Transmission Projects: At A Glance

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EXECUTIVE SUMMARY

Utilities make investments in their system to provide customers with reliable and economic electric service, addressing system needs such as meeting reliability requirements, modernizing and replacing infrastructure as needed, accommodating new and retiring electricity generation sources and meeting public policy requirements. This eighth annual publication of EEI’s Transmission Projects: At A Glance report showcases a cross-section of major transmission projects that EEI’s members completed in 2013 or have planned for the next ten years and highlights EEI members’ continuing focus to make needed transmission investments. This report represents a sampling of the wide array of projects currently planned or under construction by EEI’s members.

Building a Stronger Grid to Meet Customer Needs

EEI’s members remain dedicated to building needed and beneficial transmission, and modernizing the nation’s transmission network to meet twenty-first century demands. In 2012, total transmission investment reached $14.8 billion (real $2012). We expect that increases in year-over-year total transmission investment by EEI’s members will have peaked in 2013 with estimated investment at approximately $17.5 billion (real $2012). These transmission investments provide an array of benefits which include: providing reliable electricity service to customers, relieving congestion, facilitating wholesale market competition, supporting a diverse and changing generation portfolio and mitigating damage and limiting customer outages in extreme weather. New transmission investments also deploy advanced monitoring systems and other new technologies designed to ensure a more flexible and resilient grid. At the same time, all transmission projects are integrated into local systems in order to maintain the paramount objective of providing reliable electricity service to customers.

Over 170 projects are highlighted in this report, totaling approximately $60.6 billion in transmission investments through 2024. This figure is up from the approximately $51.1 billion highlighted in the 2013 report, due to changing projections of system needs. Consistent with federal and state policies, transmission projects are planned through the use of open and transparent processes that include analysis and consideration on a comparable basis of proposed transmission solutions. This ongoing evaluation and reevaluation of projects protects customers by ensuring that only efficient and cost-effective transmission solutions are ultimately constructed.

Since transmission projects address an array of needs and deliver a number of benefits, most projects in this report are multifaceted. That is, they are not developed solely to meet any one specific purpose. Accordingly, one project may fall into more than one transmission investment category. Of the total $60.6 billion worth of transmission projects highlighted in this report, interstate transmission projects represent $26.2 billion (43 percent); projects supporting the integration of renewable resources represent approximately $46.1 billion (76 percent); projects where EEI member companies are collaborating with other utilities, including non-EEI members, to develop the project represent approximately $29.8 billion (49 percent);

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1 This investment is only a portion of the total transmission investment anticipated through 2024 by EEI’s members.
and high-voltage projects of 345 kV and above represent approximately $45.7 billion (75 percent) (nominal $).

Policies Supporting Transmission Development

Effective policies for planning and siting, cost allocation and cost recovery are important to achieve the levels of transmission investments needed for reliable and cost-effective service to electricity customers. Continued investment in transmission infrastructure will be required to maintain reliability, support shifts in the nation’s generation portfolio, offer greater flexibility with the increase in distributed generation, and meet public policy requirements. However, the risks of building transmission have not diminished since the first Transmission Projects: At A Glance report was published in 2007. Recognizing the numerous benefits of a robust transmission system and the inherent risks and challenges of developing transmission are unlike any other utility plant, EEI’s members have a long history of working with policymakers and regulators to support effective policies, such as appropriate returns on equity, to address the substantial risks of developing, constructing, operating and maintaining transmission infrastructure, as well as the challenges of raising needed capital to fund transmission development.

The Energy Policy Act of 2005 (“EPAct 2005”) set forth several statutory requirements intended to support transmission investment, and the Federal Energy Regulatory Commission (“FERC”) reaffirmed its pricing policy providing rate treatments and adequate returns to assist in mitigating the risks associated with developing, constructing, operating, and maintaining transmission infrastructure. In addition, FERC advanced its strategic goal of supporting the development of transmission by enabling identification of projects through appropriate regional and interregional coordination processes and supporting allocation of costs for the selected transmission solutions that meet customer and system needs.

Despite recent disagreements regarding transmission incentives and adequate returns on investment, FERC should continue to foster the construction and upgrade of beneficial transmission by balancing the need to promote investment in long-term infrastructure assets with the short-term, cyclical movements in the capital markets in order to ensure sufficient access to capital to build needed transmission projects that present significant risks to developers.
INTRODUCTION

Building a Stronger Grid to Meet Customer Needs

While the electric industry and general economic climate have changed significantly since the first Transmission Projects: At A Glance publication in 2007, EEI members remain firmly dedicated to prudent investment in needed and beneficial transmission. In 2012, EEI members’ total transmission investments reached approximately $14.8 billion (real $2012).

As shown in the chart, year-over-year total transmission investment increased through 2013, when EEI estimates a peak at approximately $17.5 billion. Without question, this level of investment in our nation’s transmission infrastructure is significant and will provide numerous benefits for electricity customers. Investment in transmission enhances the high level of reliable electricity service that customers expect and reduces congestion and system losses, which result in direct cost savings for customers. Transmission investment also facilitates the integration of new generation sources, including renewable resources, by adding robust support to the existing network, or by directly interconnecting resources, even when located far from load centers. Transmission also provides access to other flexible power resources and support services to compliment the increasing amounts of distributed generation.

In addition, these transmission investments help to ensure the continued reliability of the grid in the face of generator retirements as our nation’s mix of electric power resources change in response to new U.S. Environmental Protection Agency (“EPA”) rules, state and local environmental requirements, and shifts in the costs of generation and power plant operations. Accordingly, compliance with EPA’s evolving clean air and water regulations will require new transmission infrastructure.

Grid Modernization

EEI members remain dedicated to planning and modernizing the nation’s transmission network to meet twenty-first century electric energy demands. Recent extreme weather events have highlighted the need for reinforcing and upgrading electric infrastructure. Such investments improve the durability of transmission and distribution infrastructure, allowing the system to withstand the impacts of severe weather events with minimal damage.

2 Actual expenditures are from EEI’s Annual Property & Plant Capital Investment Survey and FERC Form 1s.
With increasing penetration of distributed generation technology (e.g. rooftop solar, combined heat and power) and an overall interest by consumers in clean energy, transmission remains vitally important to maintaining system-wide reliability by providing access to other, flexible power resources in cases when such intermittent power supply is unavailable. At the same time, large concentrations of distributed generation increase the need for the transmission system to detect and react quickly to balance supply and demand when those generation sources go offline or are unable to meet 100 percent of customer demand. To enable flexible networks that allow for more customer control and choice, it is important that regulatory frameworks, adequate returns and equitable cost allocation are in place for utilities to provide services that meet customer needs.

Meanwhile, EEI members continue to introduce innovative technologies in transmission projects to meet system needs when they provide benefits to customers and improve service. Consistent with EPAct 2005 and FERC’s transmission incentives rate policy, many of the projects highlighted in this report integrate advanced transmission technologies including fiber optic communication, advanced conductor technology, enhanced power device monitoring and energy storage devices.

Policies Supporting Transmission Development

As demonstrated by the sample of transmission projects in this report, investment in our nation’s transmission grid continues as EEI’s members address the evolving energy needs of the nation. Since the issuance of EPAct 2005, which set forth several statutory requirements intended to attract additional investment in the transmission grid, the risks associated with planning, siting and constructing needed transmission have not diminished.

To continue to foster the development of necessary transmission, FERC should balance the need to promote investment in long-term infrastructure assets with the short-term, cyclical movements in the capital markets. Returns commensurate with the long-term prevailing risks are necessary to continue to attract sufficient capital to achieve the needed transmission investment levels and promote the implementation of advanced technologies. This is particularly true given the growing competition for capital to invest in our nation’s strategic assets and infrastructure. In response to a recent complaint regarding adequate returns on transmission investment, an initial decision, pending further FERC review, recognized that “[i]f transmission investment is substantially limited in the future, it will have a negative impact upon operational needs, reliability, and ultimately ratepayers’ future costs.”

of electricity bills, when compared to generation and distribution costs, and while the benefits of transmission projects are realized on the date they are placed into service, utilities recover these investments over the facility’s useful life (typically 40 years).

Moreover, in EPAct 2005, Congress required the adoption of transmission incentives for certain qualifying projects in recognition of the benefits of a robust transmission network, the risks of its development, and the challenges of raising adequate capital to invest in transmission given other capital requirements. These transmission incentives were also created to encourage the deployment of advanced transmission technologies. In 2012, FERC released a Policy Statement reaffirming that development of transmission still presents risks and challenges that are not present for investment in any other utility plant.

Recognizing the importance of transmission to the nation’s economy, security and quality of life, the Administration recently announced the first “Quadrennial Energy Review” building off of its Blueprint for a Secure Energy Future, instructing the heads of twenty-two executive departments and agencies to collaborate on a year-long review of transmission and distribution infrastructure. EEI members look forward to working collaboratively with stakeholders to complete this review and determine if there are further opportunities to modernize, expand, upgrade, or transform energy infrastructure to accommodate changes in energy supply, integrate new information and security technologies, and meet customers’ increasing demands.

Meanwhile, the Administration continues to direct federal agencies to coordinate transmission siting and permitting on federal lands to bolster infrastructure development to meet current challenges including environmental impacts, national security, reliability, aging facilities and transformations in energy supply. Building upon the efforts of the interagency Rapid Response Team for Transmission, the Administration has established a steering committee to identify best-management practices and process improvements for reducing transmission project reviews and has required federal agencies to study electric transmission corridors and develop an interagency pre-application process for significant onshore electric transmission projects requiring federal approval. In response, the Department of Energy (“DOE”) initiated the development of best practices by seeking public comment on its proposed Integrated, Interagency Pre-Application Process in order to facilitate a more streamlined and efficient

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4 While the transmission component may vary over time and by region, the DOE recently estimated that transmission comprises eleven percent of a customer’s bill. See, e.g., Energy Information Agency, http://www.eia.gov/energyexplained/index.cfm?page=electricity_factors_affecting_prices.
5 Section 1223 of EPAct 2005 defines an “advanced transmission technology” as a technology that increases the capacity, efficiency, or reliability of an existing or new transmission facility.
9 Presidential Memorandum - Transforming our Nation’s Electric Grid Through Improved Siting, Permitting, and Review (June 7, 2013).
transmission project review process. The Administration and federal agencies have appropriately recognized the difficulties in permitting and siting transmission facilities on federal lands. The resulting coordination efforts must continue in order to help address a major challenge in the effort to enhance the United States transmission network.

An Evolving Investment Trend

Planned transmission investments are affected by economic conditions and the rate of electricity demand growth. Accordingly, EEI forecasts a slight decrease in transmission investment after 2013, primarily attributable to load growth forecast revisions in response to the current economic environment, as well as lower long-term growth rates due to increases in demand side management and energy efficiency. In recent years, the industry had significant investments and continues to invest in new large-scale, high-voltage facilities. In addition, the industry has focused on upgrades and replacement of existing facilities to further modernize the transmission grid. So, as the planning factors change, transmission planners respond by adjusting their system infrastructure needs to meet customer demands. Nevertheless, EEI expects investment by its members during 2014 and 2015 to be significantly higher than in years prior to 2013.

The aggregate investment figure highlighted in this report provides further evidence of this trend as projected transmission investments increases for 2013. Over 170 projects are highlighted in this report, totaling approximately $60.6 billion in transmission investments through 2024, compared to the 2013 report total through 2023 of approximately $51.1 billion (nominal $).

The projects in this report are also reflective of the need to invest in high-voltage facilities to serve the changing generation mix and emerging needs of customers. Approximately 75 percent of the reported projects are high voltage (345 kV and higher), representing over 13,000 line miles. Several of the projects included in this report are in the proposal stages and are subject to additional review. System planners will review the costs and benefits of transmission facilities and will consider alternatives such as new generation supply, demand response, energy efficiency and increased deployment of distributed generation resources. Moreover, the local and regional transmission planning processes may lead to modification, delay or cancelation of some of these projects or the addition of new projects. The evolution of a project from “concept” to “steel in the ground” is part of the dynamic transmission planning process.

Transmission Planning

Prior to construction, transmission planning processes evaluate the costs and benefits of each project, assess the forecasted changes in regional supply and demand, and consider alternative

11 Planned total industry expenditures are preliminary and estimated from an approximately 80 percent response rate to EEI’s Electric Transmission Capital Budget & Forecast Survey.
solutions. In addition, in some regions, transmission projects are identified as part of state integrated resource planning processes. Once transmission projects are selected in a regional process, they are subject to additional evaluations as part of state commission reviews and siting processes. These checks and balances protect consumers by ensuring that only cost-effective and efficient transmission projects that meet local and regional needs are constructed.

In 2011, FERC sought to enhance existing regional and interregional planning procedures with its issuance of Order No. 1000. Starting in 2012 and continuing into 2014, each planning region developed or is developing proposals to reform: i) planning, including procedures to identify transmission needs driven by public policy requirements; ii) cost allocation methodologies; and iii) non-incumbent developer participation. In 2013, the industry submitted to FERC interregional compliance proposals that provide a cost allocation method for new interregional transmission facilities. These reforms are intended to provide further support for transmission development.

At the same time, EEI members continue active participation in initiatives to coordinate transmission planning activities. One such effort is the Eastern Interconnection Planning Collaborative (“EIPC”) where planning authorities in the Eastern Interconnection are now studying the interaction and potential interdependency of gas infrastructure with the electric system. Other coordinated transmission expansion efforts are underway in ERCOT through the Long Term System Assessment performed in conjunction with the Electric System Constraints and Needs study. Transmission planners in the Western Interconnection have developed a 10-year plan and are now pursuing a 20-year, regional transmission plan framework. These experiences and analyses will assist in efficiently advancing the evaluation of transmission needs and solutions.

**Report Scope**

It is against this backdrop that EEI developed this report of member company transmission projects. Contained herein is a broad, though not comprehensive, perspective on the variety of transmission projects being built in the United States to support a number of needs and objectives. While the focus in this report is to present targeted projects within these broad categories, it is important to note that these transmission projects represent only a portion of total planned transmission addressing an array of needs and delivering a number of benefits, regardless of the initial development intention. With that in mind, most projects in this report are multifaceted. That is, they are not developed solely to meet any one specific purpose. Rather, they fall into more than one transmission investment category.

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12 There are also merchant transmission projects that may result from voluntary contracts.
Interstate Transmission Projects

These interstate projects span two or more states, and often present additional challenges for siting, permitting, cost allocation and cost recovery. Interstate projects account for approximately 7,700 miles and $26.2 billion (nominal $).

Transmission Supporting the Integration of Renewable Resources

These projects support the integration of renewable resource generation. Renewable energy technologies include: wind power, solar power, hydroelectricity, geothermal, biomass and biofuels. Highlighted projects that facilitate the integration of renewable resources reflect the addition or upgrade of 12,200 miles of transmission with an accompanying investment cost of approximately $46.1 billion (nominal $).

Transmission Projects Developed by Multiple Project Partners

Given the unique risks and challenges of developing transmission, among other things, several EEI member companies are collaborating with other utilities, including non-EEI members, to develop large-scale transmission projects. This collaboration allows entities to spread the investment risks while also leveraging each other’s experience in developing needed transmission. Projects where multiple project partners are collaborating account for approximately 10,000 miles, representing a cost of approximately $29.8 billion (nominal $).
High-Voltage Transmission Projects

In addition to focusing on upgrades and replacements to modernize the grid, there is continued investment in large, high-voltage projects to accommodate changing generation sources and customer needs. As more renewable generation, which is typically located far from load, enters the supply mix, high-voltage transmission lines are vital in transporting that generation over long distances. High-voltage projects consisting of 345 kV and higher represent approximately 13,000 miles and an investment cost of over $45 billion (nominal $).

Transmission Project Inclusion Criteria

A minimum project investment threshold of $20 million was applied to the selection of projects contained in this report, for both transmission system improvements, as well as those supporting the integration of renewable resources. Similar to previous years, however, a lower threshold of $10 million was applied to any Smart Grid projects included in this report.
## Highlighted Projects Recently Completed (2013)

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Transmission Planning Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benton North to Benton South 115 kV Line</td>
<td>MISO</td>
</tr>
<tr>
<td>Church Road to Getwell</td>
<td>MISO</td>
</tr>
<tr>
<td>Cleveland Area Synchronous Condensers (Eastlake Unit 5)</td>
<td>PJM</td>
</tr>
<tr>
<td>CREZ Projects</td>
<td></td>
</tr>
<tr>
<td>Devers – Colorado River and Devers – Valley No. 2 Transmission Project</td>
<td>CAISO</td>
</tr>
<tr>
<td>Dyer Road 230/115 kV Substation Project</td>
<td>SERTP</td>
</tr>
<tr>
<td>Eldorado – Ivanpah Transmission Project</td>
<td>CAISO</td>
</tr>
<tr>
<td>Greater Springfield Reliability Project</td>
<td>ISO-NE</td>
</tr>
<tr>
<td>Intercession to Gifford – 230 kV 3000 Amp Ckt 1 Transmission Project</td>
<td>FRCC</td>
</tr>
<tr>
<td>Jacksonville 230 kV Static VAR Compensator</td>
<td>SERTP</td>
</tr>
<tr>
<td>Kathleen to Zephyrhills N – 2nd 230 kV Line Transmission Project</td>
<td>FRCC</td>
</tr>
<tr>
<td>Lower SEMA Transmission Project</td>
<td>ISO-NE</td>
</tr>
<tr>
<td>Michigan Thumb Loop Transmission Project (Phase One)</td>
<td>MISO</td>
</tr>
<tr>
<td>Mona to Oquirrh (Energy Gateway Second Circuit)</td>
<td>NTTG</td>
</tr>
<tr>
<td>NEEWS – Rhode Island Reliability Project</td>
<td>ISO-NE</td>
</tr>
<tr>
<td>Northeast Louisiana Improvement Projects (Phase One)</td>
<td>MISO</td>
</tr>
<tr>
<td>One Nevada 500 kV Transmission Intertie</td>
<td>WestConnect</td>
</tr>
<tr>
<td>Pawnee – Smoky Hill 345 kV Transmission Project</td>
<td>WestConnect</td>
</tr>
<tr>
<td>PHASOR Program</td>
<td>CAISO</td>
</tr>
<tr>
<td>Pleasant Prairie – Zion Energy Center</td>
<td>MISO</td>
</tr>
<tr>
<td>Ray Braswell to Wynndale – New 115 kV Line</td>
<td>MISO</td>
</tr>
<tr>
<td>Rockdale – Cardinal</td>
<td>MISO</td>
</tr>
<tr>
<td>Salem-Hazelton Line</td>
<td>MISO</td>
</tr>
<tr>
<td>Seminole – Muskogee 345 kV Line</td>
<td>SPP</td>
</tr>
<tr>
<td>Smart Grid Investment Grant Projects (ATC)</td>
<td>MISO</td>
</tr>
<tr>
<td>Sooner – Cleveland 345 kV Line</td>
<td>SPP</td>
</tr>
</tbody>
</table>

**EDISON ELECTRIC INSTITUTE**
# TABLE OF CONTENTS

## EXECUTIVE SUMMARY

 EXECUTIVE SUMMARY .................................................................................................................. 1

## INTRODUCTION

 INTRODUCTION .............................................................................................................................. III

## AMERICAN ELECTRIC POWER (AEP)

 AMERICAN ELECTRIC POWER (AEP) ............................................................................................................................... 1

- Prairie Wind Transmission, LLC ...................................................................................................................... 2
- Pioneer Transmission, LLC ................................................................................................................................. 3

## ELECTRIC TRANSMISSION TEXAS

 ELECTRIC TRANSMISSION TEXAS .................................................................................................................. 4

- Competitive Renewable Energy Zone Projects ......................................................................................... 4
- Valley Import Project and Cross Valley Project ............................................................................................ 5

## AEP TRANSCOS

 AEP TRANSCOS ................................................................................................................................................. 5

- I&M Transco: Sorenson 765/345 kV New Station/Lines .................................................................................. 6
- OK Transco: Chisholm to Gracemont 345 kV ......................................................................................... 7
- WV Transco: Kammer 345/138 kV Rebuild/Expansion .................................................................................. 7
- Kanawha Valley Area (KVA) Improvements ................................................................................................. 8

## AMEREN CORPORATION

 AMEREN CORPORATION ........................................................................................................................................ 9

- Grand Rivers Projects ..................................................................................................................................... 9
- Fargo – Mapleridge ....................................................................................................................................... 10
- Bondville – SW Campus ................................................................................................................................. 11
- Brokaw – South Bloomington ......................................................................................................................... 11
- Latham – Oreana ........................................................................................................................................... 12
- Lutesville – Heritage ...................................................................................................................................... 12

## AMERICAN TRANSMISSION COMPANY (ATC)

 AMERICAN TRANSMISSION COMPANY (ATC) ................................................................................................. 13

- Badger Coulee .................................................................................................................................................. 13
- Cardinal Bluffs ................................................................................................................................................ 14
- Pleasant Prairie - Zion Energy Center ........................................................................................................... 15
- Rockdale - Cardinal ....................................................................................................................................... 16
- Smart Grid Investment Grant Projects ........................................................................................................ 16
- Straits Flow Control ..................................................................................................................................... 17
- Bay Lake Initial ............................................................................................................................................... 18

## ARIZONA PUBLIC SERVICE (APS)

 ARIZONA PUBLIC SERVICE (APS) .................................................................................................................. 19

- Hassayampa - North Gila 500 kV Project ........................................................................................................ 19
- Palo Verde Substation - Delaney Substation- Sun Valley Substation - Morgan Substation - Pinnacle Peak Substation 500 kV Projects ........................................................................................................... 20
- North Gila Substation - Orchard (formerly TS8) Substation 230 kV Project ..................................................... 21
- Sun Valley – Trilby Wash – Palm Valley 230 kV Project ............................................................................... 21

## CENTERPOINT ENERGY

 CENTERPOINT ENERGY .................................................................................................................................... 23

- Mont Belvieu Area Upgrades ........................................................................................................................ 23
- Freeport Area Upgrades .................................................................................................................................. 24
CONSORTIATED EDISON, INC. (CON EDISON) .............................................................. 25
  • Ramapo – Sugarloaf 138 kV Line, Ramapo – Rock Tavern 345kV Line ............... 25
  • Staten Island Unbottling ..................................................................................... 26
  • Rainey – Corona 138 kV Line ............................................................................. 27

DUKE-AMERICAN TRANSMISSION COMPANY (DATC) ........................................ 29
  • DATC Midwest Portfolio Phase 1 South .............................................................. 29
  • DATC Midwest Portfolio Phase 1 North ............................................................. 30
  • DATC Midwest Portfolio Phase 2 ....................................................................... 30
  • DATC Midwest Portfolio Phase 3 ....................................................................... 31
  • DATC Midwest Portfolio Phase 4 ....................................................................... 32
  • DATC Midwest Portfolio Phase 5 ....................................................................... 32
  • DATC Midwest Portfolio Phase 6 ....................................................................... 33
  • DATC Midwest Portfolio Phase 7 ....................................................................... 33
  • DATC Project 8 ................................................................................................... 34
  • Zephyr Power Transmission Project .................................................................. 35

DUKE ENERGY ........................................................................................................... 37
  • Harris Plant – RTP 230 kV Transmission Line Project – DEP .................................. 38
  • Jacksonville 230 kV Static VAR Compensator - DEP ......................................... 38
  • Intercession to Gifford - 230 kV 3000 Amp Ckt 1 Transmission Project - DEF ...... 39
  • Kathleen to Zephyrhills N – 2nd 230 kV line Transmission Project - DEF ............. 40

ENTERGY CORPORATION ...................................................................................... 41
  • Holland Bottom to Beebe to Garner 161 kV Project .......................................... 41
  • Hot Springs Milton to Carpenter Dam 115 kV Project ........................................ 42
  • Osceola Area: Construct New 500/230 kV Substation ........................................ 42
  • Southeast Arkansas Reliability Projects ............................................................. 43
  • SELA Project Phase 2 and Phase 3 .................................................................... 43
  • Franklin to McComb 115 kV Project .................................................................. 44
  • Madison County Reliability Project ................................................................... 44
  • Natchez Improvement Project .......................................................................... 45
  • Ponderosa to Grimes 230 kV Project .................................................................. 45
  • Orange County Project ..................................................................................... 46
  • Benton North to Benton South 115 kV Line ....................................................... 46
  • White Bluff Area Improvements ...................................................................... 47
  • AECC Hydro Station #2 to Gillett: Construct New 115 kV Line ......................... 47
  • Willow Glen to Conway: Construct New 230 kV Line ...................................... 48
  • Iron Man to Tezcuco: Construct New 230 kV Line ........................................... 48
  • Northeast Louisiana Improvement Projects ..................................................... 49
  • Ray Braswell to Wynndale: Construct New 115 kV Line .................................... 49
  • Church Road to Getwell: Construct new 230 kV Line ....................................... 50
  • Crown Zellerbach Area: Construct New 230/138 kV Substation ....................... 50
<table>
<thead>
<tr>
<th>Company</th>
<th>Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mud Lake Area:</strong></td>
<td>Construct new 230 kV Substation</td>
</tr>
<tr>
<td><strong>Fancy Point Substation:</strong></td>
<td>Add Second 500-230 kV Autotransformer</td>
</tr>
<tr>
<td><strong>Porter to Forest:</strong></td>
<td>Construct new 138 kV Transmission Line</td>
</tr>
<tr>
<td><strong>China to Amelia:</strong></td>
<td>Construct New 230 kV Line</td>
</tr>
<tr>
<td><strong>EXELON</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Baltimore Gas and Electric (BGE)</strong></td>
<td>Conastone - Graceton - Raphael Road 230 kV Circuits</td>
</tr>
<tr>
<td><strong>COMED</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Chicago Southern Business District Burnham-Taylor 345 kV Project</strong></td>
<td>55</td>
</tr>
<tr>
<td><strong>Project to install two 300 MVAR SVCs at Prospect Heights Substation</strong></td>
<td>55</td>
</tr>
<tr>
<td><strong>Project to install two 300 MVAR SVCs at Crawford Substation</strong></td>
<td>55</td>
</tr>
<tr>
<td><strong>PECO Energy Company (PECO)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Chichester – Linwood 230kv circuits.</strong></td>
<td></td>
</tr>
<tr>
<td><strong>FirstEnergy</strong></td>
<td></td>
</tr>
<tr>
<td><strong>“Energizing the Future” Initiative</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Glenwillow-Bruce Mansfield Project.</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Cleveland Area Synchronous Condensers</strong></td>
<td></td>
</tr>
<tr>
<td><strong>ITC Holdings Corp. (ITC)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>ITC Midwest</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Multi-Value Projects 3 &amp; 4</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Salem-Hazleton Line</strong></td>
<td></td>
</tr>
<tr>
<td><strong>ITC Midwest Smart Grid Program</strong></td>
<td></td>
</tr>
<tr>
<td><strong>ITC Great Plains</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Kansas V-Plan</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Elm Creek-Summit Project</strong></td>
<td></td>
</tr>
<tr>
<td><strong>ITC Transmission</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Michigan Thumb Loop Transmission Project</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Michigan Electric Transmission Company (METC)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Au Sable Circuit Upgrade</strong></td>
<td></td>
</tr>
<tr>
<td><strong>MidAmerican Energy Holdings Company</strong></td>
<td></td>
</tr>
<tr>
<td><strong>MidAmerican Energy Company</strong></td>
<td></td>
</tr>
<tr>
<td><strong>MidAmerican Energy Expansion Projects</strong></td>
<td></td>
</tr>
<tr>
<td><strong>MidAmerican Transmission, LLC</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Prairie Wind Transmission, LLC</strong></td>
<td></td>
</tr>
<tr>
<td><strong>ETT CREZ</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Gates-Gregg 230 kV Transmission Line Project</strong></td>
<td></td>
</tr>
<tr>
<td>Company</td>
<td>Page</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>------</td>
</tr>
<tr>
<td><strong>NV ENERGY</strong></td>
<td>71</td>
</tr>
<tr>
<td>• One Nevada 500 kV Transmission Intertie (NVES &amp; NVEN)</td>
<td>71</td>
</tr>
<tr>
<td>• Renewable Energy Transmission Initiative (RTI)</td>
<td>73</td>
</tr>
<tr>
<td>• Centennial II</td>
<td>74</td>
</tr>
<tr>
<td><strong>PACIFICORP</strong></td>
<td>75</td>
</tr>
<tr>
<td>• Energy Gateway</td>
<td>76</td>
</tr>
<tr>
<td><strong>MINNESOTA POWER</strong></td>
<td>77</td>
</tr>
<tr>
<td>• CapX2020 Transmission Plan</td>
<td>77</td>
</tr>
<tr>
<td>• Great Northern Transmission Line</td>
<td>78</td>
</tr>
<tr>
<td><strong>NATIONAL GRID</strong></td>
<td>81</td>
</tr>
<tr>
<td>• Northeast Energy Link</td>
<td>81</td>
</tr>
<tr>
<td>• New England East - West Solutions (NEEWS)</td>
<td>82</td>
</tr>
<tr>
<td>• NEEWS - Interstate Reliability Project (IRP)</td>
<td>82</td>
</tr>
<tr>
<td>• NEEWS - Rhode Island Reliability Project (RIRP)</td>
<td>83</td>
</tr>
<tr>
<td><strong>NORTHEAST UTILITIES (NU)</strong></td>
<td>85</td>
</tr>
<tr>
<td>• Northern Pass Transmission Project (NPT Project)</td>
<td>85</td>
</tr>
<tr>
<td>• Greater Springfield Reliability Project (GSRP)</td>
<td>86</td>
</tr>
<tr>
<td>• Interstate Reliability Project (IRP)</td>
<td>86</td>
</tr>
<tr>
<td>• Greater Hartford Central Connecticut Reliability Projects (GHCC)</td>
<td>87</td>
</tr>
<tr>
<td>• Lower SEMA Transmission Project</td>
<td>88</td>
</tr>
<tr>
<td>• Pittsfield-Greenfield Area Solution</td>
<td>88</td>
</tr>
<tr>
<td><strong>OGE ENERGY CORP. (OGE)</strong></td>
<td>91</td>
</tr>
<tr>
<td>• Hitchland – Woodward District EHV Double-circuit 345 kV Line</td>
<td>91</td>
</tr>
<tr>
<td>• Seminole – Muskogee 345 kV Line</td>
<td>92</td>
</tr>
<tr>
<td>• Sooner – Cleveland 345 kV Line</td>
<td>92</td>
</tr>
<tr>
<td>• Woodward – Thistle Double-Circuit 345 kV Line</td>
<td>93</td>
</tr>
<tr>
<td>• Woodward – Tuco 345 kV Line</td>
<td>94</td>
</tr>
<tr>
<td>• Chisholm - Gracemont 345 kV Line</td>
<td>94</td>
</tr>
<tr>
<td>• Cimarron - Mathewson Double-Circuit 345 kV Line</td>
<td>95</td>
</tr>
<tr>
<td>• Woodward District EHV – Tatonga 2nd Circuit 345 kV Line</td>
<td>95</td>
</tr>
<tr>
<td>• Mathewson - Tatonga 2nd Circuit 345 kV Line</td>
<td>96</td>
</tr>
<tr>
<td><strong>ONCOR ELECTRIC DELIVERY COMPANY, LLC (ONCOR)</strong></td>
<td>97</td>
</tr>
<tr>
<td>• West Texas Congestion</td>
<td>97</td>
</tr>
<tr>
<td>• Permian Basin - Culberson 138 kV Transmission Line</td>
<td>98</td>
</tr>
<tr>
<td>• Dynamic Line Ratings</td>
<td>99</td>
</tr>
<tr>
<td>• Oncor CREZ Development</td>
<td>100</td>
</tr>
<tr>
<td>• Static Var Compensation</td>
<td>101</td>
</tr>
<tr>
<td>• New Bethel Energy Center 345 kV Transmission Line</td>
<td>102</td>
</tr>
<tr>
<td>Company</td>
<td>Page</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td><strong>OTTER TAIL POWER COMPANY</strong></td>
<td>103</td>
</tr>
<tr>
<td>• CapX2020 Transmission Plan</td>
<td>103</td>
</tr>
<tr>
<td>• Big Stone South to Brookings County</td>
<td>104</td>
</tr>
<tr>
<td>• Big Stone South to Ellendale</td>
<td>105</td>
</tr>
<tr>
<td><strong>PACIFIC GAS AND ELECTRIC (PG&amp;E)</strong></td>
<td>107</td>
</tr>
<tr>
<td>• Gates-Gregg 230 kV Transmission Line</td>
<td>107</td>
</tr>
<tr>
<td><strong>PEPCO HOLDINGS, INC.</strong></td>
<td>109</td>
</tr>
<tr>
<td>• Ritchie to Buzzard Point N-1-1 Compliance Project</td>
<td>109</td>
</tr>
<tr>
<td>• PJM N-1-1 Projects (Southern Delmarva)</td>
<td>110</td>
</tr>
<tr>
<td>• Burtonsville-Bowie-Oak Grove Transmission Project</td>
<td>111</td>
</tr>
<tr>
<td>• Oak Grove-Aquasco Transmission Project</td>
<td>112</td>
</tr>
<tr>
<td>• Burtonsville-Metzerott-Takoma Transmission Project</td>
<td>113</td>
</tr>
<tr>
<td><strong>PUBLIC SERVICE ELECTRIC AND GAS COMPANY (PSE&amp;G)</strong></td>
<td>115</td>
</tr>
<tr>
<td>• Burlington - Camden 230 kV Network Reinforcement Project</td>
<td>115</td>
</tr>
<tr>
<td>• Northeast Grid Reliability Transmission Project</td>
<td>116</td>
</tr>
<tr>
<td>• Susquehanna - Roseland 500 kV Transmission Line Project</td>
<td>117</td>
</tr>
<tr>
<td>• North-Central Reliability Project (formerly the West Orange 230 kV Project)</td>
<td>118</td>
</tr>
<tr>
<td>• Mickleton-Gloucester-Camden Reinforcement Project</td>
<td>118</td>
</tr>
<tr>
<td><strong>SCANA CORPORATION</strong></td>
<td>121</td>
</tr>
<tr>
<td>• V.C. Summer #2 and #3 Interconnection Project</td>
<td>121</td>
</tr>
<tr>
<td><strong>SOUTHERN CALIFORNIA EDISON (SCE)</strong></td>
<td>123</td>
</tr>
<tr>
<td>• Devers – Colorado River and Devers – Valley No. 2 Transmission Project</td>
<td>123</td>
</tr>
<tr>
<td>• Eldorado – Ivanpah Transmission Project (EITP)</td>
<td>124</td>
</tr>
<tr>
<td>• San Joaquin Cross Valley Loop (SJXVL)</td>
<td>125</td>
</tr>
<tr>
<td>• Tehachapi Renewable Transmission Project (TRTP)</td>
<td>126</td>
</tr>
<tr>
<td>• Coolwater-Lugo Transmission Project (previously South of Kramer)</td>
<td>128</td>
</tr>
<tr>
<td>• West of Devers (WOD) Upgrade Project</td>
<td>129</td>
</tr>
<tr>
<td>• Path 42</td>
<td>129</td>
</tr>
<tr>
<td>• Tehachapi Wind Energy Storage Project (TSP):</td>
<td>130</td>
</tr>
<tr>
<td>• Centralized Remedial Action Schemes (CRAS):</td>
<td>131</td>
</tr>
<tr>
<td>• PHASOR Program (previously Wide-Area Situation Awareness System)</td>
<td>131</td>
</tr>
<tr>
<td><strong>SOUTHERN COMPANY</strong></td>
<td>133</td>
</tr>
<tr>
<td>• Central Alabama Projects</td>
<td>133</td>
</tr>
<tr>
<td>• East Pelham 230/115 kV Transmission Substation Project</td>
<td>134</td>
</tr>
<tr>
<td>• Greene County - Bassett Creek 230 kV Line Project</td>
<td>135</td>
</tr>
<tr>
<td>• Kemper County IGCC Plant</td>
<td>135</td>
</tr>
<tr>
<td>• Mobile Area Network Project</td>
<td>136</td>
</tr>
<tr>
<td>• North Brewton - Alligator Swamp 230 kV Line Project</td>
<td>136</td>
</tr>
<tr>
<td>• Pinckard - Holmes Creek - Highland City 230 kV Transmission Line Project</td>
<td>137</td>
</tr>
</tbody>
</table>
### TRANSMISSION PROJECTS: AT A GLANCE — TABLE OF CONTENTS

