding that FirstEnergy's investment plan will continue to consider and adapt to changes within Pennsylvania, and thus the actual amount of investment is likely to change over time as circumstances change.

Likewise, the timing of the capital spending reflected in the model is not intended to mimic when facilities are placed into service for ratemaking purposes. Rather, the model analyzes the economic effects from capital spending on a project and those benefits start to flow through the economic study region regardless of when the project is ultimately placed into service. For example, dollars may be spent on an investment that may take many months or longer to complete before it is placed into service, but the dollars that are spent will have economic impacts regardless of the whether or when the project is completed and placed into service. Therefore, for example, while a portion of FirstEnergy's projected capital spend for a particular period may be considered construction work in progress for rate purposes because it has not been placed into service, the dollars that are projected to be spent in a particular year are included in the economic impact analysis.

Therefore, while FirstEnergy's Capital Program represents its current vision of the projects to which dollars would be allocated, it remains an estimate.

Q. What are the total estimated expenditures associated with the Capital Program that are assumed to be directly spent in Pennsylvania?

A. As noted, FirstEnergy has currently identified various investments over the Estimate Period to enhance the safety, reliability, and operations of its distribution and transmission systems in Pennsylvania that total approximately $14 billion. As summarized in Figure 3, after adjusting that total capital spend for the investments that are projected to be made on goods and services outside of Pennsylvania, a total capital spend of approximately $8 billion is anticipated over the Estimate Period in Pennsylvania. Further detail of the estimated capital spend by year over the Estimate Period in Pennsylvania is reflected in Joint Applicants Exhibit TB-2.

Figure 3: FirstEnergy's Capital Program Assumed to Have an Economic Impact in Pennsylvania ($millions)[10]

Distribution		
Reliability	$	5,417
Load	$	139
Grid Modernization	$	436
Subtotal	$	5,992
Transmission	$	2,239
Total	**$**	**8,230**

[10] FirstEnergy's projected capital investment in Pennsylvania by year over the Estimate Period is shown in Joint Applicants Exhibit TB-2.

Q. What are the estimated economic benefits for Pennsylvania resulting from FirstEnergy's Capital Program?

A. As summarized in Figure 4, FirstEnergy's projected expenditures related to the Capital Program are expected to generate a total of approximately $19.5 billion in economic output over the Estimate Period within Pennsylvania. This economic activity generated by the Capital Program is estimated to create approximately $11.2 billion in gross regional product in Pennsylvania, which includes approximately $648 million in additional state and municipal tax revenue for local communities in the state. Importantly, this economic activity associated with the Capital Program is also expected to support between approximately 9,500 jobs and 11,200 jobs annually over the Estimate Period.

Figure 4: Estimated Economic Activity of Capital Program[11]

Calendar Year	Economic Output	Gross Regional Product	State/Local Tax Revenue	Jobs Supported
	($ million)	*($ million)*	*($ million)*	*('000s)*
2023	$ 1,657.6	$ 936.7	$ 54.2	9.54
2024	$ 1,721.1	$ 974.2	$ 56.3	9.70
2025	$ 1,919.7	$ 1,091.9	$ 63.1	10.59
2026	$ 2,079.2	$ 1,186.4	$ 68.6	11.22
2027	$ 2,051.6	$ 1,175.6	$ 68.0	10.85
2028	$ 2,028.1	$ 1,167.4	$ 67.5	10.52
2029	$ 2,017.4	$ 1,167.2	$ 67.5	10.28
2030	$ 2,012.6	$ 1,170.3	$ 67.7	10.06
2031	$ 1,999.9	$ 1,167.7	$ 67.5	9.81
2032	$ 2,001.5	$ 1,172.5	$ 67.8	9.62
Total	**$ 19,488.6**	**$ 11,210.0**	**$ 648.2**	

Q. To the extent that the estimated future capital investments in FirstEnergy's transmission and distribution infrastructure in Pennsylvania changes, would the

[11] Economic output, gross regional product, and state and local tax revenues are presented in nominal dollars.

expectation be that future capital investment would still create substantial economic benefits?

