17RTEP1-212 Proposal

SUBMITTED BY: ITC MID-ATLANTIC DEVELOPMENT LLC

Redacted Version

February 27, 2017

A FORTIS COMPANY

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A. EXECUTIVE SUMMARY

1. Name and Address

ITC Mid-Atlantic Development LLC
27175 Energy Way
Novi, MI 48377

2. Proposal Window and Associated Violations Addressed

ITC Mid-Atlantic Development LLC ("ITC") has proposed a 230-kV project that addresses flowgates ME-1 and ME-2 Market Efficiency facilities recommended for proposals by PJM in the RTEP 2016/17 Long Term Proposal Window. The ME-1 and ME-2 flowgates are the Conastone to Graceton 230-kV and Graceton to Bagley 230-kV lines. The project consists of a new 230-kV line between a new ITC owned Pyle Road switchyard and the existing Peach Bottom 230-kV substation, between Pyle Road and a new ITC owned Old Post switchyard, and between Pyle Road and a new ITC owned Fallston Road switchyard. A new 20MW / 40MWh lithium-ion battery energy storage system (BESS) is connected at the new Fallston Road switchyard. The reduction in congestion on the ME-1 and ME-2 flowgates is shown in Table A1 below. In addition, the project resolves a significant portion of the BGE zone and overall PJM congestion.

Table A1– Flowgate Resolution

			Congestion Delta (%)		
Facility Name	**Area**	**Type**	**2021**	**2024**	**2027**
Conastone to Graceton 230 kV	BGE	LINE	-98.7%	-99.5%	-99.8%
Graceton to Bagley 230 kV	BGE	LINE	-100.0%	-100.0%	-100.0%
BGE Total	BGE		-94.6%	-92.6%	-93.0%
PJM Total			-46.6%	-52.6%	-42.4%

3. Violations Caused or Not Addressed by Proposal

The project targeted the ME-1 and ME-2 flowgates which were congestion on the Conastone to Graceton 230-kV and Graceton to Bagley 230-kV lines. The ME-3, Susquehanna to Harwood 230-kV, and ME-4, Bosserman to Olive 138-kV, flowgates were not targeted by the project. Additional reliability analysis was performed with the inclusion of the project and did not indicate any adverse reliability impacts as a result of the project.

4. Identification of Interregional Project

The proposed project was developed to address multiple market efficiency needs within the PJM footprint and is wholly contained within the boundaries of PJM member operating territories (PECO & BGE). It provides market efficiency benefits to multiple PJM zones.

5. Intentions to Construct/Own/Operate/Maintain

ITC Mid-Atlantic Development LLC intends to be the Designated Entity to construct, own, operate and maintain the project described in this proposed project submittal. The BESS is an integral part of the project and shall be a Transmission asset.

6. Description of Proposed Solution and Resolution

ITC has identified the following project to address Market Efficiency congestion identified as a part of the 2016/17 RTEP Long Term Proposal Window (Figure 1 in Appendix A, Table A2):

Table A2– Summary of Proposed Solution

Project	Line	Proposed Solution	Resolution
17RTEP1-212	Peach Bottom to Pyle Road to Fallston Road and to Old Post 230-kV Line	12.7-miles of new 230-kV overhead line from Peach Bottom substation (PECO) to a new ITC owned 230-kV Pyle Road switchyard. 9.8-miles of new 230-kV single-circuit overhead line from new ITC owned Pyle Road switchyard to new ITC owned Fallston Road switchyard that includes a 20MW / 40 MWh battery; the existing Graceton to Bagley 230-kV line is cut in to Fallston Road. 15.4-miles of new 230-kV overhead line from new ITC owned Pyle Road switchyard to new ITC owned Old Post switchyard; the existing Raphael Road to Otter Point 230-kV line is cut in to Old Post.	• Conastone – Graceton 230-kV congestion • Graceton – Bagley 230-kV congestion

	1.0-mile of the Pyle Road to Old Post and Peach Bottom to Pyle Road will be on double-circuit towers.

7. Description of How the Project(s) Should be Considered

The greenfield proposed project described above in Table A2 is an alternative to address the primary target issues on the congested 230-kV flowgates serving Baltimore load. It is not anticipated for PJM to segment the ITC project since there is a high degree of overlap on potential solution alternatives. However, ITC makes no prohibition on PJM scope additions, combinations, or reductions to this ITC proposal. Issues identified in future 2017 RTEP Proposal Windows may make such revisions to greenfield project elements the most sensible approach.

The incumbent upgrade components of the project are not under ITC control but are critical components to the ITC proposal. Scope revisions, additions and subtractions to incumbent upgrades that augment or improve the ITC resolution should be considered. The owner of these facilities is best capable of understanding the scope of the project and the more cost effective solution. For example an incumbent could identify a rearrangement at a substation that would improve the project will correspondingly increase or decrease scope and cost to the incumbent upgrades that would increase or decrease the overall cost of the project.

In summary, an ITC greenfield solution should be evaluated independently of whether an incumbent or PJM has a better approach than ITC's to addressing the necessary upgrades to properly incorporate the ITC greenfield proposal.

8. High-Level Overview of Cost and Cost Commitment

The capital cost of the proposed project in 2017 dollars, including the substation work that would be assigned to incumbent transmission owners, are shown in Table A4 below and described in detail in section E.2.

Table A4– Summary of Total Project Costs[1]

Project	Greenfield Cost in 2017 Dollars ($MM)	Incumbent Cost in 2017 Dollars ($MM)	Total Project Cost in 2017 Dollars ($MM)	Total Project Cost in 2021 ISD Dollars ($MM)
17RTEP1-212	$142.9	$7.3	$150.2	$165.7

Cost Containment/Commitment

As described in Section E.3, ITC is proposing a binding project cost cap for the project proposed herein. This cap on project costs would change only under certain explicitly defined, narrow exceptions based on circumstances beyond ITC's control and which would be experienced by any project owner.

9. Additional Benefits of Proposal

Project Robustness

This Proposal by ITC provides a robust solution to make the PJM market more efficient when analyzing the PJM base case, along with all the PJM defined sensitivities. Further details are included in Section D.

Unique Qualifications of ITC

As the nation's first and largest independent transmission-only utility, ITC has unrivaled experience in the successful integration of established transmission systems and non-incumbent development projects into a unified independent transmission company. To date, ITC's Southwest Power Pool ("SPP") affiliate ITC Great Plains LLC ("ITC Great Plains" or "ITCGP") remains the only transmission owner in United States history to be built from the ground up, through the construction of greenfield transmission projects, not through the acquisition of existing transmission lines. No other utility has at its disposal ITC's resources, experience, and singular focus on transmission in general and on non-incumbent transmission development in particular, and ITC will leverage these unique characteristics to develop this greenfield project and successfully integrate it into ITC's other operations, just as ITC Great Plains' facilities have been.

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[1] Project cost totals are shown in both current year (2017) dollars as well as In-Service Date (ISD) dollars (2021); ISD dollars are escalated at a rate of 2.5% per year per the standard PJM escalation rate.

ITC has successfully expanded from its origins in Southeast Michigan to include planning, construction, operation and maintenance of over 15,000-miles of transmission facilities in seven states covering three NERC regions and two RTO footprints. ITC has expanded into the PJM footprint with the new Covert to Segreto 345-kV line in Southwest Michigan, which went into service on June 1, 2016.

Since ITC was formed in 2003, contract maintenance services have been used over its entire multistate footprint. These services have been typically performed via a specialized utility maintenance contractor but in some cases have been in partnership with local utilities to leverage their local experience and knowledge. ITC has consistently delivered best-in-class reliability metrics.

ITC operates as a utility in eight different states, and recognizes that states have varying regulatory and legal requirements. ITC has unrivaled experience in successfully navigating state regulatory processes to obtain public utility status and to obtain siting authority for greenfield transmission projects, particularly in states outside of ITC's incumbent footprint. ITC will leverage this experience in obtaining state regulatory approvals outside of its incumbent territory to successfully obtain all necessary approvals in PJM states where ITC is successful in securing projects through the PJM competitive process.