- **Plant Smith - Laguna Beach - Santa Rosa 230 kV Transmission Line Project** ........................................ 137
- **Plant Vogtle Network Improvement Project** .................................................................................................. 138
- **Tuscaloosa Area Solution** ......................................................................................................................... 138
- **Wadley 500/230 kV Project** .......................................................................................................................... 139
- **Jasper 161kV Area Improvements** ............................................................................................................. 139
- **Eastern Area Improvements** ....................................................................................................................... 140
- **Auburn – Opelika 115kV Networking** ......................................................................................................... 140
- **Bassett Creek South 230kV Improvements** .................................................................................................. 141
- **Turkey Hill Networking** ............................................................................................................................... 141
- **Pensacola Area Voltage Improvements** ....................................................................................................... 142
- **Panama City Area Voltage Improvements** .................................................................................................. 142
- **Dyer Road 230/115kV Substation Project** .................................................................................................... 142
- **Jasper – Pine Grove Primary 115kV Project** ............................................................................................... 143
- **Judy Mountain 230/115kV Substation Project** ........................................................................................... 143
- **McIntosh – Blandford – Meldrim 230kV Reconductor Project** ................................................................. 144
- **Boulevard 230/115kV Project** ..................................................................................................................... 144
- **Statesboro Primary – Wadley Primary 115kV Project** .................................................................................. 145

### TRANSOURCE ........................................................................................................................................... 147
- Nebraska City - Sibley Line and Iatan - Nashua Line ....................................................................................... 147

### VERMONT ELECTRIC POWER COMPANY (VELCO) ............................................................................. 149
- Connecticut River Valley Upgrades .................................................................................................................. 149
- Transmission System Improvements ............................................................................................................... 150

### WESTAR ENERGY, INC. .......................................................................................................................... 151
- Summit to Elm Creek 345 kV Transmission Line ............................................................................................. 151

### PRAIRIE WIND TRANSMISSION, LLC ................................................................................................ 152
- Wichita - Medicine Lodge - Woodward 345 kV Transmission Line ............................................................... 152

### XCEL ENERGY INC. ................................................................................................................................. 153

### NORTHERN STATES POWER COMPANIES (NSP COMPANIES) ........................................................ 153
- CapX2020 Transmission Plan ............................................................................................................................. 154
- MISO Multi Value Project Portfolio .................................................................................................................. 155
- Scott County 345 kV Substation Expansion .................................................................................................... 156
- Bayfield Loop .................................................................................................................................................... 156
- Bayfront to Ironwood 88 kV ............................................................................................................................. 156
- Couderay-Osprey 161 kV Line ......................................................................................................................... 157

### PUBLIC SERVICE OF COLORADO (PSCO) ........................................................................................... 157
- Pawnee - Daniels Park 345 kV Transmission Line ............................................................................................ 157
- Pawnee - Smoky Hill 345 kV Transmission Project ......................................................................................... 158

### SOUTHWESTERN PUBLIC SERVICE (SPS) ........................................................................................ 158
- Hitchland - Woodward 345 kV Transmission Line .......................................................................................... 159
- Tuco - Woodward District 345 kV Transmission Line .................................................................................... 159
<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interstate Transmission Projects</td>
<td>161</td>
</tr>
<tr>
<td>Transmission Projects Developed by Multiple Project Partners</td>
<td>163</td>
</tr>
<tr>
<td>Transmission Supporting the Integration of Renewable Resources</td>
<td>165</td>
</tr>
<tr>
<td>High-Voltage Transmission Projects</td>
<td>167</td>
</tr>
</tbody>
</table>
AMERICAN ELECTRIC POWER

(AEP)

Company Background:

- AEP is one of the largest electric utilities in the United States, delivering electricity to more than five million customers in 11 states.

- AEP’s service territory covers approximately 200,000 square miles in Arkansas, Indiana, Kentucky, Louisiana, Michigan, Ohio, Oklahoma, Tennessee, Texas, Virginia and West Virginia.

- System-wide there are approximately 40,000 circuit miles of transmission lines, including over 2,100 circuit miles of 765 kV transmission.

- Customer service is provided through AEP’s seven regional utilities: AEP Ohio; AEP Texas; Appalachian Power; Indiana Michigan Power; Kentucky Power; Public Service Company of Oklahoma; and Southwestern Electric Power Company.

- AEP is continuing its efforts to develop an extra high-voltage (EHV) interstate transmission superhighway. In furtherance of this effort, AEP is increasing on-system investment through the establishment of service territory focused transmission companies (Transcos). AEP is also maintaining a focus on its current project-based joint ventures with several utilities to build transmission in regions across the country:
  
  - Electric Transmission Texas, LLC (ETT): A joint venture with a subsidiary of MidAmerican Energy Holdings Company established to invest in transmission within the Electric Reliability Council of Texas (ERCOT);
  
  - Transource Energy, LLC: A partnership with Great Plains Energy, Inc. to pursue competitive transmission projects under FERC Order 1000;
  
  - Electric Transmission America, LLC (ETA): A joint venture with a subsidiary of MidAmerican Energy Holdings;
  
  - ETA has established Prairie Wind Transmission, LLC, a joint venture with Westar Energy to build EHV transmission in the Southwest Power Pool (SPP);
  
  - Pioneer Transmission, LLC: AEP and Duke Energy formed a joint venture to build a 765 kV transmission line in Indiana.

- Between 2003 and 2012, AEP put $4.3 billion of transmission plant into service.
Prairie Wind Transmission, LLC

Description: The Prairie Wind project consists of approximately 108 miles of new double-circuit 345 kV transmission line linking an existing 345 kV substation near Wichita, Kansas to a new 345 kV Thistle substation northeast of Medicine Lodge, Kansas (near the Flat Ridge Wind Farm). The line continues south from the wind farm to the Kansas-Oklahoma border.

Cost: The total project is estimated to cost $170 million. ETA and Westar Energy will each invest $85 million.

Status: The project broke ground on August 1, 2012 and is currently under construction. The project is scheduled to be in-service by December 2014.

Investment Partners: Electric Transmission America, LLC (a 50/50 joint venture between subsidiaries of American Electric Power and MidAmerican Energy Holdings Company) and Westar Energy.

Benefits: The line will increase the reliability of the transmission system and the capacity to move power in the area, providing utilities and their customers with access to lower-cost electricity. Additionally, it will facilitate wind generation development and allow utilities to operate their existing power plants more efficiently.
Pioneer Transmission, LLC

Description: The Pioneer project consists of approximately 286 miles of new 765 kV transmission line linking Duke Energy’s Greentown Station (near Kokomo, Indiana) to AEP’s Rockport Station (near Evansville, Indiana). Originating at Duke Energy’s Greentown Station, the 765 kV line runs west to the existing Reynolds 345 kV substation just north of Lafayette, Indiana before extending southwest to AEP’s Sullivan Station and further south to AEP’s Rockport Station.

Cost: The total project is estimated to cost $1.1 billion.

Status: The 66 mile segment of the project that runs from Greentown to the existing Reynolds 345 kV substation was included in the 2011 MISO Transmission Expansion Plan as a Multi-Value Project (MVP). The Greentown to Reynolds segment has entered the EPC phase. It will be developed jointly by Pioneer and NIPSCO. The remaining portion of the project will be evaluated by MISO and PJM as part of their next planning review cycles. The anticipated in service date for the Greentown to Reynolds segment is 2018.


Benefits: The project will enhance the reliability of power delivery by creating a major new route for power. It will better link the region’s power plants and create a route for new generation, such as wind energy. Pioneer, along with the other MVP projects approved by MISO, will facilitate the integration of wind generation in Indiana and enhance market efficiency.
Electric Transmission Texas

Company Background:

- Electric Transmission Texas, LLC (ETT) is a regulated transmission-only electric utility that builds, owns, and operates transmission assets within the Electric Reliability Council of Texas (ERCOT) under the regulation of the Public Utility Commission of Texas (PUCT).

- Currently, ETT owns and operates 1,304 circuit miles of transmission and has 530 circuit miles under development through region-wide efforts.

Competitive Renewable Energy Zone Projects

Description: The PUCT assigned $4.93 billion of Competitive Renewable Energy Zone (CREZ) transmission projects to be constructed by seven transmission and distribution utilities. The project will eventually transmit 18,456 megawatts (MW) of wind power from West Texas and the Panhandle to highly populated metropolitan areas of the state. ETT’s current CREZ portfolio includes 1,087 circuit miles of 345 kV transmission lines.

Cost: ETT’s current estimate of total CREZ investment is approximately $1.5 billion through 2013.

Status: Majority of construction for CREZ was in 2012 and 2013. All of the CREZ projects were in service by the end of 2013.

Investment Partners: ETT is a joint venture between subsidiaries of AEP and MidAmerican Energy Holding Company. Each owns a 50 percent equity ownership in ETT.

Benefits: The CREZ program, including ETT’s projects, is expected to provide the capacity to transfer roughly 18,000 megawatts (MW) of wind power from West Texas and the Panhandle to highly populated metropolitan areas of the state. This increased transfer capacity will reduce existing constraints on installed wind plants and provide transmission capacity for future projects.
Valley Import Project and Cross Valley Project

**Description:** The Valley Import Project and Cross Valley Project are among the most significant planned projects in ERCOT, and include over 200 pole miles of ETT 345 kV transmission into and within the Lower Rio Grande Valley, and two new 345 kV stations.

**Cost:** The combined estimated capital cost for the Valley Import Project and Cross Valley Project is nearly $800 million. ETT's portion of the projects is estimated to be roughly $500 million.

**Status:** These projects have a planned in-service date of 2016.

**Investment Partners:** ETT is a joint venture between subsidiaries of AEP and MidAmerican Energy Holding Company. Each owns a 50 percent equity ownership in ETT.

**Benefits:** The projects will relieve existing transmission constraints in the area and serve future demand in this rapidly growing area of the U.S.

---

**AEP Transcos**

**Company Background:**

- AEP Transmission Company, LLC serves as a holding company for AEP’s seven transmission-only electric utilities that were formed in 2009 to assist AEP’s Operating Companies by providing an additional source of capital to meet their increasing transmission capital needs thereby allowing greater financial flexibility to AEP’s utility Operating Companies to make appropriate capital investment decisions across their distribution, generation, and transmission functions.

- OH Transco, I&M Transco, OK Transco, KY Transco, and WV Transco are operational and have assets in-service or under construction.

- AP Transco can seek certification of future projects in its own name but the Virginia SCC will determine whether the project will ultimately be owned by AP Transco or APco.

- SW Transco is pending approval in Arkansas and Louisiana, with decisions anticipated in 2014.
I&M Transco: Sorenson 765/345 kV New Station/Line

Description: The Sorenson project addresses low voltages in the Fort Wayne area and is a PJM mandated project. This project includes 14 miles of new 765 kV line and a 765/345 kV transformer at Sorenson Station, as well as a 345 kV line that will utilize AEP’s new Breakthrough Overhead Line Design (BOLD).

Estimated Cost: $250 million.


Investment Partners: None.

Benefits: The Sorenson project will bring an additional EHV source of power closer to Fort Wayne and ensure reliable service in the region.
OK Transco: Chisholm to Gracemont 345 kV

**Description:** The Chisholm to Gracemont 345 kV line addresses future overloads on the 138 kV network in western Oklahoma. Multiple 138 kV elements are overloaded for the future loss of various lines. This project alleviates the issue by introducing a new EHV 345 kV source at Chisholm in western Oklahoma.

**Estimated Cost:** $120 million.

**Status:** Expected in-service date of March 2018.

**Investment Partners:** None.

**Benefits:** The Chisholm to Gracemont EHV 345 kV transmission line ensures reliable service in western Oklahoma by connecting this area to the existing Oklahoma EHV system at Gracemont.

WV Transco: Kammer 345/138 kV Rebuild/Expansion

**Description:** The Kammer project provides the network upgrades to maintain grid reliability for generation retirements. The project includes new circuit breakers in the 765 kV and 345 kV yards, and a complete rebuild of the 138 kV yard at Kammer Station.

**Estimated Cost:** $165 million.

**Status:** Expected in-service date of December 2015.

**Investment Partners:** None.

**Benefits:** The Kammer project will ensure continued reliable service to the region after the retirement of 630 MW of generation.
Kanawha Valley Area (KVA) Improvements

Description: The Kanawha Valley Area project provides network upgrades to maintain grid reliability in West Virginia for generation retirements. The project includes rebuilding a 52 mile double-circuit 138 kV line and establishing a connection between the Mountaineer and Sporn Stations via a new 765/345 kV transformer.

Estimated Cost: $252 million.

Status: Expected in-service date of December 2016.

Investment Partners: None.

Benefits: The KVA project will not only meet the immediate needs to maintain grid reliability, but position the region well for future growth.
Company Background:

- Ameren Corporation serves 2.4 million electric customers and 900,000 natural gas customers across 64,000 square miles in Illinois and Missouri. Ameren has three subsidiaries which are transmission-owning members of the MISO. The three companies own and operate approximately 7,500 miles of transmission lines.

- Ameren Transmission Company (ATX) is the transmission development subsidiary. ATX was formed in July 2010 and is dedicated to regional electric transmission infrastructure investment.

- Ameren Illinois Company (AIC) delivers electric and gas service to its customers in Illinois.

- Ameren Missouri is a vertically integrated utility providing electric and gas service in central and eastern Missouri.

- Between 2003 and 2012, Ameren invested approximately $694 million in transmission.

Grand Rivers Projects

Description: The approved Grand Rivers Projects consist of three new transmission projects in Illinois and Missouri consisting of over 500 miles of 345kV transmission lines. These projects are named Illinois Rivers, Mark Twain and Spoon River.

The Illinois Rivers project consists of approximately 375 miles of 345 kV transmission from northeastern Missouri, crossing the Mississippi River and continuing east across Illinois to the Indiana Border.

The Mark Twain project is approximately 90 miles of 345 kV transmission from the Missouri- Iowa border in northeast Missouri connecting to the Missouri terminus of the Illinois River project.

The Spoon River project consists of 70 miles of 345 kV transmission in Northwest Illinois. (A portion of the Spoon River project may be built by another MISO transmission owner in accordance with the MISO Transmission Owners Agreement.) These three projects will primarily be constructed by Ameren Transmission Company of Illinois. Fiber Optic Shield Wire will be used throughout the project to facilitate high speed relaying, with the potential to be used for data pathways for smart grid development. Additionally, at least one advanced technology; low-loss transformer will be installed.
Cost: Over $1.3 billion.

Status: The Grand Rivers Projects were designated as Multi-Value Projects (MVPs) as part of the $6 billion of transmission investment included in the 2011 MISO Transmission Expansion Plan which was approved by the MISO Board of Directors on December 8, 2011. In May 2011, the Illinois Rivers Project received FERC approval for incentive ratemaking treatment, including Construction Work in Progress (CWIP), use of a hypothetical capital structure during construction, and future recovery of abandonment costs. In November 2012, the same incentive ratemaking treatment was also approved by FERC for the Mark Twain and Spoon River projects. After close to 100 public meetings throughout Illinois on the proposed Illinois Rivers route, a filing with the Illinois Commerce Commission was made in November 2012 requesting a Certificate of Public Convenience and Necessity. In August 2013, the Illinois Commerce Commission (ICC) issued an order supporting the need for the project and granting a Certificate of Public Convenience and necessity (CPCN) for the construction of portions of the Illinois Rivers transmission project. In February 2014, the ICC issued a final order approving the remaining substations and routes for the Illinois Rivers project. The first substation is expected to be placed into service in 2015. The first transmission line sections of Illinois Rivers are expected to be in-service in 2016, with all portions of the project expected to be completed by the end of 2019.

The Mark Twain and Spoon River projects are both in the planning and design stage. Both are expected to be placed into service by the end of 2018.

Investment Partners: None.

Benefits: Collectively, with the other MISO-approved MVPs, these projects will enable the integration of wind and other renewable energy resources into the MISO system to meet the MISO member renewable energy standards and goals. They enhance the reliability of the bulk electric system and improve the MISO market efficiency by reducing energy production costs. They also provide the system with flexibility and resiliency as the generators in MISO implement their plans for environmental compliance, including possible generation plant closures.

Fargo – Mapleridge

Description: The project involves the construction of a new substation near Peoria, Illinois (Mapleridge) that will split the existing Duck Creek – Tazewell 345 kV line into two circuits. From Mapleridge, a new 345 kV line will be extended in a northerly direction, approximately 16 miles, to the existing Fargo substation. The project includes a new 345/138 kV transformer at Fargo. Fiber Optic Shield Wire will be installed to facilitate high speed relaying and communication. This project will be constructed by Ameren Illinois.

Cost: $80 million.

Status: The public meeting process was completed in late 2012 and a Certificate of Public Convenience and Necessity (CPCN) filing was made with the Illinois Commerce Commission (ICC) in February 2013. In September 2013, the ICC granted the CPCN for the project. Design
and easement acquisition activities for the project are in progress. The planned in-service date of the project is December 2016.

**Investment Partners:** None.

**Benefits:** This project will eliminate the risk of low voltages on the north side of Peoria, Illinois.

### Bondville – SW Campus

**Description:** The project involves the construction of nine miles of new 138 kV line near Champaign, Illinois and upgrades to the existing Bondville and Southwest Campus substations, including multi-breaker 138 kV ring busses at each station. This project will be constructed by Ameren Illinois.

**Cost:** $45 million.

**Status:** A Certificate of Public Convenience and Necessity was received from the ICC in August 2012. Design and easement acquisition for the project are nearing completion. Construction at the Bondville and SW Campus substations is underway and the transmission line construction is targeted to begin in March 2014. The planned in-service date of the project is June 2015.

**Investment Partners:** None.

**Benefits:** This project reduces the risk of potential loss of load and voltage collapse due to multiple outages of transmission lines and transformers in the Champaign area.

### Brokaw – South Bloomington

**Description:** The project involves the construction of approximately six miles of new 345 kV line near Bloomington, Illinois and upgrades to the existing Brokaw and South Bloomington substations. The project includes a new 345/138 kV transformer at South Bloomington. This project will be constructed by Ameren Illinois.

**Cost:** $30 million.

**Status:** A Certificate of Public Convenience and Necessity was received from the ICC in September 2012. Design and easement acquisition for the project are underway. The planned in-service date of the project is December 2015.

**Investment Partners:** None.

**Benefits:** This project is needed to avoid potential future loss of load due to a common tower outage involving two 138 kV lines.
Latham – Oreana

Description: The project involves the construction of nine miles of new 345 kV line north of Decatur, Illinois from the Oreana substation to a new tap on the existing line from Clinton to Latham. The project also includes the construction of 345 ring buses at Oreana and Latham and other substation upgrades. This project will be constructed by Ameren Illinois.

Cost: $30 million.

Status: A Certificate of Public Convenience and Necessity was received from the ICC in April 2011. The transmission line portion of the project was placed in-service in October 2013 and the Oreana Substation was placed in-service in November 2013. The remaining portion of the project, the Latham substation modifications, is planned to be in service by December 2014.

Lutesville – Heritage

Description: This project involves the construction of a new 14 mile 345 kV transmission line from the existing Lutesville Substation to a new 345/138 kV substation (Heritage) northwest of Cape Girardeau, Missouri. Fiber Optic Shield Wire will be installed to facilitate high speed relaying and communication. This project will be constructed by Ameren Missouri.

Cost: $60 million.

Status: A Certificate of Public Convenience and Necessity was received from the Missouri Public Service Commission in April 2013. The design and easement acquisition activities for this project are currently in progress. The planned in-service date of the project is June 2016.

Investment Partners: None.

Benefits: This project is necessary to avoid the potential loss of more than 300 MW of load in the Southeast Missouri area due to multiple contingencies. The project is also needed to assure adequate post-contingency voltages and maintain facility loadings within ratings.
Company Background:

• ATC started business on January 1, 2001 as the first multi-state, transmission-only utility in the United States. ATC has a single focus: transmission. ATC’s transmission system allows energy producers to transport electric power from where it’s generated to where it’s needed similar to the interstate highway system with high-voltage electricity traveling on the transmission system wires like vehicles on the highway.

• ATC provides electric transmission service in an area from the Upper Peninsula of Michigan, throughout the eastern half of Wisconsin and into portions of Illinois. The 9,480 circuit miles of high-voltage transmission lines and 529 substations provide communities with access to local and regional energy sources.

• ATC operates their $3.3 billion transmission system as a single entity. As a public utility whose infrastructure serves as the link in transporting electricity to millions of electricity users, ATC has duties and responsibilities to:
  • Operate the transmission system reliably;
  • Assess the ability of the system to adequately meet current and future needs;
  • Plan system upgrades to meet those needs in the most efficient, effective, and economic ways;
  • Construct upgrades in time to meet those needs; and
  • Maintain the transmission equipment and surroundings to minimize opportunity for failures.

• Between 2003 and 2012, ATC invested nearly $3.0 billion in transmission.

Badger Coulee

Description: The Badger Coulee project consists of 160 to 180 miles of new single-circuit, 345 kV transmission line from Xcel Energy’s Briggs Road Substation near La Crosse to ATC’s North Madison Substation near Madison, Wisconsin and will continue to ATC’s Cardinal 345 kV Substation in the town of Middleton (Dane County, Wisconsin).

Cost: Approximately $514 million to $552 million, depending on ordered route.

Status: Following public input, ATC and Xcel Energy filed an application with the Public Service Commission of Wisconsin (PSCW) in October 2013. If approved by the PSCW, construction of the new line would begin in 2016 to meet an in-service date of late 2018.
Investment Partners: ATC and Xcel Energy are investment partners. Eligible for cost sharing as a MISO Multi-Value Project (MVP).

Benefits: This project is a multiple benefits project providing economic, reliability, and public policy benefits to ATC and Xcel Energy, their customers and the MISO region. Economic benefits were evaluated for a variety of future scenarios; the project demonstrated economic benefits in every future. Reliability benefits include second contingency voltage collapse avoidance, single contingency voltage support and thermal relief, improved generation stability response, and improved import capability. Public policy benefits include allowing more import of higher-capacity wind. All of these benefits have been monetized and the sum of the benefits exceeds the cost of the project in six of six futures studied. MISO regional benefits include providing a regional backbone that can be utilized for allowing additional wind generation resources to be interconnected and delivered to the system.

Cardinal Bluffs

Description: The Cardinal Bluffs project consists of approximately 115 miles of new single-circuit, 345 kV transmission line from Dubuque County, IA area to Dane County, WI. The new line will interconnect a new 345 kV substation on ITC Holdings Corp.’s Salem – Hazelton line in Dubuque County, IA to American Transmission Co.’s Cardinal 345 kV Substation in the Town of Middleton (Dane County, WI). An intermediate substation connection to the existing ATC system also will be included as part of the project.

Cost: Approximately $458 million in nominal dollars.

Status: This project has a projected in-service date of 2018-2020.

Investment Partners: ATC and ITC are investment partners. This project is eligible for cost sharing as a MISO MVP project.
Benefits: This project is a multiple benefits project providing economic, reliability, and public policy benefits to ATC and ITC, their customers, and the MISO region. Economic benefits were evaluated for a variety of future scenarios; the project demonstrated economic benefits in every future.

Reliability benefits include voltage support, thermal relief, and improved transfer capability. Public policy benefits include allowing more development and import of higher-capacity wind. All of these benefits have been monetized and the sum of the benefits exceeds the cost of the project in six of six futures studied. MISO regional benefits include providing a regional backbone that can be utilized for allowing additional wind generation resources to be interconnected and delivered to the system.

Pleasant Prairie - Zion Energy Center

Description: The Pleasant Prairie - Zion Energy Center project consists of approximately 5.3 miles of new single-circuit, 345 kV transmission line from ATC’s Pleasant Prairie Substation in Kenosha, Wisconsin to the Zion Energy Center Substation owned by Commonwealth Edison (ComEd) in northern Illinois.

Cost: Approximately $34 million.

Status: This project was approved in May 2012 by the PSCW and the Illinois Commerce Commission. Construction began in early 2013 and the line was placed in service in December 2013.

Investment Partners: None. Eligible for cost sharing as a MISO MVP project.

Benefits: The project provides savings for electric utilities and their customers by helping to relieve transmission system congestion throughout the region and enables the most efficient generators to supply power to the energy market in addition to enabling utilities to buy and sell power when it is economic to do so.

The project also improves electric system reliability, locally and regionally, by adding an additional high-voltage line to strengthen the interstate transmission connection between Wisconsin and Illinois and enabling better regional access to emergency sources of power generation.

The project is an approved MISO MVP because of its contribution in efficiently enabling renewable wind energy to be accessed by loads further east in the MISO and PJM footprints and because it provides economic savings to the MISO Energy Market footprint.
Rockdale - Cardinal

**Description:** The Rockdale - Cardinal project consists of approximately 32 miles of new single-circuit, 345 kV transmission line connecting the Rockdale Substation located near Christiana with the Cardinal Substation. Both substations required some equipment upgrades to support this new line.

**Cost:** Approximately $152 million.

**Status:** This project was approved in the summer of 2009 by the PSCW. Construction began in 2011 and was placed in service in February 2013.

**Investment Partners:** None. Received MISO Regional Expansion Criteria and Benefits I cost sharing as a Baseline Reliability Project.

**Benefits:** This project will improve reliability for Dane County and the MISO region. In recent years, Dane County has experienced some of the highest growth rates in the state, both in population and electricity usage. The existing transmission system in and around Dane County brings power in from outside the county to meet the needs for electricity. However, the system is operating at its limits and additional transmission lines are needed to keep pace with growing demand.

Smart Grid Investment Grant Projects

**Description:** The Smart Grid Investment Grant Projects consist of constructing approximately 85 miles of additional fiber optic infrastructure to connect ATC facilities, as well as the installation of 32 satellite nodes and 45 Phasor Measurement Units (PMU).

**Cost:** Approximately $25.4 million.

**Status:** ATC has negotiated a contract with the U.S. Department of Energy (DOE) that outlines reporting requirements and benefit documentation, among other metrics; the agreement was signed by the CEO in April 2010. The program of work was completed in November 2013.

**Investment Partners:** The U.S. DOE and the Department of Treasury, through the American Recovery and Reinvestment Act (ARRA).

**Benefits:** This project was developed to enhance communication reliability and data gathering capability.
Straits Flow Control

**Description:** The Straits Flow Control project consists of installing a VSC back-to-back HVDC device at a new Mackinac 138-kV substation and in series with the Straits - McGulpin 138 kV lines in the eastern portion of the Upper Peninsula of Michigan. The new Mackinac 138 kV substation will connect the 138 kV circuits in the area with the flow control device.

**Cost:** Approximately $130 million.

**Status:** Construction began in 2012 with an anticipated in-service date of August 2014.

**Investment Partners:** None.

**Benefits:** Power flow control in the eastern Upper Peninsula will adjust flows to more manageable levels, reduce system losses, improve power quality and reliability of service for local customers, and maintain reliability during maintenance work.

This project is designed to protect the Upper Peninsula system from heavy flows both east to west and west to east as system flows change. This project also has the potential to support renewable energy in the Upper Peninsula and generation changes in the Lower Peninsula.
Bay Lake Initial

Description: The initial Bay Lake project includes:

- approximately 45 miles of new single-circuit, 345 kV transmission line between a new 345-138 kV substation near the existing North Appleton substation and the existing Morgan substation north of Green Bay, Wisconsin,
- a new parallel 138 kV line,
- a new approximately 60 mile 138 kV line between Holmes and Escanaba Michigan, and
- a 150 Mvar, 138 kV SVC at a new Benson Lake Substation near Amberg, Wisconsin.

