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, and accommodating new and retiring electricity generation sources. This seventh 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 2012, 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 Ensure Reliability

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 2011, total transmission investment reached $11.1 billion (real $2011). Increases in year-over-year total transmission investment by EEI’s members is expected to continue until 2013, when EEI forecasts a peak at approximately $15.1 billion (real $2011). These transmission investments provide an array of benefits, including providing reliable electricity service to customers, relieving congestion, facilitating wholesale market competition and supporting a diverse generation portfolio. New transmission investment also deploys advanced monitoring systems and other new technologies. At the same time, all transmission projects are integrated with local systems in order to maintain the paramount objective of providing reliable electricity service to customers.

Over 150 projects are highlighted in this report, totaling approximately $51.1 billion in transmission investments through 2023. This figure is down from the approximately $64 billion highlighted in the 2012 report, due to changing projections of system needs. Consistent with the Federal Energy Regulatory Commission’s (“FERC”) 2009-2014 Strategic Plan, transmission projects are developed “through the use of open and transparent processes that include analysis and consideration on a comparable basis of proposed solutions involving any generation, transmission and demand resources.” This ongoing evaluation and reevaluation of projects protect 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 $51.1 billion worth of transmission projects highlighted in this report, $26.5 billion (52 percent) worth of large interstate transmission projects spanning multiple states are represented; projects supporting the integration of renewable resources represent approximately $38.7 billion (76 percent); and projects where EEI member companies are collaborating with other utilities, including non-EEI members, to develop the project represent approximately $29.1 billion (57 percent) [nominal $].

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1 This investment is only a portion of the total transmission investment anticipated through 2023 by EEI’s members.

Policies Supporting Transmission Development

Continued investment in transmission infrastructure will be required to, among other things, maintain reliability and support shifts in the nation’s generation portfolio. However, the risks of building transmission have not diminished since the first Transmission Projects: At A Glance report was published in 2007. Recognizing these risks, as well as the numerous benefits of a robust transmission system, policymakers have designed policies that support its 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.

Notably, the Energy Policy Act of 2005 (“EPAct 2005”) set forth several statutory requirements intended to attract additional investment in the transmission grid, including a mandate to FERC to provide incentives for transmission investments. FERC recently released a Policy Statement recognizing that developing transmission presents risks and challenges unlike investment in any other utility plant. Moving forward, to continue to foster the construction and upgrade of beneficial transmission, FERC should balance 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.
INTRODUCTION

Building a Stronger Grid to Ensure Reliability

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 2011, EEI members’ total transmission investments reached approximately $11.1 billion (real $2011).

Year-over-year total transmission investment is expected to continue until 2013, when EEI forecasts a peak at approximately $15.1 billion.1 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.

In addition, these transmission investments help to ensure the reliability of the grid in the face of generator retirement uncertainties and as our nation’s mix of electric power resources change in response to new U.S. Environmental Protection Agency (“EPA”) rules, as well as state and local environmental requirements. 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 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. In certain areas, undergrounding of facilities may be appropriate.2

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1 Actual expenditures are from EEI’s Annual Property & Plant Capital Investment Survey and FERC Form 1s.
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 the Energy Policy Act of 2005 (“EPAct 2005”) and the Federal Energy Regulatory Commission’s (“FERC”) transmission incentives rate policy, many of the projects highlighted in this report integrate advanced transmission technologies. In addition, EEI member companies continue to augment their grid modernization efforts by individual funding and the use of Department of Energy (“DOE”) Smart Grid Investment Grants (“SGIGs”).

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. However, despite 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 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. The “investment gap,” as referred to by the American Society of Civil Engineers, in several key infrastructure areas including transmission, may, if not addressed, cumulatively result in trillions of dollars in economic output losses. Transmission remains the smallest portion of electricity bills when compared to generation and distribution costs. 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), resulting in a decreasing rate impact to consumers year after year.

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, among other things,

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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 The rate impact of transmission investment and associated return on equity will decrease every year as transmission plant balance depreciates.
encourage the deployment of advanced transmission technologies. FERC recently released a Policy Statement reaffirming that development of transmission still presents risks and challenges unlike investment in any other utility plant.

Meanwhile, the DOE continues its efforts related to the coordination of transmission siting on federal lands and the authorization process of nine federal agencies for qualifying transmission projects. The interagency Rapid Response Team for Transmission aims to improve the overall quality and timeliness of transmission permitting and review by federal agencies and has yielded some positive results. For example, the Susquehanna-Roseland project (highlighted on page 119 of this report) recently received its final approvals from the National Park Service so that it could begin construction after several years of delay. This recognition by federal agencies of the difficulties in permitting and siting transmission facilities and the resulting coordination efforts should continue as it will help address a major challenge in the effort to enhance the United States transmission network.

A New Investment Trend

Planned transmission investments are affected by economic conditions and the resulting projected continuance of slow electricity demand growth. Accordingly, EEI forecasts a decrease in transmission investment after 2013, in part because several major projects have recently been modified, delayed or cancelled. Such transmission project adjustments are primarily attributable to load growth forecast revisions in response to the current economic environment, as well as long-term growth rates due to increases in demand side management and energy efficiency. That is, as the planning factors change, transmission planners respond by adjusting their system infrastructure need determinations. Nevertheless, EEI expects investment by its members during 2014 and 2015 to be significantly higher than in 2011.

The aggregate investment figure highlighted in this report provides further evidence of this trend. Over 150 projects are highlighted in this report, totaling approximately $51.1 billion in transmission investments through 2023, compared to the 2012 report total through 2022 of approximately $64 billion (nominal $). 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 and energy efficiency. Moreover, the local and regional transmission planning processes may lead to modification, delay or cancelation of some of these 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 projects are generally selected using a FERC-approved transmission planning process, which rigorously evaluates the costs and benefits of each project, assesses the forecasted changes in regional supply and demand, and considers alternative

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6 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.

7 The nine participating federal agencies are DOE, FERC, Department of Interior, Department of Defense, Department of Agriculture, Environmental Protection Agency, Department of Commerce, Council on Environmental Quality and the Advisory Council on Historic Preservation.

8 Planned total industry expenditures are preliminary and estimated from 85% response rate to EEI’s Electric Transmission Capital Budget & Forecast Survey.
solutions such as new generation or demand-side energy-efficiency measures. In addition, in some regions, transmission projects are identified as part of state integrated resource planning processes. Once transmission projects are selected, they are subject to additional evaluations as part of FERC and 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.

Recently, FERC sought to enhance existing regional and interregional planning procedures with its issuance of Order No. 1000. Throughout 2012 and continuing into 2013, each planning region developed 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. The industry is now in the midst of developing interregional compliance proposals that provide a cost allocation method for new interregional transmission facilities. These reforms are intended to support investment decisions going forward.

At the same time, EEI members continue active participation in initiatives to broaden the scope of transmission planning activities. One such effort is the Eastern Interconnection Planning Collaborative (“EIPC”) where transmission studies are being coordinated by planning authorities in the Eastern Interconnection. 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.

**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 transmission projects address an array of needs and deliver 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.

**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 10,000 miles and $26.5 billion (nominal $).

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9 There are also merchant transmission projects that may result from voluntary contracts.
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 13,300 miles of transmission with an accompanying investment cost of approximately $38.7 billion (nominal $).\(^{10}\)

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 utilities are collaborating account for approximately 11,000 miles, representing a cost of approximately $29.1 billion (nominal $).

Transmission Project Inclusion Criteria

A minimum project investment threshold of $20 million, a slight modification from previous reports, 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.

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\(^{10}\) There is no transmission project that will facilitate the delivery of renewable power only – apart from sources connected radially – given that wind generation generally uses the grid only 30-40 percent of the time and mainly during off-peak periods.
# Highlighted Projects Recently Completed (2012)

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Transmission Planning Region (FERC Order No. 890)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acadiana Load Pocket Project</td>
<td>SERTP</td>
</tr>
<tr>
<td>Astoria 345 kV – 138 kV Connection (Phase One)</td>
<td>NYISO</td>
</tr>
<tr>
<td>Benning Transmission Project</td>
<td>PJM</td>
</tr>
<tr>
<td>CapX2020 Bemidji – Grand Rapids 230 kV Line</td>
<td>MISO</td>
</tr>
<tr>
<td>G905 Generator Interconnection</td>
<td>MISO</td>
</tr>
<tr>
<td>Holland Bottom 500 kV Project (Phase One)</td>
<td>SERTP</td>
</tr>
<tr>
<td>KETA Project (Phase One)</td>
<td>SPP</td>
</tr>
<tr>
<td>NYISO Smart Grid Project</td>
<td>NYISO</td>
</tr>
<tr>
<td>Oklahoma Hugo – Valliant Project</td>
<td>SPP</td>
</tr>
<tr>
<td>Ouachita Projects</td>
<td>SERTP</td>
</tr>
<tr>
<td>Pawnee – Smoky Hill 345 kV Transmission Project (Missile Site-Smoky Hill segment)</td>
<td>WestConnect</td>
</tr>
<tr>
<td>SELA Project Phase 2</td>
<td>SERTP</td>
</tr>
<tr>
<td>Sooner – Rose Hill 345 kV Line</td>
<td>SPP</td>
</tr>
<tr>
<td>Sunnyside – Hugo 345 kV Line</td>
<td>SPP</td>
</tr>
</tbody>
</table>
TABLE OF CONTENTS