Independent Business Model

ITC's independent transmission business model is unique and vital to its corporate identity. ITC does not own generation or distribution assets; ITC employees and directors are prohibited from owning the market securities of market participants (generation owners, load-serving entities, marketers, etc.). ITC's attention and resources are focused solely on the reliable delivery of low cost energy to end users.

The independent transmission model provides numerous substantial benefits:

- **Transparency:** Throughout transmission development and operations, ITC is transparent in its planning processes, design and routing, construction, operations and maintenance

- **Operational Excellence:** Since high-voltage transmission is ITC's sole business, ITC has an unparalleled focus on reliable transmission operations, through which it delivers creative and flexible solutions to transmission needs, and drives benefits and value to transmission customers.

- **Reliability:** Without other activities or lines of business that can become distractions, ITC is completely focused on the reliability of transmission systems.

- **Infrastructure Investment:** Since ITC does not have other capital-intensive businesses such as generation or distribution, there are no internal conflicts for capital that can lead to deferring needed transmission investments.

- **High Quality Credit:** ITC's unique business model and long-term record of achievements in financial management, project development, construction and operations have resulted in investment-grade credit ratings, which ITC is committed to retaining. Higher credit quality enables consistent and predictable access to capital, even during challenging economic times, and results in lower borrowing costs to be borne by transmission customers.

- **Public Policy Alignment:** ITC's independence does not favor any specific type of generation, but ITC's focus on transmission efficiency and flexibility results in a more robust transmission system that can be a strong facilitator of various public policies.

- **Facilitate Generator Interconnections:** Since ITC does not own generation that may be impacted by new generation or transmission facilities, generators will be treated fairly throughout the interconnection process.

- **Customer Focus:** ITC's independence from all electricity generators, buyers and sellers allows planned improvements to the electric transmission grid for the broadest public benefit including seams and regional projects.

FERC has also recognized the benefits of an independent transmission company. ITC's superior record of investment in reliability and economic infrastructure to facilitate energy markets has been recognized in federal policies aimed at perpetuating and replicating ITC's independent model. Benefits cited by FERC include:

1. Improved asset management including improvements in the reliability of the systems ITC owns;;
2. Improved access to capital markets, given a more focused business model than that of vertically-integrated utilities;
3. Development of innovative services; and
4. Additional independence from market participants

In summary, ITC offers the following benefits to PJM:

- **Vast Resources** – Because ITC is the largest independent transmission owner in the country, it has the resources needed to undertake all sizes and complexities of projects;

- **Experience in the PJM Region** – Existing connections and the Covert-Segreto project means ITC will have a reduced or very minimal learning curve, so we can hit the ground running in PJM earlier than other non-incumbent owners;
- **Experience Operating Infrastructure in Different Regions** – ITC has owned, operated and maintained more than 15,600 miles of transmission lines in seven states, serving a combined peak-load of more than 26,000 MW, and is the sole transmission-owning utility to successfully form a new non-incumbent transmission-owning affiliate from scratch;
- **Experience participating in Multiple Regional Processes** – ITC is a transmission-owning member in both the Midcontinent Independent System Operator ("MISO") and the SPP Regional Transmission Organizations ("RTO") and actively participates in both the planning and operations process of both RTOs;
- **Scalable Resources** – ITC can match its expertise based on the needs of its customers because of its close working relationships with industry-leading consultants and contracting firms.

In 2016, Fortis Inc. and GIC Private Limited acquired ITC Holdings in a transaction that closed on Oct. 14. ITC Holdings Corp. common shares are owned 80.1% by Fortis Inc. and 19.9% by GIC Private Limited. Additional information can be accessed at www.itc-holdings.com.

- We are now part of the Fortis family of companies, effective Oct. 14, 2016.
- Fortis has a decentralized approach to managing its utility operations, so there will be no changes to how ITC operates.
- As a national leader in transmission development, ITC is well positioned to execute on our strategic objectives, community commitments, and to move forward under the Fortis umbrella.
- Fortis is now among the top 15 North American regulated investor-owned utilities ranked by enterprise value. Its 8,000 employees serve customers at utility operations in five Canadian provinces, nine U.S. states and three Caribbean countries.

About Fortis

Fortis is a leader in the North American regulated electric and gas utility industry with assets of more than CAD$45 billion. The Corporation's 8,000 employees serve customers at utility operations in five Canadian provinces, nine U.S. states and three Caribbean countries.

Fortis shares are listed on the TSX and NYSE and trade under the symbol FTS. Additional information can be accessed at www.fortisinc.com, www.sedar.com, or www.sec.gov.

About GIC

GIC is a leading global investment firm with well over US$100 billion in assets under management. Established in 1981 to secure the financial future of Singapore, the firm manages Singapore's foreign reserves. With its disciplined long-term value approach, GIC is uniquely positioned to invest in both the public and private markets, including equities, fixed income, real estate, private equity and infrastructure. In infrastructure, GIC's primary strategy is to invest directly in operating infrastructure assets with a high degree of cash flow visibility and which provide a hedge against inflation. These include mature, low to moderate-risk assets in developed markets, complemented by investments with higher growth potential in emerging markets. GIC employs over 1,300 people across offices in Singapore, Beijing, London, Mumbai, New York, San Francisco, Sao Paulo, Seoul, Shanghai, and Tokyo. For more information, please visit www.gic.com.sg.

B. COMPANY EVALUATION INFORMATION

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2. Pre-Qualification Submittal Identification Number

ITC affirms that the information included in its pre-qualification application dated March 2014 and posted on the PJM website reflects the company's present qualifications.

3. Technical & Engineering Qualifications

ITC Mid-Atlantic Development LLC is a wholly-owned subsidiary of ITC Grid Development, LLC, which is itself a wholly-owned subsidiary of ITC Holdings Corp. ITC Mid-Atlantic was formed to develop, construct, own, operate, maintain and finance transmission facilities in PJM. As a wholly-owned subsidiary of ITC Grid Development, LLC, ITC Mid-Atlantic has full access to the resources, capabilities, and expertise of ITC Holdings Corp. and its affiliates.

ITC is the nation's first, largest and only publicly-traded independent transmission company. Since its founding in 2003, ITC has invested over $5.8 billion in the electric transmission grid to improve reliability, expand non-discriminatory access to markets, lower the overall cost of delivered energy and allow new generating resources to interconnect to its transmission systems regardless of ownership. In its first 10 years, ITC successfully acquired and integrated three transmission businesses. In addition, ITC established a new subsidiary company, ITC Great Plains, a new pioneering transmission-only utility that was created from the ground-up. ITC Great Plains has identified and facilitated critical regional transmission infrastructure in the SPP footprint, and has constructed a portfolio of actionable transmission development projects by partnering with local utilities and electric cooperatives.

a. Operating Companies

A brief summary of the existing operating companies provides a high-level context of ITC and its capabilities to develop and own transmission projects (approvals, siting, engineering, construction, operations and maintenance).

ITC Companies in MISO and SPP

ITC has four operating companies that own, operate and maintain transmission assets of multiple voltage levels in diverse geographies and conditions: International Transmission Company, d/b/a; ITC*Transmission*; Michigan Electric Transmission Company, LLC; ITC Midwest LLC; and ITC Great Plains, LLC (see Table B1).

ITC*Transmission* ("ITCT"), the operating company in Southeast Michigan is comprised of approximately 3,000 circuit miles of transmission assets formerly owned by DTE Electric and its parent company DTE Energy. ITCT has invested over $1.9 billion to upgrade and expand this system. ITCT serves the densely populated Detroit metropolitan area and its concentration of automotive and other manufacturing and supplier facilities in the region. ITCT's transmission system includes predominantly 120-kV and 345-kV facilities. ITCT also owns and operates some 230-kV facilities, as well as underground transmission facilities operated at 120-kV and 345-kV. ITCT has existing transmission interconnections with the IESO (HydroOne) and PJM (ATSI).

The Michigan Electric Transmission Company ("METC") transmission system serves much of the remainder of Michigan's Lower Peninsula and is made up of the transmission assets formerly owned by Consumers Energy and its parent company CMS Energy. METC's transmission system has approximately 5,600 circuit miles of 138-kV and 345-kV facilities. Over $1.3 billion has been invested in the METC system to strengthen the transmission network. METC also has existing interconnections with PJM (AEP).