Cost: Approximately $293 - 415 million.

Status: This project has received MISO Board approval. Following public input, ATC filed an application with the Public Service Commission of Michigan for the Holmes to Escanaba portion in October 2013. ATC expects to file an application for the remaining portions of the initial project with the Public Service Commission of Wisconsin in early 2014. If approved by the Commissions, construction of the initial project could begin by 2015 with in-service dates for some project components as early as 2016 and 2017. Other phases of the project, beyond the initial, have been suspended pending future developments affecting the need for remaining phases.

Investment Partners: None. Cost sharing as a MISO reliability project.

Benefits: Addresses urgent load serving needs of Northern Wisconsin and the Upper Peninsula of Michigan due to recent changes in generation critical to reliability in the study area, operational changes underway at area generators resulting in loss of capacity, recent system performance information highlighting an increased knowledge of risk of loss of load events for this area, load increase due to impending behind-the-meter generation retirements, and multiple significant loss of load events in the past eight years.
Company Background:

- APS delivers electricity to more than one million customers in 11 of Arizona's 15 counties.
- System-wide, there are approximately 2,933 circuit miles of 230 kV and above high-voltage transmission lines that APS operates and either wholly or partially owns.
- APS is and has been an active participant in WestConnect.
- Planning activities and the FERC Order 1000 compliance activities are coordinated by this organization.
- Between 2003 and 2012, APS invested approximately $1.0 billion in transmission.

**Hassayampa - North Gila 500 kV Project**

**Description:** The Hassayampa - North Gila 500 kV Project consists of approximately 112 miles of new single-circuit, 500 kV transmission line between Hassayampa Switchyard located near the Palo Verde Hub (the area around the Palo Verde Nuclear Generating Station) and the existing North Gila Substation (northeast of Yuma). The line will be built on tubular or lattice tower structures 130-150 feet high, spaced approximately 600-1,800 feet apart.

**Cost:** Approximately $300 million.

**Status:** The Arizona Corporation Commission (ACC) granted APS a Certificate of Environmental Compatibility (CEC) on January 23, 2008. Most materials have been received and construction is about 20% complete. The project has an anticipated in-service date of 2015.

**Investment Partners:** None.

**Benefits:** This project will provide the electrical transmission infrastructure to import power into the high-growth Yuma area from additional generation resources around the Palo Verde Hub.

The project will improve the reliability between Arizona and California. It will also improve the reliability of the APS system in the Yuma area by providing an additional high-voltage transmission source to the region. The project will provide Arizona load serving entities access
to geothermal and solar renewable resources in the Imperial Valley area of California. The project will help the development of new solar generation located along the corridor where interconnection requests have been received.

### Palo Verde Substation - Delaney Substation - Sun Valley Substation - Morgan Substation - Pinnacle Peak Substation 500 kV Projects

**Description:** The Palo Verde Substation - Delaney Substation - Sun Valley Substation - Morgan Substation - Pinnacle Peak Substation 500 kV Projects consist of approximately 110 miles of new 500 kV transmission line connecting southwest Phoenix to northeast Phoenix. The project will consist of four segments: Palo Verde Substation to Delaney Substation; Delaney Substation to Sun Valley Substation; Sun Valley Substation to Morgan Substation; and Morgan Substation to Pinnacle Peak Substation.

**Cost:** Approximately $700 million.

**Status:** The ACC granted APS a CEC for the Palo Verde Substation to Delaney Substation to Sun Valley Substation 500 kV Transmission Project on August 17, 2005. The Palo Verde Substation to Delaney Substation portion is planned to be completed and operational by the summer of 2016. The Delaney Substation to Sun Valley Substation 500 kV Line Project is anticipated to be in service in 2016. The Sun Valley to Morgan 500 kV Transmission Line Project is anticipated to be in service by 2018. A CEC for the Sun Valley to Morgan Project was granted by the ACC on March 17, 2009. The Morgan to Pinnacle Peak 500/230 kV Transmission Project was placed into service in October 2010 and the ACC granted APS a CEC on February 13, 2007.

**Investment Partners:** Central Arizona Water Conservation District.

**Benefits:** This project will strengthen the entire Arizona and APS transmission system by providing an additional high-voltage transmission source to the Phoenix Metropolitan area, allowing the import of an additional 1,000 MWs of power from generating sources at, or around, the Palo Verde Hub. The project will connect three major transmission systems: the Navajo South system; the Palo Verde system; and the Four Corners system. The project will also strengthen the transmission system throughout the Phoenix Metropolitan area. The project will enable the development of new large-scale solar generation projects in the area.
North Gila Substation - Orchard (formerly TS8) Substation 230 kV Project

**Description:** The North Gila Substation - Orchard Substation 230 kV Project consists of approximately 13 miles of new 230 kV transmission line within the Yuma, Arizona load pocket. The project will consist of 500/230 kV transformers at North Gila Substation, the 230 kV line, and a new 230/69 kV substation.

**Cost:** Approximately $100 million.

**Status:** The ACC granted APS a CEC for the North Gila Substation to Orchard Substation 230 kV Transmission Project on January 26, 2012. The North Gila 500/230 kV transformers, North Gila Substation to Orchard Substation 230 kV line, and Orchard 230/69 kV Substation are planned to be completed and operational by the summer of 2018.

**Investment Partners:** None.

**Benefits:** This project serves the need for electric energy, improved reliability, and continuity of service for the greater Yuma area.

Sun Valley – Trilby Wash – Palm Valley 230 kV Project

**Description:** The Sun Valley – Trilby Wash – Palm Valley 230 kV Project consists of approximately 30 miles of new 230 kV transmission line within the western Phoenix Metropolitan area. It will be built as a double-circuit capable line. However, only one circuit will be installed initially. The second circuit will be installed as needed. In addition to the 230 kV line, the project will also include a new 230/69 kV substation at Trilby Wash with one 230/69 transformer.

**Cost:** Approximately $72 million.

**Status:** The Arizona Corporation Commission (ACC) granted APS a Certificate of Environmental Compatibility (CEC) on May 5, 2005 for the Sun Valley – Trilby Wash segment and on December 22, 2003 for the Trilby Wash - Palm Valley segment. The Trilby Wash - Palm Valley 230 kV line and Trilby
Wash Substation has an anticipated in-service date of 2015. The Sun Valley - Trilby Wash 230 kV line has an anticipated in-service date of 2016.

**Investment Partners:** None.

**Benefits:** This project is required to serve the electric energy needs in the western Phoenix Metropolitan area. The project will provide more capability to import power into the Phoenix Metropolitan area along with improved reliability and continuity of service for communities in the area including El Mirage, Surprise, Youngtown, Buckeye, and unincorporated Maricopa County.
CENTERPOINT ENERGY

Company Background:

- CenterPoint Energy, Inc., headquartered in Houston, Texas, is a domestic energy delivery company that provides electric transmission and distribution service, natural gas distribution, competitive natural gas sales and services, and pipeline and field services operations.
- The company serves more than five million customers in Arkansas, Louisiana, Minnesota, Mississippi, Oklahoma, and Texas.
- Assets total nearly $23 billion.
- With over 8,700 employees, CenterPoint Energy and its predecessor companies have been in business for more than 135 years.
- CenterPoint Energy Houston Electric (CenterPoint Energy) is the regulated electric transmission and distribution utility focused strictly on energy delivery within a 5,000 square-mile service area in and around Houston.
- CenterPoint Energy’s transmission infrastructure consists of approximately 3,700 circuit miles of overhead transmission lines and 26 circuit miles of underground transmission lines.
- Between 2003 and 2012, CenterPoint Energy invested approximately $750 million in transmission.

Mont Belvieu Area Upgrades

Description: The Mont Belvieu Area upgrade project consists of a new Jordan 345 kV / 138 kV substation, a new 800 MVA 345 kV / 138 kV autotransformer, and other miscellaneous transmission system upgrades. The Jordan substation will connect six 138 kV circuits (four existing and two new 0.9 mi lines) as well looping in an existing 345 kV circuit.

Cost: The project is estimated to cost approximately $42 million.

Status: The project was approved by the Electric Reliability Council of Texas (ERCOT) Regional Planning Group in March 2012. Construction began in early 2013 with several of the upgrades completed by May 2013. The overall project, including the installation of the 800 MVA 345 kV / 138 kV autotransformer is scheduled for completion by May 2014.

Investment Partners: None.

Benefits: The completion of this project will provide necessary real and reactive power support in response to significant industrial customer load growth at both existing substations and several new industrial customer substations in the area. Additional reliability will be provided for system protection purposes by limiting the number of in-series industrial customer substations and providing a dual pilot relaying scheme.
Freeport Area Upgrades

Description: The Freeport area is a 69 kV load pocket located in the far southern portion of the CenterPoint Energy transmission system. The 69kv load pocket is connected to the rest of the transmission system by two 138/69kV autotransformers that are more than 40 years old and one long 69kV transmission line. The Freeport Area Upgrades Project consists of upgrading and converting all transmission facilities in the Freeport area to 138 kV operation.

Cost: The project is estimated to cost approximately $47 million.

Status: The project was approved by the Electric Reliability Council of Texas (ERCOT) Regional Planning Group in July 2012. Construction began in early 2013 with the overall project scheduled for completion by May 2015.

Investment Partners: None.

Benefits: The project will improve reliability of the Freeport area by replacing aging transmission structures and transformers that are nearing the end of their useful life and also provide storm hardening benefits in the Freeport area which is important given its close proximity to the Gulf of Mexico. All transmission circuits in the Freeport Area will be converted to 138kV operation and upgraded with high-temperature conductor allowing for future load growth in the area.
CONSOLIDATED EDISON, INC. (CON EDISON)

Company Background:

- Con Edison’s regulated electric business consists of Consolidated Edison Company of New York (CECONY) and Orange & Rockland Utilities (O&R).
- CECONY provides electric service to approximately 3.3 million customers in New York City and Westchester County.
- O&R provides electric service to 300,000 customers in southeastern New York and adjacent areas of northern New Jersey and eastern Pennsylvania.
- CECONY’s transmission infrastructure consists of approximately 749 circuit miles of underground electric transmission/sub-transmission and approximately 438 circuit miles of overhead electric transmission.
- O&R’s transmission consists of approximately 451 circuit miles of overhead electric transmission and approximately 27 circuit miles of underground electric transmission.
- Between 2003 and 2012, Con Edison invested approximately $2.0 billion in transmission.

**Ramapo – Sugarloaf 138 kV Line, Ramapo – Rock Tavern 345kV Line**

**Description:** O&R is developing a 138 kV line, Feeder 28, which will consist of 15 miles of new bundled 345 kV conductor between its Sugarloaf 138 kV substation in Orange County and the 138 kV side of Ramapo 345/138kV substation in Rockland County. The conductor will be installed on existing double circuit towers that presently carry a 345 kV line between Rock Tavern and Ramapo substations.

The O&R transmission project will be leveraged to establish a second 345 kV transmission line between CECONY’s Ramapo 345 kV substation and Central Hudson’s Rock Tavern 345 kV substation in northern Orange County. The Ramapo – Rock Tavern 345 kV line will consist of converting Feeder 28 to a 345kV line and adding 27 miles of new bundled 345 kV conductor between Sugarloaf substation and Rock Tavern 345 kV substations. Converting Feeder 28 will consist of relocating the connection within the
Ramapo substation from 138kV to 345kV and installing a new 345/138 kV step-down transformer at Sugarloaf substation.

Cost: The Ramapo – Sugarloaf 138kV (Feeder 28) project cost is approximately $30 million. The project cost for the Ramapo – Rock Tavern 345kV line is estimated at $130 million.

Status: Construction is underway for Feeder 28 and is on schedule to be in service by summer 2014. The Ramapo – Rock Tavern 345kV has been approved by New York’s Public Service Commission and is on schedule to begin construction in spring 2014 and be in service by summer 2016.

Investment Partners: Feeder 28 is being developed by O&R. The Ramapo – Rock Tavern 345kV line is part of the proposed NY Transco project portfolio. NY Transco is a proposed transmission company partnership owned by the NY Transmission Owners. The project is currently being developed by CECONY and will be transferred to NY Transco once it is formed.

Benefits: Ramapo – Sugarloaf 138kV (Feeder 28) addresses a local reliability need for the O&R system. This new feeder will serve as an additional supply to O&R to accommodate load growth.

The Ramapo – Rock Tavern 345kV line increases transmission capability into Southeastern New York providing additional consumer access to efficient, cost-effective generation. The line was submitted as part of a response to the New York Public Service Commission to address the goals of New York’s Energy Highway initiative. Specifically it is one of three state-approved transmission projects that address a potential reliability need in 2016 if nuclear plant Indian Point retires and is recognized for providing additional statewide benefits including developing a more robust electric grid and promoting economic development.

Staten Island Unbottling

Description: Phase One of this project will split an existing 345 kV double-leg transmission feeder, which runs between Goethals substation in Staten Island, NY and Linden Cogeneration substation in Linden, NJ, into two separate feeders. This will consist of relocating each terminal connection of the two-leg feeder into two separate connections at both Goethals and Linden substations.

Phase Two of the project will consist of installing ten refrigeration plants to force cool dielectric fluid for four underground 345kV transmission feeders running between Goethals substation and Gowanus and Farragut substations in Brooklyn.

Cost: Phase One and Phase Two project cost is approximately $250 million.
Status: The project has been approved by the New York Public Service Commission, and is on schedule to begin construction in spring 2014 and be in service by summer 2016.

Investment Partners: The project is part of the proposed NY Transco project portfolio. NY Transco is a proposed transmission company partnership owned by the NY Transmission Owners. The project is currently being developed by CECONY and will be transferred to NY Transco once it is formed.

Benefits: Phase One increases the reliability at Goethals substation by reducing the impact of losing the single existing feeder between Goethals and Linden Cogen substations. Phase Two relieves congestion by increasing transmission capacity by 200MW from Staten Island to Brooklyn, providing additional access to existing generation.

The Staten Island Unbottling project was submitted as part of a response to the New York Public Service Commission to address the goals of New York's Energy Highway initiative. Specifically it is one of three state-approved transmission projects that address a potential reliability need in 2016 if nuclear plant Indian Point retires and is recognized for providing additional statewide benefits including developing a more robust electric grid and promoting economic development.

Rainey – Corona 138 kV Line

Description: The new 138kV line within Queens County will supply power from Rainey 345kV transmission substation to Corona 138kV substation and will consist of approximately 7 miles of new underground 138kV solid dielectric cable as well as a new step-down 345/138 kV Autotransformer, a 138kV Phase Angle Regulator (PAR) and several new high voltage circuit breakers for the terminal substations.

Cost: The project cost is estimated at $220 million.

Status: The project is currently in the design engineering phase. Construction will begin in 2015 and the line is scheduled to be in service by summer 2018.

Investment Partners: None.

Benefits: The project addresses reliability deficiencies for two Transmission Load Areas encompassing Astoria, Corona, and Jamaica, Queens which were caused by the mothballing of two steam electric generation units in Astoria.
DUKE-AMERICAN TRANSMISSION COMPANY (DATC)

Company Background:


- DATC has proposed the Midwest Portfolio, a combination of transmission line projects that includes multiple phases in five Midwestern states. This portfolio fills performance gaps in the existing transmission grid to improve electric system reliability, market efficiency, and economic benefits to local utilities and will increase delivery of high-quality renewable resources.

- In April, 2013 DATC completed purchase of 72 percent of the capacity of Path 15, an 84-mile, 500-kilovolt transmission line in central California.

- Also, DATC has purchased the rights to develop the Zephyr Power Transmission Project, a proposed 950 mile transmission line that would deliver wind energy produced in eastern Wyoming to California and the southwest United States.

DATC Midwest Portfolio Phase 1 South (mileages and costs will be further refined)

Description: DATC Midwest Portfolio Phase 1 South consists of 11 miles of 345 kV transmission lines, 13 miles of 138 kV transmission lines, and one new 345 kV substation. The project will provide a more robust network north and west of Indianapolis, supporting continued delivery of economic power to area homes and businesses.


Status: DATC Midwest Portfolio Phase 1 South was identified as a “Best Fit Plan” in the MISO MTEP13 Market Efficiency Project (MEP) process and has been advanced to MTEP Appendix B. The project is being reviewed for possible inter-regional benefits in the MISO-PJM cross-border planning process. An anticipated in-service date of 2022 has been identified for this project.

States Served: MISO network customer states, most prominently Indiana.
Investment Partners: All DATC projects will be jointly owned by Duke Energy and American Transmission Company LLC. If selected as a MISO MEP, this project will be eligible for regional cost sharing.

Benefits: This phase of the DATC Midwest Portfolio provides multiple benefits including system reliability, market efficiency, and economic benefits to local utilities. It also enables increased delivery of high-quality renewable resources.

DATC Midwest Portfolio Phase 1 North (mileages and costs will be further refined)

Description: DATC Midwest Portfolio Phase 1 North consists of 75 miles of 345 kV transmission line. The project will provide a more robust network to bypass historical congestion southeast of Chicago and support continued flows of economic power between Illinois and Indiana in either direction, as dictated by market conditions.

Cost: Approximately $135.8 million (2013$).

Status: DATC Midwest Portfolio Phase 1 North is included in Appendix C of the 2013 MISO MTEP and is being reviewed for inter-regional benefits in the MISO-PJM cross-border planning process. An anticipated in-service date of 2022 has been identified for this project.

States Served: MISO and PJM network customer states, most prominently Illinois and Indiana.

Investment Partners: All DATC projects will be jointly owned by Duke Energy and American Transmission Company LLC.

Benefits: This phase of the DATC Midwest Portfolio provides multiple benefits including system reliability, market efficiency, and economic benefits to local utilities. It also enables increased delivery of high-quality renewable resources.

DATC Midwest Portfolio Phase 2 (mileages and costs will be further refined)

Description: DATC Midwest Portfolio Phase 2 consists of 43 miles of 345 kV double-circuit transmission lines connecting to Tazewell and Brokaw substations in central Illinois, a 117-mile 500 kV HVDC transmission line and two HVDC terminals. The project will span from central Illinois to western Indiana.


Status: DATC Midwest Portfolio Phase 2 is included in Appendix C of the 2013 MISO MTEP. An anticipated in-service date of 2023 has been identified for this project.
States Served: MISO network customer states, most prominently Illinois and Indiana.

Investment Partners: All DATC projects will be jointly owned by Duke Energy and American Transmission Company LLC.

Benefits: This phase of the DATC Midwest Portfolio provides multiple benefits including system reliability, market efficiency, and economic benefits to local utilities. It enables increased delivery of high-quality renewable resources. Furthermore, Midwest Portfolio Phase 2 uses advanced technology for improved system control and efficiency which will create a bypass for chronically congested lines south of Chicago.

DATC Midwest Portfolio Phase 3 (mileages and costs will be further refined)

Description: DATC Midwest Portfolio Phase 3 consists of 50 miles of single-circuit 345 kV transmission lines and three new substations. The project will span from northeastern Illinois to the Dumont substation in north-central Indiana.


Status: DATC Midwest Portfolio Phase 3 is included in Appendix C of the 2013 MISO MTEP and is being reviewed for inter-regional benefits in the MISO-PJM cross-border planning process. An anticipated in-service date of 2022 has been identified for this project.

States Served: MISO and PJM network customer states, most prominently Illinois and Indiana.

Investment Partners: All DATC projects will be jointly owned by Duke Energy and American Transmission Company LLC.

Benefits: This phase of the DATC Midwest Portfolio provides multiple benefits including system reliability, market efficiency, and economic benefits to local utilities. It also enables increased delivery of high-quality renewable resources.
DATC Midwest Portfolio Phase 4 (mileages and costs will be further refined)

Description: DATC Midwest Portfolio Phase 4 consists of 147 miles of double-circuit 345 kV transmission lines, 99 miles of single-circuit 345 kV transmission lines, 15 miles of single-circuit 161 kV transmission lines, a 435 mile 500 kV HVDC transmission line, a new HVDC terminal and five new AC substations. The project will span from northwestern Iowa to Central Illinois.


Status: DATC Midwest Portfolio Phase 4 is included in Appendix C of the 2013 MISO MTEP. An anticipated in-service date of 2024 has been identified for this project.

States Served: MISO network customer states, most prominently Iowa and Illinois.

Investment Partners: All DATC projects will be jointly owned by Duke Energy and American Transmission Company LLC.

Benefits: This phase of the DATC Midwest Portfolio provides multiple benefits including system reliability, market efficiency, economic benefits to local utilities and it enables increased delivery of high-quality renewable resources. Furthermore, Midwest Portfolio Phase 4 uses advanced technology for improved system control and efficiency.

DATC Midwest Portfolio Phase 5 (mileages and costs will be further refined)

Description: DATC Midwest Portfolio Phase 5 will consist of 145 miles of double-circuit 345 kV transmission lines, 36 miles of single-circuit 345 kV transmission lines and a 765-345 kV transformer. The project will span from the Gwynneville substation in central Indiana to the Beatty substation in central Ohio.


Status: DATC Midwest Portfolio Phase 5 is included in Appendix C of the 2013 MISO MTEP. An anticipated in-service date of 2023 has been identified for this project.

States Served: MISO and PJM network customer states, most prominently Indiana and Ohio.
Investment Partners: All DATC projects will be jointly owned by Duke Energy and American Transmission Company LLC.

Benefits: This phase of the DATC Midwest Portfolio provides multiple benefits including system reliability, market efficiency, economic benefits to local utilities and it enables increased delivery of high-quality renewable resources.

DATC Midwest Portfolio Phase 6 (mileages and costs will be further refined)

Description: DATC Midwest Portfolio Phase 6 will consist of 124 miles of double-circuit 345 kV transmission line. The project will span from the Lee County substation in north-central Illinois to the new DATC HVDC terminal in central Illinois.


Status: DATC Midwest Portfolio Phase 6 is included in Appendix C of the 2013 MISO MTEP. An anticipated in-service date of 2023 has been identified for this project.

States Served: MISO and PJM network customer states, most prominently Illinois.

Investment Partners: All DATC projects will be jointly owned by Duke Energy and American Transmission Company LLC.

Benefits: This phase of the DATC Midwest Portfolio provides multiple benefits including system reliability, market efficiency, economic benefits to local utilities and it enables increased delivery of high-quality renewable resources.

DATC Midwest Portfolio Phase 7 (mileages and costs will be further refined)

Description: DATC Midwest Portfolio Phase 8 will consist of a 55 mile single-circuit 345 kV line. The project will span from near the Paddock substation in southeastern Wisconsin to the Pleasant Valley substation in northeastern Illinois.


Status: DATC Midwest Portfolio Phase 7 is included in Appendix C of the 2013 MISO MTEP. An anticipated in-service date of 2022 has been identified for this project.

States Served: MISO and PJM network customer states, most prominently Wisconsin and Illinois.
**Investment Partners:** All DATC projects will be jointly owned by Duke Energy and American Transmission Company LLC.

**Benefits:** This phase of the DATC Midwest Portfolio provides multiple benefits including system reliability, market efficiency, economic benefits to local utilities and it enables increased delivery of high-quality renewable resources.

**DATC Project 8 (mileages and costs will be further refined)**

**Description:** DATC Project 8 will consist of a 7 mile 345 kV line constructed in parallel with an existing 345 kV line to create a double circuit 345 kV line. The project will span from a new DATC 8 substation located on the Miami Fort – West Milton line to the Woodsdale substation northwest of Cincinnati.

**Cost:** Approximately $25 million (2013$).

**Status:** DATC Project 8 has been submitted to the PJM MEP process and will be evaluated for PJM regional benefits. An anticipated in-service date of 2020 has been identified for this project.

**States Served:** PJM network customer states, most prominently Ohio.

**Investment Partners:** All DATC projects will be jointly owned by Duke Energy and American Transmission Company LLC.

**Benefits:** This DATC project provides multiple benefits including system reliability, market efficiency, economic benefits to local utilities and it addresses multiple congested Cincinnati-area system elements.
Zephyr Power Transmission Project

Description: The Zephyr Power Transmission Project is a 950 mile 500 kV high-voltage direct-current line. The line will have a 3,000 MW capacity. The Zephyr project would originate in Chugwater, Wyoming and would terminate in the Eldorado Valley just south of Las Vegas.

Cost: Approximately $3.5 billion.

Status: The Zephyr Power Transmission Project is proposed with an anticipated in-service date of 2020.

States Served: Multiple, potentially including Wyoming, Utah, Nevada, California and others.

Investment Partners: All DATC projects will be jointly owned by Duke Energy and American Transmission Company LLC.

Benefits: DATC’s Zephyr project creates a highly efficient and strategic connection between the wind-rich areas of Wyoming and electricity load centers in California and the southwestern U.S.
DUKE ENERGY

Company Background:

- Duke Energy is the largest electric power holding company in the United States with more than $100 billion in total assets.

- Duke Energy’s regulated utility operations serve more than 7 million electric customers located in six states in the Southeast and Midwest (North Carolina, South Carolina, Florida, Indiana, Ohio, and Kentucky) over a 100 thousand square-mile service territory.


- Duke Energy owns and operates approximately 32,000 circuit miles of transmission.

- Duke Energy is engaged in transmission investment within their regulated utilities as well as in subsidiary joint ventures.

- Duke Energy participates in the Eastern Interconnection Planning Collaborative as well as in MISO, PJM, the North Carolina Transmission Planning Collaborative, the Southeastern Regional Transmission Planning process, and the FRCC transmission planning region.

- Between 2003 and 2012, Duke Energy (including previous Progress Energy Inc.) invested approximately $4.0 billion in transmission.
Harris Plant – RTP 230 kV Transmission Line Project – DEP

**Description:** The Harris Plant – RTP 230 kV Transmission Line Project consists of approximately 14 miles of new 230 kV transmission line and converts seven miles of 115 kV transmission line to 230 kV from Harris Plant to a new RTP 230 kV substation.

**Cost:** Approximately $49 million.

**Status:** The project is under construction. The RTP 230 kV substation and 14 miles of new line are in-service. The remainder of the project is scheduled for completion by June 2014. All rights-of-way have been acquired and engineering is complete.

**Investment Partners:** None.

**Benefits:** This project benefits the regional transmission grid.

Jacksonville 230 kV Static VAR Compensator - DEP

**Description:** Install a 300 MVAR 230 kV Static VAR Compensator (SVC) at the Jacksonville 230 kV Substation.

**Cost:** Approximately $31 million.

**Status:** The project was placed in service in May 2013.

**Investment Partners:** None.

**Benefits:** This project was identified during a dynamic evaluation of DEP’s Eastern System during periods of increased imports. The analysis indicated that under certain faulted conditions that DEP East’s transmission network along the coast of North Carolina would be unable to maintain adequate voltage support. The lack of voltage support in the coastal area means that voltage recovery following certain faults is inadequate to maintain proper voltage. The addition of this static VAR compensator mitigates the voltage concern.
Intercession to Gifford - 230 kV 3000 Amp Ckt 1 Transmission Project - DEF

**Description:** Construct new 13 mile, 230 kV transmission line from Intercession City substation to Gifford substation.

**Costs:** $37.2 million.

**Status:** The project was completed in July 2013.

**Investment Partners:** None.

**Benefits:** The new Intercession City-Gifford 230 kV relieves overloads caused by Category B and C5 contingencies, by supplying an alternate path of power-flow into Orlando load pocket. In addition to mitigating overloads, this new path will also provide support to DEF’s transmission grid assisting with maintenance outages as well as contributing to reduced flows across DEF’s 69 kV grid. Intercession City-Gifford 230 kV will enhance both DEF’s ability as well as neighboring utilities’ to provide safe and reliable electricity to homes, schools, and businesses in the region.

This new transmission line was identified as the most cost-effective and efficient means to both increase the capability of the existing 230 kV network and serve the increasing load and customer base in the central Florida region. The majority of the transmission line will reside within a TLSA certified corridor and will adhere to the applicable design, construction, operational, environmental, and safety requirements.
Kathleen to Zephyrhills N – 2nd 230 kV line Transmission Project - DEF

Description: Construct an additional 11 mile, 230 kV transmission line between the Kathleen and Zephyrhills North substations.

Cost: $22.0 million.

Status: The project was completed in September 2013.

Investment Partners: None.

Benefits: An additional source is needed to the Tarpon Springs – Zephyrhills (TZ) 69 kV line in southern Pasco County, for load and voltage support as well as redundancy for the radial Kathleen – Zephyrhills North 230 kV line. DEF plans to achieve this by building a second 230 kV line from Kathleen to Zephyrhills North.

Without this proposed project, for the event of an outage of the single existing 230 kV Kathleen - Zephyrhills North line, numerous facilities will be overloaded and experience low voltages in this area between DEF, Tampa Electric Company, and Withlacoochee River Electric Cooperative. On certain high load days, the Energy Control Center Operators from the three utilities perform pre-contingency remedial switching in anticipation of the outage. If the contingency occurs, additional remedial switching may be performed, and load curtailment may be needed to alleviate overloading and undervoltages.
ENTERGY CORPORATION

Company Background:


- Entergy’s service territory covers more than 114,000 square miles in Arkansas, Louisiana, Mississippi, and Texas.

- System-wide, there are approximately 15,400 circuit miles of transmission lines.

Holland Bottom to Beebe to Garner 161 kV Project

Description: This project is located northeast of Little Rock, AR and will be constructed in two phases. Phase 1 includes constructing a new 161 kV line from the new Holland Bottom 500/161 kV substation to the existing Beebe 115 kV station, and installing a 161/115 kV autotransformer at Beebe. Phase 2 of the project includes continuing the new 161 kV line from Beebe to the existing Garner 115 kV substation and constructing a 161 kV substation to tap into the Copper Springs-to-Searcy South 161 kV line section.

Cost: Approximately $73 million.

Status: Phase 1 of the project is expected to be in service by the summer of 2019; and, Phase 2 of the project is expected to be in service by the summer of 2021.

Investment Partners: None.

Benefits: This project addresses future load growth and reliability needs in the northeast Little Rock area.
Hot Springs Milton to Carpenter Dam 115 kV Project

**Description:** This project is located southwest of Hot Springs, AR and will involve the construction of a new 17-mile 115 kV line connecting Hot Springs Milton to Carpenter Dam. This new line will supply a new distribution substation and will also eliminate the radial line from Mt. Pine South to Hot Springs Milton by completing an additional loop in the Hot Springs area.

**Cost:** Approximately $61 million.

**Status:** This project is expected to be in service by the summer of 2016.

**Investment Partners:** None.

**Benefits:** This project addresses future load growth and reliability needs in the southwest Hot Springs area.

Osceola Area: Construct New 500/230 kV Substation

**Description:** This project, located in northeast Arkansas, involves cutting in a new Driver 500 kV substation on the existing San Souci – Shelby 500 kV line. Driver substation will be constructed with two 500/230 kV autotransformers serving the new Driver 230 kV station.

**Cost:** Approximately $76 million.

**Status:** The project is expected be placed in service by the winter of 2015.

**Investment Partners:** None.

**Benefits:** This project addresses future load growth and reliability needs in northeast Arkansas.
Southeast Arkansas Reliability Projects

Description: Three projects located in southeast Arkansas are involved in the construction of a new 230 kV transmission line (initially to be operated at 115 kV). Included in these projects are the construction of a new line from Lake Village Bagby to Macon Lake to Reed, and the construction of a new line from Reed to Monticello East. The projects also include the construction of a new switching substation at Reed.

Cost: Approximately $92 million.

Status: These projects are expected to be in service as follows: Lake Village Bagby to Macon Lake (summer 2014), Macon Lake to Reed (summer 2017) and Reed to Monticello East (summer 2020).

Investment Partners: None.

Benefits: This project addresses future load growth and reliability needs in the southeastern portion of Arkansas.

SELA Project Phase 2 and Phase 3

Description: The SELA Project Phase 2 and Phase 3, located in southeast Louisiana, involves the construction of a new 230 kV transmission line connecting the Peters Road 230 kV substation, a new Oakville 230 kV distribution substation, and the Alliance substation, which is located in lower Plaquemines Parish. The project also includes the installation of a 230-115 kV autotransformer at Alliance.