A. Yes. As discussed, the overall level and timing of FirstEnergy's capital investment is likely to change over the Estimate Period; however, the economic benefits to the Pennsylvania economy associated with a capital investment program of the magnitude that FirstEnergy has currently identified, even if it changes relatively modestly, would remain significant.

Q. Do the estimated impacts on the Pennsylvania economy that you have discussed capture all of the economic impacts likely to be associated with the investments in the Capital Program?

A. No. Although beyond the scope of my analysis, there are likely to be numerous additional economic benefits associated with FirstEnergy's planned capital investments that would accrue to the communities in the FE PA Utilities' service territories that are not captured in my analysis. The scope of my analysis is to estimate the gross economic benefits associated with FirstEnergy's future capital spending in Pennsylvania that will be facilitated and supported by a FirstEnergy that is financially stronger as a result of the Transaction. However, I would expect there to be numerous additional economic benefits resulting from FirstEnergy's future distribution and transmission investments in Pennsylvania that are not captured in my analysis.[12]

For example, the significant investments that FirstEnergy has currently identified for increasing reliability would be expected to reduce the number and duration of customer

[12] Future capital investments in the distribution and transmission infrastructure in Pennsylvania likely would also have an impact on the future rate levels of the FE PA Utilities' customers, and this effect has also not been estimated and would need to be considered in relation to the totality of the economic benefits associated with such future spending.

outages, and thus help minimize the economic losses that are faced by customers due to outages. In addition, reducing outages and enhancing power quality can help attract new businesses to the FE PA Utilities' service territories, creating further economic benefits for the local communities and the state as a whole. While there are variety of factors that are considered when businesses seek to move to a new location and/or expand an existing location, reliability and power quality can be an important factor for energy-intensive businesses (*e.g.*, data centers; manufacturing). Replacing aging transmission and distribution infrastructure may be driven by enhancing reliability and not increasing system capacity; however, such investments can also increase capacity for future load growth and/or reduce the cost of expanding the system in the future. Thus, both FirstEnergy's investments to enhance reliability and the capability to serve load also help to facilitate future business development opportunities to retain and attract businesses in Pennsylvania.

Further, investments to replace and upgrade existing transmission and distribution infrastructure can also help to reduce line losses, which, all else equal, help to reduce the amount of power that the FE PA Utilities are required to generate or purchase to serve customers, and thus lower customers' costs. To the extent that FirstEnergy's investments can result in a reduction of line losses during peak load hours, additional customer savings could result through reduced capacity needs on the grid.

Lastly, FirstEnergy's Capital Program will also help facilitate the energy transition that is occurring throughout the United States. Facilitating this transition through grid modernization, distributed generation, and electric vehicle deployment will benefit the local communities in Pennsylvania served by FirstEnergy by lowering greenhouse gas emissions and mitigating the numerous negative economic effects of climate change,

including the disruption from climate-related events, and helping customers more efficiently consume electricity.

III. CONCLUSION

Q. What are your conclusions regarding the economic impacts in Pennsylvania of FirstEnergy's anticipated capital spending over the Estimate Period?

A. FirstEnergy expects the Transaction will improve its financial strength and its ability to finance and continue to deploy the necessary investments in its distribution and transmission systems over the next decade, thus better positioning FirstEnergy to undertake its Capital Program. FirstEnergy's investment in its distribution and transmission infrastructure in Pennsylvania addressed by the Capital Program is projected to result in wide-ranging and substantial economic benefits to the local communities in Pennsylvania served by FirstEnergy as well as in Pennsylvania as a whole. The existing Capital Program represents a substantial injection of investment dollars into the local economies that will promote economic activity, support jobs, and generate state and local tax revenues, thus providing important economic stimulus to Pennsylvania communities. The majority of these investments are designed to maintain and enhance the safety and reliability of the electric distribution system, as well as modernize the electrical grid used to provide service to customers, and it is likely that such enhancements would lead to further economic benefits above and beyond the benefits that have been estimated in my analysis.