ITC Midwest ("ITCMW") serves most of Iowa and parts of Minnesota, Illinois and Missouri with approximately 6,600 circuit miles of transmission assets formerly owned by Interstate Power and Light Company and its parent company Alliant Energy. ITC has invested over $2.1 billion into the ITCMW system since acquiring the assets in late 2007. The ITCMW footprint is predominantly rural and includes 34.5-kV, 69-kV, 115-kV, 161-kV and 345-kV facilities. ITCMW has existing interconnections with PJM (ComEd) as well.

Table B1 – ITC Line Miles by Voltage

Voltage	ITC Line miles
<100-kV	4,406
100-kV – 230-kV	7,073
345-kV	4,067
Total	15,682

ITC Great Plains ("ITCGP") operates approximately 436 miles of 345-kV transmission facilities in Kansas and Oklahoma. Preconstruction activities are underway for another 30 miles of 345-kV transmission. Unlike ITC's other operating companies, ITCGP was not created from the acquisition of an existing transmission system; it was built from the ground up by establishing a presence in a new region, acquiring discrete transmission assets and acquiring the rights to construct, own and operate specific facilities through co-development agreements with utilities in Kansas and Oklahoma.

ITC Interconnection LLC ("ITCI") has expanded into PJM with the new Covert to Segreto 345-kV line in Southwest Michigan, which went into service on June 1, 2016. ITCI became a TO with these facilities energized.

In summary, ITC offers the following benefits to PJM:

- Largest independent transmission owner in the country: *resources needed to undertake complex projects*
- Experience in the PJM region through existing connections and the Covert-Segreto project: *reduces learning curve and enables ITC to hit the ground running on day one*
- Experience owning, operating and maintaining more than 15,600-miles of transmission line in seven states serving a combined peak load of more than 23,000 megawatts (MW): *processes in place to operate infrastructure in many different regions*
- Transmission-owning member of both Midcontinent Independent System Operator (MISO) and Southwest Power Pool (SPP) Regional Transmission Organizations (RTOs): *experience participating in multiple regional processes*
- Close working relationships with industry-leading consulting firms: *ability to scale up and down resources to match expertise with PJM's needs*

b. ITC Engineering

ITC's in-house engineering staff totals over 300 engineering employees across the Design, Project Management, Operations and Planning departments. These resources include: 149 engineers (over 600 total years of experience) in project development functions such as detailed design for high-voltage electrical infrastructure and 10 project management engineers (over 300 total years of experience). ITC has also developed close working relationships with industry-leading consulting firms that have considerable experience working hand-in-hand with ITC on detailed engineering and design packages. These consultants act as an extension of ITC and often have teams solely dedicated to ITC projects. This arrangement enables ITC to scale resources up and down to match expertise with the present transmission development needs.

All design packages are reviewed, finalized, and approved for construction by ITC internal engineering staff. ITC will continue to use its internal expertise in both substation design engineering and transmission line design engineering in coordination with its consulting firms to develop future projects.

Through the detailed design process, ITC strives to create efficiency and optimize system performance and functionality. This effort has resulted in standardization of substation layouts, protective relay and control panels, control center design, substation equipment, and line structures. This standardization method streamlines design, creates efficiencies during maintenance practices, and optimizes required inventories due to the use of interchangeable parts.

To ensure ITC's expectations are achieved, certain policies, practices, processes, and field manuals have been developed. These include but are not limited to:

- Redacted
- Redacted
- Redacted
- Redacted

ITC's design and construction standards meet or exceed National Electric Safety Code ("NESC") requirements. ITC has committed to constructing transmission to a NESC Grade B standard or above. It is the objective of ITC to maintain best-in-class construction standards and techniques to provide a reliable and efficient transmission system.

c. Operations & Maintenance

ITC has extensive experience conducting preventative and predictive maintenance on the 15,000+ circuit-miles of existing transmission lines on its system, and has consistently achieved best-in-class results in numerous reliability and safety metrics. The ultimate goals of ITC's maintenance program are to achieve compliance with all applicable North American Electric Reliability Corporation (NERC) Mandatory Reliability Standards, and to maintain its system in accordance with Good Utility Practice. To achieve these ultimate goals, ITC conducts a comprehensive maintenance program that focuses on five distinct areas: preventive, reactive, facilities, vegetation, and vehicular maintenance. For each category of preventative maintenance, ITC's program is conducted based on four principles:

1. Redacted
2. Redacted
3. Redacted
4. Redacted

ITC also supports its preventative and predictive maintenance program through efficient and reliable system designs, which ensure that ITC's system is expanded in a manner which is compatible with ITC's maintenance practices and reliability and safety goals. ITC also supports its maintenance program through capital improvements. The systematic upgrading of aging and/or obsolete equipment, such as circuit breakers, switches, relays, surge arrestors, transmission line structures, security infrastructure and other equipment, on a recurring basis obviates can significantly obviate the need for maintenance by replacing unreliable or maintenance-intensive equipment with state-of-the-art equipment that is more dependable and easier to maintain.

ITC's maintenance program has consistently achieved measureable safety and reliability results which far exceed industry averages with respect to compliance with NERC Mandatory Reliability Standards and outage prevention. ITC also has a peerless safety record – in the 2014 Edison Electric Institute Annual Safety Survey (the most recent year in which data is available), ITC's lost work day incident rate and recordable safety incident rate were both in the top decile of all US transmission owners:

Table B2 – Lost Work Day Case Incident Rate

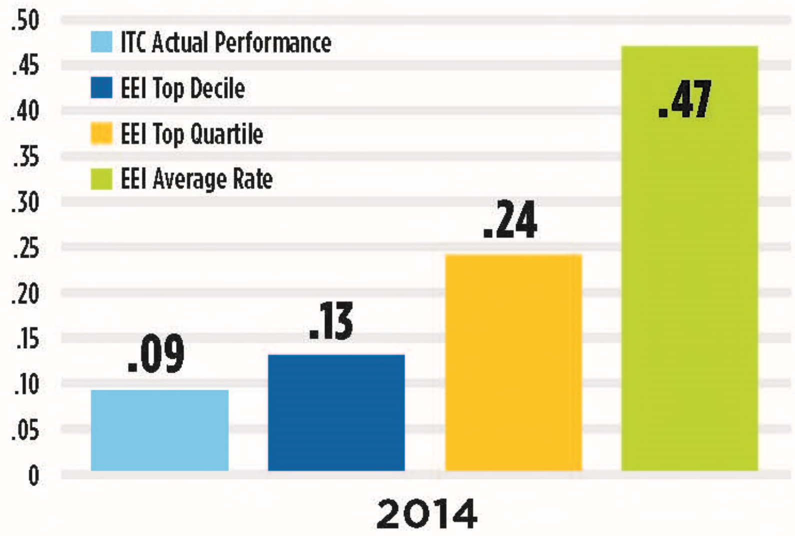
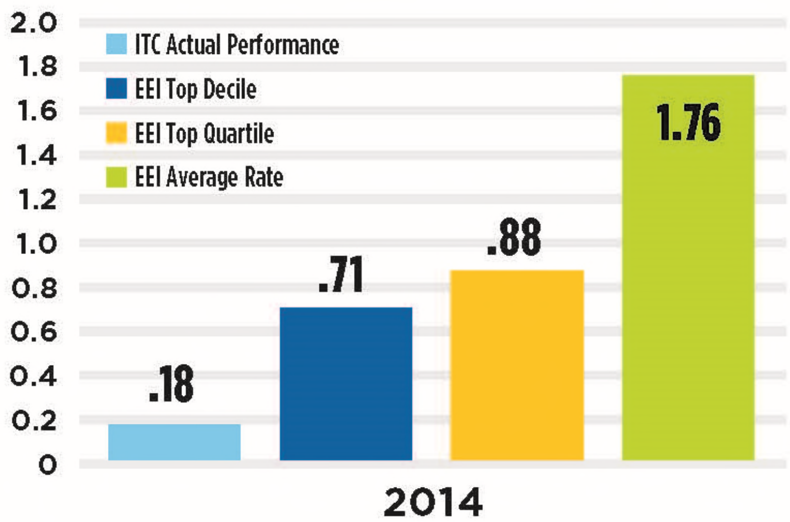


Table B3 – Recordable Incident Rate



In support of ITC's maintenance program, ITC's Capital Improvement program has also consistently replaced or upgraded aging components in a manner which eliminates maintenance needs. For example, ITC's replacement of circuit breakers in the ITC*Transmission* and Michigan Electric

Transmission Company systems has decreased the average age of circuit breakers on those systems by more than 11 years since ITC acquired those system.