Cost: Approximately $58 million.

Status: Phase 2 was completed and placed in service in September 2012. Phase 3 of the project is currently under construction and is expected to be completed in 2015.

Investment Partners: None.

Benefits: This project addresses future load growth and reliability needs in southeast Louisiana.
Franklin to McComb 115 kV Project

Description: The Franklin to McComb 115 kV Project involves the construction of a new 230 kV transmission line (initially operated at 115 kV) from Franklin to the McComb Substation.

Cost: Approximately $60 million.

Status: This project is expected to be in service by the summer of 2020.

Investment Partners: None.

Benefits: This project addresses future load growth and reliability needs in the south Mississippi area.

Madison County Reliability Project

Description: This project includes constructing a new 230 kV line from the existing Bozeman Road 230 kV substation (currently a radial station) to the new Tinnin Road 230 kV substation, which will tap the existing Clinton Industrial to Gerald Andrus 230 kV line in northern Hinds County.

Cost: Approximately $58 million.

Status: This project is expected to be in service by the summer of 2017.

Investment Partners: None.

Benefits: This project addresses future load growth and reliability needs in the Madison County, Mississippi area.
Natchez Improvement Project

Description: This project includes constructing a new 230 kV line from Baxter Wilson 115 kV to Natchez SES 115 kV to initially be operated at 115 kV. The project will also include rebuilding the existing Baxter Wilson to Natchez SES 115 kV.

Cost: Approximately $146 million.

Status: This project is expected to be in service by the summer of 2018.

Investment Partners: None.

Benefits: This project addresses future load growth and reliability needs in the Natchez, Mississippi area.

Ponderosa to Grimes 230 kV Project

Description: The Ponderosa to Grimes 230 kV project is a long-term project located in the western area of Entergy Texas. The project includes the installation of a 345-230 kV autotransformer at Grimes, installation of a new 230-138 kV autotransformer at the Ponderosa switching station, and the construction of a new 230 kV line between Grimes and Ponderosa. The project also includes the upgrade of a 138 kV transmission line between the Ponderosa and Conroe substations.

Cost: Approximately $97 million.

Status: The project is expected to be in service in the summer of 2016.

Investment Partners: None.

Benefits: This project addresses both the future load growth and reliability needs in Entergy Texas’ western area as well as congestion in the Grimes substation area.
Orange County Project

Description: The Orange County project is a long-term project to be located north of the Beaumont/Port Arthur area in Texas. The project includes construction of a new 230 kV switching substation referred to as Chisolm Road, construction of a new 230 kV line from Hartburg to Chisolm Road, and cutting-in of the existing McLewis to Helbig and Georgetown to Sabine 230 kV lines. The project also includes the installation of a second 500-230 kV autotransformer at Hartburg.

Cost: Approximately $74 million.

Status: The project is expected to be in service in the summer of 2017.

Investment Partners: None.

Benefits: This project addresses future load growth and reliability needs in the east Texas area north of Beaumont.

Benton North to Benton South 115 kV Line

Description: This project, located in the southwest area of Little Rock, Arkansas, involves the construction of a new 115 kV transmission line and two substations to connect the Benton North and Benton South areas.

Cost: Approximately $28 million.

Status: The project was completed in April 2013.

Investment Partners: None.

Benefits: This project addresses future load growth and reliability needs in the southwest Little Rock area of Arkansas.
White Bluff Area Improvements

Description: These projects in the Pine Bluff area of central Arkansas include the reconfiguration of the White Bluff 500 kV substation, the addition of a new 500-230 kV autotransformer, and the construction of a new 230 kV transmission line from Entergy Arkansas’ White Bluff generating facility to Woodward Substation.

Cost: Approximately $66 million.

Status: The project is expected to be placed in service in the summer of 2016.

Investment Partners: None.

Benefits: This project addresses future load growth and reliability needs in the White Bluff/Woodward areas of central Arkansas.

AECC Hydro Station #2 to Gillett: Construct New 115 kV Line

Description: This project, located in east-central Arkansas, involves the construction of a new 30-mile-long 115 kV transmission line connecting Entergy Arkansas’ Gillett 115 kV Substation with AECC’s Hydro Station #2.

Cost: Approximately $26 million.

Status: The project is expected to be placed in service in the summer of 2016.

Investment Partners: None.

Benefits: This project addresses future load growth and reliability needs in the east-central area of Arkansas.
Willow Glen to Conway: Construct New 230 kV Line

**Description:** This project, located in the Baton Rouge industrial corridor of southeast Louisiana, involves the construction of a new 15-mile-long 230 kV transmission line between Entergy Gulf States Louisiana’s Willow Glen and Conway substations.

**Cost:** Approximately $61 million.

**Status:** The project is expected to be placed in service by the spring of 2014.

**Investment Partners:** None.

**Benefits:** This economic project addresses future load growth and reliability needs while also helping to maintain and improve import capabilities into the Amite South area of southeast Louisiana.

Iron Man to Tezcuco: Construct New 230 kV Line

**Description:** This project, located in southeast Louisiana, involves the construction of a new ten-mile-long 230 kV transmission line between Entergy Louisiana’s Tezcuco Substation and the new Iron Man 230 kV Switching Station.

**Cost:** Approximately $39 million.

**Status:** The project, which is currently under construction, is expected to be placed in service by the summer of 2015.

**Investment Partners:** None.

**Benefits:** This project addresses future load growth and reliability needs in southeast Louisiana.
Northeast Louisiana Improvement Projects

Description: This portfolio of projects, located in northeast Louisiana, involves three phases:

Phase 1: Construction of a new 230 kV transmission line (initially to be operated at 115 kV) between Entergy Louisiana’s Swartz and Oak Ridge substations.

Phase 2: Construction of a new double-circuit 230-115 kV transmission line between Entergy Louisiana’s Oakridge and the proposed Dunn substations.

Phase 3: Re-conductor of the existing Sterlington to Oak Ridge 115 kV transmission line.

Cost: Approximately $77 million.

Status: This portfolio of projects is being constructed in multiple phases. Phase 1 was completed in 2013; Phase 2 is expected to be placed in service by the summer of 2014; and Phase 3 is expected to be placed in service by the summer of 2015.

Investment Partners: None.

Benefits: This project addresses future load growth and reliability needs in northeast Louisiana.

Ray Braswell to Wynndale: Construct New 115 kV Line

Description: This project, located in central Mississippi, involves the construction of a new 230 kV line (initially operated at 115 kV) transmission line between Entergy Mississippi’s Ray Braswell and the proposed Wynndale substation.

Cost: Approximately $37 million.

Status: The project was completed in November 2013.

Investment Partners: None.

Benefits: This project addresses future load growth and reliability needs in central Mississippi.
Church Road to Getwell: Construct new 230 kV Line

**Description:** This project, located in northwest Mississippi, involves the construction of a new 230 kV transmission line between Entergy Mississippi’s Church Road and Getwell 230 kV substations.

**Cost:** Approximately $57 million.

**Status:** Church Road to Getwell was completed in May 2013.

**Investment Partners:** None.

**Benefits:** This project addresses future load growth and reliability needs in northwest Mississippi.

![Church Road to Getwell Map](image1)

Crown Zellerbach Area: Construct New 230/138 kV Substation

**Description:** This project, located in southeast Louisiana, involves constructing approximately 4 miles of new 230 kV transmission line to cut-in a proposed new 230-138 kV substation between the Fancy Point and Waterloo substations near the Crown Zellerbach 138 kV substation.

**Cost:** Approximately $21 million.

**Status:** The project is expected to be placed in service by the summer of 2017.

**Investment Partners:** None.

**Benefits:** This project addresses future load growth and reliability needs in southeast Louisiana.

![Crown Zellerbach Area Map](image2)
Mud Lake Area: Construct New 230 kV Substation

**Description:** This project, located in southwest Louisiana, involves constructing approximately 12 miles of new 230 kV transmission line to cut-in and out of the proposed new Mud Lake 230 kV substation between the Big 3 and Sabine 230 kV substations.

**Cost:** Approximately $59 million.

**Status:** The project is expected be placed in service by the fall of 2017.

**Investment Partners:** None.

**Benefits:** This project addresses future load growth and reliability needs in southwest Louisiana.

Fancy Point Substation: Add Second 500-230 kV Autotransformer

**Description:** This project, located in southeast Louisiana, involves the addition of a second 1,200 MVA, 500-230 kV autotransformer at the Fancy Point substation.

**Cost:** Approximately $21 million.

**Status:** The project is expected be placed in service by the summer of 2017.

**Investment Partners:** None.

**Benefits:** This project addresses future load growth and reliability needs in southeast Louisiana.
**Porter to Forest: Construct new 138 kV Transmission Line**

*Description:* This project, located near Conroe, Texas, involves the construction of an approximately 12-mile-long 138 kV transmission line between the existing Porter substation and the proposed Forest 138 kV substation.

*Cost:* Approximately $21 million.

*Status:* The project is expected be placed in service by the summer of 2016.

*Investment Partners:* None.

*Benefits:* This project addresses future load growth and reliability needs in support of Entergy Texas’ western region.

**China to Amelia: Construct New 230 kV Line**

*Description:* This project, located in east Texas, involves the construction of a new 230 kV transmission line between Entergy Texas’ China and Amelia 230 kV substations.

*Cost:* Approximately $31 million.

*Status:* The project, which is currently under construction, is expected be placed in service by the summer of 2016.

*Investment Partners:* None.

*Benefits:* This project addresses future load growth and reliability needs in east Texas.
EXELON

Company Background:

• Exelon is the leading U.S. competitive energy provider, with one of the cleanest and lowest-cost power generation fleets and largest retail customer bases in the country. The Exelon family of companies participates in every stage of the energy business, from generation to power sales to transmission to delivery. Headquartered in Chicago, the company has operations and business activities in 47 states, the District of Columbia and Canada. Exelon has approximately $23.5 billion in annual revenues and trades on the NYSE under the ticker symbol EXC.

• Through its BGE, ComEd and PECO utility subsidiaries, Exelon is one of the largest electrical and natural gas distribution companies in the nation. It delivers electricity to approximately 6.6 million customers in central Maryland (BGE), northern Illinois (ComEd) and southeastern Pennsylvania (PECO). It delivers natural gas to approximately 1.2 million customers in central Maryland (BGE) and the Philadelphia area (PECO).

• Exelon actively participates in the Eastern Interconnection Planning Collaborative (EIPC) and the PJM Regional Transmission Planning Process.

Baltimore Gas and Electric (BGE)

Company Background:

• Baltimore Gas and Electric (BGE) is a unit of Chicago-based Exelon Corporation (NYSE: EXC).

• BGE owns and operates a system of over 1,290 miles of transmission lines consisting of voltages of 115 kV, 230 kV, and 500 kV.
Conastone - Graceton - Raphael Road 230 kV Circuits

**Description:** The project consists of constructing and rebuilding 230 kV lines between Conastone, Graceton, and Raphael Rd. The total line length is approximately 29 miles. This improvement will create double-circuit connections between these substations with increased circuit capabilities. The existing 230 kV lines are of limited capacity and of single-circuit design.

**Cost:** Approximately $111 million.

**Status:** This project is currently in the design engineering phase. The in-service date is anticipated to be June 2017.

**Investment Partners:** None.

**Benefits:** This project maintains system reliability by avoiding NERC N-1-1 reliability criteria violations.

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**ComEd**

**Company Background:**

- Commonwealth Edison Company (ComEd) is a unit of Chicago-based Exelon Corporation (NYSE: EXC).
- ComEd owns and operates a system of over 5,000 miles of transmission lines consisting of voltages of 138 kV, 345 kV, and 765 kV, and has a peak summer load of more than 23,700 MW.
Chicago Southern Business District Burnham-Taylor 345 kV Project

Description: The Chicago Southern Business District Burnham-Taylor 345 kV Project consists of constructing approximately six miles of 345 kV XLPE cable in new duct packages (two cables per phase) between the Garfield and Taylor substations. The existing two High Pressure Fluid Filled (HPFF) cables will be reconfigured to a single-circuit and substation equipment will be upgraded to accommodate the changes.

Cost: Approximately $125 million.

Status: In progress and is targeted for completion in June 2014.

Investment Partners: None.

Benefits: This project will upgrade the existing capacity of the 345 kV system within the City of Chicago and enhance reliability.

Project to install two 300 MVAR SVCs at Prospect Heights Substation

Description: The Prospect Heights SVC Project consists of constructing two 138 kV, 300 MVAR SVCs at ComEd’s Prospect Heights substation in Chicago’s northwest suburbs.

Cost: Approximately $64.6 million.

Status: In progress and is targeted for completion in June 2014.

Investment Partners: None.

Benefits: This project will improve dynamic voltage recovery and system reliability.

Project to install two 300 MVAR SVCs at Crawford Substation

Description: The Crawford SVC Project consists of constructing two 138 kV, 300 MVAR SVCs at ComEd’s Crawford substation in the City of Chicago.

Cost: Approximately $77.8 million.

Status: Undergoing Preliminary Engineering and targeted for completion in June 2016.

Investment Partners: None.

Benefits: This project will improve dynamic voltage recovery and system reliability.
PECO Energy Company (PECO)

Company Background:

- PECO is a unit of Chicago-based Exelon Corporation (NYSE: EXC)
- PECO owns and operates a system of over 1,100 miles of transmission lines consisting of voltages of 69 kV, 130 kV, 230 kV, and 500 kV.

Chichester – Linwood 230kv circuits.

Description: The project consists of constructing and upgrading 2 230 kV lines between Chichester and Linwood substations. The total length is approximately 1.5 miles. This improvement will increase the capacity of both transmission lines by combining the two existing lines into one circuit and the construction of a new combination aerial / underground line along a distinct route from the existing lines. Substation equipment at both ends of the line will be upgraded to accommodate the change.

Cost: Approximately $52 million.

Status: This project is currently in the design engineering phase. The in-service date is anticipated to be June 2018.

Investment Partners: None.

Benefits: This project will upgrade the existing capacity of the 230 kV system serving the City of Philadelphia and Delaware County, and enhance reliability.
FIRSTENERGY

Company Background:

- FirstEnergy is a leading regional energy provider headquartered in Akron, Ohio. Our subsidiaries and affiliates are involved in the generation, transmission and distribution of electricity, as well as energy management and other energy-related services.

- Our 10 utility operating companies form one of the nation’s largest investor-owned electric systems based on serving 6 million customers in six states.

- Our generation subsidiaries currently control nearly 18,000 megawatts of capacity from a diversified mix of scrubbed coal, nuclear, natural gas, oil, hydroelectric pumped-storage and contracted wind and solar resources – including more than 1,900 megawatts of renewable energy.

- Our transmission subsidiaries operate approximately 24,000 miles of transmission lines connecting the Midwest and Mid-Atlantic regions. Between 2003 and 2013, FirstEnergy invested over $3 billion in transmission projects.

- We operate regional transmission control centers in Fairmont, West Virginia and Akron, Ohio.

- We produce approximately $15 billion in annual revenues, own $50 billion in assets, and have nearly 16,300 employees.

“Energizing the Future” Initiative

Description: Our “Energizing the Future” initiative is a comprehensive transmission construction program designed to enhance service reliability as power plants in the region are deactivated due to the significant cost of complying with U.S. Environmental Protection Agency mandates.

These projects include the construction of new 138 kilovolt (kV) and 345 kV transmission lines, constructing new transmission substations, and converting certain FirstEnergy generating units in northern Ohio to synchronous condensers, which are devices to regulate voltage.

Last year, we announced plans to invest an additional $2.8 billion over four years to expand this initiative. The main focus of the initial construction effort will be the 69 kV transmission power lines and substations in the Ohio Edison, The Illuminating Company, Toledo Edison and Penn Power areas.

Work on these new projects is expected to begin in 2014 and continue through 2017.

As part of this program, approximately 7,500 circuit miles of 69 kV and higher transmission lines will be evaluated and rebuilt, as needed. More than 170 substations will be inspected and upgraded, along with 70,000 transmission structures that will be evaluated and rebuilt, as needed.
Overall, the new transmission projects are designed to increase FirstEnergy’s load serving capability in areas where future economic growth is anticipated, particularly in Ohio’s shale gas regions; improve service reliability; create more flexibility when restoring service following storms; reduce line losses; and lower the company’s overall transmission maintenance costs.

Glenwillow-Bruce Mansfield Project

**Description:** The Glenwillow-Bruce Mansfield transmission project is part of the Energizing the Future initiative. The single-circuit 345 kV transmission line will run from the company’s Bruce Mansfield Plant in Pennsylvania to the new Glenwillow Substation under construction near Cleveland, Ohio. The transmission line is 114.5 miles long with the majority of it being installed on existing transmission structures and existing rights-of-way. The line and substation were approved by the Ohio Power Siting Board in 2013.

**Cost:** Approximately $151.2 million.

**Status:** Under construction. PJM-requested in-service date is June 1, 2015.

**Investment Partners:** None.

**Benefits:** Reinforces the transmission system as a result of generation plants planned for deactivation over the next several years.

Cleveland Area Synchronous Condensers

**Description:** Convert several generating units in the Cleveland area to synchronous condensers to provide dynamic reactive voltage support by 2015.

**Cost:** At the time of the asset transfer filing at FERC in July 2012, the total estimated cost of conversion, including the cost of the transferred assets, was $81.5 million.

**Status:** The first conversion was completed at Eastlake Unit 5 in July 2013. Conversion of other units is planned for June 2014 through June 2015.

**Investment Partners:** None.

**Benefits:** The conversion of the units to synchronous condensers is a more economical, effective and expedient solution based on initial installation and long-term operation costs.
ITC HOLDINGS CORP. (ITC)

Company Background:

- ITC Holdings Corp. (NYSE: ITC) is the nation’s largest independent electric transmission company.
- Headquartered in Novi, Michigan, ITC invests in the electric transmission grid to improve reliability, expand access to markets, lower the overall cost of delivered energy, and allow new generating resources to interconnect to its transmission systems.
- ITC’s regulated operating subsidiaries include ITC Transmission, Michigan Electric Transmission Company, ITC Midwest and ITC Great Plains. Through these subsidiaries, ITC owns and operates high-voltage transmission facilities in Michigan, Iowa, Minnesota, Illinois, Missouri, Kansas, and Oklahoma, serving a combined peak load exceeding 26,000 megawatts along 15,000 circuit miles of transmission line. Through ITC Grid Development and its subsidiaries, the company also focuses on expansion in areas where significant transmission system improvements are needed.
- From the company’s inception in 2003 through 2012, ITC invested nearly $3.4 billion in transmission.

ITC Midwest

Company Background:

- ITC Midwest, LLC is a wholly-owned subsidiary of ITC Holdings Corp., the nation’s largest independent electric transmission company. Based in Cedar Rapids, Iowa, ITC Midwest operates more than 6,600 circuit miles of transmission lines in Iowa, Minnesota, Illinois, and Missouri. ITC Midwest also maintains operating locations in Dubuque, Iowa City and Perry, Iowa; and Albert Lea, and Lakefield, Minnesota.
- ITC Midwest is a member of MISO.
Multi-Value Projects 3 & 4

**Description:** The proposed lines were defined in MISO’s MVP study, conducted with substantial input from transmission-owning utilities, load-serving entities, generation developers, and state utility commissions. The projects represent approximately 400 total miles of 345 kilovolt (kV) lines. ITC Midwest will construct and own approximately 225 miles of those lines. Project 3 will require the construction of approximately 145 miles of 345 kV line in Iowa and 70 miles of 345 kV line in Minnesota. ITC Midwest’s portion of Project 3 originates at ITC Midwest’s Lakefield Junction substation in southwest Minnesota, connecting east to the Winnebago area in south central Minnesota, and south to a new MidAmerican Energy substation that will be constructed near Algona, Iowa. Project 4 will connect Project 3 to ITC Midwest’s existing Hazleton 345 kV substation northeast of Waterloo, Iowa. The line will connect east to the Mason City area and then south to the Iowa Falls area, then east to the Hazleton substation. ITC Midwest will be responsible for approximately 110 miles of 345 kV line as part of Project 4.

**Costs:**

**Multi-Value Project 3:** Total estimated cost for all segments (ITC & Mid-American): $514 million.

**Multi-Value Project 4:** Total estimated cost for all segments (ITC & Mid-American): $591 million.

**Status:** ITC Midwest is currently working to identify potential routes and prepare filings to request the needed state regulatory approvals to build the line.

**Investment Partners:** None.

**Benefits:** In proposing the projects, MISO set out to accomplish several objectives, including improving the operations and efficiency of the regional energy markets, providing access to low-cost generation, reducing energy wasted because of constraints, inefficiency and line losses on the system, allowing for the optimal use of wind energy resources, and providing optionality for future energy solutions.
Salem-Hazleton Line

**Description:** The 345-kilovolt (kV) Salem-Hazleton line developed by ITC Midwest addresses long-standing reliability and system congestion issues in northeast Iowa. The line extends approximately 80 miles from the existing ITC Midwest Hazleton substation in Buchanan County to the company's existing Salem substation in Dubuque County. Approximately 54 miles of the new line are double-circuited with an existing 161 kV line west of the Hazleton substation. The Salem-Hazleton line completes a loop of more than 300 miles of 345 kV lines in eastern Iowa to help ensure electric reliability and reduce system congestion.

**Cost:** ITC Midwest estimated the line cost and costs for upgrades at termination substations at approximately $162 million.

**Status:** Following more than three years of RTO and regulatory review and approvals, ITC Midwest completed the line and placed it in service in the spring of 2013.

**Investment Partners:** None.

**Benefits:** The Salem-Hazleton line is needed to upgrade the electric transmission system in eastern Iowa to more reliably serve customer demand during normal operation and during times when elements of the system are unavailable due to planned or unplanned outages on the system. The Salem-Hazleton Line was studied and supported in the MISO (2006-09) Eastern Iowa Transmission Reliability Study (Eastern Iowa Study) as an efficient and cost-effective solution to correct long-standing reliability problems in eastern Iowa.

ITC Midwest Smart Grid Program

**Description:** The purpose of this project is to integrate the operations of the ITC Midwest electric system to an independent ITC EMS/SCADA system. Also, this project seeks to improve transmission system reliability, real-time monitoring capabilities, and event analysis capabilities by strategically implementing the following smart grid improvements to substations across the ITC Midwest: upgrading the Communications Infrastructure by deploying an advanced, digital network architecture that provides security, reliability, and greatly increased bandwidth; improving Real-Time Monitoring and Controls by deploying Remote Terminal Units (RTUs), substation intelligent alarming and asset health monitoring units that enable enhanced real-time observation and rapid analysis and response to system events; enhancing Event Analysis Capabilities by deploying GPS technology and relay communications networks to enable improved decision support and analytics capability; and migrating from Legacy, Proprietary Protocols to open, interoperable architectures that will better support additional smart grid technologies, such as SynchroPhasors, through the development of expanded, interoperable technology platforms.
This project encompasses over 150 substation RTU and relay communication networks and seven transformer monitoring units.

Cost: Approximately $35 million.

Status: This project is in the implementation stage. The project is forecasted to be completed by 2015.

Investment Partners: None.

Benefits: This project will fully transfer operations and control of the ITC Midwest electric system from Alliant Energy, the previous owner-entity of the system. The project contributes to furthering the development of smart grid functions by providing the ability to: develop, store, send, and receive digital information relevant to grid operations through intelligent devices; sense and localize disruptions or changes in power flows on the grid and communicate such information instantaneously and automatically for purposes of enabling automatic protective responses to sustain reliability and security of grid operations; detect, prevent, communicate with regard to, respond to, or recover from system security threats, including cyber security threats and terrorism, using digital information, media and devices; and support future smart grid technologies (i.e., SynchroPhasors) through the development of an expanded, interoperable technology platform.

This project will make the transmission system monitoring more robust and better able to integrate renewable energy sources. As the penetration of intermittent generation resources, such as wind, are increased on the transmission grid, the need for improved monitoring on the system also increases. Without adequate system monitoring and controls, intermittent generation creates issues for grid reliability, energy scheduling, and capacity planning. The project will enable an increased addition of renewable resources on the grid.

ITC Great Plains

Company Background:

• ITC Great Plains, LLC is a transmission-only utility with authority to construct, own, operate, and maintain a regulated, high-voltage transmission system in the Southwest Power Pool (SPP) region. Based in Topeka, Kansas, ITC Great Plains operates approximately 200 circuit miles of transmission lines in Kansas and Oklahoma. ITC Great Plains is a subsidiary of ITC Grid Development, LLC, a wholly-owned subsidiary of ITC Holdings Corp., the nation’s largest independent electric transmission company.

• ITC Great Plains is a transmission-owning member of SPP.
Kansas V-Plan

Description: The Kansas V-Plan project consists of approximately 200 miles of new double-circuit, 345 kV transmission lines designed to connect central and western Kansas. In cooperation with Sunflower Electric Power Corporation and Mid-Kansas Electric Company, ITC Great Plains will design and construct two segments of the V-Plan project totaling approximately 120 miles, from Spearville south to the new Clark County substation, then east to the Thistle substation that ITC will construct east of Medicine Lodge. Prairie Wind Transmission will construct the third section of the line, from Medicine Lodge to a termination point outside Wichita.

Cost: Approximately $300 million for ITC Great Plains portion.

Status: The Kansas V-Plan was approved by the SPP Board of Directors on April 27, 2010. FERC approved the novation agreement on June 24, 2011. The Kansas Corporation Commission (KCC) approved the siting application on July 12, 2011. Construction began in November 2012. The project is projected to be in service by late 2014.

Investment Partners: None.

Benefits: This project will improve electric reliability and enable renewable and other energy developers to tap into the transmission grid, further establishing a competitive energy market in the state. This will contribute to a stronger transmission grid that will benefit the entire region.
Elm Creek-Summit Project

Description: The Elm Creek to Summit Project is a new 60-mile, 345,000-volt (345 kV) line linking the existing 345 kV Summit Substation southeast of Salina, Kansas, to a new 345 kV substation southeast of Concordia, Kansas, to be located near the existing 230 kV Elm Creek Substation. ITC Great Plains, LLC (ITC), under a co-development agreement with Mid-Kansas Electric, LLC (MKEC), will construct, co-own with MKEC and operate the northern section of the line, and Westar Energy, Inc. (Westar) will construct, own, and operate the southern section. The Southwest Power Pool (SPP) requires this project to be in service no later than 2018. Currently we are targeting an in-service date of 2016.

Cost: Approximately $46.8 million for ITC Great Plains portion.

Status: The Kansas Corporation Commission approved the route for the project on August 27, 2013. The easement acquisition process began in the fourth quarter of 2013. The Southwest Power Pool (SPP) requires this project to be in service no later than 2018. Currently we are targeting an in-service date of 2016.

Investment Partners: Mid-Kansas Electric Company, LLC.

Benefits: This project will improve the reliability of the grid in central Kansas, allowing the grid to continue to meet required standards of reliability. It will benefit residents and businesses in central Kansas and beyond by easing congestion across the transmission network and improving the efficiency of the grid.

ITCTransmission

Company Background:

- International Transmission Company (d/b/a ITCTransmission) is a wholly-owned subsidiary of ITC Holdings Corp., the nation’s largest independent electric transmission company. Based in Novi, Michigan, ITCTransmission owns, operates, and maintains approximately 2,800 circuit miles of transmission line in southeast Michigan, serving a population of 5.1 million.
- ITCTransmission is a member of MISO.
Michigan Thumb Loop Transmission Project

**Description:** The Michigan Thumb Loop Transmission Project consists of approximately 140 miles of new double-circuit, 345 kV transmission lines and four new substations that will serve as a “backbone” for wind development located in Michigan’s Thumb region. Additional lines and facilities will be needed in the future as wind generators go into service and connect to the backbone system to fulfill the requirements of the state’s Renewable Portfolio Standard.

The system is designed to meet the identified minimum and maximum wind energy potential of the Thumb region (2,367 and 4,236 MW respectively) and is capable of supporting a maximum capacity of about 5,000 MW.

**Cost:** Approximately $510 million.

**Status:** MISO has approved the Thumb Loop project as the first MVP eligible for regional cost sharing as approved by FERC. ITC Transmission secured siting approval from the Michigan Public Service Commission on February 25, 2011. The project will be constructed in stages. The first segment entered service in September 2013. The remaining stages are targeted for completion by 2015.

**Investment Partners:** None.

**Benefits:** This project will serve as an efficient transmission “backbone” to support wind energy development in the Thumb region in support of Michigan’s Renewable Portfolio Standard. It also will improve reliability and economic efficiency in the region. In addition to the system benefits realized by the project, it is estimated that the construction phase of this project alone will have an economic impact to Michigan of $366 million, including but not limited to employment of local contractors, vendors and suppliers.
Michigan Electric Transmission Company (METC)

Company Background:

- Michigan Electric Transmission Company, LLC (METC) is a wholly-owned subsidiary of ITC Holdings Corp., the nation’s largest independent electric transmission company. Based in Novi, Michigan, METC owns, operates, and maintains approximately 5,600 circuit miles of transmission line in western and northern portions of Michigan’s Lower Peninsula, serving a population of 4.9 million.
- METC is a member of MISO.

Au Sable Circuit Upgrade

Description: The 110-mile Au Sable circuit from Zilwaukee to Mio, Michigan, is important to electric reliability in northeastern Michigan. METC is rebuilding and upgrading this line from single-circuit, 138 kV to future 230 kV double-circuit design and construction standards.

Cost: Approximately $70 million.

Status: The final segment of the project will be completed by early 2014 and is projected to enter service in the second quarter of 2014.

Investment Partners: None.

Benefits: Rebuilding and upgrading this circuit will increase its capacity and reliability, including increased lightning protection, and will facilitate potential future 230 kV expansion in northern Michigan.
MIDAMERICAN ENERGY HOLDINGS COMPANY

Company Background:

- MidAmerican Energy Holdings Company, a consolidated subsidiary of Berkshire Hathaway Inc., is a global energy services provider that serves more than 8.4 million electric and natural gas customers worldwide, including more than five million electric customers located in 10 Midwestern (Illinois, Iowa, and South Dakota) and western (California, Idaho, Nevada, Oregon, Utah, Washington, and Wyoming) states.

- MidAmerican’s U.S. regulated utility operations include MidAmerican Energy Company, an Iowa-based utility providing regulated electric and natural gas service; NV Energy, a Nevada-based utility providing regulated electric and natural gas service; PacifiCorp, an Oregon-based utility providing regulated electric service as Pacific Power in California, Oregon and Washington, and as Rocky Mountain Power in Idaho, Utah and Wyoming; and MidAmerican Transmission, a transmission development company that owns and operates transmission assets in several regions of the U.S. and is pursuing additional investment opportunities in organized and traditional markets in the U.S. and Canada.

- MidAmerican’s U.S. utility subsidiaries own and/or operate more than 24,000 miles of transmission and are engaged in significant transmission investment projects, both independently and through subsidiary joint ventures.

- Between 2003 and 2012, MidAmerican invested approximately $3 billion in transmission.
MidAmerican Energy Company

- MidAmerican Energy Company, based in Des Moines, Iowa, is an electric and natural gas utility serving rate-regulated retail customers in Iowa, Illinois, South Dakota, and Nebraska, and competitive retail customers in the central and eastern U.S. MidAmerican Energy is a transmission-owning member of MISO and owns an extensive transmission system within the MISO footprint. Additionally, MidAmerican Energy is actively engaged in marketing wholesale electric power in various regions.

- As of year-end 2012, MidAmerican Energy provided service to approximately 735,000 electric customers in a 10,600 square mile area. MidAmerican Energy had approximately 8,092 megawatts of owned or contracted generating capacity, including approximately 2,285 megawatts of wind-powered generation, and a peak load of 4,808 megawatts. MidAmerican Energy is a public utility within the contemplation of the Federal Power Act, and owns or operates approximately 2,200 miles of transmission facilities.