EXECUTIVE SUMMARY .............................................................................................................. III
INTRODUCTION ............................................................................................................................ V

AMERICAN ELECTRIC POWER (AEP) ..................................................................................... 1
  • Pioneer Transmission, LLC ................................................................................................. 2
  • Prairie Wind Transmission, LLC ....................................................................................... 2
  • RITELine Transmission ..................................................................................................... 3

ELECTRIC TRANSMISSION TEXAS ..................................................................................... 4
  • Competitive Renewable Energy Zone Projects ............................................................... 4
  • Valley Import Project and Cross Valley Project ................................................................ 5

AMEREN CORPORATION ........................................................................................................ 7
  • Grand Rivers Projects ...................................................................................................... 7
  • Fargo – Mapleridge ........................................................................................................... 8
  • Bondville – SW Campus .................................................................................................. 9
  • Brokaw – South Bloomington ......................................................................................... 9
  • Latham – Oreana ............................................................................................................. 9
  • Lutesville – Heritage ....................................................................................................... 10

ARIZONA PUBLIC SERVICE (APS) ...................................................................................... 11
  • Palo Verde Hub - North Gila 500 kV Project .................................................................. 11
  • Palo Verde Substation - Delaney Substation - Sun Valley Substation -
    Morgan Substation - Pinnacle Peak Substation 500 kV Projects .................................. 12
  • North Gila Substation - TS8 Substation 230 kV Project ............................................. 13

AMERICAN TRANSMISSION COMPANY (ATC) ............................................................... 15
  • Badger Coulee ................................................................................................................ 15
  • Cardinal Bluffs ................................................................................................................ 16
  • Pleasant Prairie - Zion Energy Center ........................................................................... 17
  • Rockdale - Cardinal ....................................................................................................... 18
  • Smart Grid Investment Grant Projects ......................................................................... 18
  • Straits Flow Control ..................................................................................................... 19
  • Bay Lake Initial ............................................................................................................. 20

CENTERPOINT ENERGY ....................................................................................................... 21
  • Mont Belvieu Area Upgrades ......................................................................................... 21
  • Freeport Area Upgrades ............................................................................................... 22

CONSOLIDATED EDISON, INC. (CON EDISON) ............................................................... 23
  • NYISO Smart Grid Project ............................................................................................ 23
  • PJM SynchroPhasor Smart Grid Project ....................................................................... 24
  • Astoria 345 kV – 138 kV Connection .......................................................................... 25
## TRANSMISSION PROJECTS: AT A GLANCE — TABLE OF CONTENTS

### DUKE-AMERICAN TRANSMISSION COMPANY (DATC) .................................................. 27
- DATC Midwest Portfolio Phase 1 ................................................................. 27
- DATC Midwest Portfolio Phase 2 ................................................................. 28
- DATC Midwest Portfolio Phase 3 ................................................................. 28
- DATC Midwest Portfolio Phase 4 ................................................................. 29
- DATC Midwest Portfolio Phase 5 ................................................................. 29
- DATC Midwest Portfolio Phase 6 ................................................................. 30
- DATC Midwest Portfolio Phase 7 ................................................................. 30
- Zephyr Power Transmission Project ......................................................... 31

### DUKE ENERGY ................................................................................................. 33
- Harris Plant – RTP 230 kV Transmission Line Project ............................... 33
- Jacksonville 230 kV Static VAR Compensator ........................................... 34
- Intercession to Gifford - 230 kV 3000 Amp Ckt 1 Transmission Project ....... 34
- Kathleen to Zephyrhills N – 2nd 230 kV line Transmission Project ............. 35

### ENTERGY CORPORATION ............................................................................. 37
- Holland Bottom 500 kV Project ................................................................. 37
- Southeast Arkansas Reliability Projects ...................................................... 38
- SELA Project Phase 2 and Phase 3 ............................................................... 38
- Franklin to McComb 115 kV Project ........................................................... 39
- Ouachita Projects .......................................................................................... 39
- Acadiana Load Pocket Project ................................................................. 40
- Ponderosa to Grimes 230 kV Project .......................................................... 40
- Orange County Project ............................................................................... 40
- Benton North to Benton South 115 kV Line ................................................. 41
- White Bluff Area Improvements ............................................................... 42
- AECC Hydro Station #2 to Gillett: Construct New 115 kV Line ................. 42
- Amity Tap to Gum Springs: Construct New 115 kV Line ......................... 43
- Willow Glen to Conway: Construct New 230 kV Line ............................... 43
- Iron Man to Tezcuco: Construct New 230 kV Line .................................... 44
- Northeast Louisiana Improvement Projects .............................................. 44
- Ray Braswell to Wynndale: Construct New 115 kV Line ......................... 45
- Church Road to Getwell to Senatobia: Construct new 230 kV Line .......... 45
- China to Amelia: Construct New 230 kV Line ......................................... 46

### EXELON ............................................................................................................. 47

### COMED ............................................................................................................ 47
- Chicago Southern Business District Burnham-Taylor 345 kV Project ........ 48
- Project to install two 300 MVAR SVCs at Prospect Heights Substation ....... 48

### BALTIMORE GAS AND ELECTRIC (BGE) ..................................................... 49
- Conastone - Graceton - Raphael Road 230 kV Circuits .............................. 49
- Hanover Pike 500/230 kV Station ............................................................... 50
<table>
<thead>
<tr>
<th>Company</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIRSTENERGY</td>
<td>51</td>
</tr>
<tr>
<td>“Energizing the Future” Initiative – Bruce Mansfield-Glenwillow</td>
<td>51</td>
</tr>
<tr>
<td>Cleveland Area Synchronous Condensers</td>
<td>52</td>
</tr>
<tr>
<td>ITC HOLDINGS CORP. (ITC)</td>
<td>53</td>
</tr>
<tr>
<td>Green Power Express LP</td>
<td>53</td>
</tr>
<tr>
<td>ITC MIDWEST</td>
<td>54</td>
</tr>
<tr>
<td>Multi-Value Projects 3 &amp; 4</td>
<td>54</td>
</tr>
<tr>
<td>Salem-Hazleton Line</td>
<td>55</td>
</tr>
<tr>
<td>ITC Midwest Smart Grid Program</td>
<td>56</td>
</tr>
<tr>
<td>ITC GREAT PLAINS</td>
<td>57</td>
</tr>
<tr>
<td>Kansas V-Plan</td>
<td>57</td>
</tr>
<tr>
<td>KETA Project</td>
<td>58</td>
</tr>
<tr>
<td>Oklahoma Hugo - Valliant Project</td>
<td>59</td>
</tr>
<tr>
<td>ITC TRANSMISSION</td>
<td>59</td>
</tr>
<tr>
<td>Michigan Thumb Loop Transmission Project</td>
<td>60</td>
</tr>
<tr>
<td>MICHIGAN ELECTRIC TRANSMISSION COMPANY (METC)</td>
<td>61</td>
</tr>
<tr>
<td>Au Sable Circuit Upgrade</td>
<td>61</td>
</tr>
<tr>
<td>G905 Generator Interconnection</td>
<td>62</td>
</tr>
<tr>
<td>KANSAS CITY POWER &amp; LIGHT (KCP&amp;L)</td>
<td>63</td>
</tr>
<tr>
<td>Iatan - Nashua 345 kV Transmission Line</td>
<td>63</td>
</tr>
<tr>
<td>Sibley - Nebraska City 345 kV Transmission Line</td>
<td>64</td>
</tr>
<tr>
<td>MIDAMERICAN ENERGY HOLDINGS COMPANY</td>
<td>65</td>
</tr>
<tr>
<td>MIDAMERICAN ENERGY COMPANY</td>
<td>65</td>
</tr>
<tr>
<td>MidAmerican Energy Expansion Projects</td>
<td>66</td>
</tr>
<tr>
<td>MIDAMERICAN TRANSMISSION, LLC</td>
<td>66</td>
</tr>
<tr>
<td>Prairie Wind Transmission, LLC</td>
<td>67</td>
</tr>
<tr>
<td>PACIFICORP</td>
<td>67</td>
</tr>
<tr>
<td>ETT CREZ</td>
<td>67</td>
</tr>
<tr>
<td>Energy Gateway</td>
<td>68</td>
</tr>
<tr>
<td>MINNESOTA POWER</td>
<td>69</td>
</tr>
<tr>
<td>CapX2020 Transmission Plan</td>
<td>70</td>
</tr>
<tr>
<td>Transmission to Serve Essar Steel Minnesota</td>
<td>71</td>
</tr>
<tr>
<td>Great Northern Transmission Line</td>
<td>72</td>
</tr>
<tr>
<td>NATIONAL GRID</td>
<td>73</td>
</tr>
<tr>
<td>Northeast Energy Link</td>
<td>73</td>
</tr>
<tr>
<td>New England East - West Solutions (NEEWS)</td>
<td>74</td>
</tr>
<tr>
<td>NEEWS - Interstate Reliability Project (IRP)</td>
<td>74</td>
</tr>
<tr>
<td>NEEWS - Rhode Island Reliability Project (RIRP)</td>
<td>75</td>
</tr>
</tbody>
</table>
### TRANSMISSION PROJECTS: AT A GLANCE — TABLE OF CONTENTS