In sum, ITC's rigorous and continuously improving comprehensive maintenance program has achieved best-in-class reliability and safety results on one the largest combined transmission systems in the United States. ITC will apply this same program to all components of the project selected by PJM, to ensure that it remains in proper condition to perform its intended function, whether during routine operations, switching, or emergency conditions.

4. Experience

a. Developing, Constructing, Operating and Maintaining

ITC has significant experience developing, constructing, operating and maintaining transmission facilities to help improve reliability, reduce congestion, improve system efficiency, and interconnect new generation to load all leading to lowering the overall costs of delivered energy to ITC's customers. ITC's history demonstrates that it does this with the intent of holding those assets over the long-term (ITC does not "flip" transmission investments). Several recent examples of transmission development and construction are provided below. ITC's primary consultants have experience designing 500-kV lines, as well as experience with Project Management at those voltages. For the design and construction of 500-kV facilities, ITC would leverage the expertise of industry-leading consultants to perform the work. ITC is well prepared to successfully construct, own, and operate the proposed facilities given the well-established ITC resources for similar facilities.

Thumb Loop Project

Representing a $510 million investment in Michigan's grid, the Michigan Thumb Loop project consists of approximately 140 miles of double-circuit, 345-kV lines and four new substations. ITC has led the planning, construction and development phases, working with skilled labor, engineering and project management organizations to manage project resources. The Michigan Thumb Loop project was the first of MISO's Multi-Value Projects (MVPs) to be approved and will serve as the backbone of a system designed to meet requirements set by Michigan's Wind Energy Resource Zone Board. The Thumb Loop project will also provide additional power delivery capacity for future economic development thereby helping existing businesses grow and also attract new businesses, jobs and investment to the region.

Despite its size and complexity, ITC completed this project on time and on budget – a testament to the company's project management and construction team abilities. Each Phase of the project was completed on schedule – Phase 1 of the project was placed in-service in September 2013, while Phase 2 entered into service in May, 2014, with the remainder of the project completed and put in-service in May, 2015. In total, the Thumb Loop project includes nearly 800 structures consisting of both tubular steel poles and lattice steel towers. Additional lines and facilities are being added as wind generators go into service and connect to the system to fulfill the requirements of the State of Michigan's Renewable Portfolio Standard. The Thumb Loop project is a prime example of ITC's efforts to improve the national electric transmission system, create access to competitive energy markets and foster growth for local and regional economies – all for the benefit of customers.

KETA Project

The KETA Project is a 227 mile, 345-kV project which runs from Spearville, Kansas, in the southwestern part of Kansas; north to the Post Rock substation just outside of Hays, Kansas; and then north to Axtell, Nebraska. The Kansas Electric Transmission Authority (KETA) identified this particular project in 2007 through its initiatives to bring significant economic and reliability benefits to Kansas and the regional transmission grid. KETA is an organization that was created in 2005 by the Kansas Electric Transmission Authority Act (HB 2263) and is intended to promote and facilitate the expansion of Kansas transmission infrastructure for the betterment of the Kansas economy. ITCGP worked with the incumbent electric cooperatives to acquire the rights to build the Kansas portion of this 345-kV project, from Spearville to the Kansas/Nebraska state line. ITC placed its portion of the KETA (Spearville-Axtell) transmission project into service in 2012, five months ahead of schedule and at a cost significantly below the budgeted amount, which demonstrates ITC's focus and commitment to cost containment and operational excellence.

V-Plan

In cooperation with Sunflower Electric Power Corporation and Mid-Kansas Electric Company, ITC has constructed two segments of the V-Plan project, totaling approximately 122 miles of double-circuit 345-kV line. The high-voltage transmission line is designed to connect eastern and western Kansas to improve electric reliability and enable energy developers to tap into the transmission grid. The project was placed in-service on schedule in December 2014.

Au Sable Circuit

This 110 mile, 138-kV line from Zilwaukee to Mio, Michigan, is important to electric reliability in northeastern Michigan. In June 2014, ITC completed rebuilding and upgrading this line from single-circuit 138kV to future double-circuit 230-kV design and construction standards. This will increase its capacity and reliability, provide increased lightning protection and facilitate potential future 230-kV expansion in northern Michigan. The project is the result of ITC's rigorous planning process that is designed to anticipate future customer needs and provide the grid flexibility to meet those needs in an efficient and cost-effective manner.

Multi-Value Projects (MVPs)

ITC is advancing its portions of four Multi-Value Projects (MVPs) in Iowa, Minnesota and Wisconsin. Following approval of these projects by MISO in late 2011, ITC has focused on siting preparations and worked with other utilities to finalize ownership levels of the projects in support of our targeted in-service dates. In 2014, two 345-kV line sections received Iowa regulatory approval and easements have been secured. Also in 2014, regulatory hearings were completed toward the Certificate of Need and Route Permit in Minnesota. These projects are part of MISO's MVP portfolio and are anticipated to provide broad regional benefits while also supporting approved state and federal energy policy mandates in the MISO region. Anticipated in-service dates of the projects range from 2015 to 2020.

ITC will build portions of the following projects:

- MVP 3 – a joint project with MidAmerican Energy Company of about 70 miles in Minnesota and about 145 miles in Iowa, of which ITC will construct approximately 100 miles of new 345-kV line.
- MVP 4 – a joint project with MidAmerican Energy Company of approximately 190 miles in Iowa, of which ITC will construct approximately 118 miles of new 345-kV line.
- MVP 5 – a joint project with American Transmission Company (ATC) of approximately 125 miles of 345-kV line in Wisconsin and Iowa.
- MVP 7 – a joint project with MidAmerican of approximately 90 miles of 345-kV line in Iowa and Missouri.

b. Standardized Construction Practices

ITC has an exceptionally strong record of adhering to standardized construction, maintenance, and operating procedures, which have driven ITC's ability to safely and reliably complete numerous transmission projects on time and within their original budget. ITC's operations and maintenance practices are equally strong with similar records of achievement. ITC has standard construction specification documents to which its construction teams adhere.

c. Emergency Response & Restoration Capability

ITC has a strong track record of mobilizing quickly and effectively to resolve forced outages. Weather events often strike the ITC system with little or no warning, requiring an immediate response. ITC employees and contractors excel at prioritizing and focusing organized efforts on safely and quickly restoring the transmission system to ensure grid reliability and prompt restoration of service to customers.

One example of ITC's capability for emergency response and restoration of damaged equipment our response to the July 2011 Midwest Derecho storm. In the early morning hours of July 11, 2011, a storm, with winds of more than 100 miles per hour swept through central Iowa, with peak winds estimated to be in the range of 130 miles per hour, equal to a Category 3 hurricane. At its peak, Interstate Power and Light, the electric utility providing retail service to many customers in the area, estimated that more than 45,000 of its retail customers across four counties lost power. Thousands more customers who were served by electric cooperatives and municipal utilities were also impacted. The National Oceanic and Atmospheric Administration said the storm was the most widespread and damaging wind event to affect central and east central Iowa since 1998. The storm knocked out nine 161-kV lines, two 69-kV lines and twenty 34.5-kV lines across the ITCMW system and affected approximately 60 substations. More than 300 poles required replacement.

Within 72 hours, ITCMW restored transmission service to all customers and customer substations that could take service, pending the repairs of their distribution systems. Once all customer connections were re-established, crews began working to provide backup feeds to those substations. The secondary feeds were critical to serve the returning load as distribution customers were returned to service.

Many other examples of ITC's timely remedying of facility failures due to weather or other events are available upon request.

d. Regional Experience

ITC has experience working with PJM through its multiple existing system interconnections and is familiar with its functions and history. Three of ITC's four operating companies have interconnections with PJM transmission owners.

ITC maintains a strong track record of providing crews to support PJM during extreme weather and other emergency events. Our extensive experience with other RTOs, combined with our experience in PJM, offers tangible benefits in the form of our independence and history as an owner, operator and developer of transmission throughout the country.