MidAmerican Energy Expansion Projects

Description: The MidAmerican Energy Expansion Projects are major new transmission facilities to be constructed in Iowa, Illinois, and Missouri as an integral part of a portfolio of MISO projects called the 2011 Multi Value Project (MVP) Portfolio. The MidAmerican Energy Expansion Projects are characterized as the Obrien County – Webster Project; the Hampton Blackhawk Project; the Oak Grove – Galesburg project; and MidAmerican Energy’s share of the Ottumwa to Adair project. MidAmerican Energy’s share of the MidAmerican Energy Expansion Projects are expected to consist of roughly 240 miles of new 345 kV transmission lines and include two new 345 kV substations, significant modifications to four 345 kV substations, and one new 345-161 kV-transformer.

Cost: The MidAmerican Energy Expansion Projects represent approximately $532 million to $572 million in transmission investment.

Status: The MidAmerican Energy Expansion Projects were approved for construction by the MISO Board of Directors in December 2011. Initial work on the projects has begun with projected in-service dates of the projects from 2015 through 2017.

Benefits: The MidAmerican Energy Expansion Projects, as a part of the 2011 MISO MVP Portfolio, are a unique set of transmission projects to be constructed in order to contribute to a wide variety of benefits, including public policy needs, congestion relief and fuel savings, operating reserve margin and system planning reserve margin reductions, and transmission line loss reductions. In addition, the projects will enhance wind turbine investments and allow states to meet their renewable portfolio standards.
MidAmerican Transmission, LLC

- MidAmerican Transmission, LLC is a wholly owned transmission development company of MidAmerican Energy Holdings Company. MidAmerican Transmission, LLC’s subsidiary joint transmission ventures include:
  - Electric Transmission Texas, LLC (ETT): A joint venture with American Electric Power (AEP) established to invest in transmission within the Electric Reliability Council of Texas (ERCOT).
  - Electric Transmission America, LLC (ETA): A second joint venture with AEP* that includes Prairie Wind Transmission, LLC - A joint venture between ETA and Westar Energy to develop high-voltage transmission in the Southwest Power Pool region.
    * See the AEP section for additional information on these joint venture projects.
Gates-Gregg 230 kV Transmission Line Project

**Description:** Gates-Gregg 230 kV transmission line. PG&E, MidAmerican Transmission, and Citizens Energy Corporation have formed a consortium to construct as a single circuit 230 kV line on double-circuit towers to accommodate future growth. The line will span 70 miles from the Gates-to-Gregg substations.

**Cost:** The California ISO estimates the cost to be approximately $115m to $145m excluding indirect project costs such as environmental mitigation, land acquisition, permitting and licensing, public outreach costs, or inflation.

**Status:** On November 6, 2013, the ISO announced the consortium of Pacific Gas and Electric and Citizens Energy Corporation and MidAmerican Transmission has been selected over four other qualified bidders to develop, own and operate the 230 kV transmission line.

**Investment Partners:** PG&E, MidAmerican Transmission and Citizens Energy Corporation.

**Benefits:**

- Improve reliability in the Greater Fresno Area.
- Alleviates constraints at Helms Pump Storage Plant.
- Supports delivery and integration of renewable power to support California’s 33% renewable portfolio standard (RPS).
NV Energy

Company Background:

- NV Energy, Inc. is an investor-owned public utility holding company, which wholly owns Sierra Pacific Power Company and Nevada Power Company (collectively, “NV Energy”), both regulated public utility companies. NV Energy, Inc. is the newest member of MidAmerican Energy Holdings Company, the acquisition being completed on December 19, 2013. NV Energy serves approximately 1.2 million customers over a 54,500 square mile area in southern and northern Nevada.

- System wide there are approximately 3,850 miles of FERC classified circuit mile transmission.

- Between 2003 and 2012, NV Energy invested approximately $800 million in transmission.

One Nevada 500 kV Transmission Intertie (NVES & NVEN)

Description: NV Energy has completed a 235 mile 500 kV transmission line from northern Nevada (near Ely, Nevada) to southern Nevada (NE Las Vegas) tying Nevada’s electrical grid together by creating a direct interconnection between the Northern and Southern NV Energy systems. The project also adds one 500/345 kV substation.

Cost: $552 million excluding AFUDC.

Status: The Joint NV Energy / Great Basin Transmission South, LLC One Nevada Transmission Line Project (ON Line) was placed in service late in the evening of December 31, 2013 and was available for commercial operation in hour one of January 1, 2014.

- 231-mile 500 kV transmission line Robinson Summit - Harry Allen
- Robinson Summit 500/345 kV substation Northern Terminal
- Falcon-Gonder 345 kV Line Fold 4 miles
- Series compensation on the existing Falcon – Gonder 345 kV line added to the Falcon-Robinson Segment totaling 70 % compensation 35 % at Falcon 35% at Robinson
- Harry Allen Terminal
With the completion of ON Line, the Sierra Pacific Power Company (SPPC) Balancing Authority Area (BAA) was consolidated into the Nevada Power Company (NPC) BAA. NV Energy worked with the Western Electricity Coordinating Council Planning Coordination Committee (PCC), Technical Studies Subcommittee and formed a project review group (PRG) to review the consolidation of the Western Electricity Coordinating Council ratings in both BAAs. This consolidation included re-definition of the existing path #81 (Centennial) into a “Southern Nevada Transmission Interface” (SNTI) and removal of the ON Line project from the three phase rating process.

- The SNTI studies were completed and the Final Report was approved by the PRG on September 27, 2013.
- The SNTI underwent a 30-day review by PCC from October 2, 2013 – November 1, 2013. No comments were received and on November 4, 2013, the SNTI was granted an Accepted Rating of 4,533 MW North-South and 3,970 MW South-to-North effective with the ON Line Project going into service.

**Investment Partners:** Great Basin Transmission South, LLC.

**Benefits:**

- Facilitated combining the BAA, which provides numerous benefits, including:
  - scheduling,
  - optimal dispatch, and
  - reduced planning and operating generation reserves.
- Delivers renewable energy from Northern to Southern Nevada.
- Utilizes the Southwest Intertie Project (SWIP) for future interconnection between Southern Nevada/Arizona with Idaho System (SWIP-North).
- Provides foundation for the delivery of renewable energy & other future generation from the North/NE (Idaho, Wyoming, Utah) to Southern Nevada/Arizona/California.

**SB123: “NVision”**

SB123 is a Nevada Senate Bill for an Emission Reduction and Capacity Replacement Plan approved in June, 2013. The bill requires NVE-South to retire or eliminate 800 MW of coal by 2019.

- NVE-South to retire or eliminate Reid Gardner # 1, 2 & 3 in 2014, Reid Gardner # 4 in 2017 and Navajo in 2019.
- Requires NVE to replace coal with company owned 550 MW of generation either constructed or acquired: Generation type not specified
- Requires annual RFPs for 100 MW of new renewables in 2014, 15, 16
- Requires 50 MW of company-owned renewables
Renewable Energy Transmission Initiative (RTI)

The 2009 Nevada legislature passed Assembly Bill 387, making transmission development to support renewable generation public policy. AB 387 required NV Energy to identify transmission plans and costs to access Renewable Energy Transmission Access Advisory Committee (RETACC)/Nevada Public Utilities Commission approved renewable energy zones.

- In July 2011, NV Energy introduced its Renewable Transmission Initiative (RTI) as a customer driven process to determine market interest in developing the RETAAC Zones.

- In the 2012 Sierra Integrated Resource Plan (IRP) a plan to access these zones was published as the Renewable Energy Zone Transmission Plan (REZTP).

- The RTI received a significant initial response. NV Energy received over 5,000 MWs of Statements of Interest in the RTI. There was sufficient interest to study RTI facilities capable of delivering from Points of Receipt 1 (Dixie valley), 2 (Esmeralda region), and 3 (Armargosa valley) to Point of Delivery C (Eldorado substation in the Eldorado valley).

- Participant meetings were held to discuss the findings of the studies. The participants then held the option to elect to proceed into the permitting phase of RTI. Unfortunately, there was insufficient interest from participants to continue the RTI as an aggregated process.
Centennial II

With the termination of its Renewable Transmission Initiative (RTI) efforts due to lack of participant interest, NV Energy has proposed the Centennial II Project. The Centennial II Project is proposed to facilitate the integration of additional renewable energy resources, provide mutually beneficial reserve sharing for renewable energy, meet requests for transmission service, and provide expanded load service to the Las Vegas Valley (the three transmission corridors discussed below):

The proposed Centennial II Project would consist of approximately 138 miles of new overhead electric transmission lines and associated facilities, construction of a new 500/230 kV substation, upgrading of two existing substations. All segments of the proposed Centennial II Project would require new structures and in some cases, double circuits on these structures would be required. A map of the proposed Centennial II Project is depicted in Exhibit A.

The UEPA application for Centennial II modifies the initial UEPA application prepared by NV Energy for the RTI. This was submitted to the State of Nevada Public Utility Commission in May 2011 (Docket No. 11-05002). The UEPA and SF299 applications cover the following corridors:

- A transmission corridor beginning at the existing Harry Allen substation in the northeast Las Vegas Valley and traversing south approximately 51 miles to the existing Eldorado substation in the Eldorado Valley. This segment of the transmission route would consist of a new 500 kV AC double circuit overhead transmission structures and Optical Ground Wire (OPGW).

- A transmission corridor beginning at the existing Northwest substation and traversing approximately 36 miles east and then north-northeast to the existing Harry Allen substation. This segment of the transmission route would include: a set of two new transmission structures allowing one overhead 500 kV AC circuit in one set of structures and a separate overhead 230 kV double circuit configuration in the other set, both with OPGW.

- A transmission corridor and new substation facility beginning at the new Sagebrush substation, located in the Amargosa Valley in Nye County, and traversing approximately 51.5 miles east and then southeast to the existing Northwest substation. This segment of the proposed transmission route would include a set of two new transmission structures allowing one overhead 500 kV AC circuit in one set of structures and a separate overhead 230 kV double circuit configuration in the other, both with OPGW.

The proposed Project would be constructed, operated, and maintained by NV Energy and would follow, where feasible, existing transmission lines and/or previously identified federal and/or state established transmission corridors.
PacifiCorp

Company Background:

- PacifiCorp owns and operates one of the largest privately held transmission systems in the U.S., consisting of more than 16,200 circuit miles of transmission lines ranging from 46 kV to 500 kV.
- PacifiCorp provides electric service to 1.8 million customers in 750 communities across six western states with a service territory that covers approximately 136,000 square miles in Oregon, Washington, California, Wyoming, Utah, and Idaho.
- PacifiCorp is interconnected with more than 80 generation plants and 13 adjacent control areas at approximately 152 points of interconnection.
- To provide electric service to its retail customers, PacifiCorp owns or has interest in generation resources directly interconnected to its transmission system, with an average monthly system peak of over 15,000 MWs. This generation capacity includes a diverse mix of resources including coal, hydro, wind power, natural gas simple cycle and combined cycle combustion turbines, and geothermal.
Energy Gateway

Description: PacifiCorp’s Energy Gateway transmission plan is a major transmission expansion program announced in May 2007 that will add approximately 2,000 miles of new transmission lines across the West. The project is comprised of eight segments, the majority of which are categorized as part of Gateway West, Gateway South, or Gateway Central (see Energy Gateway map for segment information). Energy Gateway is the largest and most extensive transmission project PacifiCorp has ever undertaken.

Cost: Energy Gateway is a multi-year project with an approximate $6 billion investment plan.

Status: The $832 million Populus to Terminal line, energized November 2010, was the first completed segment of Energy Gateway, adding approximately 135 miles of new double-circuit 345 kV line from southeast Idaho into northern Utah. The second segment, the estimated $370 million Mona to Oquirrh project, consists of approximately 100 miles of single-circuit 500 kV and double-circuit 345 kV transmission line in central Utah, and was placed in service in May 2013. Construction began in May 2013 on the third segment, the approximately $380 million Sigurd to Red Butte project, which adds approximately 170 miles of new single-circuit 345 kV line in southwest Utah and is scheduled for completion in June 2015. Outreach, siting, and permitting efforts continue for several other segments of Energy Gateway, with additional segments scheduled to be in service in 2016 and beyond. See the Energy Gateway website for additional project information (www.pacificorp.com/energygateway).

Investment Partners: At the initiation of Energy Gateway, PacifiCorp entered into a permitting agreement with Idaho Power on the Gateway West project. PacifiCorp has a permitting agreement with Idaho Power and Bonneville Power Administration on Idaho Power’s Boardman to Hemingway 500 kilovolt transmission project.

Benefits: The Energy Gateway transmission expansion program is designed to provide the company with improved infrastructure to meet its tariff requirements and reliably serve the growing needs of its customers. As an important part of the company’s integrated resource planning process, the project will strengthen the connections between PacifiCorp’s two control areas and provide more flexibility to move energy resources where they are needed, helping to maintain low-cost delivery and service reliability for all network customers. The project will also provide long-term regional benefits to the Western Interconnection by providing additional high-voltage backbone transmission for efficient, flexible, and diverse resource development in resource rich areas.
MINNESOTA POWER

Company Background:

• Minnesota Power, a division of ALLETE, provides electricity in a 26,000 square mile electric service territory located in northeastern Minnesota. Minnesota Power supplies retail electric service to 144,000 retail customers and wholesale electric service to 16 municipalities.

• Transmission and distribution components include 8,866 circuit miles of lines and 169 substations. Minnesota Power’s transmission network is interconnected with the transmission grid to promote reliability and is part of a larger regional transmission organization; MISO.

• Between 2003 and 2012, Minnesota Power invested approximately $170 million in transmission.

CapX2020 Transmission Plan

Description: The CapX2020 Transmission Plan consists of approximately 240 miles of new single-circuit, 345 kV transmission line between Brookings County, South Dakota, and Hampton, Minnesota, plus a related 345 kV transmission line between Marshall and Granite Falls, Minnesota; approximately 240 miles of new single-circuit, 345 kV transmission line between Fargo, North Dakota, and St. Cloud and Monticello, Minnesota; approximately 125 miles of new single-circuit, 345 kV transmission line between Hampton and Rochester, Minnesota, continuing on to La Crosse, Wisconsin; and approximately 70 miles of new single-circuit, 230 kV transmission line between Bemidji and Grand Rapids, Minnesota.

Cost: The four lines will cost between $1.4 and $1.7 billion with an additional $200 million to provide for future double-circuit 345 kV lines. Of this total, approximately $700 million is associated with the wind generation-supporting Brookings County-Hampton line.

This project is a joint initiative of 11 transmission owning utilities, including Minnesota Power, in the Upper Midwest to expand the electric transmission grid to ensure continued reliable service to 2020 and beyond. Planning studies show that customer demand for electricity will
increase by 4,000 to 6,000 MWs by 2020.

Of these new transmission lines, Minnesota Power is involved in the Bemidji - Grand Rapids 230 kV Line, the Fargo - St. Cloud 345 kV Line, and the St. Cloud - Monticello 345 kV Line.

**Status:** The Minnesota Public Utilities Commission (MN PUC) approved Certificate of Need applications for all four projects in 2009. Minnesota Route Permit applications were filed for three of the projects in 2008, with the fourth filed in January 2010. Filing for the North Dakota, South Dakota, and Wisconsin regulatory permits were completed and filed in 2011.

Minnesota Route Permits were received in 2010 for the Bemidji - Grand Rapids 230 kV Line and the St. Cloud - Monticello 345 kV Line. Construction of the St. Cloud - Monticello Line started in late 2010 and this line section was placed in-service in December 2011. The North Dakota permits for the Fargo - St. Cloud 345 kV Line were received in 2012. Construction on this section of the line has begun. Construction of the Bemidji - Grand Rapids 230 kV Line was started in January 2011 and the line was placed in service in September 2012.


**Benefits:** The CapX2020 Projects will alleviate emerging electric reliability issues around the Upper Midwest and strengthen the regional transmission system. In addition, the Brookings County to Hampton line will add capacity for an additional 700 MWs of generation in southwest Minnesota and eastern South Dakota. The Brookings County to Hampton line was also included as one of 16 MultiValue Projects (MVP) MISO Board of Directors approved in December 2011. These MVP transmission projects will provide broad regional benefits commensurate with costs and also supports approved state and federal energy policy mandates in the MISO region.

### Great Northern Transmission Line

**Description:** Minnesota Power, in partnership with Manitoba Hydro, is proposing to construct a new interconnection from southern Manitoba to northeastern Minnesota. The Great Northern Transmission Line Project is needed to bring clean, emission-free energy into Minnesota, meet growing energy demands, and strengthen system reliability. In the early planning stages of the Project, Minnesota Power anticipated development of two transmission lines and associated facilities – the 500 kV Great Northern Transmission Line between Winnipeg, Manitoba, Canada, and the Iron Range in northeastern Minnesota, and a separate 345 kV transmission line between the Iron Range and Hermantown, Minnesota. Subsequently, Minnesota Power and Manitoba Hydro determined that there are not sufficient transmission service requests to support the 345 kV transmission line. In order to meet a June 1, 2020, in-service date, Minnesota Power is moving forward with the routing, siting, and permitting process for the 500 kV Great Northern Transmission Line Project.

The Great Northern Transmission Line Project is required to facilitate at least 750 MW of
incremental Manitoba – United States transfer capability, including 383 MW of hydropower and wind storage energy products to serve Minnesota Power’s customers. Minnesota Power’s 250 MW Power Purchase Agreement and 133 MW Renewable Energy Optimization Agreement with Manitoba Hydro both require that new transmission facilities be in place by June 1, 2020, to facilitate the transactions. Further power purchase agreements between Manitoba Hydro and utilities in the United States may require up to 1,100 MW of incremental Manitoba to United States transfer capability, which the 345 kV build was designed to facilitate. The Manitoba hydropower purchases made possible by the Great Northern Transmission Line will provide Minnesota Power and other utilities in the Upper Midwest access to reasonably priced, predominantly emission-free energy supply that has a unique combination of baseload supply characteristics, price certainty, and resource optimization flexibility not available in comparable alternatives for meeting customer requirements.

The Great Northern Transmission Line Project includes the new 500 kV transmission line and expansion of the existing Blackberry Substation to accommodate the new line and 500/230 kV transformation. The Project is planned to be in-service by June 1, 2020, in order to meet the terms of Minnesota Power’s PPA and ROA. When it becomes necessary, the 345 kV build will consist of expansion of the Blackberry 500 kV Substation to include 500/345 kV transformation and a new double-circuit 345 kV line from Blackberry to the Arrowhead Substation. The 345 kV build of the project has been deferred until the need for additional deliveries becomes more well-defined.

Cost: 500 kV Build: Approximately $500 million.

Cost: 345 kV Build: Approximately $280 million.

Status: In anticipation of the Project’s aggressive schedule and needing to meet a June 1, 2020, in-service date, Minnesota Power initiated a proactive public outreach program to key agency stakeholders and the public starting in mid-2012. Through this program, hundreds of landowners, the public, and federal, state, and local agency stakeholders have already been engaged through a variety of means, including three rounds of voluntary public open house meetings held throughout the Project area. On October 21, 2013, Minnesota Power submitted an Application for a Certificate of Need to construct the 500 kV Great Northern Transmission Line and associated facilities to the Minnesota Public Utilities Commission. This was the first major step in a regulatory review process that will also include a Route Permit Application and a Presidential Permit Application, to be submitted to the Minnesota Public Utilities Commission and the United States Department of Energy, respectively, in early 2014.

500 kV Build Project Investment Partners: Minnesota Power, Manitoba Hydro.

345 kV Build Project Investment Partners: TBD.
Benefits: The Manitoba hydropower purchases made possible by the Great Northern Transmission Line will provide Minnesota Power and other utilities in the Upper Midwest access to a reasonably priced, predominantly emission-free energy supply that has a unique combination of baseload supply characteristics, price certainty, and resource optimization flexibility not available in comparable alternatives for meeting customer requirements.
NATIONAL GRID

Company Background:

- National Grid is an international electricity and gas company. In the U.S., National Grid distributes electricity to approximately 3.4 million customers in Massachusetts, New York, and Rhode Island. National Grid owns over 3,800 MWs of contracted electricity generation that provides power to over one million Long Island Power Authority customers.

- National Grid owns and operates over 8,800 circuit miles of transmission in the United States.

- Between 2003 and 2012, National Grid has invested approximately $2.2 billion in transmission.

Northeast Energy Link

Description: The Northeast Energy Link project consists of approximately 230 miles of new 1,100 MW HVDC transmission line from Orrington, Maine to eastern Massachusetts.

Cost: Estimated $2 billion.

Status: Preliminary engineering and permitting work is underway. Economic studies and preliminary siting and routing analysis have been performed. On May 17, 2012, FERC issued an order granting NEL’s Petition for Declaratory Order seeking the Commission’s approval that the proposed sale of the line’s capacity is consistent with FERC policy and precedent. Preparations are being made to seek other regulatory approvals. The project in-service date is expected to be late 2018.

Investment Partners: Emera Maine.

Benefits: NEL will deliver cost-effective renewable and low carbon resources from northern New England and the Canadian Maritime to southern New England customers, providing energy to meet state Renewable Portfolio Standard requirements. By facilitating the development of additional renewable and low-carbon resources in the region, NEL will also benefit customers by lowering market clearing prices, expanding fuel diversity, and improving system reliability by reducing transmission congestion and thermal losses.
New England East - West Solutions (NEEWS)

Description: The New England East – West Solution (NEEWS) is a set of four projects that will upgrade the New England transmission system in Massachusetts, Connecticut and Rhode Island. The projects developed collaboratively by National Grid and Northeast Utilities (NU), involve more than 150 circuit miles of new and/or reconstructed 345 kV and 115 kV transmission lines, significant upgrades to several major substations, a new substation, a new switching station and a number of related system upgrades. The four NEEWS projects are:

- Interstate Reliability Project (NU and National Grid);
- Rhode Island Reliability Project (National Grid);
- Central Connecticut Reliability Project (NU); and
- Greater Springfield Reliability Project (NU).

Cost: National Grid’s total capital investment in the above NEEWS projects and the associated advanced NEEWS projects is estimated to be approximately $744 million.

Benefits: The four NEEWS Projects work together to address a multitude of regional transmission needs identified by ISO-New England in its Regional System Plan, including:

- Constrained east-to-west and west-to-east power flow deliverability across New England;
- Constraints in serving load across the region;
- Thermal and voltage issues in the Springfield, Massachusetts area;
- Interstate transfer capacity;
- Limits affecting Connecticut reliability;
- Constrained east-to-west power flow across Connecticut; and
- Interstate transfer capacity limits and voltage concerns affecting Rhode Island reliability.

NEEWS - Interstate Reliability Project (IRP)

Description: The IRP consists of approximately 74.7 miles of new single-circuit, 345 kV transmission line. National Grid will construct the Massachusetts and Rhode Island portion of the transmission line terminating at Millbury, Massachusetts. NU will construct the Connecticut portion of the transmission line. The IRP will address east-to-west and west-to-east transmission constraints of power across Connecticut, Rhode Island and Massachusetts.

Status: The in-service date for the IRP is expected to be 2015/16.

Investment Partners: Northeast Utilities.
NEEWS - Rhode Island Reliability Project (RIRP)

**Description:** The RIRP is a collection of projects aimed at improving the reliability and performance of the Rhode Island transmission network. The RIRP consists of 21.4 miles of new single-circuit 345 kV and 115 kV overhead lines, further line reconductoring, substation upgrades and expansions, and terminal upgrades. The project is designed to address transmission reliability issues in Rhode Island.

**Status:** The Rhode Island Reliability portion of the project completed permitting and licensing activities, and commenced construction in October 2010. The Rhode Island Reliability group of projects were completed and placed in service in 2013.

**Investment Partners:** None.
NORTHEAST UTILITIES (NU)

Company Background:

- The NU Electric operating companies include: the Connecticut Light and Power Company (CL&P), NSTAR Electric, Public Service Company of New Hampshire (PSNH), and Western Massachusetts Electric Company (WMECO).

- Gas companies include: Yankee Gas (YG), NSTAR Gas, and Hopkinton LNG Corporation.

- NU delivers electricity to more than 3.6 million customers through over 4,500 circuit miles of transmission line.

- NU companies coordinate transmission planning with ISO New England (ISO-NE) and are making substantial investments in new transmission facilities.

- Between 2001 and 2012, legacy NU (i.e., prior to the merger with NSTAR) invested approximately $4.2 billion into its transmission system.

- During 2013, NU invested approximately $0.7 billion into its transmission system.

- Between 2014 and 2018, NU expects to invest $4.0 billion into transmission system upgrades.

Northern Pass Transmission Project (NPT Project)

Description: The NPT Project consists of approximately 153 miles of new 300 kV HVDC transmission line and an associated 34 mile radial 345 kV transmission line that will interconnect Québec with the bulk power system in New Hampshire for the purpose of importing 1,200 MWs of low-carbon emissions power into New England. The owner of the NPT Project is Northern Pass Transmission LLC, a wholly owned subsidiary of Northeast Utilities. The U.S. portion of the HVDC line is about 153 miles in length and includes an AC/DC HVDC converter terminal in Franklin, New Hampshire. The AC radial line is about 34 miles in length, connecting the converter terminal to the Deerfield Substation in Deerfield, New Hampshire. The project will be participant-funded via a transmission service agreement with Hydro Renewable Energy, Inc. (Hydro Renewable), a U.S. subsidiary of Hydro-Quebec.

Cost: The estimated capital cost for the U.S. portion of the line is approximately $1.4 billion.

Status: On February 11, 2011, NPT received the FERC order approving the arrangements of a Transmission Service Agreement between NPT and Hydro Renewable. In October 2010, NPT filed an application for Presidential Permit with the Department of Energy, and in June 2011, filed a Special Use Agreement application with U.S. Forest Service. In 2013, NPT filed amendments to both the DOE and U.S. Forest Service applications. On December 31, 2013, NPT received I.3.9 approval from ISO-NE. The target in-service date for this project is anticipated for mid-2017.

Investment Partners: None.
Benefits: This is an economic and environmental project that will provide a competitively priced, reliable supply of large quantities of primarily (98 percent) hydroelectric power energy, a low greenhouse gas emitting source of energy. Power sold into the New England markets by Hydro Renewable would largely displace less efficient fossil fuel-fired generation in New England, and greenhouse gas emissions associated with the production of electricity will be reduced by up to five million tons of CO2 per year. This will help New Hampshire achieve the goals of the New Hampshire Climate Action Plan, and assist New England in meeting its targets under the Regional Greenhouse Gas Initiative (RGGI), an initiative that all New England states have signed, and under potential future cap and trade program or carbon tax adopted at the federal level.

Other Highlights: International Project, Low Carbon.

Greater Springfield Reliability Project (GSRP)

Description: The GSRP consists of approximately 35 miles of new single and double-circuit, 345 kV transmission lines in Connecticut and Massachusetts and 60 circuit miles of new and reconstructed single and double-circuit, 115 kV overhead transmission lines in Massachusetts. The project also includes three major substation upgrades, two new switching stations and work on eight other switching stations and substations.

Cost: The project was completed at a final cost of over $40M below the original estimate of $718M.

Status: The project was placed into service on November 20, 2013.

Investment Partners: United Illuminating has invested approximately 8.4 percent of the cost of the Connecticut portion of the project.

Benefits: The GSRP is designed to address transmission system reliability.

Interstate Reliability Project (IRP)

Description: The IRP consists of approximately 75 miles of new single-circuit, 345 kV transmission line. The NU portion of the line consists of 37 miles of new single-circuit, 345 kV transmission line built parallel to existing 345 kV circuits in the same right-of-way. The line will begin at the Card Street Substation in Lebanon, Connecticut, proceed through the Lake Road substation in Killingly, Connecticut and cross the Rhode Island/Connecticut border into National Grid territory. National Grid will then construct approximately 38 miles of the transmission line through Rhode Island terminating at Millbury, Massachusetts.

Cost: The preliminary cost estimate of the Connecticut portion of the IRP is $218 million.

Status: Siting approvals have been received in both Connecticut and Rhode Island and all State environmental permits have been received. For the Massachusetts portion of the Project, a siting application was filed in mid-2012, with evidentiary hearings complete in the summer of 2013. The Massachusetts siting decision and the Federal environmental permit are expected
in early 2014 with construction slated to begin immediately thereafter. The in-service date is projected to be 2015.

**Investment Partners:** National Grid will construct and own its portion of the line in Rhode Island and Massachusetts, and United Illuminating is investing approximately 8.4 percent of the cost of the Connecticut portion of the project.

**Benefits:** The IRP will address weaknesses in both the east-to-west and west-to-east transmission of power across Connecticut, Rhode Island, and Massachusetts. By providing more direct routes between power sources and eastern Connecticut, and increasing the overall capacity of the transmission system, the IRP will mean that access to cleaner, competitively priced power will be routinely possible. The project also includes upgrades to seven substations (three each in Connecticut and Massachusetts, and one in Rhode Island), providing a stronger transmission connection between Massachusetts and Connecticut. Recent generation retirements in New England exacerbate the need for IRP.

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**Greater Hartford Central Connecticut Reliability Projects (GHCC)**

**Description:** The GHCC is currently in the planning phase, being studied by ISO-NE with a focus both on local and regional reliability problems in four areas across the State of Connecticut and across the Western Connecticut Import Interface. ISO-NE presented its preliminary need analysis to the Planning Advisory Committee (PAC) in August of 2012, which showed severe voltage violations and thermal overloads existing under normal and contingency conditions. ISO-NE also presented the results of its Market Resource Alternatives (MRA) Study over the course of additional PAC meetings, wherein ISO-NE determined that greater than 1,200 MWs of simultaneously occurring MRAs in specified locations would be required to fully resolve the reliability violations. ISO-NE presented its final need analysis in late 2013 and is completing its needs report. Transmission solutions are currently being assessed with results anticipated in the first half of 2014.

**Status:** Preliminary results of the GHCC need assessment were presented to stakeholders in August of 2012 with the final presentation given in November 2013. Currently, it is anticipated that the preferred solution set will be identified in the first half of 2014 and may include multiple 115 kV upgrades across Connecticut.

**Cost:** Current estimates range from $300 million to $350 million and will be updated upon selection of the preferred solution.

**Investment Partners:** Once a solution set has been identified and a project or projects are developed, a determination will be made regarding investment partners.

**Benefits:** The GHCC project will address local area reliability issues in four Connecticut load sub-pockets as well as regional reliability violations caused by power flow constraints across the Western Connecticut Import Interface (formerly known as the East-West Interface).
Lower SEMA Transmission Project

Description: The Lower SEMA Project addresses system reliability concerns in the lower southeastern Massachusetts area, which includes Cape Cod. The Lower SEMA Transmission Projects consists of an approximately 18 mile, new 345 kV transmission line on existing rights of way from the Carver substation crossing the Cape Cod Canal to a new 345/115 kV substation west of Barnstable on Cape Cod.

Cost: The estimated capital cost of the project is approximately $106.5 million.

Status: The project received siting approval in April 2012. Construction began in October 2012. The 345kV line to Cape Cod was energized in June 2013 and the new 345/115kV substation was placed in service in October 2013. Some additional 115kV work remains, and the project is expected to be completed prior to the summer.

Investment Partners: None.

Benefits: This is a reliability project that will strengthen the transmission system for southeastern Massachusetts and Cape Cod and increase the load serving capability to Cape Cod.

Other Highlights: The project also includes separation of an existing double-circuit 345 kV transmission line crossing the Cape Cod Canal onto separate sets of structures.

Pittsfield-Greenfield Area Solution

Description: The Pittsfield-Greenfield Area Solution involves a family of smaller projects designed to reinforce the transmission system in western and north-central areas of Massachusetts to comply with regional and national reliability standards. The individual reinforcements include:

- Installing a 345/115-kV autotransformer;
- Constructing a new 115-kV switching station;
- Constructing a new one mile 115-kV line;
- Rebuilding and reconductoring portions of an existing 115-kV line;
- Adding 115-kV capacitor banks (two of three sites are already in service); and
- Completing structure replacements to remove sag limits on two lines.