#### NORTHEAST UTILITIES (NU)

- The Northern Pass Transmission Project (NPT Project) ............................................... 77
- Greater Springfield Reliability Project (GSRP) ................................................................. 78
- Interstate Reliability Project (IRP) ...................................................................................... 78
- Greater Hartford Central Connecticut Reliability Projects (GHCC) ............................ 79
- Greater Boston Study Solution ......................................................................................... 80
- Lower SEMA Transmission Project.................................................................................. 81

#### NORTWESTERN ENERGY

- 500 kV Upgrade Project ................................................................................................... 83
- Mountain States Transmission Intertie (MSTI) ................................................................. 84
- Montana Renewable Collector System (MT-RCS)............................................................ 85

#### NV ENERGY

- One Nevada 500 kV Transmission Intertie (NVES & NVEN) ........................................... 87
- Renewable Energy Transmission Initiative (RTI) ............................................................ 89

#### OGE ENERGY CORP. (OGE)

- Hitchland – Woodward District EHV Double-circuit 345 kV Line ............................... 91
- Seminole – Muskogee 345 kV Line ................................................................................... 92
- Sooner – Cleveland 345 kV Line ...................................................................................... 92
- Sooner – Rose Hill 345 kV Line ....................................................................................... 93
- Sunnyside – Hugo 345 kV Line ........................................................................................ 93
- Woodward – Thistle Double-Circuit 345 kV Line ............................................................. 94
- Woodward – Tuco 345 kV Line ......................................................................................... 94
- Elk City - Gracemont 345 kV Line .................................................................................. 95
- Cimarron – Mathewson Double-Circuit 345 kV Line ...................................................... 96
- Woodward District EHV – Tatonga 2nd Circuit 345 kV Line ........................................... 96
- Mathewson - Tatonga 2nd Circuit 345 kV Line ................................................................ 97

#### ONCOR ELECTRIC DELIVERY COMPANY, LLC (ONCOR)

- West Texas Congestion ..................................................................................................... 99
- Dynamic Line Ratings .................................................................................................... 100
- Oncor CREZ Development ............................................................................................ 101
- Phasor Measurement ....................................................................................................... 102
- Static Var Compensation .................................................................................................. 103

#### OTTER TAIL POWER COMPANY

- CapX2020 Transmission Plan .......................................................................................... 105
- Big Stone South to Brookings County ............................................................................. 106
- Big Stone South to Ellendale ........................................................................................... 107
TRANSMISSION PROJECTS: AT A GLANCE — TABLE OF CONTENTS

PEPCO HOLDINGS, INC ................................................................. 109
• Ritchie to Buzzard Point N-1-1 Compliance Project ........................................... 109
• Benning Transmission Project ........................................................................ 110
• PJM N-1-1 Projects (Southern Delmarva) .......................................................... 111
• Burtonsville-Bowie-Oak Grove Transmission Project ....................................... 111
• Oak Grove-Aquasco Transmission Project .......................................................... 112
• Burtonsville-Metzerott-Takoma Transmission Project ...................................... 112

PACIFIC GAS AND ELECTRIC (PG&E) ................................................ 115
• Greater Fresno Area Upgrade Project ................................................................ 115

PUBLIC SERVICE ELECTRIC AND GAS COMPANY (PSE&G) ............. 117
• Burlington - Camden 230 kV Network Reinforcement Project ......................... 117
• Northeast Grid Reliability Transmission Project ............................................... 118
• Susquehanna - Roseland 500 kV Transmission Line Project .............................. 119
• North-Central Reliability Project (formerly the West Orange 230 kV Project) .... 120
• Mickleton-Gloucester-Camden Reinforcement Project ....................................... 121

SOUTHERN CALIFORNIA EDISON (SCE) ............................................. 123
• Devers – Colorado River and Devers – Valley No. 2 Transmission Project; formerly the California Portion of Devers – Palo Verde 2 (DPV2) Transmission Project ............................. 123
• Eldorado – Ivanpah Transmission Project (EITP) .............................................. 124
• San Joaquin Cross Valley Loop (SJXVL) ............................................................ 125
• Tehachapi Renewable Transmission Project (TRTP) ......................................... 126
• South of Kramer (SOK) ..................................................................................... 128
• West of Devers (WOD) ..................................................................................... 129
• Path 42 ............................................................................................................. 129
• Tehachapi Wind Energy Storage Project (TSP) .................................................. 130
• Centralized Remedial Action Schemes (CRAS) .................................................. 131
• Wide-Area Situation Awareness System (WASAS) ........................................... 131

SOUTHERN COMPANY ........................................................................ 133
• Central Alabama Projects .................................................................................. 133
• Douglas - Pine Grove Primary 230 kV Line Project ........................................... 134
• East Pelham 230/115 kV Transmission Substation Project ................................. 134
• Greene County - Bassett Creek 230 kV Line Project ......................................... 135
• Kemper County IGCC Plant ............................................................................. 135
• Mobile Area Network Project ........................................................................... 136
• North Brewton - Alligator Swamp 230 kV Line Project .................................... 136
• Pinckard - Holmes Creek - Highland City 230 kV Transmission Line Project ... 137
• Plant Smith - Laguna Beach - Santa Rosa 230 kV Transmission Line Project .... 137
• Plant Vogtle Network Improvement Project ..................................................... 138
• South Tuscaloosa - Eutaw Area Network Project ................................................ 138
• Wadley 500/230 kV Project ............................................................................... 139
# TRANSMISSION PROJECTS: AT A GLANCE — TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Company/Multi-Party Project</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>VERMONT ELECTRIC POWER COMPANY (VELCO)</strong></td>
<td>141</td>
</tr>
<tr>
<td>• Connecticut River Valley Upgrades</td>
<td>141</td>
</tr>
<tr>
<td>• Substations Additions and Upgrades</td>
<td>142</td>
</tr>
<tr>
<td><strong>WESTAR ENERGY, INC.</strong></td>
<td>143</td>
</tr>
<tr>
<td>• Summit to Elm Creek 345 kV Transmission Line</td>
<td>143</td>
</tr>
<tr>
<td>• Rose Hill - Sooner 345 kV Transmission Line</td>
<td>144</td>
</tr>
<tr>
<td><strong>PRAIRIE WIND TRANSMISSION, LLC</strong></td>
<td>145</td>
</tr>
<tr>
<td>• Wichita - Medicine Lodge - Woodward 345 kV Transmission Line</td>
<td>145</td>
</tr>
<tr>
<td><strong>XCEL ENERGY INC.</strong></td>
<td>147</td>
</tr>
<tr>
<td><strong>NORTHERN STATES POWER COMPANIES (NSP COMPANIES)</strong></td>
<td>147</td>
</tr>
<tr>
<td>• CapX2020 Transmission Plan</td>
<td>148</td>
</tr>
<tr>
<td>• MISO Multi Value Project Portfolio</td>
<td>149</td>
</tr>
<tr>
<td><strong>PUBLIC SERVICE OF COLORADO (PSCO)</strong></td>
<td>150</td>
</tr>
<tr>
<td><strong>CO SENATE BILL 100 PLAN PROJECTS</strong></td>
<td>150</td>
</tr>
<tr>
<td>• Pawnee - Daniels Park 345 kV Transmission Line</td>
<td>150</td>
</tr>
<tr>
<td>• Pawnee - Smoky Hill 345 kV Transmission Project</td>
<td>150</td>
</tr>
<tr>
<td><strong>SOUTHWESTERN PUBLIC SERVICE (SPS)</strong></td>
<td>151</td>
</tr>
<tr>
<td>• Hitchland - Woodward 345 kV Transmission Line</td>
<td>151</td>
</tr>
<tr>
<td>• Tuco - Woodward District 345 kV Transmission Line</td>
<td>152</td>
</tr>
<tr>
<td><strong>INTERSTATE TRANSMISSION PROJECTS</strong></td>
<td>153</td>
</tr>
<tr>
<td><strong>TRANSMISSION SUPPORTING THE INTEGRATION OF RENEWABLE RESOURCES</strong></td>
<td>154</td>
</tr>
<tr>
<td><strong>TRANSMISSION PROJECTS DEVELOPED BY MULTIPLE PROJECT PARTNERS</strong></td>
<td>155</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 more than 39,000 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). In addition, AEP formed Transource Energy, LLC, a partnership with Great Plains Energy, Inc. to pursue competitive transmission projects under FERC Order 1000. AEP is also maintaining a focus on its current project-based joint ventures with several utilities to build transmission in regions across the country:
  - Pioneer Transmission, LLC: AEP and Duke Energy formed a joint venture to build a 765 kV transmission line in Indiana;
  - 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);
  - 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).
- Between 2002 and 2011, AEP invested approximately $4 billion in transmission.
Pioneer Transmission, LLC

**Description:** The Pioneer project consists of approximately 240 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 a new 765 kV substation (Reynolds) 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 $950 million.