As an example of this, ITC resources have supported utilities in PJM in emergency situations, including deployment of 167 personnel to New Jersey and eastern Pennsylvania in response to Hurricane Sandy. These resources came from Michigan, Iowa and Minnesota. ITC resources have also supported PJM member Commonwealth Edison during emergency situations.

Outside of PJM, ITC has extensive experience in a wide range of activities with multiple RTOs including transmission project development, advocacy, and participation in Federal Energy Regulatory Commission ("FERC") Order No. 890 Compliant stakeholder planning processes. ITC has MISO transmission assets in Michigan, Iowa, Minnesota, Illinois and Missouri. ITC also has SPP operational transmission assets in Oklahoma and Kansas.

ITC has been a member of MISO since the company's inception in 2003. ITC is one of the largest transmission owners in MISO and is actively involved in a wide range of activities, committees, and working groups. ITC has a valuable working relationship with MISO management and staff and have proven to be a contributing and collaborative member. ITC played a key leadership role in advocating regional transmission projects, which resulted in MISO's MVPs – a set of 17 regional projects valued at $5.2 billion.

ITCGP has been a member of the SPP since 2007. As an SPP transmission owner, ITC has strong working relationships with SPP management and staff. Since 2007, through its leadership positions on various task forces and working groups, ITCGP has been a consistent participant in the SPP planning process, advocating for specific large-scale regional projects. Participation and advocacy in these groups resulted in SPP's approval of approximately $500 million of transmission expansion projects that are in varying stages of development or operation by ITCGP.

ITC has expanded into the PJM footprint with the new Covert to Segreto 345-kV line in Southwest Michigan which went into service on June 1, 2016.

e. Acquiring Right-of-Way and Permitting

ITC has extensive experience acquiring rights-of-way ("ROW") in the eastern interconnection. ITC's primary land acquisition firm which ITC would likely retain to work on this project has extensive experience working on ROW acquisition projects in the region of PJM where this project is proposed. ITC will acquire ROW in PJM in the same manner that has generated success by obtaining broad stakeholder support in routing, siting, and permitting. The siting process begins with a routing study that considers multiple stakeholders broadly and carefully. As a project advances, ITC begins ROW acquisition, working extensively and collaboratively with landowners to secure land rights on a voluntary basis. ROW is generally secured voluntarily and ITC makes every effort to work with landowners. However, even when ITC has filed condemnation actions, the company continues to work with the landowners and is often able to reach mutually acceptable resolution outside of the judicial forum.

Transmission development requires a wide variety of permits ranging from road crossing permits to Department of Natural Resources and U. S. Army Corps of Engineer permits. Since 2009, ITC has obtained more than 1,500 permits. ITC has a well-established permitting process involving a cross-functional team led by a Design Engineering group that also includes Project Engineering, Environmental, Legal, and Local Governmental and Community Affairs groups. This team works closely with consulting firms to identify required permits for the project and provide the information needed for filing permit applications. ITC has effectively leveraged a variety of local, regional, and national firms to successfully acquire the required permits, including - redacted. A few examples of ITC's siting and permitting experience are cited below.

As part of ITC's environmental management system and in line with ITC's best-in-class approach to conducting business, ITC is committed to considering environmental impacts in its decision-making process when planning infrastructure improvement projects. Transmission line projects can span many miles and occasionally cross environmentally sensitive areas. ITC's project teams understand this and include environmental assessments for wetlands, threatened and endangered species and other sensitive habitats as part of the planning process.

Examples:

KETA project: A 174 mile, single-circuit, 345-kV line on new ROW in Kansas. ITC performed a routing study and worked with the state siting authority to secure route approval. ITC secured 10 Department of Transportation ("DOT") permits and 15 Department of Environmental Quality ("DEQ") permits for the project. ITC also worked with the U.S. Fish and Wildlife Service and the Kansas Department of Wildlife, Parks and Tourism on whooping crane protection and lesser prairie chicken habitat protection and remediation.

Salem-Hazleton project: An 81 mile, single-circuit, 345-kV line on mostly new ROW in Iowa. ITC was able to successfully negotiate co-locating approximately 20 miles of the new line jointly with another transmission company's facility. ITC worked through the Iowa Utilities Board siting process. ITC secured six Iowa DOT permits, one DEQ permit, 124 road crossing permits, two Department of Natural Resources permits or letters of no effect, three Federal Aviation Administration permits, three county floodplain permits and two Army Corp of Engineers permits or letters of no effect.

Thumb Loop project: A 140 mile, double-circuit, 345-kV line in Michigan. ITC actively participated in the Michigan Public Service Commission ("MPSC"), which approved the preferred route. Phase 1 of the project was energized in September 2013. Phase 2 was placed in-service in May 2014. The final phase of the project was placed into service in May 2015. To date, ITC has obtained 16 Michigan DOT permits, 20 DEQ permits, six soil erosion permits, 175 county road crossing permits and 60 drain commission permits.

V-Plan project: A 122 mile, double-circuit, 345-kV line under construction in Kansas with a projected in-service date of December 2014. ITC obtained siting approval from the Kansas Corporation Commission and to date has obtained nine Kansas DOT and five DEQ permits. ITC worked with environmental stakeholders to find alternative routes to minimize impact to landowners and to lesser prairie chicken habitat and to help facilitate further wind farm development.

5. Financing Plan and Financial Statements

Redacted

6. Commitment to execute Consolidated Transmission Owner Agreement

If ITC Mid-Atlantic LLC is the successful bidder of a project and becomes a Designated Entity, ITC Mid-Atlantic Development LLC commits to execute the PJM Interconnection Consolidated Transmission Owners Agreement.

C. CONSTRUCTABILITY INFORMATION

1. Scope and Detailed Breakdown of Project Elements

ITC has identified the Peach Bottom to Pyle Road to Fallston Road and to Old Post 230-kV line (17RTEP1-212) project to address Market Efficiency congestion identified as a part of the 2016/17 RTEP Long Term Proposal Window. A high level summary of the project is provided in Table C1 below.

Table C1 – Project Scope Summaries

Project	Line	Project Scope

17RTEP1-212	Peach Bottom to Pyle Road to Fallston Road and to Old Post 230-kV Line	• 37.5 total miles of new 230-kV (36.5-miles single-circuit and 1.0-miles double-circuit) overhead line with connections of:
		  ◦ Peach Bottom substation (PECO) to a new 230-kV Pyle Road switchyard (ITC)
		  ◦ New Pyle Road switchyard (ITC) to a new 230-kV Fallston Road switchyard (ITC)
		  ◦ New Pyle Road switchyard (ITC) to a new 230-kV Old Post switchyard (ITC)
		• Greenfield ring bus Pyle Road Switchyard (ITC)
		• Greenfield ring bus Old Post Switchyard (ITC)
		• Cut in the existing Raphael Road to Otter Point 230-kV line to Old Post switchyard (ITC)
		• Greenfield ring bus Fallston Road Switchyard (ITC)
		• New 20MW / 40MWh battery energy storage system connected to 230-kV at Fallston Road
		• Cut in the existing Graceton to Bagley 230-kV line to Fallston Road switchyard (ITC)
		• Modifications at the Peach Bottom 230-kV Substation (PECO)

This project would be a highly beneficial addition to the PJM system in order to facilitate the delivery of cost effective generation now and into the future to serve the Baltimore/Washington D.C. metro area through an enhanced 230-kV path from north to south. Such diversity would improve resiliency, security and potentially mitigate or reduce the occurrence of catastrophic and widespread outages.

The interconnection of the project was developed to minimize outages to critical circuits serving load in the Baltimore area. Specifically the approach to build a new greenfield 230-kV substation would result in a significantly reduced outage time compared to the multiple and significant outages required to reconfigure the nearby existing Bagley and Otter Point 230-kV substations to interconnect the project. Furthermore, both the Bagley and Otter Point 230-kV substations appear to have a unique operating protocol that would require adjustment to continue serving the lower voltage circuits in the area and incorporate the project which would further complicate the incorporation of the project. However, if these challenges were overcome with sufficient cost savings, this transmission line proposal should be adjusted accordingly to connect directly to an upgraded existing incumbent substation.