Cost: Current estimates for the combined reinforcements total over $100 million excluding National Grid estimates for associated upgrades.

Status: The Pittsfield-Greenfield Area Solution received formal technical approval from ISO-NE in late 2012. Detailed engineering as well as siting/permitting activities have already begun and will continue into 2014. Some limited construction and commissioning activities were completed in 2013. The in-service dates for the remaining reinforcements are expected to be phased in during 2014, 2015, and 2016.
Investment Partners: None.

Benefits: The Pittsfield-Greenfield Area Solution reinforcements address reliability concerns that alleviate thermal overloads and resolve voltage issues found on the two major transmission paths in western Massachusetts.
Company Background:

- OGE Energy Corp., through its electric utility subsidiary OG&E Electric Services, serves over 789,000 customers in its 30,000 square mile service territory in Oklahoma and western Arkansas.
- OGE owns over 4,900 circuit miles of transmission lines from 69 kV to 500 kV.
- OGE is a member and its transmission facilities are under the operational control of the Southwest Power Pool (SPP).
- Between 2003 and 2012, OGE invested approximately $1.1 billion in transmission.

Transmission Related Smart Grid Initiatives:

OGE has deployed synchrophasor technology on approximately one-third of its transmission network, including 100 percent of the EHV system and 1.7GWs of wind power plant assets. The technology has proved useful for monitoring system oscillations, detecting failing equipment, and locating system disturbances.

Hitchland – Woodward District EHV Double-circuit 345 kV Line

Description: The Hitchland - Woodward District EHV project consists of 130 miles of new 345 kV, double-circuit transmission line that will extend from OG&E’s Woodward District EHV substation to Southwestern Public Service Company’s (SPS) Hitchland substation. OG&E will build and own approximately 82 miles of the new line. SPS will construct and own the remaining portion of the line. Associated upgrades to the Woodward District EHV Substation include increasing the substation bus capacity to 5,000 A and installing a 60 MVAR switchable shunt line reactor on each circuit of the new line.

Cost: OG&E’s cost is approximately $165 million.

Status: Preliminary line routing and engineering has been completed. Construction of the line began December 2012 and the project has an estimated in-service date of June 2014.

Investment Partners: The SPP provided OG&E and SPS notices to construct separate portions of the transmission line.
**Benefits:** This project was directed to be built by the SPP as a “Priority Project” to enhance the reliability of the SPP transmission system, to facilitate the integration of wind resources, and enable west-east transfers across the SPP region.

### Seminole – Muskogee 345 kV Line

**Description:** The Seminole - Muskogee project consists of approximately 120 miles of new 345 kV transmission line that will extend from OG&E’s Seminole substation to OG&E’s Muskogee substation. Associated upgrades to both the Seminole and the Muskogee substations are required to facilitate the new line.

**Cost:** Approximately $170 million.

**Status:** This project was placed into service December 2013.

**Investment Partners:** None.

**Benefits:** This project has been approved as part of the SPP Balanced Portfolio 3E projects to enable economic transfers and enhance regional transmission reliability.

### Sooner – Cleveland 345 kV Line

**Description:** The Sooner - Cleveland project consists of approximately 38 miles of new 345 kV transmission line to be constructed from OG&E’s Sooner substation to the Grand River Dam Authority’s Cleveland substation, as well as associated upgrades to the Sooner Substation. OG&E will construct and operate the entire Sooner Cleveland line.

**Cost:** Approximately $46 million.

**Status:** This project was placed into service in February 2013.

**Investment Partners:** None.

**Benefits:** This project is required for transmission service as directed by the SPP.
Woodward – Thistle Double-Circuit 345 kV Line

**Description:** The Woodward - Thistle project consists of 110 miles of new double-circuit, 345 kV transmission line to be built from OG&E’s Woodward District EHV Substation to the new Thistle substation which will be constructed and owned by ITC Great Plains. OG&E will build and operate approximately 80 miles of the line from Woodward EHV substation to the Oklahoma-Kansas border. ITC Great plains will construct and own the transmission line from the Oklahoma-Kansas border to their new Thistle substation. Associated upgrades to the Woodward District EHV Substation include increasing the substation bus capacity to 5,000 A and installing a 55 MVAR switchable shunt line reactor on each circuit of the new line.

**Cost:** OG&E’s cost is approximately $145 million.

**Status:** Construction is proceeding. The project has an estimated in-service date of December 2014.

**Investment Partners:** The SPP provided OG&E and ITC Great Plains notices to construct separate portions of the transmission line.

**Benefits:** This project was directed to be built by the SPP as a “Priority Project” to enhance the reliability of the SPP transmission system, facilitate the integration of wind resources, and enable west-east transfers across the SPP.
Woodward – Tuco 345 kV Line

**Description:** The Tuco - Woodward project consists of approximately 265 miles of new 345 kV transmission line from OG&E’s Woodward District EHV substation to Southwestern Public Service Company’s (SPS) Tuco substation. The OG&E portion of the Tuco - Woodward project is 95 miles in length and will terminate at the new OG&E Border substation located on the Oklahoma – Texas border south of I-40. The new Border substation will include a 75 MVAR shunt reactor on the Woodward EHV – Tuco line.

**Cost:** OG&E’s estimated cost is $147 million.

**Status:** This project is estimated to be in service by May 2014.

**Investment Partners:** The SPP provided OG&E and SPS notices to construct separate portions of the transmission line.

**Benefits:** This 345 kV line was approved as part of the SPP Balanced Portfolio 3E Projects to enable economic transfers and enhance regional transmission reliability. This project supports the integration of wind generation and system reliability.

Chisholm - Gracemont 345 kV Line

**Description:** The Chisholm - Gracemont project consists of 93 miles of new 345 kV transmission line to be built from OG&E’s Gracemont substation to the new Public Service Company of Oklahoma (AEP) Elk City substation. OG&E will build and operate approximately 30 miles of the line from Gracemont substation.

**Cost:** OG&E’s estimated cost is $45 million.

**Status:** Preliminary line route investigation began in 2012. The project has an estimated in-service date of March 2018.

**Investment Partners:** The SPP provided OG&E and AEP notices to construct separate portions of the transmission line.

**Benefits:** This project was directed to be built by the SPP as part of the Integrated Transmission Planning 10-year (ITP10) Assessment. The project will enhance the reliability of the SPP transmission system, facilitate the integration of wind resources, and enable west-east transfers across the SPP.
Cimarron - Mathewson Double-Circuit 345 kV Line

Description: The Cimarron – Mathewson project consists of the new 345/138 kV Mathewson substation and 16 miles of new 345 kV, double-circuit transmission line to be built from Cimarron substation to the new Mathewson substation.

Mathewson substation will create a point of connection between the 345 kV Cimarron to Woodring line and the 345 kV Tatonga to Northwest transmission line.

Cost: Approximately $53 million.

Status: Preliminary line route investigation began in 2012. The project has an estimated in-service date of March 1, 2021.

Investment Partners: None.

Benefits: This project was directed to be built by the SPP as part of the ITP10 Assessment. The project will enhance the reliability of the SPP transmission system, facilitate the integration of wind resources, and enable west-east transfers across the SPP.

Woodward District EHV – Tatonga 2nd Circuit 345 kV Line

Description: The Woodward District EHV - Tatonga project consists of 50 miles of new 345 kV transmission line to be built from Woodward District EHV substation to Tatonga substation. The line will be the second circuit of an existing 345 kV line between Woodward District EHV and Tatonga.

Cost: Approximately $59 million.

Status: The project has an estimated in-service date of March 1, 2021.

Investment Partners: None.

Benefits: This project was directed to be built by the SPP as part of the ITP10 Assessment. The project will enhance the reliability of the SPP transmission system, facilitate the integration of wind resources, and enable west-east transfers across the SPP.
Mathewson - Tatonga 2\textsuperscript{nd} Circuit 345 kV Line

\textbf{Description:} The Mathewson - Tatonga project consists of 60 miles of new 345 kV transmission line to be built from the new OG&E Mathewson substation to Tatonga substation. The line will be the second circuit of an existing 345 kV line between Mathewson and Tatonga.

\textbf{Cost:} Approximately $66 million.

\textbf{Status:} The project has an estimated in-service date of March 1, 2021.

\textbf{Investment Partners:} None.

\textbf{Benefits:} This project was directed to be built by the SPP as part of the ITP10 Assessment. The project will enhance the reliability of the SPP transmission system, facilitate the integration of wind resources, and enable west-east transfers across the SPP.
ONCOR ELECTRIC DELIVERY COMPANY, LLC (ONCOR)

Company Background:

- Oncor is a regulated electricity distribution and transmission business. Oncor operates and is governed as a separate and independent company from Energy Future Holdings Corporation.
- Oncor operates the largest distribution and transmission system in Texas and is the sixth-largest system in the nation. The company delivers power to approximately three million homes and businesses, or about one-third of the state’s population.
- Oncor operates approximately 15,000 circuit miles of transmission lines in Texas, including more than 5,000 circuit miles of 345 kV lines.
- Between 2001 and 2012 Oncor invested approximately $5.1 billion into its transmission system.

Transmission Related Smart Grid Initiatives:

- Oncor has consistently upgraded its transmission management and control systems with the latest smart grid technology. With more than 92 percent of transmission relays now electronic, digital fault recorders and relay records are automatically moved to a central system for rapid analysis.

West Texas Congestion

Description: ERCOT Staff performed the 2012 West Texas Sensitivity Study with extensive review and input by NERC registered Transmission Planners (TPs), Transmission Owners (TOs), such as Oncor, and other stakeholders, which addresses reliability and economic transmission needs to meet the growing electric demand being driven by the oil and natural gas industry in the Permian Basin, and the associated economic expansion in supporting residential, commercial and supporting industries in the ERCOT West and Far West weather zones. ERCOT’s “2012 West Texas Sensitivity Study Report” revised September 17, 2013 (WTS Study) identified approximately 65 projects that resolve thermal loading and voltage issues across the interconnected system of all TOs operating in the West Texas area. Approximately 22 of
the ERCOT proposed projects are within Oncor’s footprint, 13 of which Oncor previously identified, and are currently under development. The project completion years and scope of each project stated in the WTS Study were selected to timely address reliability and economic needs based upon the study results. Oncor will work with ERCOT and other TOs to determine if scope and completion dates need to be adjusted based on factors such as changes in assumptions, identification of better alternatives, availability of construction clearances, time required to receive required regulatory or governmental approvals, equipment availability, time required to design the projects, land acquisition and resource constraints. Projects will be submitted for ERCOT Regional Planning Group (RPG) review, as needed.

Cost: Approximately $130 million.

Status: Oncor submitted West Texas Area projects from the ERCOT WTS Study for RPG review. The submittal to RPG describes the need for Oncor to proceed with constructing two new 345/138 kV switching stations and a new 138 kV line to Midessa. These three projects were identified in the WTS Study and provide a new 345 kV source fed from the Oncor Moss – Midland East 345 kV Line into the underlying Oncor 138 kV facilities in Ector, Midland and Andrews counties. Other existing Oncor projects already in progress in West Texas are not included in the RPG submittal.

Investment Partners: None.

Permian Basin - Culberson 138 kV Transmission Line

Description: The need to expand Oncor transmission facilities in West Texas is being driven by the oil and natural gas industry. To meet anticipated electric demand, a new 138 kV transmission line from the Permian Basin 138 kV Switching Station in Ward County to the existing Culberson 138 kV Switching Station located in Culberson County is being proposed.

Cost: Approximately $73 million.

Status: The Permian Basin – Culberson 138 kV Line Project has been approved by the ERCOT Regional Planning Group (RPG). Oncor will file an application for an amendment to its Certificate of Convenience and Necessity (CCN) for the proposed Permian Basin – Culberson 138 kV Transmission Line in the second quarter of 2014.

Investment Partners: None.

Benefits: Completion of the Oncor project will provide an effective solution that creates a transmission loop for serving the existing customers and future load growth anticipated in the Permian Basin and surrounding areas while adding valuable transmission capacity to the entire transmission system. This project will help ensure continued reliable electric service to the entire local region.
Dynamic Line Ratings

**Description:** Oncor participated in the Department of Energy (DOE) SmartGrid Demonstration Projects program addressing the use of Dynamic Line Rating (DLR) to improve the efficiency of the existing transmission infrastructure and to reduce congestion costs.

**Cost:** Cost is being shared with DOE.

**Status:** Oncor has installed primary and secondary dynamic line rating equipment on eight transmission circuits. The primary system, CAT-1 equipment, streams real-time data through the System Control and Data Acquisition (SCADA) system to the Oncor Energy Management System environment. That data will be processed and dynamic ratings posted to the operations departments at Oncor and ERCOT. The secondary systems, Sagometers and Promethean RTTLMS, provide offline data for performing statistical validation of the dynamic ratings and their “reach” from installation point down the transmission line to capture the characteristics of line sections rather than point locations.

The DOE is particularly interested in assessing the impact of DLR on congestion of transmission lines. Analysis has shown that congestion is very difficult to predict from a location, timing and extent perspective. With ERCOT support, Oncor has calculated the projected impact of having increased line capacity on six transmission lines that have exhibited extreme congestion levels in 2011 and 2012. The analysis shows positive impacts on mitigating the congestion on the target lines.

Increased capacity to meet load growth and line capacity needs is also being assessed based on the statistical analysis of the DLR capacity relative to Static and Ambient Adjusted Ratings.

The project ran from January 1, 2010 through December 30, 2012. The Final Report has been submitted. The DLR equipment installed on the line continues to feed ratings to the Oncor control center and ERCOT.

The DLR project was successful and a decision was made to add DLR capabilities to five lines in the Midland – Odessa area for summer of 2013 operation. The CAT-1 devices were installed and ratings were integrated into the system telemetry on June 17, 2013. Two of the lines were since reconducted in the fall of 2013, and the DLR equipment was removed.

**Investment Partners:** None.

**Benefits:** The project has several benefit objectives in the technical area as well as economic. Technically, the project will validate the DLR protocol and optimize the application of instrumentation. The lessons learned from the project will be developed into a “guide” for future deployment of DLR systems by other utilities. Technical studies will also be designed to identify the amount of increased capacity over static ratings and its probability of occurrence and persistence to be available for different periods of time, i.e., the next 15 minutes up to 2 or 3 hours. Economic benefits will compare the impact of increased capacity to relieve congestion in the grid and for its application to identify capital investment deferments where the solution used DLR rather than physical upgrades or new construction.

**West Texas installation cost:** $1.2 million.
Oncor CREZ Development

Description: In 2005, the Texas Legislature directed the Public Utility Commission of Texas (PUCT) to develop a transmission plan to meet the State’s increased renewable energy goals. From 2005 to 2008, the PUCT identified five Competitive Renewable Energy Zones (CREZ) to which lines would be built, adopted a transmission plan, and developed the process to select transmission companies to build the lines. The PUCT ultimately selected eight companies to build the new lines and upgrade existing stations and lines.

The PUCT awarded Oncor more than one-quarter of the total CREZ transmission project buildout, encompassing over 1,000 miles of new transmission lines.

CREZ projects are grouped into one of three categories: Default, Priority and Subsequent projects. The Default Category, which represented 20 percent of Oncor’s total CREZ spend, included upgrades to existing station and transmission line facilities. The Priority Category, which represented 40 percent of Oncor’s CREZ spend, included new transmission lines and stations for existing (constrained) wind that is currently installed but could not come to market due to transmission flow constraints. The Subsequent Category, which represents 40 percent of Oncor’s CREZ spend, included new transmission lines and stations for renewable generation to be brought to the market.

The Default Category projects include twelve stations and eleven transmission lines totaling 256 miles. The Priority Projects include ten stations and nine transmission lines totaling 377 miles. The Subsequent Projects include nine stations and five transmission lines totaling 404 miles.

The CREZ Reactive Compensation Study was issued by ERCOT in December 2010 to outline the reactive support requirements for CREZ, accomplished through the addition of static and dynamic reactive devices, including the installation of three Static Var Compensators (SVCs), series compensation equipment and shunt reactive devices. Oncor has assessed the scope of work and developed revised plans in accordance with the study results.

Cost: Approximately $2 billion.

Status: The Default Category projects received two CCNs and the Priority Category projects received seven CCNs. All Default and Priority projects were completed at the end of 2012. The Subsequent Category received five CCNs and all projects were completed and energized by December 2013.
Investment Partners: None.

Benefits: The CREZ transmission project provides the infrastructure necessary to approximately double Texas’ current renewable energy capacity in West Texas. This will allow the State to meet increased renewable energy goals while reducing greenhouse gas emissions. CREZ will also improve ERCOT’s ability to move power produced from all generation sources within the State as energy demand increases, as well as improve overall grid reliability.

Static Var Compensation

Description: Oncor has deployed the world’s largest cluster of Static Var Compensators (SVCs) in the north Texas area, adding to the reliability of Oncor’s grid. This technology will maintain grid reliability in the urban environment as generators are retired and not replaced. Additionally, 3 SVC projects are being installed as part of the CREZ initiative.

Cost: More than $50 million per site.

Status: A total of four SVC projects are currently in-service at Oncor. The first unit was operational in Dallas in June 2009; a second unit was placed in service in December 2010, and two additional units were placed in service in early 2011. Currently three SVC projects are in progress as part of the CREZ initiative with expected in service during the first quarter 2014.

Investment Partners: None.

Benefits: SVC technology will help in controlling voltage and rapidly responding to changes in grid conditions. SVC provides the needed voltage control without the need for generation close to population centers. It will also accommodate for the future use of wind power and other forms of remote and renewable energy generation.
New Bethel Energy Center 345 kV Transmission Line

**Description:** The State of Texas is continuing to promote and increase the integration of renewable and clean energy into the Texas electric market. Reliable electric facilities must be in place to support increased levels of renewable energy and to provide efficient means for this electric power to reach consumers. Oncor has received a request to interconnect a new, proposed 317 MW Compressed Air Energy Storage (CAES) electric generation facility, located in East Texas, with the Electric Reliability Council of Texas (ERCOT) grid. Oncor is proposing to construct a new double-circuit 345 kV electric transmission line to interconnect the proposed plant to the electric grid.

**Cost:** Approximately $60 million.

**Status:** Oncor will file an application for an amendment to its Certificate of Convenience and Necessity (CCN) for the proposed New Bethel Energy Center 345 kV Transmission Line in the second quarter of 2014.

**Investment Partners:** None.

**Benefits:** Completion of the Oncor project will provide the necessary interconnection of the proposed generation station and the ERCOT grid, which will supply additional clean energy into the Texas electric market.
OTTER TAIL POWER COMPANY

Company Background:

- Otter Tail Power Company is an electric utility that has operations in three states (Minnesota, North Dakota, and South Dakota) serving 129,800 customers.
- System-wide it has about 5,300 miles of transmission lines.
- Between 2003 and 2012, Otter Tail Power Company has invested approximately $96 million into its transmission system.

CapX2020 Transmission Plan

Description: The CapX2020 transmission plan consists of approximately 250 miles of new double-circuit, 345 kV transmission line between Brookings County, South Dakota, and Hampton, Minnesota, with a double-circuit capable line portion from Helena, Minnesota, to Hampton, Minnesota, plus a related 23 mile double-circuit capable, 345 kV transmission line between Lyon County, Minnesota, and Hazel Creek, Minnesota; approximately 240 miles of new double-circuit capable, 345 kV transmission line between Fargo, North Dakota, and St. Cloud and Monticello, Minnesota; and approximately 70 miles of new single-circuit, 230 kV transmission line between Bemidji and Grand Rapids, Minnesota.

This project is a joint initiative of 11 transmission owning utilities, including Otter Tail Power Company, in the Upper Midwest to expand the electric transmission grid to ensure continued reliable service to the year 2020 and beyond.

The Brookings County - Hampton Project provides access to wind generation in southwest Minnesota and eastern South Dakota. The line is expected to increase the delivery of wind generation by 700 MWs. While the other CapX2020 lines are driven primarily by reliability needs, they will also facilitate future generation outlet, including wind development, by
providing the necessary infrastructure to support other wind-focused transmission additions. The Brookings County - Hampton Project was approved in December 2011 by the MISO Board of Directors as part of the MultiValue Project (MVP) Portfolio.

**Big Stone South to Brookings County**

**Description:** Big Stone South - Brookings County will consist of an approximately 70 mile long, 345 kV transmission line from a connection near Big Stone City, South Dakota, to the Brookings County Substation near Brookings, South Dakota. It also will include two 2 mile long, 230 kV lines from the Big Stone substation to a new Big Stone South substation.

**Cost:** Approximately $210 to $230 million, depending on final route determination.

**Status:** The MISO Board of Directors approved this project in December 2011 as an MVP. It is estimated to be in service in 2017.

**Investment Partners:** The project is being jointly developed by Otter Tail Power Company and Xcel Energy.

**Benefits:** As part of the MVP portfolio, this project will provide regional reliability, economic value and support public policy requirements.
Big Stone South to Ellendale

**Description:** Big Stone South - Ellendale is an approximately 160 to 170 mile long, 345 kV transmission line between the Big Stone South Substation near Big Stone City, South Dakota, and Ellendale Substation near Ellendale, North Dakota.

**Cost:** Approximately $293 to $370 million depending on final route determination.

**Status:** The MISO Board of Directors approved this project in December 2011 as an MVP. It is estimated to be in service in 2019.

**Investment Partners:** The project is being developed by Otter Tail Power Company and Montana-Dakota Utilities Co.

**Benefits:** As part of the MVP portfolio, this project will provide regional reliability, economic value and support public policy requirements.
PACIFIC GAS AND ELECTRIC (PG&E)

Company Background:

- PG&E serves over five million electric customers in northern California over a 70,000 square-mile service area.
- At December 31, 2012, PG&E owned approximately 18,100 circuit miles of interconnected transmission lines operated at voltages of 60 kV to 500 kV.
- PG&E is a member of the California Transmission Planning Group (CTPG).
- Between 2003 and 2012, PG&E invested approximately $5.6 billion in transmission.

Gates-Gregg 230 kV Transmission Line

Description: The 70-mile line spans from PG&E’s Gates to Gregg substations in the Fresno area. In addition to enhancing our reliability performance throughout Fresno, Kings and Madera counties, the increased capacity provided by this line will also assist in the integration and development of renewable energy. The Greater Fresno area is served by local area generation including the Helms Pumped Storage, hydro-generation, thermal generation, and solar generation.

Cost: The California ISO estimates the total project cost to be approximately $115M-$145M in direct costs, i.e. excluding indirect costs such as environmental mitigation, land acquisition, permitting and licensing, public outreach costs, or inflation.

Status: Anticipated in-service date is 2020.

Investment Partners: PG&E, MidAmerican Transmission, and Citizens Energy Corporation have formed a consortium.

Benefits: Benefits include 1) improving transmission reliability in the Greater Fresno Area; 2) helping to meet California’s Renewables Portfolio Standard (RPS) goals by integrating renewable resources and delivering renewable power; and (3) alleviating constraints at Helms Pumped Storage Plant.
PEPCO HOLDINGS, INC.

Company Background:

- Pepco Holdings, Inc. (PHI) delivers electricity to approximately 2 million customers in Delaware, the District of Columbia, Maryland, New Jersey, and Virginia.
- PHI’s energy-related businesses include:
  - Pepco – a regulated electric utility delivering electricity to more than 793,000 customers in Washington, D.C., and its Maryland suburbs;
  - Atlantic City Electric – a regulated electric utility serving nearly 544,000 customers in southern New Jersey;
  - Delmarva Power – a regulated utility serving more than 502,000 customers in Delaware and the Delmarva Peninsula.
- System-wide, there are approximately 3,750 circuit miles of transmission lines.
- Region-wide efforts include participation in PJM Interconnection, Edison Electric Institute, Reliability First Corporation, and the Eastern Interconnection Planning Collaborative.
- Between 2003 and 2012, PEPCO invested approximately $1.6 billion in transmission.

Ritchie to Buzzard Point N-1-1 Compliance Project

Description: The Ritchie to Buzzard Point N-1-1 Compliance Project consists of converting an existing 11.0 mile long 138 kV circuit to 230 kV operation and upgrading an existing 11.0 mile long 230 kV circuit from Pepco’s Ritchie Substation, located in Seat Pleasant, Maryland, to Pepco’s Buzzard Point Substation, located in the southwest portion of the District of Columbia. The project also includes the addition of a new 230/138 kV transformer and 100 MVAR shunt reactor at Buzzard Point. The project is required to insure that the supply feeders into Buzzard Point are N-1-1 compliant.

Cost: Approximately $100 million.
Status: The project has received most of the regulatory approvals and permits and is currently under construction. Construction of the project started in the fall of 2012, the first phase of the project is expected to be in service June 1, 2014, with the second phase scheduled for completion June 1, 2018.

Investment Partners: None.

Benefits: The addition of this project will allow the Pepco system to meet the NERC N-1-1 Reliability Standard TPL-003-0 for Bulk Electric System facilities. Additionally, approximately 240 MWs of combustion turbines were recently retired at the Buzzard Point substation and this project helps to account for this loss of capacity.

PJM N-1-1 Projects (Southern Delmarva)

Description: The PJM N-1-1 Delmarva Projects consist of constructing new and upgrading existing 138 kV and 230 kV infrastructure in the Southern Delmarva zone. Approximately 67 circuit miles of new transmission will be constructed. Additionally, two 230/138 kV autotransformers and a 138 kV Static VAR Compensator (SVC) installation are part of the project. The N-1-1 efforts span the entire PHI service territory, however, an emphasis has been placed on the efforts in the Southern Delmarva zone due to significant outage, resource, and environmental coordination which will be imperative to meet the required in-service dates.

Cost: Approximately $151 million.

Status: There are many sub-projects within the overall N-1-1 initiative which will be completed over multiple years. The majority of projects which have been identified thus far have in-service dates spanning from 2012 – 2017. These projects are in the completed, engineering, and regulatory approval phases. Within the state of Maryland, the requirement to procure Certificates of Public Convenience and Need (CPCN) necessitate providing detailed information inclusive of the specifics of the projects well in advance of the in-service date.

Investment Partners: None.

Benefits: The projects will improve reliability for Maryland and the Delmarva Peninsula by placing the necessary infrastructure in place to mitigate the harmful effects of an N-1-1 event (as per NERC TPL-003 Category C). Strengthening of the transmission system along with the growing Delmarva Peninsula will be a beneficial outcome of the efforts.
Burtonsville-Bowie-Oak Grove Transmission Project

**Description:** The Burtonsville-Bowie-Oak Grove Transmission Project consists of reconductoring two existing 21 mile long 230 kV circuits from Pepco’s Burtonsville Substation, located in Laurel, Maryland, to Pepco’s Oak Grove Substation, located in Upper Malboro, Maryland. The project also includes the upgrade of terminal equipment at each Substation. The project is required to meet PJM’s Generation Deliverability Common Mode Outage Criteria.

**Cost:** Approximately $50 million.

**Status:** The project was approved by PJM in 2011 and it is in the planning phase. The scheduled in-service date is June 2016.

**Investment Partners:** None.

**Benefits:** The addition of this project will allow the Pepco system to meet the PJM Generation Deliverability Common Mode Outage criteria, which ensures that the system is reliable and capable of exporting generation.
Oak Grove-Aquasco Transmission Project

**Description:** The Oak Grove-Aquasco project consists of reconductoring an existing 18 mile long 230 kV circuit from Pepco’s Oak Grove Substation, located in Upper Malboro, Maryland, to Pepco’s Aquasco Substation, located in Aquasco Maryland. The project also includes the upgrade of terminal equipment at each substation. The project is required to meet PJM’s Generation Deliverability Common Mode Outage Criteria.

**Cost:** Approximately $27 million.

**Status:** The project was approved by PJM in 2011 and it is in the planning phase. The scheduled in-service date is June 2016.

**Investment Partners:** None.

**Benefits:** The addition of this project will allow the Pepco system to meet the PJM Generation Deliverability Common Mode Outage criteria, which ensures that the system is reliable and capable of exporting generation.
Burtonsville-Metzerott-Takoma Transmission Project

**Description:** The Burtonsville-Metzerott-Takoma Transmission Project consists of replacing approximately 10 miles of an existing double-circuit 230 kV transmission line between the Burtonsville Substation, located in Laurel Maryland, to the Takoma Substation, located in Takoma, Maryland. The project also includes terminal upgrades at each substation. The project is required due to aging infrastructure and it is also driven by the need to address potential winter load reliability issues, which would prevent scheduling the tower outage for construction.

**Cost:** Approximately $30 million.

**Status:** This project is in the planning phase and it is expected to be in service by June 2015.

**Investment Partners:** None.

**Benefits:** The addition of this project will increase the transmission capacity into the Takoma and Metzerott area. In addition, the project will provide a wider operational range for the local transmission system.
PUBLIC SERVICE ELECTRIC
AND GAS COMPANY (PSE&G)

Company Background:

- Public Service Electric and Gas Company (PSE&G) serves 2.2 million electric customers and 1.8 million gas customers in New Jersey. These customers reside in a 2,600 square mile diagonal corridor across the state from Bergen to Gloucester Counties.
- System-wide there are approximately 1,500 circuit miles of transmission line.
- Between 2003 and 2012, PSE&G invested approximately $3.0 billion in transmission.

Burlington - Camden 230 kV Network Reinforcement Project

Description: The Burlington - Camden 230 kV Network Reinforcement Project consists of upgrading 37 circuit miles (30 miles of overhead and seven miles of underground) of transmission operating from 138 kV to 230 kV, constructing a new 230 kV switching station at Burlington and converting five existing stations to 230 kV operation. The upgraded stations are Levittown, Cinnaminson, Camden, Gloucester, and Cuthbert Boulevard. This project is a proposed electric reliability transmission baseline upgrade to the PJM transmission system, extending from the Burlington Switching Station to the Camden Switching Station and continuing on to the Gloucester Switching Station in Southern New Jersey. PSE&G will be responsible to design, procure, and construct all transmission facilities within the scope of this project. All circuits to be upgraded are located within existing rights-of-way (ROW) between Burlington and Gloucester Switching Stations.

Cost: Approximately $399 million.
Status: This project was approved by the PJM Board of Managers in February 2010 with an in-service date of June 1, 2014. The project is currently 99 percent engineered and construction commenced on the project in July 2012 after receiving the required construction permits. The total project is approximately 85% complete.

Investment Partners: None.

Benefits: The project is needed to maintain transmission system reliability by addressing several PJM-identified voltage violations that are anticipated to occur beginning in 2014. The project will prevent these violations and reinforce the transmission system in Southern New Jersey.

Northeast Grid Reliability Transmission Project

Description: The Northeast Grid Reliability Transmission Project consists of upgrading approximately 50 miles of overhead transmission circuits from 138 kV to 230 kV operation, constructing a new 230 kV underground circuit from Bergen to Athenia Stations looping through Saddle Brook Station, constructing a new underground circuit from South Waterfront to Hudson Stations, and upgrading the 230 kV or converting to 230 kV operation at 12 existing stations. Those stations are Roseland, West Caldwell, Cook Road, Kingsland, Turnpike, Kearny, Essex, Hudson, Bergen, Saddle Brook, Athenia, and South Waterfront. This is a proposed electric reliability transmission baseline upgrade to the PJM transmission system. PSE&G will be responsible to design, procure, and construct all transmission facilities within the scope of this project. All overhead transmission circuits to be upgraded are located within existing ROW between Hudson and Roseland Stations. The two new underground circuits may require acquisition of a new ROW as the route has not been finalized at this time.

Cost: Approximately $907 million.

Status: This project was approved by the PJM Board of Managers in October 2010. The projected in-service date is June 1, 2015. The project is currently in the engineering/design phase. While some permit application approvals are pending, many permit approvals have been received. The majority of long lead time material has been ordered and underground circuit construction has begun.

Investment Partners: None.