**Status:** The 66 mile segment of the project that runs from Greentown to the new 765 kV Reynolds substation was included in the 2011 MISO Transmission Expansion Plan as a Multi-Value Project (MVP). On August 20, 2012 Pioneer filed an Offer of Settlement with FERC wherein Pioneer and NIPSCO agreed to develop the first segment of the project jointly. 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.

**Investment Partners:** American Electric Power and Duke Energy.

**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.

Prairie Wind Transmission, LLC

**Description:** The Prairie Wind project consists of approximately 108 miles of new double-circuit 345 kV transmission line linking a 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 $180 million. ETA and Westar Energy will each invest $90 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.

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**RITELine Transmission**

**Description:** The approximately 420 mile, 765 kV transmission line will begin at the proposed Blue Creek substation on the Indiana/Ohio border, run west through Indiana to Kewanee, Illinois, and then north to Byron, Illinois. There is also a segment in Illinois from Kewanee to Exelon’s Collins substation.

**Cost:** The total project is estimated to cost $1.6 billion. American Electric Power’s investment in the project will be approximately $500 million, with Exelon Corporation and Commonwealth Edison investing $200 million and $900 million, respectively.

**Status:** On October 14, 2011 FERC issued an order granting incentives for the project. The project is currently under evaluation by PJM. The project is expected to be placed in-service in phases from 2018-2020.

**Investment Partners:** American Electric Power, Exelon Transmission Co., and Commonwealth Edison.

**Benefits:** The project is designed to augment system reliability, enable states to meet their respective renewable portfolio standard requirements, relieve congestion, and enhance system operations.
Electric Transmission Texas

Company Background

- Electric Transmission Texas (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 603 circuit miles of transmission and has 1,344 circuit miles under development through region-wide efforts.

Competitive Renewable Energy Zone Projects

Description: The PUC 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 is in 2012 and 2013 with CREZ projects planned in-service for 2013.

Investment Partners: ETT is a joint venture between subsidiaries of AEP and MidAmerican Energy Holdings 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 345 kV transmission into and within the Lower Rio Grande Valley.

**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 $400 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 Holdings 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 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 2007-2011, Ameren invested approximately $345 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 345 kV 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. An order is expected by August 2013. The first sections of Illinois Rivers are expected to be in-service in 2016, with all segments of the three projects expected to be completed by the end of 2019.

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 filing was made with the Illinois Commerce Commission in February 2013. The 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 in August 2012. The in-service date of the project is June 2016.

**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.

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**Brokaw – South Bloomington**

**Description:** The project involves the construction of approximately seven 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 in September 2012. The in-service date of the project is June 2016.

**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.

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**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 busses 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 in April 2011. The in-service date for the line is December 2013. The in-service date for the substation modifications is December 2014.
Investment Partners: None.

Benefits: This project will enable the Ameren system to maintain reliable service with the loss of two or more bulk electric system elements.

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: The public meeting process has been completed and a Certificate of Public Convenience and Necessity filing for a portion of the route has been submitted to the Missouri Public Service Commission. The in-service date of the project is December 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.
ARIZONA PUBLIC SERVICE (APS)

Company Background:

• APS delivers electricity to more than one million customers in 11 of Arizona’s 15 counties.

• System-wide, there are approximately 2,651 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 coordinated by this organization.

• Between 2002 and 2011, APS invested approximately $1,150 million in transmission.

Palo Verde Hub - North Gila 500 kV Project

Description: The Palo Verde Hub - North Gila 500 kV Project consists of approximately 112 miles of new single-circuit, 500 kV transmission line between the Palo Verde Hub (the area around the Palo Verde Nuclear Generating Station) and the existing North Gila Substation (northeast of Yuma). The Hassayampa Switchyard will be the connection point in the Palo Verde hub area. 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 and 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 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:** Salt River Project and 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 - TS8 Substation 230 kV Project

**Description:** The North Gila Substation - TS8 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 TS8 Substation 230 kV Transmission Project on January 26, 2012. The North Gila 500/230 kV transformers, North Gila Substation to TS8 Substation 230 kV line, and TS8 230/69 kV Substation are planned to be completed and operational by the summer of 2016.

**Investment Partners:** None.

**Benefits:** This project serves the need for electric energy, improved reliability, and continuity of service for the greater Yuma area.
AMERICAN TRANSMISSION COMPANY (ATC)

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 9,440 circuit miles of high-voltage transmission lines and 519 substations provide communities with access to local and regional energy sources.

- ATC operates their $3.1 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 2002 and 2011, ATC invested nearly $2.7 billion in transmission.

Badger Coulee

Description: The Badger Coulee project consists of approximately 150 miles of new single-circuit, 345 kV transmission line from La Crosse into the greater Madison area of Wisconsin.

Cost: Approximately $470 million to $500 million, depending on ordered route.

Status: Following public input, ATC tentatively plans to file an application with the Public Service Commission of Wisconsin (PSCW) in 2013. If approved by the PSCW, construction of the new line would begin in 2016 to meet an in-service date of 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, its 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, improved import capability, and potential removal of special protection schemes. 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, with MISO MVP cost sharing. 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 125 miles of new single-circuit, 345 kV transmission line from the Dubuque County, Iowa area into Dane County, Wisconsin. The new line will interconnect a new 345 kV substation in Dubuque County, Iowa to the existing ATC system near Montfort, Wisconsin and will continue to ATC's Cardinal 345 kV Substation in the town of Middleton (Dane County, Wisconsin).

Cost: Approximately $425 million.

Status: This project is provisional in status with a projected in-service date of late 2018.

Investment Partners: ATC and ITC Holdings Corp. are investment partners. 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, its 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, improved import capability, and potential removal of special protection schemes. 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, with MISO MVP cost sharing. 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 $31 million.

**Status:** This project was approved in May 2012 by the PSCW and the Illinois Commerce Commission. Construction is expected to begin in early 2013 with an anticipated in-service date of mid-to-late 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 proposed as a 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 will require some equipment upgrades to support this new line.

**Cost:** Approximately $219 million.

**Status:** This project was approved in the summer of 2009 by the PSCW. Construction began in 2011 with an anticipated in-service date of early 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 in 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 65 miles of additional fiber optic network on ATC facilities and the installation of 45 Phasor Measurement Unit’s (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. Preliminary design work has started along with procurement of fiber optic communication equipment. The program of work is targeted to be completed by the end of April 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 flow control devices such as back-to-back HVDC controls connected in series with the Straits - McGulpin 138 kV lines in the eastern portion of the Upper Peninsula of Michigan. This alternative may require the installation of terminal equipment to connect the devices with the 138 kV circuits and provide adequate protection.

**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 and new generation is developed in the Lower Peninsula. This project also has the potential to support renewable energy in the Upper Peninsula.
Bay Lake Initial

**Description:** The initial Bay Lake project includes:

- approximately 43 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 60 mile 138 kV line between Holmes and Escanaba Michigan, and
- a 150 Mvar, 138 kV SVC near Amberg, Wisconsin.

**Cost:** Approximately $340 million.

**Status:** The initial portion of the project has received MISO Board approval. Following public input, ATC plans to file applications with the Public Service Commissions of Michigan and Wisconsin by early 2014. If approved by the Commissions, construction of the initial project would begin by 2015 to meet an in-service date late in 2017. Other phases of the project are pending review in the MISO Transmission Expansion Plan (MTEP) process and may add other 345 kV and 138 kV lines in northeast Wisconsin and Michigan’s Upper Peninsula.

**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.
CENTERPOINT ENERGY

• 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 $21 billion.

• With over 8,800 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.

• Between 2002 and 2011, CenterPoint invested approximately $700 million in transmission.

Mont Belvieu Area Upgrades

Description: The Mont Belvieu Area upgrade project consists of a new Jordan 345/138 kV substation, a new 800 MVA 345/138 kV autotransformer, and other miscellaneous transmission system upgrades in Texas. The Jordan substation will connect six 138 kV circuits (four existing and two new 0.9 mile 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 (ERCOT) Regional Planning Group in March 2012. Construction will begin in early 2013 with several of the upgrades set for completion by May 2013. The overall project is scheduled for completion by April 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 69 kV load pocket is connected to the rest of the transmission system by two 138/69 kV autotransformers that are more than 40 years old and one long 69 kV 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 will begin in early 2013 with the overall project scheduled for completion by summer peak 2015.