Q. Does this conclude your testimony?

A. Yes.

Toby Bishop

PRINCIPAL

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Mr. Bishop is an energy industry expert with over 25 years of experience specializing in regulatory economics and civil litigation issues concerning the natural gas and electric industries.

Mr. Bishop has worked with various energy industry clients across the U.S. and Canada, including electric and natural gas utilities, natural gas pipelines and storage providers, and independent energy project developers.

Mr. Bishop's expertise covers strategic, regulatory, financial, and transactional matters for the energy industry. He has worked on federal and state rate case proceedings, valuations of numerous energy assets, utility municipalization efforts, contractual disputes, purchase and sales transactions, regulatory strategy and policy matters, and competitive and market power concerns.

Mr. Bishop has provided expert testimony, affidavits, and other filings in over 50 administrative and civil proceedings, including before the Federal Energy Regulatory Commission (FERC), the Canada Energy Regulator (CER), state and provincial regulatory agencies, and state courts. His testimony and reports have covered market power, utility ratemaking, prudence evaluations, market conditions, infrastructure need, valuation, and regulatory and economic policy.

Prior to joining Brattle, Mr. Bishop was a Senior Vice President at an energy consultancy, and he previously worked at two management consulting firms.

AREAS OF EXPERTISE

- Oil & Gas Litigation and Damages
- Energy Litigation & Regulatory Disputes
- Regulatory Economics, Finance & Rates

EDUCATION

- **Colgate University**
  BA in Economics and Geography (magna cum laude; Phi Beta Kappa)

PROFESSIONAL EXPERIENCE

- **The Brattle Group (2022–Present)**
  Principal
- **Concentric Energy Advisors, Inc. (2002–2022)**
  Senior Vice President
- **Reed Consulting Group/Navigant Consulting, Inc. (1995–2002)**
- **Fleet National Bank (1993–1995)**

SELECTED CONSULTING EXPERIENCE

REGULATORY AND LITIGATION REPRESENTATION/SUPPORT

Extensive experience in the research, analysis, preparation, and defense of expert testimony, reports, affidavits, and other filings in administrative and civil proceedings on a wide range of energy and economic issues. Clients in these matters have included natural gas distribution companies, natural gas pipelines, natural gas storage providers, natural gas producers, electric utilities, and independent energy project developers. Testimony has focused on issues ranging from broad regulatory and economic policy, valuation for damages assessment, and management prudence to virtually all elements of the utility ratemaking process, including cost of service, cost allocation, rate design, and cost of capital. Representative engagements have included:

- Evaluation of potential market power and competitive concerns on over 25 occasions for leading North American energy companies, including the preparation of independent market power analyses and supporting testimony in association with market-based rate applications for underground natural gas storage facilities throughout the US and Canada and utility merger proceedings.
- Assisting clients across the U.S. with all aspects of cost of capital issues, including direct, rebuttal, surrebuttal testimonies, discovery, cross-examination and post-hearing briefs.
- Extensive litigation support to TransCanada PipeLines before the National Energy Board, including major proceedings regarding its Mainline pipeline restructuring, changes in

services, abandonment cost recovery, and its comprehensive settlement to transition to a new tolling regime.