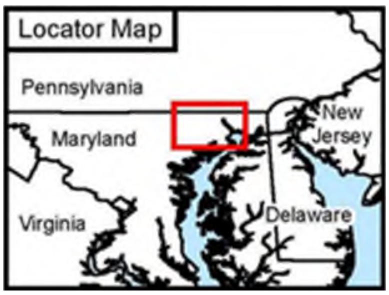
Redacted

a. 17RTEP1-212: Peach Bottom to Pyle Road to Fallston Road to Old Post 230-kV Transmission Line and Battery Project

The Peach Bottom to Pyle Road to Fallston Road (and battery at Fallston Road) to Old Post 230-kV line is a streamlined solution to address the Market Efficiency congestion identified as a part of the 2016/17 RTEP Long Term Proposal Window. This project, referred to as 17RTEP1-212, consists of constructing approximately 37.5-miles of new 230-kV (36.5-miles single-circuit and 1.0-miles double-circuit) overhead line from the existing Peach Bottom substation (PECO) to a new ITC owned Pyle Road switchyard to a new ITC owned Fallston Road switchyard and to a new ITC owned Old Post switchyard. A new 20MW / 40MWh AES Advancion battery array is connected to the 230-kV system at the new Fallston Road switchyard.

Greenfield Switchyard Details

The project includes three greenfield substations, named Pyle Road, Fallston Road, and Old Post. Fallston Road and Old Post loop in the existing Graceton-Bagley 230-kV line and Raphael Road-Otter Point 230-kV line, respectively. Fallston Road also includes a turnkey 20MW/40MWh energy storage facility connected to the 230-kV ring bus that will be operated to supplement the congestion mitigation provided by the transmission line. The assumed scope of work required at Pyle Road, Fallston Road, and Old Post are shown below.



Pyle Road Substation (New Greenfield)

Conceptual One Line Diagram: Figure 6, Appendix A

Conceptual Arrangement Plan: Figure 8, Appendix A

- The 230-kV switchyard would be a three position ring bus, in a two-bay breaker and a half configuration.
- The proposed Peach Bottom-Pyle Road and Old Post-Pyle Road lines would enter from the east side of the station. The proposed Fallston Road-Pyle Road line would enter from the west side of the station.
- Install metering CTs and metering equipment on the Peach Bottom-Pyle Road line.

Possible substation locations including a location in which ITC has land option agreements are shown in Figure 5A of Appendix A.

Fallston Road Substation (New Greenfield)

Conceptual One Line Diagram: Figure 6, Appendix A

Conceptual Arrangement Plan: Figure 9, Appendix A

- The 230-kV switchyard would be a three position ring bus, in a two-bay breaker and a half configuration.
- The existing Graceton-Bagley line would be looped in on the north and south sides of the new switchyard at approximately 0.3 transmission line miles from Bagley station.
- The proposed Fallston Road-Pyle Road line would enter from the north side of the station.
- The demarcation points would be the first structure within the substation fence.
- Install metering CTs and metering equipment on Graceton-Fallston Road and Bagley-Fallston Road lines.
- A 230/13.8kV 21.5MVA power transformer is used to connect the battery system to the transmission system.

Possible substation locations are shown in Figure 5B of Appendix A.

Old Post Substation (New Greenfield)

Conceptual One Line Diagram: Figure 6, Appendix A

Conceptual Arrangement Plan: Figure 10, Appendix A

- The 230-kV switchyard would be a three position ring bus, in a two-bay breaker and a half configuration.
- The existing Raphael Road-Otter Point line would be looped in on the south side of the new switchyard at approximately 0.4 transmission line miles from Otter Point station.
- The new proposed Pyle Road-Old Post line would enter from the north side of the station.
- The demarcation points would be the first structure within the substation fence.

- Install metering CTs and metering equipment on the Raphael Road-Old Post and Otter Point-Old Post lines.

Possible substation location(s) are shown in Figure 5C of Appendix A.

Relaying

The new substation relaying would consist of primary and secondary line relays for each 230-kV line, breaker control & breaker failure relays for each 230-kV breaker, primary and secondary transformer relays, an RTU & communications panel, and a DFR panel. Relaying for the energy storage facility is included in the turnkey package. Revenue meters would be installed for lines terminating at existing facilities. Line relay upgrades would also be required at the remote ends of the existing lines (Graceton, Bagley, Raphael Road, & Otter Point).

ITC has developed standard relay system designs to protect its equipment and has long standing working relationships with its control panel vendors. Standard design packages are available for line relaying with power line carrier, line relaying using current differential, transformer differential, bus differential and breaker control panels. All design packages are redundant protection schemes. The use of pilot protection and direct transfer trip is determined by system stability studies and fault analysis.

ITC typically uses redacted relays that have established industry track records. ITC makes use of the advanced communication technologies available on these relays for system protection, operation, control and metering. ITC's use of standard relay panel designs allows for quick deployment and installation in the field and quick replacement and restoration in the event of a failure. It is assumed that ITC would coordinate the line relaying design with the existing substation owners and that OPGW would be installed and used for line differential relaying on the new lines.

Substation Land

ITC has investigated land options and identified multiple feasible site options for each new greenfield station. A single site alternative for each was used to develop cost-estimates. The sites are located at the coordinates below. Pyle Road and Old Post switchyards would be approximately 2.1 acres, and Fallston Road would be approximately 2.3 acres in size. ITC has secured an option with an existing landowner to obtain the rights/easements to the property in order to construct the Pyle Road substation on property near the listed coordinates.

- Pyle Road:

- Fallston Road:
- Old Post:

Advancion Battery Array Details

ITC's partnership with AES to provide the battery technology associated with this proposal provides PJM with proven experience and technology in battery storage solutions. Advancion is the most proven, reliable, and fully integrated battery-based storage platform available in the industry and is the only solution with an established operational history. Advancion is a complete energy storage solution that leverages over 30 years of AES experience serving utility customers and nearly a decade of commercial energy storage development and operations.

Advancion is a 4th generation system that uses a massively parallel architecture designed for high reliability combined with a proven controls system capable of delivering multiple applications concurrently. The modular design is 5 times more compact than previous installations and 40 percent more dense than competing solutions. The combination of these factors reduces the total cost of system ownership from both an initial capital cost and lifetime maintenance cost.

Advancion is designed to avoid costly project-by-project integration. It allows access to the largest battery suppliers globally, and avoids obsolescence as the technologies evolve by enabling new batteries to be installed in the future using the best technology at the time. These advances provide lower cost, better performance, and enable financing; all designed to ensure the benefits of energy storage for utilities and their customers around the world.

Advancion 4 adds several additional advancements to both the energy storage sector and the broader electric sector that are not available from other suppliers:

- Standardized Array Design
- Supplier Certification
- Nodal Architecture
- Distributed Control System

Greenfield Transmission Line Details

The Project is being proposed to utilize all-overhead line construction using primarily tubular steel monopoles and 954 kcmil ACSR conductor. ITC has extensive experience using this conductor and benefits from supplier alliances, standard structure designs and recent construction experience. Table C1 shows the proposed project terminal points.

Table C1 – Terminal Points

	Beginning Station (Existing)	Intermediate Station (New)	Ending Station (New)	Ending Station (New)
Station Name	Peach Bottom	Pyle Road	Fallston Road	Old Post
Owner	PECO	ITC	ITC	ITC
Voltage	230-kV	230-kV	230-kV	230-kV
State	Pennsylvania	Maryland	Maryland	Maryland
County	York	Harford	Harford	Harford
Coordinates				

Route and Geographic Description

For the development of this proposal, a high-level study was conducted to identify a route representative of what could reasonably be expected for a project of this type in this area. Redacted

Portions of 13 cities are located within the study area (Table C2). The largest of these cities is redacted.

Table C2 – Major Cities within the Study Area

City	County	Population
Aberdeen	Harford	15,449

Redacted

Public Opposition

Overhead electric transmission line projects can be some of the most controversial projects in the United States. They typically involve the crossing of private property, the clearing of vegetation and the construction of large structures that are visible to the public. Often they cross multiple jurisdictions and political boundaries with competing interests. The risk for public opposition is always there, but the outcomes can be greatly mitigated by engaging and involving the full range of project stakeholders early, often and throughout the life of the project.