Investment Partners: None.

Benefits: The project will improve reliability of the Freeport area by replacing transmission structures and transformers that are very old and 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 138 kV 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 742 circuit miles of underground electric transmission/sub-transmission and approximately 438 circuit miles of overhead electric transmission.
- O&R’s transmission consists of approximately 454 circuit miles of overhead electric transmission and approximately 26 circuit miles of underground electric transmission.
- Between 2002 and 2011, ConEdison invested approximately $1.9 billion in transmission.

NYISO Smart Grid Project

**Description:** The New York Independent System Operator (NYISO) has been awarded funds through the American Recovery and Reinvestment Act (ARRA) to make New York’s grid smarter and more efficient through the deployment of Phasor Measurement Unit (PMU) technology and capacitor banks. The NYISO is partnering with all eight New York transmission owners to implement this statewide program. CECONY and O&R will install 14 PMUs and two capacitor banks. The PMU installation provides for the extension of CECONY’s and O&R’s existing fiber optic network to new locations to interconnect future PMU installations in their service territories.

**Cost:** NYISO’s project cost will total approximately $75 million, with $37 million awarded by the U.S. Department of Energy. CECONY and O&R have an estimated cost of $8 million for deployment of the technology.

**Status:** Through 2012 CECONY and O&R had invested $4 million. Con Edison has completed PMU installations at 14 sites. Additionally, construction at the capacitor bank locations has been completed. One site has been energized and the second site is scheduled to be energized in the fourth quarter of 2012.

**Investment Partners:** NYISO and U.S. Department of Energy.
**Benefits**: The deployment of PMUs is expected to enable wide area visualization as well as enhance grid monitoring, real-time assessments, and event analysis to effectively improve system reliability. The addition of capacitor banks will optimize the voltage profile on the power system in the vicinity of each installation, and enhance reliability by strengthening the system’s ability to withstand and recover from disturbances that result in voltage dips or low-voltage conditions. By improving the power factor at an area substation, the capacitor banks will also increase the capability of that substation to carry load, thereby allowing for load growth further into the future.

**PJM SynchroPhasor Smart Grid Project**

**Description**: This project will deploy synchrophasor technology and PMUs throughout the PJM system. It will provide the foundational infrastructure upon which additional PMUs, Phasor Data Concentrators (PDCs), and other advanced applications can be deployed. Project participants include 12 of the PJM Transmission Owners, including O&R, who will install a PMU at the Mahwah substation.

**Cost**: PJM’s project cost will total almost $28 million with approximately $14 million provided by the U.S. Department of Energy’s matching grant. O&R will receive approximately $150,000 from the U.S. Department of Energy’s grant.

**Status**: O&R’s PMU has been installed and commissioned.

**Investment Partners**: PJM and U.S. Department of Energy.

**Benefits**: PJM’s initiative will enable increased visibility and strengthen reliability on the transmission system. The project will also provide the foundational infrastructure upon which additional PMUs, PDCs, and future advanced applications may be developed.
Astoria 345 kV – 138 kV Connection

**Description:** The new Astoria 345 kV - 138 kV connection in Astoria, Queens consists of a new partially overhead/ partially underground feeder that supplies power from the gas insulated (GIS) 345 kV Astoria Annex transmission Substation to the 138 kV Astoria East Substation as well as a new step-down 345/138 kV Autotransformer and a 138 kV Phase Angle Regulator (PAR). For the summer 2012 operating season, the feeder temporarily tapped off an existing feeder termination at the Astoria Annex yard (Phase One) but will be moved into a spare bus position at the Astoria Annex prior to the summer of 2013 (Phase Two).

**Cost:** Phase One and Phase Two project cost is approximately $43 million.

**Status:** Construction of Phase One was completed and the line became operational in June 2012. Phase Two is on schedule to be completed by summer 2013.

**Investment Partners:** None.

**Benefits:** The new line, Autotransformer, and PAR addresses a 200 MVA reliability deficiency in the Astoria and Corona, Queens load areas which was caused by the mothballing of two steam electric generation units in Astoria. The project was planned, engineered, and constructed within the six month window for advance notification of generator retirement or mothballing. The project also relieves congestion by providing additional consumer access to efficient, cost-effective generation supplied through the 345 kV Astoria Annex Substation.
DUKE-AMERICAN TRANSMISSION COMPANY (DATC)

Company Background


- DATC has proposed the Midwest Portfolio, a combination of transmission line projects that includes seven 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.

- 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 (mileages and costs will be further refined)

**Description:** DATC Midwest Portfolio Phase 1 consists of 60 miles of 345 kV transmission lines, 35 miles of double-circuit 230 kV transmission lines, and 33 miles of 138 kV transmission lines. The project will span from northwest to west-central Indiana from a new tap substation in Illinois to the Qualitech and Royalton substations northwest of Indianapolis.

**Cost:** Approximately $238 million.

**Status:** DATC Midwest Portfolio Phase 1 is included in Appendix C of the 2012 MISO MTEP. An anticipated in-service date of 2017 has been identified for this project.

**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 2

**Description:** DATC Midwest Portfolio Phase 2 consists of 42 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.

**Cost:** Approximately $831 million.

**Status:** DATC Midwest Portfolio Phase 2 is included in Appendix C of the 2012 MISO MTEP. An anticipated in-service date of 2018 has been identified for this project.

**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 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.

**Cost:** Approximately $134 million.

**Status:** DATC Midwest Portfolio Phase 3 is included in Appendix C of the 2012 MISO MTEP. An anticipated in-service date of 2017 has been identified for this project.

**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 4

**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.

**Cost:** Approximately $2 billion.

**Status:** DATC Midwest Portfolio Phase 4 is included in Appendix C of the 2012 MISO MTEP. An anticipated in-service date of 2019 has been identified for this project.

**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

**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.

**Cost:** Approximately $472 million dollars.

**Status:** DATC Midwest Portfolio Phase 5 is included in Appendix C of the 2012 MISO MTEP. An anticipated in-service date of 2019 has been identified for this project.

**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

**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.

**Cost:** Approximately $266 million.

**Status:** DATC Midwest Portfolio Phase 6 is included in Appendix C of the 2012 MISO MTEP. An anticipated in-service date of 2019 has been identified for this project.

**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 7 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.

**Cost:** Approximately $122 million.

**Status:** DATC Midwest Portfolio Phase 7 is included in Appendix C of the 2012 MISO MTEP. An anticipated in-service date of 2017 has been identified for this project.

**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.
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.

**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

- 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).
- Duke Energy owns 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 and the FRCC transmission planning region.
- Between 2002 and 2011, Duke Energy (including previous Progress Energy Inc.) invested approximately $3.7 billion in transmission.

Harris Plant – RTP 230 kV Transmission Line Project

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.

Costs: Approximately $60 million.

Status: The project is under construction. The RTP 230 kV substation and 11 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

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

**Costs:** Approximately $32 million.

**Status:** The project is expected to be in-service in June 2013.

**Investment Partners:** None.

**Benefits:** This project was identified during a dynamic evaluation of PEC’s Eastern System during periods of increased imports. The analysis indicated that under certain faulted conditions that PEC 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

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

**Costs:** $39.9 million.

**Status:** The project is expected to be in-service in May 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 PEF’s transmission grid assisting with maintenance outages as well as contributing to reduced flows across PEF’s 69 kV grid. Intercession City-Gifford 230 kV will enhance both PEF’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

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

**Cost:** $20.8 million.

**Status:** The project is expected to be in-service 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. PEF 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 PEF, 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.
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 500 kV Project

Description: The Holland Bottom 500 kV project, located northeast of Little Rock, Arkansas, included the construction of a new 500-161/115 kV substation with a 500-115 kV and a 500-161 kV autotransformer, each with a rating of 600 MVA. The project also included the construction of a new 20 mile-long 161 kV transmission line rated 558 MVA.

Cost: Approximately $72 million.

Status: Phase 1 of the project, installation of a new 500-115 kV autotransformer, was completed in January 2012. Phase 2 of the project, which included the installation of a 500-161 kV autotransformer and the construction of a new 161 kV transmission line, was completed in May 2012.

Investment Partners: None.

Project Benefits: This project is intended to address future load growth and reliability needs in the northeast Little Rock area.
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 station 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 2015) and Reed to Monticello East (summer 2015).

**Investment Partners:** None.

**Benefits:** This project is intended to address 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 2013 or early 2014.

**Investment Partners:** None.

**Benefits:** This project is intended to address future load growth and reliability needs in the southeast Louisiana area.
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 $56 million.

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

**Investment Partners:** None.

**Benefits:** This project is intended to address future load growth and reliability needs in the south Mississippi area.