- Extensive litigation support to NOVA Gas Transmission Ltd. in multiple proceedings regarding the development and tolling of new facilities and new services in British Columbia and Alberta.
- Litigation support for multiple petroleum products pipelines concerning tolling disputes.
- Litigation support regarding electric, natural gas and water/wastewater cost of capital issues before various state regulatory commissions and the Federal Energy Regulatory Commission.
- Evaluation of the economic impacts and benefits associated with utility capital spending programs and the reasonableness of related rate requests.
- Litigation support for the Upper Midwest Shipper Group on all aspects of the rate case proceedings concerning Northern Natural (RP19-1353), Natural Gas Pipeline Company of America (RP17-303), and ANR Pipeline (RP16-440).
- Development of a financial model and assist in the transaction structuring for a natural gas storage developer seeking to construct and then sell a storage facility to an LDC in the western half of the US.
- Strategic analysis for a large energy company considering alternatives for its existing pipeline and storage portfolio.
- Litigation support for the WEC Energy Group on all aspects the Great Lakes Gas Transmission RP17-593 rate case proceeding.
- Litigation support, including the drafting of a reply expert report, relating to a $500 million claim associated with the value of Ultra Petroleum Corp. exiting bankruptcy.
- Litigation support, including the drafting of expert reports, on behalf of Mitsubishi Heavy Industries regarding a $7.5 billion claim in an international arbitration proceeding regarding damages associated with the SONGS 2 and 3 nuclear facilities.
- Cost allocation and rate design witness providing ongoing litigation support on behalf of Arizona Public Service in El Paso Natural Gas Company's two most recent FERC rate cases.
- Litigation support before the Alberta Energy Regulatory (formerly Energy Resources Conservation Board), on behalf of CrossAlta Gas Storage regarding public interest issues related to natural gas storage in a case in which an oil producer was seeking to drill through the CrossAlta storage reservoir.

- Preparing multiple rounds of testimony in support of a group of utilities, including Oncor, AEP and MidAmerican Energy, seeking to construct over $5 billion of new transmission in Texas as part of the state's Competitive Renewable Energy Zone process.
- Preparing expert reports and providing litigation support to Boston Edison regarding its damages claims against the Department of Energy relating to spent nuclear fuel for Pilgrim nuclear generating station.
- Assisting ONEOK Partners in the development and implementation of two new off-system storage services for its Guardian Pipeline, including the development of the open season process for these new services, the pro forma tariff, forms of service agreement, precedent agreements between Guardian and its customers, and rate design for the new services.
- Preparation of an expert report on behalf of Merrill Lynch assessing and quantifying damages in its litigation regarding the sale of its energy trading business.
- Providing litigation support to Missouri Gas Energy to defend against proposed gas purchase disallowances for storage utilization, hedging activity and capacity release decisions.
- Providing ongoing regulatory oversight and litigation support to the Northern Distributor Group, a group of 13 local distribution companies (LDCs) in the Midwest served by Northern Natural Gas Company in FERC rate, certificate, and other regulatory matters. Included drafting testimony, comments, interventions and various other regulatory filings to be filed with the FERC.

VALUATION

Significant experience utilizing multiple methodologies to value energy assets for strategic planning, tax, financing and other purposes. Methodologies utilized have included discounted cash flow, comparable sales, replacement, and reproduction cost analyses. Have prepared expert reports, appraisals, review appraisals, testimony, and certifications for use before courts, federal and state regulatory proceedings, taxing authorities, financial institutions, and boards of directors. Representative engagements have included:

- Valuation of numerous electric generation facilities (*e.g.*, coal, natural gas, run-of-river hydroelectric, pumped storage, biomass) throughout the United States.
- Valuation of the electric transmission and distribution property of numerous investor-owned and electric cooperative utilities.

- Preparation of feasibility studies evaluating the costs and benefits of the potential municipalization of existing electric utility systems in Colorado, Washington, Maine, and Kansas.
- Preparation of multiple whitepapers evaluating the issues concerning proposed legislation for state ownership of electric utility systems in Maine.
- Valuation of property of a telecommunications provider in New Hampshire for property tax purposes.
- Valuation of peak shaving and import LNG facilities.
- Valuation of a combined cycle electric generating facility in Florida for purposes of a fairness opinion issued by Concentric's subsidiary, CE Capital Advisors, Inc.
- Valuation of Northern Indiana Public Service Company's generation, transmission, and distribution assets as part of an electric rate proceeding.
- Valuation of certain FirstEnergy generation facilities for the release of a bond indenture.