Physical Characteristics

The electrical and physical characteristics for the proposed line are shown in Table C7 below. Typical 230-kV overhead transmission structure cross-sections are included as Figure 2 and Figure 3 of Appendix A.

Table C7 – Line Characteristics

	Overhead Line – 37.5-miles
Construction	Tubular Steel Monopoles (deadends & angle structures) See Figure 2 and Figure 3, Appendix A
Nominal Voltage Rating	230-kV
AC or DC	AC
Summer Normal Rating	Redacted MVA
Summer Emergency Rating	Redacted MVA
Grounding Design (for underground circuits)	N/A
Configuration	Redacted
Phase Conductor Type	Redacted
Shield Wire Conductor Type (for overhead circuits)	Redacted

Facilities to be Constructed by Others

The proposed project requires the addition of new breakers, switches, line termination structures, and associated equipment at the existing Peach Bottom substation to accommodate the termination of the proposed line. The assumed scope of work required at each affected station is shown below; however, the final scope of work is subject to change and would be determined by the existing transmission owner in coordination with ITC.

Any proposed upgrades to existing TO-owned substations meet the publicly posted criteria on the PJM website and are subject to modification by the TO if necessary. If the proposed upgrades are deemed infeasible, with a PJM scope change, ITC could construct new greenfield facilities to minimize the impact to the existing TO facilities and to accommodate the project.

Peach Bottom Substation

Conceptual One Line Diagram: Figure 6, Appendix A

Conceptual Arrangement Plan: Figure 7A, Appendix A

Conceptual Elevation Sketch: Figure 7B, Appendix A

- Demolish existing line termination structure and switch.

- Install a new line termination structure, additional monopole structure, and switch for the existing Peach Bottom-Muddy Run line.
- Add one 230-kV SF6 gas circuit breaker, associated switches, and line termination structure to accommodate new line to Pyle Road.
- The proposed line would enter from the west side of the station.
- It is assumed the existing fence should not need to be expanded.
- The demarcation point on the proposed line would be the first structure within the substation fence.
- Install line and breaker relays to protect the proposed line.

Relaying

The proposed substation expansion relaying at Peach Bottom would consist of primary and secondary line protection relays, breaker failure and control relays, and minor modifications to the existing bus relaying schemes. It is assumed that ITC would coordinate the line relaying design with the existing substation owners and that OPGW would be installed and used for line differential relaying on the new line. It is further assumed that there is sufficient space in existing facilities to locate the new relaying equipment.

Substation Land

The scope of work at Peach Bottom does not require expansion of the existing substation footprint. No additional land should be needed.

Transmission Line & Substation Outages

- Redacted
- Redacted
- Redacted

Note: Additional constructability outages may be required upon detailed construction planning.

Total Cost of Project and Major Components

Table C8 provides a summary of major component costs for the project, in 2017 dollars. Section E.2 discusses the costs associated with this project in further detail.

Table C8 – 17RTEP1-212 Project Costs

Components	COST ($MM)
Transmission Line Components	
Substation Components	
GRAND TOTAL (2017 dollars)	

2. Regional and Interregional Requirements

All proposed project options are wholly contained within the boundaries of PJM's operating territory and, more specifically, within BGE's existing territory. There are no proposed direct interconnections with any other PJM TO or neighboring ISO/RTO operating regions. For these reasons, ITC notes that these projects are not considered to be interregional in nature and ITC will not be seeking interregional cost allocation.

D. ANALYTICAL ASSESSMENT

1. Equipment Parameters and Assumptions

Redacted

2. Model Data

As part of this proposal package, ITC has submitted modeling data to PJM for the project. The information below is a summary of the information provided.

Peach Bottom to Pyle Road to Fallston Road and to Old Post 230-kV Line and Battery

The transmission line characteristics used for modeling the new 17RTEP1-212 230-kV line is shown in Table D1 below.

Table D1 – 17RTEP1-212 Model Data

From		To		CKT	R (p.u.)	X (p.u.)	B (p.u.)	Rate A (MVA)	Rate B (MVA)	Length (miles)
213866	PCHBTM	700002	PYLE_RD	1						12.7
220981	OLDPOST	700002	PYLE_RD	1						10.0
700002	PYLE_RD	700001	FALLSTON	1						15.8

3. Detailed Analysis Report on Proposed Solutions

The Project is proposed as a system enhancement to improve market efficiency. Security constrained economic dispatch simulations were performed using the PJM provided economic models and simulation files posted as of November 1st, 2016 including subsequent PJM revisions. The proposed Project was added to the database and simulations were performed using PROMOD version 11.1.9. The results of the simulation with the Project included were compared against the base case simulation without the Project to determine the market efficiency benefits derived from the Project. The Project was shown to provide near complete relief of the congestion reported by PJM on the primary targeted flowgates – Conastone to Graceton and Graceton to Bagley facilities. The Project was shown to relieve congestion on multiple PJM identified Recommended for Proposal flowgates as shown in Table D2.

Table D2 – 17RTEP1-212 Project Flowgates Congestion Reduction

			Congestion Delta (%)		
Facility Name	**Area**	**Type**	**2021**	**2024**	**2027**

Simulations were performed for the 2017, 2021, 2024, and 2027 study years in order to extrapolate the Project's 15 year net present value (NPV) of benefits consisting of Net Load Payment (NLP) benefit, Adjusted Production Costs (APC) benefit, and Capacity benefit as applicable based on a Regional or Lower Voltage Project classification. In addition to these benefits, the net benefit and overall Benefit-to-Cost Ratio (BCR) was calculated for the Project. Table D3 provides the total Project cost, in 2017$, along with the key benefit metrics discussed previously. The net benefit, which estimates the result of this project on PJM rate payers, shows that the benefits are calculated to exceed the cost by $1,291 million in 2017 dollars.

Table D3 – Project Benefits

Project Type	In-Service Date	Cost (2017 MM$)	NLP Benefits[1] (MM$)	APC Benefits[1] (MM$)	Net Benefit[2] (MM$)	BCR (NPV_B/NPV_C)
Lower kV						

[1]Benefits shown represent a 15 year NPV from project in-service date.

[2]Net Benefit is calculated as net of 15 year NPV of project benefits minus costs from project in-service date.

4. Additional Supporting Documentation

In addition to testing the project's effectiveness in alleviating the identified Market Efficiency congestion, reliability analysis for N-1, N-1-1 was performed along with Reactive Interface analysis to determine potential impacts of the project on defined interfaces. These power flow analyses were performed using the posted data for PJM's 2016 RTEP Proposal Window 2 per PJM's direction. The N-1 and N-1-1 analyses were performed using the posted case (base summer peak) and the modified base cases with the inclusion of the project. The Reactive Interface analysis was performed using a modified base case to scale the generation to emulate the changes made to the case[2] provided in the 2014-15 Long Term Proposal Window. Redacted - tools were used for simulation. The raw results files can be made available upon PJM request.

Bus, failed breaker, single, and tower contingencies were evaluated for the N-1 analysis. All single contingencies in the BGE area, including ties, as well as contingencies five (5) buses away from the Peach Bottom 230-kV bus were considered for the N-1-1 analysis. Contingencies as defined in the PJM Market Efficiency Modeling Practices document for the East, Central, West, Bedington – Black Oak, AP South, 5004/5005, and AEP/Dominion Transfer Interfaces were considered for the Reactive Interface analysis.

The entire PJM footprint was monitored for thermal and voltage impacts for the N-1 and N-1-1 analysis. Any facility that became overloaded with the addition of the project and showed greater than 2% difference between the base case and the project case was considered an adverse impact. As ITC could not identically replicate the PJM N-1-1 methodology which includes system re-dispatch and topology modification, the N-1-1 results depict a more conservative review of the system's resiliency under those

[2] 2019_RTEP_SCED_2014_ME_WINDOW_REACTIVE_INT_CALC.sav

contingency conditions. For the Reactive Interface analysis, each Transfer Interface had buses monitored as defined in the PJM Market Efficiency Modeling Practices document.

Table D4 – 17RTEP1-212 Project N-1-1 Adverse Thermal Impacts

Facility	Base Rating (MVA)	Contingency Rating (MVA)	First Contingency	Second Contingency	Final AC % Loading

No post-contingency actions, such as system re-dispatch or topology modifications, were made for the N-1-1 analysis. The thermal overload of the facility in Table D4 may be overstated as post-contingency actions for N-1-1 events could avoid this thermal impact.