Benefits: This project is needed to maintain transmission system reliability by addressing several PJM-identified voltage violations that are anticipated to occur beginning in 2015. The project will prevent these violations and reinforce the transmission system in northern New Jersey.
Susquehanna - Roseland 500 kV Transmission Line Project

**Description:** The Susquehanna - Roseland 500 kV Transmission Line Project consists of approximately 45 miles of new 500 kV transmission line running from the Delaware Water Gap east to the Roseland Switching Station, and two new 500 kV switching stations; one in Hopatcong and one in Roseland. This project is a proposed electric reliability transmission baseline upgrade to the PJM transmission system, extending from the Berwick area in Pennsylvania to the Roseland-East Hanover area in northern New Jersey. PSE&G will construct the New Jersey portion of the project, while PPL Electric Utilities will construct the Pennsylvania portion of the project. All of the circuits in New Jersey will be built along existing ROW by removing existing 230 kV circuits between Roseland, Montville, Newton, and Bushkill, Pennsylvania and building 500/230 kV tower lines in their place.

**Cost:** Approximately $1.33 billion, of which approximately $790 million will be PSE&G’s responsibility.

**Status:** This project was approved by the PJM Board of Managers in June 2007 with an in-service date of June 1, 2012. The National Park Service (NPS) review of that portion of the Project to be built in the Delaware Water Gap National Park was approved in October 2012. Subsequent to the NPS approval, NJDEP issued permits in October 2012. Based on those approvals, the Roseland to Hopatcong portion of the Project is currently expected to be in service by June 2014. The remainder of the Project is anticipated to be completed by June 2015.

**Investment Partners:** PPL Electric Utilities.

**Benefits:** The project is needed to maintain reliability by addressing several PJM-identified reliability criteria violations that were anticipated to occur beginning in 2012. The project will prevent overloads on existing power lines in New Jersey and Pennsylvania.
North-Central Reliability Project (formerly the West Orange 230 kV Project)

**Description:** The North-Central Reliability Project consists of upgrading four 138 kV transmission lines 35 miles and six existing stations to 230 kV operation. The upgraded stations are West Orange, Marion Drive, Laurel Avenue, Fanwood, New Dover, and Woodbridge. This project is a proposed electric reliability transmission baseline upgrade to the PJM transmission system, extending from the West Orange Switching Station to the Sewaren Switching Station in Central New Jersey. PSE&G will be responsible to design, procure and construct all transmission facilities within the scope of this project. All circuits to be upgraded are located within existing ROW between West Orange and Sewaren Switching Stations.

**Cost:** Approximately $390 million.

**Status:** This project was approved by the PJM Board of Managers in February of 2010 with an in-service date of June 1, 2014. The Project was submitted to the BPU in May of 2011 and an approval was received on June 18, 2012. The project is currently in the construction phase and is on schedule to be completed by the anticipated in-service date.

**Investment Partners:** None.

**Benefits:** The project is needed to maintain transmission system reliability by addressing several PJM-identified voltage violations that are anticipated to occur beginning in 2014. The project will prevent these violations and reinforce the transmission system in Central New Jersey.

Mickleton-Gloucester-Camden Reinforcement Project

**Description:** The Mickleton-Gloucester-Camden Reinforcement Project (referred to as Southern Reinforcement Project) scope consists of building two new 230 kV underground circuits from Gloucester Switch to Camden Switch looping one into Cuthbert Boulevard Substation, building a second parallel overhead circuit from Gloucester Switch to Atlantic City Electric’s Mickleton Station, and re-conductoring the existing Gloucester–Mickleton. The project will install 36 miles of transmission line, ten miles of overhead reconductoring, ten miles of new overhead, and 16 miles of new underground. The station upgrades...
will be completed at Mickleton (by Atlantic City Electric), Thorofare, Deptford, Eagle Point (by Sunoco), Cuthbert, Gloucester, and Camden. PSE&G will be responsible to design, procure, and construct all transmission facilities within the scope of this project. The required PJM project in-service date is June 2015.

**Cost:** Approximately $435 million.

**Status:** This project was approved by the PJM Board of Managers in February 2010 with an in-service date of June 1, 2015. The project is currently in the planning and detailed engineering phase. Construction began in November 2012.

**Investment Partners:** None.

**Benefits:** The project is needed to maintain transmission system reliability by addressing several PJM-identified thermal overloads that are anticipated to occur beginning in 2015. The project will prevent these violations and reinforce the transmission system in Southern New Jersey.
SCANA CORPORATION

Company Background:

South Carolina Electric & Gas (SCE&G) delivers electricity to more than 668,000 retail and wholesale customers throughout South Carolina. SCE&G owns more than 3650 miles of transmission lines and participates in numerous transmission assessment and planning efforts; including the Eastern Interconnection Planning Collaborative (EIPC), SERC reliability assessment activities, the Carolinas Transmission Coordination Arrangement (CTRA) and the South Carolina Regional Transmission Planning (SCRTP) process.

V.C. Summer #2 and #3 Interconnection Project

Description: The V.C. Summer #2 and #3 Interconnection Project includes four (4) new 230 kV transmission circuits originating at the V.C. Summer Nuclear Station and connecting to existing and new transmission substations within the SCE&G system. These 4 circuits will reliably interconnect and integrate these generators into the electrical transmission grid. These 4 circuits total over 250 miles of new construction including the V.C. Summer – Killian 230 kV line (37 miles), the V.C. Summer – Lake Murray 230 kV #2 line (22 miles) and the V.C. Summer – St. George double circuit 230 kV lines (96 miles each). All but 6 miles of this transmission construction will be located on existing rights-of-way. Because 245 miles of this construction will be on existing rights-of-way, a significant amount of existing 115 kV circuits is being rebuilt/relocated on these existing rights-of-way to provide space for the new 230 kV construction. These circuits will be located entirely within the state of South Carolina.

Cost: The estimated cost of these 4 circuits is $272 million.

Status: The estimated in-service date for the: V.C. Summer – Killian 230 kV line is May 2014, V.C. Summer – Lake Murray #2 230 kV line is December 2014 and for the V.C. Summer – St. George 230 kV lines is January 2018.
Investment Partners: None.

Benefits: This transmission project will reliably interconnect the V.C. Summer #2 and #3 Nuclear Generators, which will provide continued electric power to meet South Carolina’s energy needs.
SOUTHERN CALIFORNIA EDISON (SCE)

Company Background:

• SCE provides power to 180 cities in 50,000 square miles encompassing 11 counties in central, coastal, and Southern California serving 13 million people and nearly 300,000 businesses.

• The SCE-owned transmission grid is under the operational control of the California Independent System Operator (CAISO).

• SCE’s system consists of over 12,000 circuit miles of transmission lines.

• Between 2006 and 2012, SCE invested approximately $3.8 billion (direct costs in nominal dollars, excluding corporate overheads) in transmission.

• SCE plans to invest over $2.1 billion (estimated direct costs in nominal dollars, excluding corporate overheads) of capital in transmission projects from 2013 through 2015.

Transmission Related Smart Grid Initiatives:

SCE is also making substantial investments in advanced technologies that will move SCE towards a more integrated Smart Grid. Three such projects are the PHASOR Program, Centralized Remedial Action System (CRAS), and Tehachapi Wind Energy Storage Project (TSP).

Devers – Colorado River and Devers – Valley No. 2 Transmission Project; also known as the California Portion of Devers – Palo Verde 2 (DPV2) Transmission Project

Description: The Devers–Colorado River/Devers–Valley No. 2 Transmission Project consists of the approximate 153 mile California-only portion of the former DPV2 project and is comprised of:

• Approximately 111 miles of new 500 kV transmission line between the existing Devers Substation, near Palm Springs, California and a new Colorado River Substation, near Blythe, California (along this route there is also a new Red Bluff Substation, near Desert Center, California which was separately licensed), and

• Approximately 42 miles of new 500 kV transmission line between the Devers Substation and the existing Valley Substation near Romoland, California.
Cost: Approximately $800 million (estimated direct costs in nominal dollars, excluding corporate overheads).

Status: Construction commenced January 2012 and the project went in service in September 2013.

Investment Partners: None.

Benefits: This project will provide interconnection and electrical transmission for numerous solar energy facilities, as well as conventional generation facilities, including large-scale solar projects in California and Nevada, to serve load centers in Los Angeles and San Bernardino Counties in California.

Eldorado – Ivanpah Transmission Project (EITP)

Description: The EITP project consists of a new 220/115 kV substation near Primm, Nevada and approximately 35 miles of new double-circuit, 220 kV transmission line that extends from the Ivanpah Dry Lake Area in Southern California to Eldorado Substation in southern Nevada. EITP will provide greater access to the renewable resource rich areas of the Mojave Desert along the California - Nevada border around Primm, Nevada.

Cost: Approximately $350 million (estimated direct costs in nominal dollars, excluding corporate overheads).

Status: CPUC and Bureau of Land Management permitting was completed in May 2011. Construction began in March 2012 and the project went in service in July 2013.

Investment Partners: None.

Benefits: EITP will support renewable generation development, assisting California in meeting Renewables Portfolio Standard (RPS) goals.
San Joaquin Cross Valley Loop (SJXVL)

**Description:** The SJXVL project consists of approximately 23 miles of new and upgraded double-circuit, 220 kV high-voltage transmission line and associated substation facilities. SJXVL will extend from Rector Substation located in Visalia, California and traverse portions of the San Joaquin Valley to a location near Woodlake in Tulare County, California.

**Cost:** Approximately $190 million (estimated direct costs in nominal dollars, excluding corporate overheads).

**Status:** CPUC project approval based on SCE’s route alternative 2 was granted in July 2010. As of October 2011, SCE engaged in Section 10 - Habitat Conservation Plan (HCP) consultation with USF&W and obtained approval in October 2013. Construction activities are in progress and forecast to complete subsequent to Golden Eagle nesting activities in 2014.

**Investment Partners:** None.

**Benefits:** This project will improve the reliability of the California transmission grid by increasing the transmission capacity between the Big Creek Hydroelectric Project and Rector Substation to mitigate overload conditions; serve forecasted electrical demand in the southeastern portion of the San Joaquin Valley; reduce the need to interrupt customer electrical services under transmission line outage conditions; and minimize the need to reduce Big Creek Hydroelectric Project generation under transmission line outage conditions.
Tehachapi Renewable Transmission Project (TRTP)

Description: The TRTP is an 11 segment project consisting of new and upgraded 220 kV and 500 kV transmission lines and associated substations built primarily to assist the development of renewable energy generation projects in remote areas of eastern Kern County, California. Segments 1-3 consist of 83 miles of new transmission and TRTP Segments 4-11 consist of 173 miles of transmission.

- TRTP Segments 1-3 are specific to the Tehachapi Wind Resource Area in southern Kern County and Los Angeles County, and include:
  - Segment 1: 26.5 miles of 500 kV transmission line from Santa Clarita to Lancaster;
  - Segment 2: 21 miles of new 500 kV and 220 kV transmission lines and modifications at the Vincent Substation in Lancaster;
  - Segment 3a: 25.6 miles of 500 kV and 220 kV transmission lines connecting SCE’s Antelope Substation in Lancaster to a new substation west of Mojave in Kern County; and
  - Segment 3b: 9.6 miles of 220 kV transmission line from Mojave to east of Tehachapi.

- TRTP Segments 4-11 are specific to new and upgraded electric transmission lines and substations between eastern Kern County and San Bernardino County, and include:
  - Segment 4: Construction of the new 15 mile 500 kV transmission line from Whirlwind Substation to Vincent Substation. Construction would be in a new ROW, parallel to the existing ROW;
  - Segment 5: Construction of a new 18 mile 500 kV transmission line that would connect SCE’s existing Antelope Substation with SCE’s existing Vincent Substation near Acton. This new line would be built next to an identical existing 500 kV line and would replace two 220 kV lines that would be removed. An existing ROW would be utilized. This new line would be initially energized at 220 kV;
  - Segment 6: Replacement of approximately 16 miles of an existing 220 kV transmission line that runs from SCE’s existing Vincent Substation to the southern edge of the Angeles National Forest (ANF) near the city of Duarte with a new 500 kV transmission line that would initially be energized at 220 kV. An existing ROW would be utilized. Replacement of approximately five miles of an existing SCE 220 kV transmission line between Vincent Substation and the northern border of the ANF with a new 500 kV transmission line;
• Segment 7: Replacement of 16 miles of the existing 220 kV line from the ANF border near the city of Duarte south to SCE's existing Rio Hondo Substation in the city of Irwindale and then continuing southwest across various San Gabriel Valley cities toward SCE's existing Mesa Substation in the Monterey Park/Montebello area with a double-circuit, 500 kV transmission line. Existing ROWs would be utilized and various lower-voltage subtransmission lines between the Rio Hondo and Mesa Substations would require relocation within existing ROW or public ROW;

• Segment 8: Replacement of existing single-circuit, 220 kV line that runs from the existing Mesa Substation area to the Chino Substation area and existing double-circuit, 220 kV line from Chino Substation to the existing Mira Loma Substation with a 33 mile double-circuit, 500 kV line. Replacement of approximately seven miles of existing 220 kV line that run from SCE's Chino Substation to its Mira Loma Substation located in the city of Ontario with a double-circuit, 220 kV line. Existing ROWs would be utilized except for where approximately three miles of new ROW would be required in limited areas. Various lower-voltage sub-transmission lines in the Chino area would require relocation within existing ROW or public ROW;

• Segment 9: Installation of equipment and upgrades at Antelope, Vincent, Windhub, and Whirlwind Substations to connect new 220 kV and 500 kV transmission lines to facilitate interconnection of renewable resources;

• Segment 10: Construction of 17 miles of new single-circuit, 500 kV transmission line to connect the proposed Whirlwind Substation (Segment 4) with the Windhub2 Collector substation. New ROW would be required; and

• Segment 11: Replacement of approximately 20 miles of 220 kV transmission line between the existing Vincent Substation and Gould Substation near La Cañada Flintridge with 17 miles of new single-circuit, 500 kV transmission line. Installation of a second 220 kV transmission line on the currently empty side of the transmission towers that already extend from the area of Gould Substation across various San Gabriel Valley cities to the area of Mesa Substation in Monterey Park. An existing ROW would be utilized.

• Chino Hills Underground: Construction of approximately 3.5 miles of underground single-circuit 500kV transmission line in existing ROW through Chino Hills.

Cost: Approximately $2.9 billion (estimated direct costs in nominal dollars, excluding corporate overheads).

Status: Regulatory approvals granted for Tehachapi Segments 4-11 include: CPUC CPCN in December 2009, US Forest Service Biological Opinion in July 2010, US Forest Service Record of Decision (ROD) in October 2010, US Army Corp of Engineers ROD in February 2011, and Angeles National Forest Special Use Permit in September 2011. Construction of segments 4-11 began in 2010. A Petition for Modification was filed with the CPUC in October 2011 and a July 2013 decision directed SCE to underground a 500 kV transmission line segment through Chino Hills. A Petition for Modification to implement Federal Aviation Authority (FAA) mitigations was filed with the CPUC in October 2011 and was approved in October 2013. Segments 1-5, 9, 10, Windhub, Whirlwind, and Highwind Substations are in service. The remaining segments are in construction to meet the forecast in-service dates ranging from 2014 through 2016.
Investment Partners: None.

Benefits: TRTP will support interconnection of up to 4,500 MWs of generation, most of which are expected to be renewable resources. This will assist California to meet its RPS goals; improve the reliability of the California transmission grid by enabling the expansion of the transfer capability of Path 26; serve load growth in the Antelope Valley; and ease transmission constraints in the Los Angeles basin.

Coolwater-Lugo Transmission Project (previously South of Kramer)

Description: The proposed Coolwater-Lugo project consists of approximately 63 miles of primarily double-circuit, 220 kV transmission line between SCE’s existing Coolwater 220/115 kV Substation in Daggett, and SCE’s existing Lugo 500/220 kV Substation in Hesperia, California. In addition, the project involves siting of a proposed future 500/220 kV Desert View Substation, and 16 miles of transmission line between Desert View and Lugo substations, consisting of 500 kV single-circuit transmission line and towers, initially energized at 220 kV until the future Desert View Substation becomes operational.

Cost: Approximately $700 - $800 million (estimated direct costs in nominal dollars, excluding corporate overheads).

Status: The Coolwater-Lugo project is in the licensing stage. Site and route evaluation, community and agency outreach activities are underway. SCE filed a CPCN application with the CPUC in August 2013 and submitted a Plan of Development (POD) to the BLM in November 2013. The project is forecast to be in service by 2018.

Investment Partners: None.

Benefits: Construction of Coolwater-Lugo will remedy the reliability and congestion problems that would result from the development and interconnection of over 2,400 MWs of renewable solar and wind generation in the Mojave Desert region of Southern California.
West of Devers (WOD) Upgrade Project

**Description:** The proposed West of Devers Upgrade Project facilities will be located in San Bernardino and Riverside Counties in southern California. WOD entails the removal and rebuilding of five existing 220 kV lines: Devers-Vista #1 and #2, Devers-San Bernardino, Devers-El Casco, and El Casco-San Bernardino. The upgraded 220 kV lines are needed to allow full delivery of multiple generation projects interconnecting at SCE's new Colorado River and Red Bluff Substations.

**Cost:** Approximately $1.0 billion (estimated direct costs in nominal dollars, excluding corporate overheads).

**Status:** The WOD Upgrade Project is in the licensing stage. Site and route evaluation, community and agency outreach activities are underway. SCE filed a CPCN application with the CPUC in October 2013. The project is forecast to be in service by 2020.

**Investment Partners:** None.

**Benefits:** Construction of WOD Upgrade Project will increase the transfer capability of the existing WOD corridor and provide for the full delivery of new renewable solar generation being developed in California.

Path 42

**Description:** The proposed Path 42 project, in partnership with Imperial Irrigation District (IID), will enable the delivery of additional renewable energy to the CAISO controlled grid. The SCE portion of this project primarily consists of the construction of approximately 15 miles of the Devers – Mirage #1 and Devers – Mirage #2 230 kV transmission lines along with various upgrades at both the Devers Substation and Mirage Substation.

**Cost (SCE Portion):** Approximately $50 million (estimated direct costs in nominal dollars excluding corporate overheads).

**Status:** Development activities, including preliminary engineering and environmental permitting, are in progress. IID is preparing the California Environmental Quality Act and National Environmental Policy Act documents for the environmental review process. The project is forecasted to be complete in 2014.
**Investment Partners:** Imperial Irrigation District.

**Benefits:** This project will enable transfer of approximately 1,090 MWs of additional renewable energy from IID to SCE’s portion of the CAISO controlled grid. This project will contribute to meeting California’s RPS goal of 33 percent of retail load served by renewable resources by 2020.

**Tehachapi Wind Energy Storage Project (TSP):**

**Description:** The Tehachapi Wind Energy Storage Project (TSP) will evaluate the performance of an eight MW, four hour (32 MWh) battery energy storage system (BESS) to improve grid performance and assist in the integration of large-scale variable energy resourced generation. Project performance will be measured with 13 specific operational uses: provide voltage support and grid stabilization; decrease transmission losses; diminish congestion; increase system reliability; defer transmission investment; optimize renewable-related transmission; provide system capacity and resources adequacy; integrate renewable energy (smoothing); shift wind generation output; frequency regulation; spin/non-spin replacement reserves; ramp management; and energy price arbitrage. Most of the operations either shift other generation resources to meet peak load and other electricity system needs with stored electricity, or resolve grid stability and capacity concerns that result from the interconnection of variable energy resources. SCE will also demonstrate the ability of lithium-ion battery storage to provide nearly instantaneous maximum capacity for supply-side ramp rate control.

**Cost:** Approximately $57 million: $25 million Department of Energy (DOE) funding, remainder of project costs funded by SCE and its partners (estimated direct costs in nominal dollars, excluding corporate overheads).

**Status:** Battery system building construction began at Monolith Substation in February 2012 and is substantially complete. Battery system commissioning scheduled in 2014. Operations, measurement, and testing scheduled to be completed in 2016.

**Investment Partners:** DOE through an American Recovery and Reinvestment Act project grant.

**Benefits:** The objective of the project is to evaluate the capability of utility scale lithium-ion battery technology to improve grid performance and assist in the integration of variable energy resources. Though lithium-ion battery technology has been tested at a smaller scale and is currently being used in hybrid and electric vehicles, it has not been proven for large-scale utility purposes.
Centralized Remedial Action Schemes (CRAS):

Description: The Centralized Remedial Action Schemes (CRAS) project will centralize control and operation of SCE’s special protection systems on the SCE transmission grid. The CRAS will transition existing special protection systems from an Intelligent Electronic Device (IED) at substations to a redundant and highly secure centralized processing system. The CRAS will accommodate complex special protection systems that would not be possible with individual IED systems.

Cost: Approximately $50 million (estimated direct costs in nominal dollars, excluding corporate overheads).

Status: The project is anticipated to be completed during the fourth quarter of 2014.

Investment Partners: None.

Benefits: The CRAS will 1) mitigate and permit existing and new generation projects to connect to the grid and to meet California’s RPS goal; 2) enhance the coordination and effectiveness of existing special protection technology; 3) enhance the ability to build new schemes to enable a more efficient generator interconnection process; and 4) improve the efficiency of managing and maintaining existing and new special protection systems.

PHASOR Program (previously Wide-Area Situation Awareness System)

Description: SCE’s PHASOR Program (previously referred to as the Wide-Area Situational Awareness System or WASAS) consists of: (1) Digital Fault Recorder/Phasor Measurement Unit (DFR/PMU) Infrastructure Replacement; and (2) PHASOR System. The DFR/PMU Infrastructure Replacement program involves the installation of combined DFR/PMU devices to enable SCE 500 kV and 220 kV transmission substations to have synchrophasor measurement capability. The PHASOR System provides the basic infrastructure necessary for a synchrophasor data management system. The PHASOR System will collect, store, and share PMU data that SCE acquires from DFR/PMU devices on the grid. It is designed to provide Western Electricity Coordinating Council (WECC) utilities and system operators with information about the operating status of the bulk power system through the Western Interconnection Synchrophasor Program (WISP).

Cost: Approximately $25 million (estimated direct costs in nominal dollars, excluding corporate overheads).

Status: The system was placed in service in 2013.

Investment Partners: None.

Benefits: Phasor measurement systems are powerful tools that provide bulk power system information at speeds previously unavailable. SCE will be able to manage in real time the extensive data collected from the phasor measurement devices and other data sources to enable smarter, faster decision-making. Armed with the information provided by the system, SCE system operators will be able to take proactive corrective measures to avoid large-
scale blackouts before the system reaches a breaking point. At the same time, having better information on the system’s breaking point will eventually allow system operators to optimize the use of existing transmission facilities by safely operating closer to the edge.
Company Background:

- With 4.4 million customers, Southern Company utilities serve a 120,000 square mile service territory spanning most of Georgia and Alabama, southeastern Mississippi, and the panhandle region of Florida.
- Southern Company owns four regulated retail electric utilities: Alabama Power; Georgia Power; Gulf Power; and Mississippi Power.
- System-wide there are approximately 27,000 circuit miles of transmission line.
- Between 2003 and 2012, Southern Company invested over $3.5 billion in transmission.

Transmission Related Smart Grid Initiatives:

Southern Company has been utilizing Smart Grid technologies for a number of years through its robust communication network and data acquisition and outage management tools that optimize system performance and reliability. Southern Company is planning to invest approximately $216 million between 2013 and 2018 by installing new Smart Grid technologies or replacing existing telecommunications equipment and fiber that has reached the end of life. These technologies advance Smart Substation applications and Transmission Line Automation.

Central Alabama Projects

Description: The Central Alabama CC projects consist of a new 500/230 kV autobank at Autagaville TS and two new bundled 230kV lines (.6 and .7 miles) from the Autaugaville 500/230 kV substation to the Harris 230 kV Substation; a new 230/115 kV autobank at County Line Road TS; a new 120 MVAR capacitor bank; reconductoring approximately 40.1 miles of existing single-circuit, 230 kV transmission line; reconductoring 4.5 miles of existing single-circuit, 115 kV transmission line; and upgrading approximately six miles of 230 kV line.

Cost: Approximately $87 million.

Status: These projects are currently scheduled to be in service the summer of 2014.
Investment Partners: None.

Benefits: The transmission improvements will meet the future network resource requirements for Gulf Power Company.

East Pelham 230/115 kV Transmission Substation Project

Description: The East Pelham 230/115 kV Transmission Substation project includes approximately one mile of new single-circuit, 230 kV transmission line; 33.5 miles of new single-circuit, 115 kV transmission line; upgraded structures on approximately 18 miles of single-circuit, 230 kV transmission line; constructs a new 400 MVA, 230/115 kV substation on a 26 acre site; and constructs two new 115 kV switching stations (Alabaster and East Chelsea).

Cost: Approximately $57 million.

Status: This project is currently scheduled to be in service the summer of 2015.

Investment Partners: None.

Benefits: This project will meet load growth and alleviate thermal overloads in the Birmingham, Alabama area.
Greene County - Bassett Creek 230 kV Line Project

**Description:** The Greene County - Bassett Creek 230 kV line project consists of approximately 58 miles of new single-circuit, 230 kV transmission line between Greene County SP and Bassett Creek 230/115 kV Substations.

**Cost:** Approximately $103 million.

**Status:** This project is currently scheduled to be in service the summer of 2015.

**Investment Partners:** None.

**Benefits:** This project is for infrastructure reliability in the Thomasville area of Alabama.

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Kemper County IGCC Plant

**Description:** The Kemper County IGCC Plant project consists of a new 600 MW IGCC plant constructed by Mississippi Power Company. Transmission improvements associated with this plant consist of a 230 kV switchyard and collector bus; two new 230 kV switching stations; a new 230/115 kV substation in Meridian, MS; approximately 55 miles of new 230 kV transmission line; ten miles of new 115 kV transmission line; and upgrades to 24 miles of existing 115 kV transmission line in Kemper County and Meridian areas of Mississippi.

**Cost:** Approximately $120 million.

**Status:** This project is currently scheduled to be in service the summer of 2014.

**Investment Partners:** None.

**Benefits:** The new generation and transmission improvements will meet the future network resource requirements for Mississippi Power Company.
Mobile Area Network Project

Description: The Mobile Area Network Project consists of constructing a 115 kV six terminal switching station at North Crichton; approximately 14 miles of new single-circuit, 115 kV transmission line; reconductoring 28 miles of existing single and double-circuit, 115 kV transmission line; and installing associated network switches and distance relaying.

Cost: Approximately $74 million.

Status: This project is currently scheduled to be in service the summer of 2016.

Investment Partners: None.

Benefits: This project is for infrastructure reliability and operational flexibility in the Mobile Metropolitan area of Mobile County, Alabama.

North Brewton - Alligator Swamp 230 kV Line Project

Description: The North Brewton - Alligator Swamp 230 kV line project consists of approximately 54.7 miles of new single-circuit, 230 kV transmission line between North Brewton 230/115 kV and Alligator Swamp 230 kV Substations.

Cost: Approximately $73 million.

Status: This project is currently scheduled to be in service the summer of 2015.

Investment Partners: None.

Benefits: This project is for infrastructure reliability in the Pensacola area of Florida.
Pinckard - Holmes Creek - Highland City 230 kV Transmission Line Project

Description: The Pinckard - Holmes Creek - Highland City 230 kV Transmission Line Project consists of approximately 73 miles of new single-circuit, 230 kV transmission line from the Holmes Creek Substation to the Highland City Substation (in the northeastern area of the Florida Panhandle) and rebuilding the existing Pinckard TS - Holmes Creek 115 kV transmission line and converting it to 230 kV operation.

Cost: Approximately $92 million.

Status: This project is currently scheduled to be in service the summer of 2015.

Investment Partners: None.

Benefits: This project is for load growth and reliability in Southeast Alabama and in the central Panhandle, Panama City, and Destin areas of Florida.

Plant Smith - Laguna Beach - Santa Rosa 230 kV Transmission Line Project

Description: The Plant Smith - Laguna Beach - Santa Rosa 230 kV Transmission Line Project consists of converting 14 miles of existing single-circuit, 115 kV line to 230 kV operation between Plant Smith and Laguna Beach Substations; a second 230 kV Autobank at Laguna Beach Substation; replace Laguna Beach - Santa Rosa #1 115 kV transmission line with a 230 kV transmission line; rebuild Crystal Beach – Bluewater Bay 115kV transmission line; and add a new Santa Rosa 230 kV Substation with one, 400 MVA transformer bank (in the Central Florida Panhandle, Destin, and Panama City Beach areas).

Cost: Approximately $69 million.

Status: This project is currently planned in two phases, with the second phase scheduled to be in service the summer of 2020.

Investment Partners: None.

Benefits: This project is for load growth and reliability in the Panama City and Destin areas of the Florida Panhandle.
Plant Vogtle Network Improvement Project

**Description:** The Plant Vogtle Network Improvement Project consists of approximately 50 miles of new single-circuit, 500 kV transmission line between Vogtle and Thomson 500/230 kV Substations, and expanding the 500 kV switchyard at Plant Vogtle.

**Cost:** Approximately $132 million.

**Status:** This project is currently scheduled to be in service the summer of 2017.

**Investment Partners:** None.

**Benefits:** This project will address generator stability issues related to the expansion of the existing Plant Vogtle facility.

Tuscaloosa Area Solution

**Description:** The South Tuscaloosa - Eutaw Area Network Project consists of 23 miles of new single-circuit, 115 kV transmission line from the Epes Substation to the Eutaw Substation; a new 230/115 kV substation at Moundville T.S.; approximately 21.2 miles of new single-circuit, 115 kV transmission line; converting two 46 kV substations to 115 kV operation; and constructing approximately 25 miles of new single-circuit 230kV transmission line.

**Cost:** Approximately $96 million.

**Status:** This project is currently planned in three phases, with the third phase scheduled to be in service the summer of 2019.

**Investment Partners:** None.

**Benefits:** This project is for load growth, infrastructure reliability and operational flexibility in the Tuscaloosa County and Greene County areas of Alabama.
Wadley 500/230 kV Project

**Description:** The Wadley 500/230 kV Project consists of expanding the existing Wadley 230/115 kV substation by constructing a 500 kV ring bus and installing a new 2,016 MVA 500/230 kV autotransformer.

**Cost:** Approximately $56 million.

**Status:** This project is currently scheduled to be in service the summer of 2018.

**Investment Partners:** Municipal Electric Authority of Georgia (MEAG Power).

**Benefits:** This project will address generator stability issues related to the expansion of the existing Plant Vogtle facility.

Jasper 161kV Area Improvements

**Description:** The Jasper Area Improvement Project consists of reconductoring 20 miles of existing 161kV line; constructing approximately 1 mile of new 161kV line; and adding a new 5-breaker 161kV switching station.

**Cost:** Approximately $28 million.

**Status:** This project is currently scheduled to be in service the summer of 2017.

**Investment Partners:** None.

**Benefits:** This project is for load growth, infrastructure reliability and operational flexibility in the Jasper area.
Eastern Area Improvements

**Description:** The Eastern Area Improvement Project consists of reconductoring approximately 5 miles of existing 115kV line; adding a new 115kV switching station; and constructing approximately 34 miles of new 115kV line.

**Cost:** Approximately $41 million.

**Status:** This project is currently scheduled to be in service the summer of 2019.

**Investment Partners:** None.

**Benefits:** This project is for load growth, infrastructure reliability and operational flexibility in the Anniston and Gadsden areas.

Auburn – Opelika 115kV Networking

**Description:** The Auburn – Opelika 115kV Networking project consists of constructing four new 115kV switching stations, reconductoring approximately 23 miles of existing 115kV line and constructing 4 miles of new 115kV line.

**Cost:** Approximately $34 million.

**Status:** This project is currently scheduled to be in service the summer of 2019.

**Investment Partners:** None.

**Benefits:** This project is for load growth, infrastructure reliability and operational flexibility in the Auburn and Opelika areas.
Bassett Creek South 230kV Improvements

**Description:** The Bassett Creek South 230kV Improvements consist of a new 25 mile 230kV line from Bassett Creek to a new switching station on the Lowman – Belleville 230kV line.