MARKET ASSESSMENT

Retained by numerous leading domestic and international energy companies to provide assessments of energy markets throughout the United States. Such assessments have included evaluation of electric and natural gas supply issues, development of projected electric and natural gas demand, viability/feasibility of infrastructure projects including numerous analyses regarding underground storage, LNG and electric generation, analysis of gas commodity price trends, assessment of existing and projected natural gas and electric transmission infrastructure, market structure, regulatory issues, and assessment of competitive position. Market assessment engagements typically have been used as integral elements of asset-specific strategic plans, regulatory initiatives or valuation analyses. Many of the projects have been supported by the filing of expert reports with the FERC, the National Energy Board (NEB), and state regulatory agencies. Representative engagements have included:

- Preparation of a report on behalf of Spire Missouri regarding the benefits of the existing STL Pipeline versus other potential near-term and longer-term alternatives should the FERC decide to rescind the certificate for the STL Pipeline.
- Preparation of a report on behalf of the proposed Adelphia Gateway pipeline regarding the potential energy and economic benefits to natural gas and electric consumers in the Greater Philadelphia region.

- Preparation of multiple reports on behalf of the proposed PennEast Pipeline regarding the potential economic benefits of the pipeline to natural gas and electric customers in the Mid-Atlantic region, including rebuttal comments addressing issues raised by opponents of the pipeline.
- Preparing numerous assessments of the natural gas and electric markets in eastern Canada, Atlantic Canada, and the northeastern and mid-Atlantic United States for various energy companies seeking to enter the market and/or expand existing operations in the market.
- Preparing a detailed demand and supply analysis of the opportunity for underground natural gas storage in the Mid-Atlantic and upper Midwest markets.
- Evaluating the opportunity for the development of a new underground storage facility in the southeastern United States. The project included preparing a detailed report for the client that included the future market opportunity that could be achieved from the facility.
- Preparing a detailed demand/supply and risk analysis of an existing natural gas storage project in the eastern US for a commercial bank seeking to finance a partnership buyout of the facility.
- Evaluating the market opportunity for LNG in the northeastern United States for a client seeking to develop an LNG facility import terminal. The project included reviewing future demand/supply in the region and competing supplies.

MERGERS, ACQUISITIONS, AND DIVESTITURES

For numerous leading energy companies, have assisted in the acquisition and divestiture of over $5 billion in energy assets, including providing strategic advice, detailed due diligence, and project management relating to a variety of regulated and non-regulated energy projects. Representative engagements have included:

- The sales of the Point Beach, Palisades, and Duane Arnold nuclear generating facilities.
- The divestitures of the generating fleets of Boston Edison, GPU, and Potomac Electric Power.
- Assisting a large energy company evaluate and value a potential natural gas storage acquisition in the western United States.
- Assisting a large North American pipeline company evaluate its positioning in the market, including a review of issues such as cost of service, cost allocation, rate design, trading points and new service alternatives for its pipelines.

- Confidential buy-side valuation and assessment of a regulated combination electric and natural gas utility in the northeastern US.
- Confidential buy-side valuation and assessment of a regulated combination electric and natural gas utility in New York.