Ouachita Projects

**Description:** The Ouachita portfolio of projects, located in north Louisiana, included the construction of multiple 115 kV transmission line upgrades and the replacement of an existing 500-115 kV 500 MVA autotransformer at Sterlington substation with a new 750 MVA autotransformer. The 500 MVA autotransformer was relocated to the Baxter Wilson EHV substation (Vicksburg, Mississippi area) in order to provide a second 500-115 kV autotransformer source.

**Cost:** Approximately $61 million.

**Status:** The project was completed in June 2012 and is in-service.

**Investment Partners:** None.

**Benefits:** These transmission improvements are needed for the deliverability of designated network resources in north Louisiana.
Acadiana Load Pocket Project

**Description:** The Acadiana Load Pocket Project is a joint project between Entergy Gulf States Louisiana, L.L.C., Cleco Corporation, and Lafayette Utilities System to develop a new 230 kV overlay in the Acadiana area of south Louisiana. The project included the addition of a 500-230 kV autotransformer at the new Cleco Rork 500 kV substation, construction of a new 230 kV line from Rork to the Sellers Road substation to the Segura substation, and installation of a new 230-138 kV autotransformer at Segura. It also included the addition of a second 500-230 kV autotransformer at Wells substation, construction of a new 230 kV line from Wells to Labbe substation, construction of a new 230 kV line from Labbe to Sellers Road to Meaux substation, installation of a 230-138 kV autotransformer at Meaux, and construction of a second Labbe to Bonin 230 kV line.

**Cost:** Approximately $200 million.

**Status:** Phase 1 of the project was completed in 2011. Phase 2, which is the final phase of the project, was completed and placed in-service in May 2012.

**Investment Partners:** Entergy Gulf States Louisiana, L.L.C., Cleco Corporation, and Lafayette Utilities System.

**Benefits:** This portfolio of projects addresses both reliability and economic needs identified in the Acadiana Load Pocket of south Louisiana.

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, Inc. (ETI). 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 Ponderosa and the 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 is intended to address both the future load growth and reliability needs in the western area of ETI as well as address congestion in the Grimes area.

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**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 station 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 $65 million.

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

**Investment Partners:** None.

**Benefits:** This project is intended to address future load growth and reliability needs in the east Texas area north of Beaumont.

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**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 switching stations to connect the Benton North and Benton South areas.

**Cost:** Approximately $30 million.

**Status:** The project is currently in the construction phase and is expected to be placed in-service in the winter 2012/2013 period.

**Investment Partners:** None.

**Benefits:** This project is intended to address 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 2015.

Investment Partners: None.

Benefits: This project is intended to address 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 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 is intended to address future load growth and reliability needs in the east-central area of Arkansas.
Amity Tap to Gum Springs: Construct New 115 kV Line

**Description:** This project, located in west-central Arkansas, involves the construction of a new 30 mile 115 kV transmission line connecting Entergy Arkansas’ Amity 115 Tap Station with the proposed Gum Springs Switching Station.

**Cost:** Approximately $46 million.

**Status:** The project is expected to be placed in-service by the summer of 2018.

**Investment Partners:** None.

**Benefits:** This project is intended to address future load growth and reliability needs in the west-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 230 kV transmission line between Entergy Gulf States Louisiana’s Willow Glen and Conway substations.

**Cost:** Approximately $38 million.

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

**Investment Partners:** None.

**Benefits:** This economic project will help address 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 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 is intended to address future load growth and reliability needs in southeast Louisiana.

Northeast Louisiana Improvement Projects

**Description:** This project, located in northeast Louisiana, involves the construction of the following projects:

**Phase 1:** Construction of a new 230 kV transmission line (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 project, which is being constructed in multiple phases, is scheduled to be placed in-service as follows: Phase 1 is currently under construction and expected to be placed in-service the summer of 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 is intended to address 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 115 kV transmission line between Entergy Mississippi’s Ray Braswell and the proposed Wynndale substation.

**Cost:** Approximately $33 million.

**Status:** The project, which is currently under construction, is expected be placed in-service by the summer of 2013.

**Investment Partners:** None.

**Benefits:** This project is intended to address future load growth and reliability needs in central Mississippi.

Church Road to Getwell to Senatobia: 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. The project then includes the construction of a new 230 kV transmission line between Getwell and the proposed Senatobia Industrial 230-115 kV substation.

**Cost:** Approximately $57 million.

**Status:** Phase 1 of the project, Church Road to Getwell, is currently under construction and expected to be placed in-service by the summer of 2013. Phase 2 of the project, Getwell to Senatobia Industrial, is expected to be placed in-service by the summer of 2016.

**Investment Partners:** None.

**Benefits:** This project is intended to address future load growth and reliability needs in northwest Mississippi.
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 to be placed in-service by the summer of 2016.

**Investment Partners:** None.

**Benefits:** This project is intended to address future load growth and reliability needs in east Texas.
EXELON

Company Background:

- Exelon is one of the nation’s largest electric utilities, delivering electricity and natural gas to more than 6.6 million customers in central Maryland (BGE), northern Illinois (ComEd) and southeastern Pennsylvania (PECO).
- Headquartered in Chicago, Exelon has operations and business activities in 47 states, the District of Columbia, and Canada. The company has approximately 35,000 megawatts of owned capacity comprising one of the nation’s cleanest and lowest-cost power generation fleets. Its Constellation business unit provides energy products and services to approximately 100,000 business and public sector customers and approximately 1 million residential customers.
- Exelon actively participates in the Eastern Interconnection Planning Collaborative (EIPC) and the PJM Regional Transmission Planning Process.

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.

Partners: None.

Benefits: This project will improve dynamic voltage recovery and system reliability required due to generation retirements.
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.
Hanover Pike 500/230 kV Station

**Description:** The Hanover Pike 500/230 kV Station project consists of constructing the 500/230 kV station by tapping the Conastone - Brighton 500 kV line and Conastone -Northwest 230 kV lines. The project also creates two new 230 kV bundled conductor lines from Hanover Pike Northwest Substation. The two existing 230 kV lines that connect to Northwest will be rebuilt with bundled conductor.

**Cost:** Approximately $124 million.

**Status:** This project was identified during the PJM Regional Transmission Expansion Plan evaluation. The project is in the design engineering phase with an anticipated in-service date of June 2017.

**Investment Partners:** None.

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

Company Background:

- FirstEnergy is a diversified energy company dedicated to safety, reliability, and operational excellence. Headquartered in Akron, Ohio, its ten electric distribution companies comprise one of the nation’s largest investor-owned electric systems, serving six million customers in the Midwest and Mid-Atlantic regions. Its diverse generating fleet features non-emitting nuclear, scrubbed baseload coal, natural gas, and pumped-storage hydro and other renewables, and has a total generating capacity of more than 20,000 megawatts.
- The company has $47 billion in assets and $16 billion in annual revenues.
- FirstEnergy’s transmission operations include 20,000 miles of high-voltage lines and three regional transmission operation centers. Stretching from the Ohio-Indiana border to the New Jersey shore, the company operates a vast infrastructure of more than 281,000 miles of distribution lines.
- Between 2002-2012, FirstEnergy invested approximately $2.7 billion in transmission.

“Energizing the Future” Initiative – Bruce Mansfield-Glenwillow

Description: The “Energizing the Future” initiative is a comprehensive transmission construction program designed to improve service reliability as power plants in the region are deactivated due to the high cost of complying with revised U.S. EPA standards.

These projects include the construction of new 138 and 345 kV transmission lines and new transmission substations. FirstEnergy expects to invest approximately $500 million to $700 million during the next five years in this initiative.

Bruce Mansfield – Glenwillow transmission project is part of the Energizing the Future initiative. This project involves a new 114 mile, 345 kV transmission line stretching from the Ohio River to the Cleveland area (costing about $132 million) and a new substation costing approximately $18 million.

Costs: $150 million.

Status: Expected to be in-service June 1, 2015.
**Investment Partners:** None.

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

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**Cleveland Area Synchronous Condensers**

**Description:** Convert several generating units in the Cleveland, Ohio area to synchronous condensers to provide up to 1,385 MVAR of dynamic reactive voltage support by 2015.

**Costs:** 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 is expected to be in-service by June 1, 2013, at Eastlake Unit 5. Approval of the affiliate asset transfer of the generation unit to American Transmission Systems, Inc. remains pending at FERC.

**Investment Partners:** None.

**Benefits:** The conversion of the units to synchronous condensers is a more economical, effective and expedient solution than the installation of new static var compensators.
ITC HOLDINGS CORP. (ITC)

Company Background:

- ITC Holdings Corp. (NYSE: ITC) is the nation’s largest independent electric transmission company.

- Based 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 2011, ITC invested nearly $3.2 billion in transmission.

Green Power Express LP

Green Power Express LP was established in 2009 to plan and construct portions of the Green Power Express project. In April 2009, FERC approved the project’s basic rate terms, including a forward looking formula rate with FERC Order 679 incentives for the Green Power Express LP.