**Cost:** Approximately $40 million.

**Status:** This project is currently scheduled to be in service the summer of 2020.

**Investment Partners:** None.

**Benefits:** This project is for infrastructure reliability and operational flexibility in the Bassett Creek and McIntosh areas.

Turkey Hill Networking

**Description:** The Turkey Hill Networking plan consists of 2.75 miles of new 115kV line and reconductoring approximately 17.6 miles of existing 115kV line.

**Cost:** Approximately $22 million.

**Status:** This project is currently scheduled to be in service the summer of 2018.

**Investment Partners:** None.

**Benefits:** This project is for load growth, voltage support, infrastructure reliability and operational flexibility in the Silverhill and Turkey Hill areas.
Pensacola Area Voltage Improvements

**Description:** The Pensacola Area Voltage Improvements consist of looping the Crist – Shoal River 230kV line into Alligator Swamp and adding two (2) new 120 MVAR 230kV filtered capacitor banks and two (2) new +125/-100 MVAR 230kV Static Var Systems in the area.

**Cost:** Approximately $50 million.

**Status:** This project is currently scheduled in two phases with the second phase to be in service the summer of 2022.

**Investment Partners:** None.

**Benefits:** This project will provide dynamic voltage support for the Pensacola area.

Panama City Area Voltage Improvements

**Description:** The Panama City Area Voltage Improvements consist of a new +125/-100 MVAR 230kV Static Var System in the area.

**Cost:** Approximately $20 million.

**Status:** This project is currently scheduled to be in service the summer of 2015.

**Investment Partners:** None.

**Benefits:** This project will provide dynamic voltage support for the Panama City area.

Dyer Road 230/115kV Substation Project

**Description:** The Dyer Road 230/115 kV Project consists of constructing a new 230/115kV substation by creating three element 230kV ring bus, installing 400MVA 230/115kV autotransformer, and creating an eight element 115kV ring bus.

**Cost:** Approximately $23 million.

**Status:** This project was placed in service on December 31, 2013.
Investment Partners: None.

Benefits: This project is for infrastructure reliability and operational flexibility in the South Metro Atlanta area of Georgia.

Jasper – Pine Grove Primary 115kV Project

Description: The Jasper – Pine Grove Primary 115kV rebuild project consists of rebuilding approximately 22 miles with 230kV constructed single pole structures with 100°C 1351 ASCR conductor.

Cost: Approximately $26 million.

Status: This project is currently scheduled to be in service the fall of 2014. The Duke Energy portion will be completed by summer 2015.

Investment Partners: Georgia Transmission Corporation (GTC).

Benefits: This project is for infrastructure reliability in the Valdosta area of Georgia.

Judy Mountain 230/115kV Substation Project

Description: The Judy Mountain 230/115 kV Project consists of constructing a new 230/115kV substation by creating five element 230kV ring bus, installing 400MVA 230/115kV autotransformer, and creating an five element 115kV ring bus.

Cost: Approximately $22 million.

Status: This project is currently scheduled to be in service the summer of 2014.

Investment Partners: Georgia Transmission Corporation (GTC).

Benefits: This project is for infrastructure reliability and operational flexibility in the Rome area of Georgia.
McIntosh – Blandford – Meldrim 230kV Reconstructor Project

**Description:** The McIntosh – Blandford – Meldrim 230kV Black and White line reconductor project consists of reconductor 18.2 miles of 230kV transmission line with 210°C 1622 ACCR conductor.

**Cost:** Approximately $30 million.

**Status:** This project is currently scheduled to be in service the summer of 2014.

**Investment Partners:** None.

**Benefits:** This project is for infrastructure reliability and operational flexibility in the Savannah area of Georgia.

Boulevard 230/115kV Project

**Description:** At the Boulevard 115/46/13.8-kV substation, install a 230/115-kV, 400 MVA transformer. Increase the capacity of the 36 MVAR, 115-kV capacitor to 60 MVAR. Terminate the Dean Forest 230-kV line. This will require a complete rebuild of the Boulevard substation.

Rebuild the Boulevard – Dean Forest 115-kV Black/White common tower lines, to 230-kV specs using 170C, 1351 ACSS conductor. Operate one side at 230-kV and the other side at 115-kV.

Expand the Dean Forest 230-kV ring-bus and terminate the Boulevard 230-kV line and the Crossgate 230-kV line.

At a point approximately 2.0 miles from Plant Kraft on the Kraft – McIntosh 230-kV Black/White lines, construct a three-element, 230-kV ring-bus switching station. Tap the Kraft – McIntosh 230-kV White line creating the Dean Forest, Kraft and McIntosh 230-kV lines. Construct a 5.5 mile, Crossgate - Dean Forest 230-kV line using 170C, 1351 ACSS conductor.
Cost: Approximately $70 million.

Status: This project is currently scheduled to be in service the summer of 2015.

Investment Partners: None.

Benefits: This project is for infrastructure reliability and operational flexibility in the Savannah area of Georgia.

Statesboro Primary – Wadley Primary 115kV Project

Description: The Statesboro Primary – Wadley Primary 115kV project consists of reconductoring approximately 22 miles of transmission line with 100˚C 1033 ACSR conductor.

Cost: Approximately $21 million.

Status: This project is currently scheduled to be in service the summer of 2021.

Investment Partners: None.

Benefits: This project is for infrastructure reliability in the Statesboro area of Georgia.
TRANSCURRENT

Company Background:

- Transource is a joint venture between American Electric Power (AEP) and Great Plains Energy (GPE) purposed with pursuing the competitive transmission market.
- Transource has approximately $400 million of transmission assets under development located in the SPP region and is actively engaged in additional project opportunities as they emerge.

Nebraska City - Sibley Line and Iatan - Nashua Line

Description: The Missouri portion of the Nebraska City - Sibley line is a 135 mile, 345 kV line. An additional 45 miles of line in Nebraska will be built and owned by Omaha Public Power District (OPPD). The Iatan - Nashua line is a 30 mile, 345 kV line.

Cost: The total estimated cost of the two SPP-approved projects in Missouri is approximately $400 million. The Missouri portion of the Nebraska City - Sibley project is estimated to cost $332 million and the Iatan - Nashua project is estimated to cost $65 million.

Status: Both projects have established routes and are in varying stages of construction. The Missouri portion of the projects were transferred from GPE to Transource Missouri in January 2014. The Iatan - Nashua project has an in-service date of 2015 and the Nebraska City - Sibley project has an in-service date of 2017.

Investment Partners: Missouri segments: Transource. Nebraska segment: OPPD.

Benefits: The Nebraska City - Sibley line will reduce regional congestion in one of SPP’s most heavily constrained areas and also helps to integrate as much as 5,000 MW of wind generation. The Iatan - Nashua line will reduce regional congestion and provide regional trade and production benefits.
VERMONT ELECTRIC POWER COMPANY (VELCO)

Company Background:

- VELCO was formed in 1956 when local utilities joined together to create the nation’s first statewide, “transmission only” company in order to provide access to clean hydro power and build and maintain the state’s high-voltage transmission grid.
- VELCO manages a system that includes 738 circuit miles of transmission lines, 55 substations and over 1,300 miles of high-speed fiber optic cable.
- VELCO is also the administrator for the $69 million in American Recovery and Reinvestment Act Smart Grid Investment Grant funds as part of the state’s distribution utilities’ $138 million eEnergy Vermont statewide Smart Grid deployment program.
- Between 2003 and 2012, VELCO invested approximately $641 million in transmission.
- In the next five years, VELCO expects to invest approximately $239 million in planned transmission upgrades.

Connecticut River Valley Upgrades

Description: Although development of the project is on-going, it is expected that this project will include the reconstruction of an existing 13.5 mile 115kV line. The project also includes the expansion of the Ascutney Substation and the reconstruction of the Chelsea Substation.

Cost: Approximately $93 million.

Status: This project is under permitting development and is scheduled to be put in service in summer of 2016.

Investment Partners: None.

Benefits: This project addresses a western/eastern New England load area system deficiency between Vermont, western Massachusetts, Connecticut, and New Hampshire, Maine, eastern Massachusetts, and Rhode Island. The overload is affected by power transfer between these regions. The project will address these areas of concern and meet present and future system needs.
Transmission System Improvements

**Description:** New substation upgrade efforts in 2014 consist of the refurbishment of an existing static synchronous compensator (STATCOM) at the Essex Substation. In addition, VELCO has initiated a project to evaluate and replace aged/insufficient transmission line infrastructure. This project will include a condition assessment and engineering analysis and consists of the replacement of multiple transmission line structures located throughout the state and an 115kV submarine cable between Vermont and New York.

**Cost:** Approximately $146 million.

**Status:** These projects are underway and are expected to be completed between 2015-2017.

**Investment Partners:** None.

**Benefits:** These projects address reliability concerns associated with aged and inadequate transmission infrastructure and will result in an overall improvement of the structural integrity and reliability of VELCO’s transmission system.
WESTAR ENERGY, INC.

Company Background:

- Westar Energy is an investor-owned, vertically integrated electric utility serving 686,000 retail customers in Kansas. Westar has served Kansas for more than 100 years and is the state’s largest electric utility.
- Westar Energy has about 7,100 MWs of electric generation capacity.
- System-wide there are approximately 4,388 circuit miles of 69 kV and above transmission line.
- Westar Energy is a member of the Southwest Power Pool (SPP).
- Between 2003 and 2012, Westar Energy invested approximately $975 million in transmission.

Summit to Elm Creek 345 kV Transmission Line

Description: The Summit - Elm Creek 345 kV project consists of approximately 60 miles of new single-circuit 345 kV transmission line linking the existing 345 kV Summit Substation southeast of Salina, Kansas, to a new 345 kV substation southeast of Concordia, Kansas to be located near the existing 230 kV Elm Creek Substation. Westar Energy will construct, own, and operate 29 miles of the southern section, located from Justice Road in Ottawa County, south to Summit Substation. ITC Great Plains, LLC, under a co-development agreement with Mid-Kansas Electric, LLC (MKEC), will construct, co-own with MKEC, and operate 30 miles of the northern section of the line, from Justice Road in Ottawa County, north to the new 345 kV substation.

Cost: Westar Energy’s cost is approximately $66 million.

Status: The following is an approximate timeline for the Summit - Elm Creek Project:

- 2012 - 2013 Routing
- 2014 Right-of-Way acquisition and engineering design
• 2015 - 2016 Construction
• December 31, 2016 Project in-service

Investment Partners: None.

Benefits: The Elm Creek to Summit project will improve the reliability of the grid in central Kansas, allowing the grid to continue to meet required standards of reliability. It will benefit residents and businesses in central Kansas and beyond by easing congestion across the transmission network and improving the efficiency of the grid. It will also provide tax revenue, construction jobs, and local expenditures, and will expand capabilities for future investment in area industry.

Prairie Wind Transmission, LLC

Company Background:

Prairie Wind Transmission, LLC., is a joint venture formed by Westar Energy and Electric Transmission America (ETA), a joint venture of subsidiaries of American Electric Power (AEP) and MidAmerican Energy Holdings Company, to build and own new electric transmission assets in Kansas.

Wichita - Medicine Lodge - Woodward 345 kV Transmission Line

Description: The Wichita - Medicine Lodge - Woodward 345 kV Transmission Line project consists of approximately 108 miles of new double-circuit, high-voltage, 345 kV transmission line linking an existing 345 kV substation near Wichita, Kansas to a new 345 kV substation northeast of Medicine Lodge, Kansas, near the new Flat Ridge Wind Farm jointly owned by Westar Energy and BP Alternative, and then south to the Kansas-Oklahoma border. OG&E will build approximately 80 miles of line from the border to Woodward Substation.

Cost: Prairie Wind Transmission's cost is approximately $170 million. Westar Energy and ETA will each invest $85 million.

Status: The project broke ground on August 1, 2012, and is currently under construction. The project is estimated to be in service by December 2014.

Investment Partners: Westar Energy and ETA.

Benefits: The project will enhance electricity transport capabilities across SPP and Kansas and will support expansion of renewable electricity generation in the region.
XCEL ENERGY INC.

Company Background:

- Xcel Energy Inc. has operations in ten western and midwestern states (Colorado, Kansas, Michigan, Minnesota, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, and Wisconsin) serving 3.3 million electric customers.

- Northern States Power (NSP) Companies, Public Service of Colorado (PSCo) and Southwestern Public Service (SPS) are subsidiaries of Xcel Energy Inc.

- System-wide there are approximately 18,700 circuit miles of transmission line.

- Between 2003 and 2012, Xcel Energy invested over $3.5 billion in transmission.

Northern States Power Companies (NSP Companies)

Company Background:

- Northern States Power Company (NSPM), a Minnesota corporation, and Northern States Power Company (NSPW), a Wisconsin corporation (jointly NSP Companies), operate an integrated system in Minnesota, North Dakota and South Dakota, and Wisconsin and the Michigan Upper Peninsula.

- The NSP Companies have approximately 1.4 million retail and wholesale customers, and operate approximately 7,000 circuit miles of transmission.

Transmission Related Smart Grid Initiatives:

NSP is participating in MISO’s SynchroPhasor Project installing equipment at power plants to track the relative phase angle of generators on the grid.
CapX2020 Transmission Plan

Description: The CapX2020 Transmission Plan consists of approximately 250 miles of new double-circuit capable, 345 kV transmission line between Brookings County, South Dakota, and Hampton, Minnesota, including a related 23 mile double-circuit capable, 345 kV transmission line between Lyon County, Minnesota and Hazel Creek, Minnesota; approximately 240 miles of new double-circuit capable, 345 kV transmission line between Fargo, North Dakota, and St. Cloud and Monticello, Minnesota; approximately 150 miles of new single-circuit, 345 kV transmission line between Hampton and Rochester, Minnesota, continuing to La Crosse, Wisconsin; and approximately 70 miles of new single-circuit, 230 kV transmission line between Bemidji and Grand Rapids, Minnesota.

This project is a joint initiative of 11 transmission owning utilities, including the NSP Companies, in the Upper Midwest to expand the electric transmission grid to ensure continued reliable service to 2020 and beyond.

The Brookings County - Hampton Project provides access to wind generation in southwest Minnesota and eastern South Dakota. The line is expected to increase the delivery of wind generation by 700 MWs. While the other lines are driven primarily for reliability needs, they will also facilitate future wind development by providing the necessary infrastructure to support other wind-focused transmission additions. In addition, the Brookings County-Hampton Project is part of the Multi Value Project (MVP) Portfolio approved by the MISO Board of Directors in December 2011.

Cost: The four lines will cost approximately $1.7 billion with an additional $200 million to provide for double-circuit capable 345 kV lines. Of this total, approximately $639 million is associated with the wind generation supporting Brookings County-Hampton Project. The Brookings County-Hampton project will be subject to the newly established MVP Portfolio cost allocation methodology. The MVP cost allocation spreads the cost of the project over the entire MISO footprint on the energy usage basis. NSP will pay approximately 9.1 percent of the total cost for all the MVP projects while maintaining the original CapX ownership arrangements.

Status: The 28-mile St Cloud-Monticello 345 kV project was completed and energized in December 2011 and the Bemidji-Grand Rapids 230 kV line was completed and energized in September 2012. Construction continues on the Fargo-St Cloud, Brookings County-Hampton and Hampton-Rochester-La Crosse 345 kV projects with an in-service date of 2015 for all three.

Benefits: This project will alleviate emerging electric reliability issues around the Upper Midwest and strengthen the regional transmission system. In addition, the Brookings County-Hampton line will add capacity for an additional 700 MWs of generation in southwest Minnesota and eastern South Dakota. The project will also provide the foundation for future transmission projects from wind-rich regions of western Minnesota and North and South Dakota.

MISO Multi Value Project Portfolio

Description: The MISO MVP Portfolio consists of 17 individual 345 kV and above projects in the MISO footprint. The NSP Companies have partial ownership of three of the 17 projects. The projects are the CapX2020 Brookings County-Hampton and the Big Stone South-Brookings County 345 kV lines and the 150 mile, single-circuit, 345 kV transmission line between La Crosse, Wisconsin and Madison, Wisconsin (Badger Coulee). This MVP portfolio is part of a regional plan to fulfill the Renewable Portfolio Standards of all states in the MISO footprint. The projects, approved as a complete portfolio, will enable enough wind integration into the MISO footprint to fulfill RPS goals through at least 2026.

Cost: The MVP portfolio will cost approximately $5.2 billion. The entire total is associated with the integration of wind generation into the MISO footprint. The MVP cost allocation spreads the cost of the project over the entire MISO footprint on the energy usage basis. NSP will pay approximately 9.1 percent of the total cost for all the MVP projects while maintaining the original CapX2020 ownership arrangement for Brookings County-Hampton. NSP has joint ownership with Otter Tail Power (OTP) in the Big Stone South-Brookings County project and with American Transmission Company (ATC) in the La Crosse-Madison (Badger Coulee) project.

Status: Construction started on the Brookings County-Hampton project in May 2012. The South Dakota Public Utilities Commission approved an application for the Big Stone South-Brookings County project in February 2014; the project has an in-service date of 2017. NSP and ATC filed an application with the Public Service Commission of Wisconsin in 2013 for the Badger Coulee project with an in-service date of 2018.

Investment Partners: The entire MISO footprint will share costs based on annual energy consumption.

Benefits: The portfolio of projects allows the MISO footprint to fully meet the RPS goals of all the states in the MISO footprint, provides significant cost savings through better generation dispatch, and provides improved system stability and voltage support to the major load centers.
Scott County 345 kV Substation Expansion

**Description:** This project is to expand the existing 115 kV Scott County Substation in Shakopee, Minnesota to include 345 kV yard. This project will include adding two new 345/115 kV, 672 MVA transformers. The 345 kV portion of the project will build a 4 position ring bus to accommodate the transformers and the new terminations on the existing Blue Lake-Helena 345 kV line. The 115 kV bus will also be expanded to allow for more terminations.

**Cost:** Approximately $27 million.

**Status:** Construction is scheduled for start in 2014 with an in-service date by the end of 2015.

**Investment Partners:** None.

**Benefits:** This project is needed for area load growth and will help alleviate transformer loadings on the existing Eden Prairie transformers on the west side of the Twin Cities Metro area.

Bayfield Loop

**Description:** This project will construct a new 115 kV transmission line into the Bayfield, Wisconsin's area existing 34.5 kV looped transmission system. This will add a new 115/34.5 kV substation into the area tying into the 34.5 kV system. In addition to the new line, the 34.5 kV section from Cornucopia-Bayfield will be rebuild once this new 115 kV portion of the project is in-service.

**Cost:** Approximately $55 million.

**Status:** Construction is scheduled for start in 2015 with an in-service date by summer of 2018.

**Investment Partners:** None.

**Benefits:** This project is needed for area load growth and will help with operations of the system in the area. It will help alleviate low voltage conditions under contingency.

Bayfront to Ironwood 88 kV

**Description:** This project will rebuild the existing 88 kV line from the Ashland, Wisconsin area to the Ironwood, Wisconsin area in northern Wisconsin to 115 kV. There is approximately 40 miles of line to rebuild and several substation modifications and conversions will be needed for this project.

**Cost:** Approximately $50 million.

**Status:** Construction is scheduled for start in 2017 with an in-service date by the end of 2021.

**Investment Partners:** None.

**Benefits:** This project is needed for several C3 contingencies in the area. In addition age and condition is an issue with this line.
Couderay-Osprey 161 kV Line

**Description:** This project will construct approximately 40 miles of new 161 kV transmission lines from the Osprey substation and a new Couderay substation near the Town of Ladysmith Wisconsin. The new Couderay substation will tie into the existing 115 kV line with a 161/115 kV, 187 MVA transformer.

**Cost:** Approximately $46 million.

**Status:** Construction was scheduled for start in 2013 with an in-service date by the end of 2015.

**Investment Partners:** None.

**Benefits:** This project is needed for area industrial load growth. In addition this project will provide support for the existing hydro units in the area to be restarted after an outage on the Hydro Lane transmission source.

PUBLIC SERVICE OF COLORADO (PSCO)

**Company Background:**

- PSCo operates in Colorado, and owns approximately 4,360 circuit miles of transmission lines 44 kV and above.
- PSCo has approximately 1.4 million retail and wholesale customers in Colorado.

CO Senate Bill 100 Plan Projects

**Pawnee - Daniels Park 345 kV Transmission Line**

**Description:** The Pawnee - Daniels Park 345 kV Transmission Line proposed project would consist of approximately 120 miles of 345 kV transmission from PSCo’s Pawnee Substation in northeastern Colorado to its Daniels Park Substation south of the Denver metro area. The first 95 miles of the project would expand the existing Pawnee - Smoky Hill 345 kV transmission line to a double-circuit, 345 kV transmission line between Pawnee and Smoky Hill Substations. One circuit being the Pawnee - Smoky Hill 345 kV line, and the second circuit would be one section of the Pawnee - Daniels Park 345 kV line. For the remaining 25 miles between PSCo’s Smoky Hill and Daniels Park Substations, a new double-circuit, 345 kV transmission line is proposed to be constructed. One of the two circuits would be the second section of the Pawnee - Daniels Park 345 kV line. The second circuit would create a new 345 kV transmission line between PSCo’s Smoky Hill Substation and the Daniels Park Substation.
Cost: Approximately $150 million.

Status: This is a planned project with an expected in-service date of 2019. The Company is required to seek approval from the Public Utilities Commission prior to construction.

Investment Partners: None.

Benefits: This project is expected to accommodate at least 500 MWs of new generation resources, interconnecting at or near the Pawnee Substation in north central and northeastern Colorado.

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**Pawnee - Smoky Hill 345 kV Transmission Project**

Description: The Pawnee - Smoky Hill 345 kV Transmission Project is a new 345 kV transmission line that connects PSCo’s existing Pawnee Substation near Brush, Colorado, to PSCo’s Smoky Hill Substation near Aurora, Colorado. The project also interconnects with PSCo’s Missile Site Substation near Deer Trail, Colorado. The line is approximately 95 miles long.

Cost: Approximately $140 million.

Status: PSCo filed for regulatory approval in October 2007, which was approved in February 2009. This project was completed in the summer of 2013.

Investment Partners: None.

Benefits: The line has allowed interconnection of over 1200 MW of new wind generation at Pawnee and Missile Site.

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**Southwestern Public Service (SPS)**

Company Background:
- SPS operates transmission facilities in Texas, New Mexico, Kansas, and Oklahoma.
- SPS has approximately 400,000 retail and wholesale customers.
- SPS operates approximately 6,703 circuit miles of transmission lines.
Hitchland - Woodward 345 kV Transmission Line

Description: The Hitchland - Woodward 345 kV Transmission Line project consists of approximately 120 miles of new double-circuit 345 kV transmission line from Hitchland Substation to the OG&E interception point from the Woodward District EHV Substation. This project was approved as one of the Southwest Power Pool (SPP) Priority Projects providing multiple benefits including reliability and an additional generation outlet including renewable resources.

Cost: Approximately $247 million, of which approximately $62 million will be SPS’ responsibility.

Status: In-service date of 2014.

Investment Partners: OG&E.

Benefits: This project is a Priority Project under the SPP Transmission Tariff providing multiple benefits including reliability and additional generation outlet including renewable resources.

Tuco - Woodward District 345 kV Transmission Line

Description: The Tuco - Texas/Oklahoma Interconnect 345 kV Transmission Line project consists of approximately 202 miles of new 345 kV transmission line from TUCO Substation to the OG&E interception around the Texas-Oklahoma state line. This project was approved as part of the SPP Balanced Portfolio 3E Projects to enable economic transfers and enhance regional transmission reliability.

Cost: Approximately $367 million, of which approximately $186 million will be SPS’ responsibility.

Status: In-service date of 2014.

Investment Partners: OG&E.

Benefits: This project is a Balanced Portfolio Project under the SPP Transmission Tariff and will enable economic transfers, enhance regional transmission reliability, and provide outlet for additional wind generation in the Texas Panhandle, eastern New Mexico, and western Oklahoma.
INTERSTATE TRANSMISSION PROJECTS

These interstate projects span two or more states, and often present additional challenges for siting, permitting, cost allocation and cost recovery. Interstate projects account for approximately 7,700 miles and $26.2 billion in this report (nominal $).

- Big Stone South to Ellendale
- CAPX2020 Transmission Plan
- Cardinal Bluffs
- “Energizing the Future” Initiative - Bruce Mansfield-Glenwillow
- Energy Gateway
- Grand Rivers Projects
- Greater Springfield Reliability Project
- Great Northern Transmission Line
- Interstate Reliability Project
- MidAmerican Energy Expansion Projects
- Midwest Portfolio Phase 1 North
- Midwest Portfolio Phase 2
- Midwest Portfolio Phase 3
- Midwest Portfolio Phase 4
- Midwest Portfolio Phase 5
- Midwest Portfolio Phase 7
- New England East - West Solutions (NEEWS)
- Northeast Energy Link
- Northern Pass Transmission Project
- Pinckard - Holmes Creek - Highland County 230 kV Transmission Line Project
- PJM N-1-1 Projects (Southern Delmarva)
- Pleasant Prairie - Zion Energy Center
- Ritchie to Buzzard Point N-1-1 Compliance Project
- Susquehanna - Roseland 500 kV Transmission Line Project
- Tuco - Woodward District 345 kV Transmission Line
- Woodward - Thistle Double Circuit 345 kV Line
- Woodward - Tuco 345 kV Line
- Zephyr Power Transmission Project
TRANSMISSION PROJECTS DEVELOPED BY MULTIPLE PROJECT PARTNERS

Given the unique risks and challenges of developing transmission, among other things, several EEI member companies are collaborating with other utilities, including non-EEI members, to develop large-scale transmission projects. This collaboration allows entities to spread the investment risks while also leveraging each other’s experience in developing needed transmission. Projects where multiple project partners are collaborating account for approximately 10,000 miles, representing a cost of approximately $29.8 billion in this report (nominal $).

- Badger Coulee
- Big Stone South to Brookings County
- Big Stone South to Ellendale
- CAPX2020 Transmission Plan
- Cardinal Bluffs
- Chisholm - Gracemont 345 kV Line
- ETT CREZ
- ETT Valley Import Project & Cross Valley Project
- Energy Gateway
- Gates-Gregg 230 kV Transmission Line
- Greater Springfield Reliability Project
- Great Northern Transmission Line
- Hitchland - Woodward District EHV Double Circuit 345 kV Line
- Iatan - Nashua Line
- Interstate Reliability Project
- Jasper - Pine Grove Primary 115 kV Project
- Judy Mountain 230/115 kV Substation Project
- Midwest Portfolio Phase 1 North
- Midwest Portfolio Phase 1 South
- Midwest Portfolio Phase 2
- Midwest Portfolio Phase 3
- Midwest Portfolio Phase 4
- Midwest Portfolio Phase 5
- Midwest Portfolio Phase 6
- Midwest Portfolio Phase 7
- Multi-Value Projects 3 & 4
- Nebraska City - Sibley Line
- New England East - West Solutions (NEEWS)
- Northeast Energy Link
- One Nevada 500 kV Transmission Intertie
- Path 42
- Pioneer Transmission, LLC
- Prairie Wind Transmission, LLC
TRANSMISSION PROJECTS: AT A GLANCE — TRANSMISSION PROJECTS DEVELOPED BY MULTIPLE PROJECT PARTNERS

- Project 8
- Ramapo - Rock Tavern
  345 kV Line
- Smart Grid Investment
  Grant Projects
- Staten Island
  Unbottling
- Summit to Elm Creek
  345 kV Transmission Line
- Susquehanna - Roseland 500 kV
  Transmission Line Project
- Tehachapi Wind Energy
  Storage Project
- Tuco - Woodward
  District 345 kV
  Transmission Line
- Wadley 500/230 kV
  Project
- Woodward - Thistle
  Double Circuit 345 kV
  Line
- Woodward - Tuco 345 kV
  Line
- Zephyr Power Transmission
  Project
These projects support the integration of renewable resource generation. Renewable energy technologies include: wind power, solar power, hydroelectricity, geothermal, biomass and biofuels. Highlighted projects that facilitate the integration of renewable resources reflect the addition or upgrade of 12,200 miles of transmission with an accompanying investment cost of approximately $46.1 billion in this report (nominal $).
TRANSMISSION PROJECTS: AT A GLANCE — TRANSMISSION SUPPORTING THE INTEGRATION OF RENEWABLE RESOURCES

- Midwest Portfolio Phase 6
- Midwest Portfolio Phase 7
- Multi-Value Projects 3 & 4
- Nebraska City - Sibley Line
- New Bethel Energy Center 345 kV Transmission Line
- Northeast Energy Link
- Northern Pass Transmission Project
- Oncor CREZ Development
- One Nevada 500 kV Transmission Intertie
- Palo Verde Hub - North Gila 500 kV Project
- Palo Verde Substation - Delaney Substation - Sun Valley Substation - Morgan Substation - Pinnacle Peak Substation 500 kV Projects
- Path 42
- Pawnee - Daniels Park 345 kV Transmission Line
- Pawnee - Smoky Hill 345 kV Transmission Project
- Prairie Wind Transmission, LLC
- San Joaquin Cross Valley Loop
- Tehachapi Renewable Transmission Project
- Tehachapi Wind Energy Storage Project
- Tuco - Woodward District 345 kV Transmission Line
- West of Devers Upgrade Project
- Woodward - Thistle Double Circuit 345 kV Line
- Woodward - Tuco 345 kV Line
- Woodward District EHV - Tatonga 2nd Circuit 345 kV Line
- Zephyr Power Transmission Project
HIGH-VOLTAGE TRANSMISSION PROJECTS

Although some member companies have shifted their focus towards upgrades and implementation of modern technologies on the existing grid, there is still a commitment among the industry to develop large high-voltage projects to accommodate changing generation sources and customer needs. As more renewable generation, which is typically located far from load, enters the supply mix, high-voltage transmission lines are vital in transporting that generation over long distances. High-voltage projects consisting of 345 kV and higher represent approximately 13,000 miles and an investment cost of over $45 billion in this report (nominal $).
TRANSMISSION PROJECTS: AT A GLANCE — HIGH-VOLTAGE TRANSMISSION PROJECTS

- Midwest Portfolio Phase 5
- Midwest Portfolio Phase 6
- Midwest Portfolio Phase 7
- Mont Belvieu Area Upgrades
- Multi-Value Projects 3 & 4
- Nebraska City - Sibley Line
- New Bethel Energy Center 345 kV Transmission Line
- New England East - West Solutions (NEEWS)
- Northern Pass Transmission Project
- One Nevada 500 kV Transmission Intertie
- Osceola Area Substation
- Palo Verde Hub - North Gila 500 kV Project
- Palo Verde Substation - Delaney Substation - Sun Valley Substation - Morgan Substation - Pinnacle Peak Substation 500 kV Projects
- Pawnee - Daniels Park 345 kV Transmission Line
- Pawnee - Smoky Hill 345 kV Transmission Project
- Pioneer Transmission, LLC
- Plant Vogtle Network Improvement Project
- Pleasant Prairie - Zion Energy Center
- Prairie Wind Transmission, LLC
- Project 8
- Ramapo - Rock Tavern 345 kV Line
- Rockdale – Cardinal
- Salem-Hazleton Line
- Scott County 345 kV Substation Expansion
- Seminole - Muskogee 345 kV Line
- Sooner - Cleveland 345 kV Line
- Sorenson 765/345 kV New Station Lines
- Staten Island Unbottling
- Summit to Elm Creek 345 kV Transmission Line
- Susquehanna - Roseland 500 kV Transmission Line Project
- Tehachapi Renewable Transmission Project
- Tuco - Woodward District 345 kV Transmission Line
- Wadley 500/230 kV Project
- White Bluff Area Improvements
- Woodward District EHV - Tatonga 2nd Circuit 345 kV Line
- Woodward - Thistle Double Circuit 345 kV Line
- Woodward - Tuco 345 kV Line
- Zephyr Power Transmission Project