EXPERT TESTIMONY

SPONSOR	DATE	CASE/APPLICANT	DOCKET NO.	SUBJECT
Federal Energy Regulatory Commission				
Northern Distributor Group	10/98	Northern Natural Gas Company	Docket No. RP98-203	Cost Allocation
Central New York Oil & Gas Company, LLC	2/06	Central New York Oil & Gas Company, LLC	Docket No. CP06-64-000	Market Power
Central New York Oil & Gas Company, LLC	10/07	Central New York Oil & Gas Company, LLC	Docket No. CP06-64-001	Market Power
Chestnut Ridge Storage, LLC	12/07	Chestnut Ridge Storage, LLC	Docket No. CP08-36	Market Power
Arlington Storage Company, LLC	3/08	Arlington Storage Company LLC	Docket No. CP08-96	Market Power
Worsham-Steed Gas Storage, LP	5/08	Worsham-Steed Gas Storage, LP	Docket No. PR08-23	Market Power
Arizona Public Service Company	5/09	El Paso Natural Gas Company	Docket No. RP08-426	Cost Allocation/ Rate Design
Arizona Public Service Company	7/09	El Paso Natural Gas Company	Docket No. RP08-426	Cost Allocation/ Rate Design
Arizona Public Service Company	8/09	El Paso Natural Gas Company	Docket No. RP08-426	Cost Allocation/ Rate Design
UGI Storage Company	11/09	UGI Storage Company	Docket No. CP10-23	Market Power
Magnum Gas Storage, LLC	11/09	Magnum Gas Storage, LLC	Docket No. CP10-22	Market Power
East Cheyenne Gas Storage, LLC	1/10	East Cheyenne Gas Storage, LLC	Docket No. CP10-34	Market Power
Petal Gas Storage, LLC	1/10	Petal Gas Storage, LLC	Docket No. CP10-50	Market Power
UGI Storage Company	2/10	UGI Storage Company	Docket No. CP10-23	Market Power

SPONSOR	DATE	CASE/APPLICANT	DOCKET NO.	SUBJECT
Arizona Public Service Company	3/10	El Paso Natural Gas Company	Docket No. RP08-426	Rate Design
Arlington Storage Company, LLC	3/10	Arlington Storage Company LLC	Docket No. CP10-99	Market Power
Tallulah Gas Storage, LLC	8/10	Tallulah Gas Storage, LLC	Docket No. CP10-494	Market Power
Rager Mountain Storage Co. LLC	10/10	Rager Mountain Storage Co. LLC	Docket No. CP11-5	Market Power
Central New York Oil & Gas Company, LLC	3/11	Central New York Oil & Gas Company, LLC	Docket No. CP10-194	Market Power
Federal Energy Regulatory Commission				
Rager Mountain Storage Co. LLC	3/11	Rager Mountain Storage Co. LLC	Docket No. CP11-5	Market Power
Arizona Public Service Company	6/11	El Paso Natural Gas Company	Docket No. RP10-1398	Cost Allocation/ Rate Design
Arizona Public Service Company	8/11	El Paso Natural Gas Company	Docket No. RP10-1398	Cost Allocation/ Rate Design
UGI Storage Company	8/11	UGI Storage Company	Docket No. CP11-542	Market Power
Central New York Oil & Gas Company, LLC	2/12	Central New York Oil & Gas Company, LLC	Docket No. CP10-194	Market Power
Worsham-Steed Gas Storage LLC	5/12	Worsham-Steed Gas Storage LLC	Docket No. PR07-6	Market Power
Rager Mountain Storage Co. LLC	1/14	Rager Mountain Storage Co. LLC	Docket No. CP13-139	Market Power
PennEast Pipeline Company, LLC	9/15	PennEast Pipeline Company, LLC	Docket No. CP15-558	Mkt. Conditions/Need
Magnum Gas Storage, LLC	11/15	Magnum Gas Storage, LLC	Docket No. CP16-18	Market Power
PennEast Pipeline Company, LLC	4/16	PennEast Pipeline Company, LLC	Docket No. CP15-558	Mkt. Conditions/Need
PennEast Pipeline Company, LLC	10/16	PennEast Pipeline Company, LLC	Docket No. CP15-558	Mkt. Conditions/Need/ Rate of Return
Costco Wholesale Corp.	1/17	Tricon Energy Ltd. and Rockbriar Partners Inc. v. Colonial Pipeline Company	Docket No. OR16-17	Petroleum/Refined Products Pipeline Capacity Prorationing