The Green Power Express project is a transmission expansion concept put forward by ITC in 2009 to serve as a catalyst for advancing regional transmission that would facilitate the movement of power from the wind-abundant areas in the Dakotas, Minnesota, and Iowa to Midwest load centers.

Projects electrically similar to The Green Power Express project are expected to be developed in segments through the regional planning process. Recently, MISO evaluated and approved several transmission lines that help to facilitate the Green Power Express concept. MISO multi-value projects (MVP) 3 and 4 currently are under development by ITC Midwest (see project description in the ITC Midwest section below). Additional segments of this project may be part of future regional transmission projects.
Substantial additions to the grid, similar to The Green Power Express project, will provide substantial benefits both on a stand-alone basis and as a component of the coordinated development of a national high-voltage backbone transmission system, by providing efficient access to substantial amounts of wind power, in the range of 20 GWs, and permitting that power to be imported from the upper Midwest to population centers in the Midwest. The Green Power Express project was conceptualized as a network of transmission segments and upgrades with appropriate redundancy so that reliability will be maintained.

**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 Partner: MidAmerican Energy Co.

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 will address long-standing reliability and system congestion issues in northeast Iowa. The line will extend 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 will be double-circuited with an existing 161 kV line west of the Hazleton substation. The Salem-Hazleton line will complete 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 $119 million.

Status: Following more than three years of RTO and regulatory review and approvals, ITC Midwest has begun construction of the line and anticipates completion 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 is a subsidiary of ITC Grid Development, LLC, a wholly-owned subsidiary of ITC Holdings Corp., the nation’s largest independent electric transmission company. Based in Topeka, Kansas, ITC Great Plains operates more than 100 circuit miles of transmission lines in Kansas and Oklahoma.
- 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.
- 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.
**KETA Project**

**Description:** The KETA Project, also known as the Spearville-Axtell transmission line, consists of approximately 225 miles of new 345 kV transmission lines that will run from Spearville, Kansas, north to the Post Rock substation near Hays, then across the Nebraska border to Axtell. The line will be built in three segments: Spearville to Post Rock; Post Rock to the Kansas-Nebraska border; and from the Kansas-Nebraska border to Axtell. ITC will build the first two segments: Spearville to Post Rock; and Post Rock to the Kansas-Nebraska border. The Nebraska Public Power District is responsible for building the third segment, from the Kansas-Nebraska border to Axtell.

**Cost:** The estimated cost for the ITC portion of the KETA project is approximately $160 million.

**Status:** ITC Great Plains broke ground November 4, 2010 on the first phase of the KETA project. ITC received Phase II route approval from the KCC on June 30, 2010. Rights-of-way (ROW) acquisition for Phase II of the project, from Post Rock to the Kansas-Nebraska border, is complete, and construction is underway. Phase I of the project entered service in June 2012. Phase II is scheduled to be in-service by the end of 2012.

**Investment Partners:** None.

**Benefits:** The Kansas Electric Transmission Authority (KETA) identified the Spearville-Axtell transmission line as a project that would bring significant economic and reliability benefits to Kansas and the regional transmission grid. The KETA Project will provide access to more reliable, efficient, and affordable electricity in Kansas and the Midwest. It will facilitate the development and export of wind generation from central and western Kansas and serve as a critical link for Kansas to regain its position as a net exporter of energy. It also will ease congestion across the transmission network, addressing the lack of high-voltage transmission lines in central and western Kansas which causes inefficiencies in the grid and does not allow power to flow in the most efficient manner.
Oklahoma Hugo - Valliant Project

Description: The Oklahoma Hugo - Valliant Project consists of approximately 18 miles of a new 345 kV transmission line that will run from a new substation ITC is building near the Western Farmers Electric Cooperative Hugo Power Plant, west of Fort Towson, to an existing substation southeast of Valliant.

Cost: Approximately $35 million.

Status: Construction began in the spring of 2011. The project went into service in June 2012.

Investment Partners: None.

Benefits: This project will reduce system congestion and inefficiency, meet increasing service requests for transmission and help provide access to more dependable, efficient, and affordable electricity in southeastern Oklahoma and throughout the state.

ITC Transmission

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. ITCTransmission secured siting approval from the Michigan Public Service Commission on February 25, 2011. The project will be completed in three phases, targeting completion in 2015. Substation construction and right-of-way acquisition are currently underway. The project will be constructed in stages, with the first segment planned to enter service in late 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.
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 5,500 circuit miles of transmission line in the western and northern portions of Michigan’s Lower Peninsula, serving a population of 4.9 million.
- METC is a member of the 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 segments of the project will be completed by late 2013 and will enter service by the end of 2013.

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.
G905 Generator Interconnection

**Description:** METC constructed two new substations and made system upgrades to connect a 200 MW wind farm to the transmission system. The project was built in two phases from mid-2011 through the end of 2012 as the wind farm ramped up production.

**Cost:** Approximately $21 million.

**Status:** Phase one involved construction of a new substation to connect the wind farm to METC’s Tittabawassee-Begole 138,000-volt (138 kV) line. This work began in June 2011 and was completed in October 2011. The second phase, which included a second new substation, reconstruction of approximately 10.7 miles of the Tittabawassee-Begole 138 kV line to increase its capacity, and a new double-circuit 138 kV line approximately 2.4 miles long to connect the second substation with METC’s Alma-Summerton 138 kV line, was completed at the end of 2012.

**Investment Partners:** None.

**Benefits:** The project transmits approximately 200 megawatts of energy from the wind farm, enough to power an estimated 54,000 homes.
KANSAS CITY POWER & LIGHT (KCP&L)

Company Background:

- Operating from its headquarters in Kansas City, Missouri, KCP&L is a full-service energy provider.
- KCP&L services more than 800,000 customers in 47 northwestern Missouri and eastern Kansas counties; a service territory of approximately 18,000 square-miles.
- KCP&L owns and operates 6,000 MWs of generating assets.
- KCP&L has 2,600 circuit miles of transmission and includes 345 kV, 161 kV and 69 kV transmission voltages.
- KCP&L is expanding its efforts to develop extra high-voltage transmission by forming Transource Energy, LLC, a partnership with AEP through its parent company Great Plains Energy, Inc., that will pursue competitive transmission projects under FERC Order 1000.
- Between 2002 and 2011, KCP&L invested approximately $207 million in transmission.

Iatan - Nashua 345 kV Transmission Line

Description: The Iatan - Nashua 345 kV Transmission Line project consists of approximately 30 miles of new 345 kV transmission line from KCP&L’s Iatan Generating Station to KCP&L’s Nashua Substation in Missouri. This project creates a 345 kV connection between the Iatan Substation 345 kV lines and an existing Hawthorn - St. Joseph 345 kV line that is nearby the 161 kV Nashua Substation. A new 345 kV ring bus will be constructed at Nashua Substation.

Cost: Approximately $64 million.

Status: This project was approved in the summer of 2009 by the Southwest Power Pool (SPP) Board of Directors as part of SPP’s Balanced Portfolio project set. Routing, siting, engineering, materials, and construction processes are currently underway. This project is anticipated to be in-service by June 2015.

Investment Partners: None.

Benefits: This project delivers trade and production cost benefits to the region while reducing transmission congestion constraints.
Sibley - Nebraska City 345 kV Transmission Line

**Description:** The Sibley - Nebraska City 345 kV Transmission Line project consists of approximately 175 miles of new 345 kV transmission line from KCP&L’s Sibley Generating Station to Omaha Public Power District’s (OPPD) Nebraska City Substation. KCP&L will construct and own 170 miles of the project and OPPD will construct and own five miles of the project. KCP&L will also install a new 345 kV Maryville Substation at a midpoint in the line.

**Cost:** Approximately $404 million, of which approximately $384 million will be KCP&L’s responsibility.

**Status:** This project was approved in June 2010 by the SPP Board of Directors as part of SPP’s Priority Project set. KCP&L and OPPD accepted obligations to construct the project in September 2010. Routing, siting, engineering, materials, and construction processes are currently underway. This project is anticipated to be in-service by June 2017.

**Investment Partners:** OPPD.

**Benefits:** This project delivers significant regional trade and production benefits, transmission congestion relief and provides for large-scale wind integration in northwest Missouri.
MIDAMERICAN ENERGY HOLDINGS COMPANY

Company Background:

• The U.S. subsidiaries of MidAmerican Energy Holdings Company—including MidAmerican Transmission, LLC, MidAmerican Energy Company and PacifiCorp—own and/or operate more than 18,000 miles of transmission and are engaged in significant transmission investment projects, both independently and through subsidiary joint ventures.

• Between 2002 and 2011, MidAmerican Energy Holdings Company 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.

Costs: 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.
Prairie Wind Transmission, LLC

ETT CREZ

PacifiCorp

- PacifiCorp owns and operates one of the largest privately held transmission systems in the U.S., consisting of more than 16,000 circuit miles of transmission lines ranging from 46 kV to 500 kV.