Table D5 – Project Reactive Interface Limit Impacts

Transfer Interface	Base Rating Delta (MW)	Contingency Rating Delta (MW)

5. Additional Benefits

Redacted

6. Proposal Template Spreadsheet

The following proposal template spreadsheets can be located in Appendix B:

- RTEP Proposal Template 2016 – 17RTEP1-212

E. COST

1. Cost-estimates

The capital cost of the proposed project, including the scope that would be assigned to incumbent transmission owners, are shown in Table E1 below. Project totals are shown in both current year (2017) dollars as well as In-Service Date (ISD) dollars (2021) which have been escalated at a rate of 2.5% per year per the standard PJM escalation rate. This is based on Consumer Pricing Index (CPI) projections.

Table E1 – Total Project Costs

Project	Greenfield ITC Cost in 2017 Dollars ($MM)	Incumbent Cost in 2017 Dollars ($MM)	Total Project Cost in 2017 Dollars ($MM)	Total Project Cost in 2021 ISD Dollars ($MM)
17RTEP1-212	$142.9	$7.3	$150.2	$165.7

Yearly cash flows for each of the proposed projects are shown in Table E2 below.

Table E2 – 17RTEP1-212 Yearly Cash Flow (2021 ISD Dollars)

	2017	2018	2019	2020	2021	Total
ITC T-Line Costs						
ITC Switchyard Costs						
Incumbent TO Costs						

2. Detailed Breakdown of Cost Elements

Breakdown of costs for the proposed project is shown in Table E3 below.

***= Incumbent Costs**

Table E3 – 17RTEP1-212 Project Costs

ITEM	COST (2017 $MM)
Transmission Line & Modifications	

Subtotal – Transmission Line

Subtotal – Transmission Line

Subtotal – Cut-in *

Subtotal – Transmission Line

Subtotal – Cut-in *

Subtotal – Transmission Lines	$91.3
Substation Modifications	
Subtotal - Old Post	
Subtotal - Fallston Road	
Subtotal - Fallston Road Battery	
Subtotal - Peach Bottom	*

Subtotal - Remote Ends		*
Subtotal - Substations		
GRAND TOTAL (2017 dollars)		

Planned Return on Equity (ROE), including any incentive adders the proposing entity intends to seek

Estimated monthly AFUDC for each Project

AFUDC MONTHLY	2017	2018	2019	2020	2021
17RTEP1-212					

Detailed breakdown of annual operation and maintenance (O&M) costs

ITC estimates the following breakdown of annual non-levelized O&M costs (in thousands of 2017 dollars) for each of the projects as shown in the table below

Maintenance Item	Sub Category	17RTEP1-212
Field O&M	Substation Operating/Switching	
	Breaker inspections	
	Switch inspections	
	Transformer Maintenance	
	Helicopter Inspection for Veg Mgt.	
	Tower Inspections	
	Vegetation Mgt.	
	Foot patrol for Veg. Mgt.	
	Reactive Line Maintenance	
	Relay/SCADA Maintenance	
	Site Maintenance	
Total Field O&M		
Total Non-Field O&M		
Grand Total Est Annual O&M		

3. Cost Commitment

- Redacted

F. SCHEDULE

1. Detailed Conceptual Schedule

The schedule below would apply to the project.

Table F1 – Proposed Schedule

G. OPERATIONS/MAINTENANCE

1. Overview of Plans for Operations and Maintenance

Operational Plan Including Intentions for Control Center

ITC incorporated new service territories into its existing operations and control center as the company has grown. This is both a result of existing systems and organic growth of ITCGP and other operations.

ITC has navigated the interconnection process with various PJM Transmission Owners related to our multiple system interconnections. As noted in the response to question B.1, three of four ITC operating companies have interconnections with PJM transmission owners.

ITC will operate the new transmission facilities from its primary control center, from which ITC operates 15,000-miles of transmission lines and associated facilities in three NERC regions (Midwest Reliability Organization, RF and SPP) as well as in two ISO/RTO footprints (MISO and SPP). In anticipation of continued growth, the control center was designed with flexibility to allow additional capacity as ITC's system expands into new ISO/RTO footprints.

All ITC system operators and key management staff are NERC-certified at the Reliability Coordinator level and maintain this certification through a comprehensive ongoing training program. ITC control room management, and personnel that staff positions responsible for asset monitoring and operation in the PJM footprint, are also PJM certified. ITC has a redundant and independent backup control center capable of operating all of ITC's transmission facilities, including all future assets. The ITC control center facilities provide all required telemetry on existing facilities to the MISO, SPP, and PJM RTOs . ITC is a PJM Member in conjunction with the Covert transmission facilities.

Maintenance Plan/Contracts

ITC has a comprehensive program and established procedures for substation maintenance on its existing systems that includes routine inspection of equipment in substations and control houses. Items identified for follow-up maintenance or repair are monitored and documented in a computerized maintenance management system. The program also includes cyclical and predictive maintenance intervals on major substation equipment including, but not limited to, circuit breakers, switches, transformers, relay and protective systems, distributed control systems and capacitor banks.

A similar comprehensive program exists for transmission line maintenance. It includes annual aerial inspections and cyclical ground line inspections and wood pole/steel tower maintenance. Items identified for follow up maintenance or repair are monitored and documented in a computerized maintenance management system. ITC's vegetation management policy is to actively manage, through removal, pruning, mowing and/or herbicides applications, the vegetation that grows within the electric transmission line easement area or right-of-way in order to ensure safety, reliability and, in the case of 200-kV and above facilities, meet mandatory reliability requirements established by NERC and approved by FERC on March 16, 2007. It is ITC's corporate goal to have zero outages as a result of vegetation interference.

ITC uses modern high-speed networked Supervisory Control and Data Acquisition ("SCADA") equipment health monitoring on key ITC assets such as transformers, circuit breakers and protective relaying. Alarming on these systems monitored 24-7 by the ITC central operations control room. When under active alarm, corrective action is initiated including dispatch of appropriate field maintenance resources.

ITC has a philosophy of maintaining minimum spare stock of substation and line equipment (including key assets such as circuit breakers and transformers). By analyzing past storm related damage and the associated material needed to respond, ITC has proactively staged emergency spare material along with general maintenance material at ITC warehouses. These warehouses are strategically located throughout the company's footprint to supply spare material 24-7 in emergencies. These strategic materials are replenished as needed.

In various geographic regions, ITC has addressed operations and maintenance staffing in a variety of ways, including service agreements with existing transmission-owning entities and establishing an O&M staff. For example, in Kansas, Sunflower Cooperative and Midwest Energy provided maintenance service for ITCGP's assets in Kansas. Following the philosophy of identifying strategic response material, certain materials and items are staged at maintenance partner locations for potential emergency needs.

Based on past experience, ITC has the flexibility to handle this important function in the optimal and most cost-effective manner.

H. APPENDIX A – SUPPORTING FIGURES

Figure 1 – Project Summary

Figure 2 – Typical 230-kV Single Circuit Transmission Structures

Figure 3 – Typical 230-kV Double Circuit Transmission Structures

Figure 4 – Route Alternatives

Figure 5A – Pyle Road Substation Alternatives

Figure 5B – Fallston Road Substation Alternatives

Figure 5C – Old Post Substation Alternatives

Figure 6 – Conceptual One Line Diagram

Figure 7A – Peach Bottom Aerial Layout

Figure 7B – Peach Bottom Elevation Sketch

Figure 8 – Pyle Road Aerial Layout

Figure 9 – Fallston Road Aerial Layout

Figure 10 – Old Post Aerial Layout

Figure 11 – Study Area

Figure 12 – Land Ownership

I. APPENDIX B – SUPPORTING DATA

RTEP Proposal Template 2016 – 17RTEP1-212

Planning Model Files Package (includes .IDV, .XML, .EVE files and documentation for event file modifications and new contingency definitions)

J. APPENDIX C – FINANCIAL STATEMENTS

ITCH 2014 Annual Financial Statement

ITCH 2015 Annual Financial Statement

ITCH 2016 Annual Financial Statement