SPONSOR	DATE	CASE/APPLICANT	DOCKET NO.	SUBJECT
Laclede Gas Company	1/17	Spire STL Pipeline, LLC	Docket No. CP17-40	Mkt. Conditions/Need
East Cheyenne Gas Storage, LLC	11/17	East Cheyenne Gas Storage, LLC	Docket No. CP18-11	Market Power
Spire Storage West, LLC	7/18	Spire Storage West, LLC	Docket No. CP18-520	Market Power
Washington 10 Storage Corp.	5/20	Washington 10 Storage Corp.	Docket No. CP20-470	Market Power
Spire Storage West, LLC	10/20	Spire Storage West, LLC	Docket No. CP21-6	Market Power
East Cheyenne Gas Storage, LLC	6/22	East Cheyenne Gas Storage, LLC	Docket No. RP22-872	Market Power
Pennsylvania Public Utility Commission				
UGI Utilities, Inc.	6/20	UGI Utilities, Inc.	Docket No. R-2019-301562	Economic Impacts of New Infrastructure
Columbia Gas of Pennsylvania, Inc.	8/20	Columbia Gas of Pennsylvania, Inc.	Docket No. R-2019-3018835	Economic Impacts of New Infrastructure
Pennsylvania-American Water Co.	9/20	Pennsylvania-American Water Co.	Docket Nos. R-2020-3019369 and R-2020-3019371	Economic Impacts of New Infrastructure
National Energy Board of Canada				
TransCanada Pipelines Ltd.	12/13	TransCanada Pipelines Ltd.	MH-1-2013	Cost Allocation
NOVA Gas Transmission Ltd.	10/17	NOVA Gas Transmission Ltd.	MH-031-2017	Tolling Policy for New Facilities
NOVA Gas Transmission Ltd.	12/17	NOVA Gas Transmission Ltd.	MH-031-2017	Tolling Policy for New Facilities
NOVA Gas Transmission Ltd.	3/19	NOVA Gas Transmission Ltd.	RH-001-2019	Tolling Policy for New Facilities
Canada Energy Regulator				
NOVA Gas Transmission Ltd.	11/19	NOVA Gas Transmission Ltd.	RH-001-2019	Tolling Policy for New Facilities
NOVA Gas Transmission Ltd.	5/21	NOVA Gas Transmission Ltd.	RH-001-2021	Tolling Policy for New Service

SPONSOR	DATE	CASE/APPLICANT	DOCKET NO.	SUBJECT
NOVA Gas Transmission Ltd.	12/21	NOVA Gas Transmission Ltd.	RH-001-2021	Tolling Policy for New Service
Nova Scotia Utility and Review Board				
Nova Scotia Power Inc.	6/19	Nova Scotia Power Inc.	M09273	Contracting Prudence / Market Conditions
British Columbia Utilities Commission				
Unocal Canada Limited	10/06	Unocal Canada Limited	Project No. 3698445	Market Power

Joint Applicants Exhibit
TB-1

FirstEnergy Estimated Capital Investment in Pennsylvania
Distribution & Transmission

Total Investment ($millions)

Project	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Total
Distribution											
Reliability	$ 525	$ 565	$ 630	$ 646	$ 662	$ 680	$ 698	$ 715	$ 734	$ 751	$ 6,606
Load	$ 0	$ 10	$ 20	$ 52	$ 53	$ 55	$ 53	$ 54	$ 55	$ 57	$ 409
Grid Modernization	$ 0	$ 0	$ 0	$ 79	$ 81	$ 83	$ 85	$ 87	$ 90	$ 92	$ 597
Transmission	$ 663	$ 591	$ 651	$ 641	$ 644	$ 670	$ 704	$ 737	$ 740	$ 744	$ 6,784
TOTAL	**$ 1,188**	**$ 1,166**	**$ 1,301**	**$ 1,418**	**$ 1,441**	**$ 1,488**	**$ 1,539**	**$ 1,594**	**$ 1,619**	**$ 1,643**	**$ 14,395**

Joint Applicants Exhibit
TB-2

FirstEnergy Estimated Capital Investment in Pennsylvania
Distribution & Transmission

Materials/Equipment Sourced in Pennsylvania ($millions)

Project	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Total
Distribution											
Reliability	$ 5	$ 6	$ 6	$ 6	$ 7	$ 7	$ 7	$ 7	$ 7	$ 8	$ 66
Load	$ 0	$ 1	$ 1	$ 3	$ 3	$ 3	$ 3	$ 3	$ 3	$ 3	$ 25
Grid Modernization	$ 0	$ 0	$ 0	$ 1	$ 1	$ 1	$ 1	$ 1	$ 1	$ 1	$ 6
Transmission	$ 60	$ 53	$ 59	$ 58	$ 58	$ 60	$ 63	$ 66	$ 67	$ 67	$ 611
TOTAL	**$ 65**	**$ 59**	**$ 66**	**$ 68**	**$ 69**	**$ 71**	**$ 74**	**$ 78**	**$ 78**	**$ 79**	**$ 707**

FirstEnergy Estimated Capital Investment in Pennsylvania
Distribution & Transmission

Labor in Pennsylvania ($millions)

Project	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Total
Distribution											
Reliability	$ 284	$ 305	$ 340	$ 349	$ 358	$ 367	$ 377	$ 386	$ 396	$ 406	$ 3,567
Load	$ 0	$ 2	$ 4	$ 9	$ 10	$ 10	$ 9	$ 10	$ 10	$ 10	$ 74
Grid Modernization	$ 0	$ 0	$ 0	$ 38	$ 39	$ 40	$ 41	$ 42	$ 43	$ 44	$ 287
Transmission	$ 93	$ 83	$ 91	$ 90	$ 90	$ 94	$ 98	$ 103	$ 104	$ 104	$ 950
TOTAL	**$ 376**	**$ 390**	**$ 435**	**$ 486**	**$ 496**	**$ 511**	**$ 526**	**$ 541**	**$ 553**	**$ 564**	**$ 4,877**

FirstEnergy Estimated Capital Investment in Pennsylvania
Distribution & Transmission

Overheads/Other in Pennsylvania ($millions)

Project	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Total
Distribution											
Reliability	$ 142	$ 153	$ 170	$ 174	$ 179	$ 183	$ 188	$ 193	$ 198	$ 203	$ 1,784
Load	$ 0	$ 1	$ 2	$ 5	$ 5	$ 5	$ 5	$ 5	$ 6	$ 6	$ 41
Grid Modernization	$ 0	$ 0	$ 0	$ 19	$ 19	$ 20	$ 20	$ 21	$ 22	$ 22	$ 143
Transmission	$ 66	$ 59	$ 65	$ 64	$ 64	$ 67	$ 70	$ 74	$ 74	$ 74	$ 678
TOTAL	**$ 208**	**$ 213**	**$ 237**	**$ 263**	**$ 268**	**$ 276**	**$ 284**	**$ 293**	**$ 299**	**$ 305**	**$ 2,646**

FirstEnergy Estimated Capital Investment in Pennsylvania
Distribution & Transmission

Total Spend in Pennsylvania ($millions)

Project	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Total
Distribution											
Reliability	$ 431	$ 463	$ 516	$ 530	$ 543	$ 557	$ 572	$ 587	$ 601	$ 616	$ 5,417
Load	$ 0	$ 3	$ 7	$ 18	$ 18	$ 19	$ 18	$ 18	$ 19	$ 19	$ 139
Grid Modernization	$ 0	$ 0	$ 0	$ 58	$ 59	$ 61	$ 62	$ 64	$ 65	$ 67	$ 436
Transmission	$ 219	$ 195	$ 215	$ 211	$ 212	$ 221	$ 232	$ 243	$ 244	$ 245	$ 2,239
GRAND TOTAL											**$ 8,230**