- PacifiCorp provides electric service to 1.7 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 12 adjacent control areas at approximately 160 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 a system peak capacity of over 12,000 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 $383 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 is scheduled for completion in May 2013. Construction is scheduled to begin in 2013 on the third segment, the approximately $380 million Sigurd to Red Butte project, which adds approximately 169 miles of new single-circuit 345 kV line in southwest Utah and is scheduled for completion in summer 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, and the Company is exploring joint-development opportunities on Portland General Electric’s Cascade Crossing 500 kilovolt transmission project from Boardman to the Salem, Oregon area (both depicted on the Energy Gateway map).

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 2002 and 2011, Minnesota Power invested approximately $140 million in transmission.

Transmission Related Smart Grid Initiatives:

Description: Minnesota Power is one of the participants in the MISO's Smart Grid Phasor Measurement Unit (PMU) Project. The SynchroPhasor data will be integrated into MISOs “Real-Time Displays” which are currently in development.

Cost: Minnesota Power's project cost is estimated to be $350,000. The MISO Smart Grid Project was awarded funds by the U.S. Department of Energy (DOE).

Status: Minnesota Power has installed a PMU/DFR at the Forbes 500 kV Substation as well as a Phasor Data Concentrator (PDC) at the Rowe Energy Control Center. Data is currently being sent to MISO's PDC. Minnesota Power is in the process of installing PMUs at the Boswell, Riverton, and Shannon 230 kV substations. The MISO grant is to be spent over three years and will be completed by early 2013.

Investment Partners: U.S. DOE.

Benefits: MISO's PDC provides data as part of the larger North American SynchroPhasor Initiative.
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 Multi Value 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.

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### Transmission to Serve Essar Steel Minnesota

**Description:** Transmission is required to supply electric power to the new Essar Steel Minnesota mine and steel mill. The Essar Steel Minnesota (ESM) Project will be developed in three phases. Phase I, consisting of a conventional taconite plant and mining load of 120 MWs, will become operational in 2013. Phase II of the project adds a Direct Reduced Iron (DRI) facility, which increases total demand to approximately 150 MWs. Phase III of the project adds an arc furnace and steel slab plant, which could increase the total peak demand to nearly 350 MWs. Both Phase II and Phase III are future expansions for which the schedule has not yet been finalized.

To serve Phase I of the ESM project, Minnesota Power’s 230 kV Boswell to Shannon Line will be looped into the new Calumet (Essar Mine Plant) and McCarthy Lake (Essar Steel Plant) substations. To serve future phases of the ESM Project, a new 230 kV line will be constructed from the Minnesota Power Blackberry Substation to the McCarthy Lake Substation.

**Cost:** Approximately $32.5 million.

**Status:** The MN PUC approved route permits for the lines in August 2010. The plan is to construct the transmission to serve ESM in stages to coincide with the load expansions associated with Phase 1, Phase II, and Phase III of the ESM Project. The looping of Boswell-Shannon Line to provide a Boswell to Calumet Substation line, Calumet to McCarthy Lake Substation line and an McCarthy Lake to Shannon Substation line will be constructed first. These lines will supply Phase I of the ESM project and are expected to be placed in-service by April 2013. The line between the Blackberry Substation and the McCarthy Lake Substation will be constructed as required to meet the load increases associated with Phase II and Phase III of ESM Project. This 230 kV line will be developed as needed to meet Essar’s future expansion schedule.

**Investment Partners:** None.

**Benefits:** The project will provide the reliable electric service to the new ESM facilities and provide the area the economic benefits associated with mining in northern Minnesota.
**Great Northern Transmission Line**

**Description:** The Great Northern Transmission Line Project includes high-voltage connections between the province of Manitoba in Canada and the Arrowhead Substation in St. Louis County, Minnesota, to enable additional deliveries from Manitoba Hydro to meet existing and future energy needs. Minnesota Power is proposing to construct a 500 kV transmission line from the border that would terminate at the Blackberry Substation in Itasca County, Minnesota, (approximately 225 to 300 miles) and a 345 kV double-circuit transmission line from Blackberry to the Arrowhead Substation near Hermantown, Minnesota (approximately 50 to 70 miles).

The Great Northern Transmission Line is intended to provide delivery and access to power generated by Manitoba Hydro’s hydroelectric stations in Manitoba, Canada. Minnesota Power needs this line to deliver at least 250 MWs of energy and capacity by June 1, 2020 under an approved Power Purchase Agreement (PPA). Several other items are driving the need for a new transmission line to be built from Manitoba, Canada, to the Arrowhead Substation. These include access to clean, renewable energy for Minnesota Power and the region, increased industrial load growth on the Iron Range, and strengthening regional reliability. The Project is intended to facilitate increased imports from Manitoba of up to 1,100 MWs to support the regional transmission system and to serve load.

The project consists of a 500 kV build and a 345 kV build. The 500 kV build includes the new 500 kV transmission line and expansion of the Blackberry Substation to accommodate the new line and a 500/230 kV transformer. This part of the project is planned to be in-service by June 1, 2020, in order to meet the terms of Minnesota Power’s PPA. For the 345 kV build, the Blackberry Substation will be expanded to include 500/345 kV transformation and a new double-circuit 345 kV line will be built from Blackberry to the Arrowhead Substation. The 345 kV build of the project is planned to be implemented in 2025.

**Cost:** Approximately $960 million.

**Status:** Minnesota Power plans to submit a Certificate of Need application to the State of Minnesota in early 2013, followed by a Route Permit Application in late 2013. Since the proposed line crosses the international border, Minnesota Power will also be submitting a Presidential Permit Application to the federal government in 2013. Assuming that permitting for the project is completed by 2015, Minnesota Power would plan to start construction in 2017.

**Phase I Project Investment Partners:** Minnesota Power, others pending.

**Phase II Project Investment Partners:** Minnesota Power, American Transmission Company, others pending.

**Benefits:** The project will provide access to at least 1,100 MWs of clean, emission-free energy for Minnesota Power and the region.
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 4,000 MWs of contracted electricity generation that provides power to over one million Long Island Power Authority customers.

• National Grid maintains over 10,000 circuit miles of transmission in the United States.

• Between 2002 and 2011, National Grid has invested approximately $1.8 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: Bangor Hydro Electric.

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 $697 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.

**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 is expected to be completed and placed in-service by the 2013 timeframe.

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

Company Background:

- NU and NSTAR merged in April 2012. Electric operating companies of the newly merged company 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 3.5 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 2002 and 2011, legacy NU (i.e., prior to the merger with NSTAR) invested approximately $3.6 billion into its transmission system.

- During 2012, post-merger NU will invest approximately $0.7 billion into its transmission system.

- Between 2013 and 2017, post-merger NU expects to invest $3.7 billion into transmission system upgrades.

The Northern Pass Transmission Project (NPT Project)

Description: The NPT Project consists of approximately 140 miles of new 300 kV HVDC transmission line and an associated 40 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 140 miles in length and includes an AC/DC HVDC converter terminal in Franklin, New Hampshire. The AC radial line is about 40 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 $1.1 billion.

Status: On February 11, 2011, NPT received the FERC order approving the arrangements of a Transmission Service Agreement between NPT and Hydro Renewable. On October 13, 2010, NPT filed an I.3.9 application with ISO-NE. In October 2010, NPT also filed an application with the Department of Energy. In June 2011, NPT filed an application with U.S. Forest Service. The target in-service date for this project is anticipated for late 2016, early 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.

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**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 nine other switching stations and substations.

**Cost:** The current estimate for the project is $718 million.

**Status:** Siting approvals have been received and construction is in full swing in both states. The Project is expected to be in service in 2013.

**Investment Partners:** United Illuminating is investing approximately 8.4 percent of the cost of the Connecticut portion of the project.

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

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**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 ROW. The line will begin at Card Street Substation in Lebanon, Connecticut, go through Lake Road and cross the Rhode Island/Connecticut border into National Grid territory, where National Grid will construct approximately 38 miles of 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:** The siting hearings for the Connecticut portion of the IRP were completed in October 2012 and a final decision approving the Connecticut portion of the project was issued by the Connecticut Siting Council on January 2, 2013. For both the Rhode Island and Massachusetts portions of the Project, siting applications were filed in mid-2012 and the siting hearings are expected to begin in early 2013 in each state. Construction of the IRP is expected to begin in early 2014 and 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. Providing more direct routes between power sources and eastern Connecticut, and increasing the overall capacity of the transmission system, 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. The IRP is designed to address reliability violations associated with the movement of power both east-to-west and west-to-east across southern New England under certain line-out conditions.

**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. 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 is expected to begin assessing transmission solutions in early 2013 with results anticipated by year end.

**Status:** Preliminary results of the GHCC need assessment were presented to stakeholders in August of 2012 with final results expected in early 2013. Currently, it is anticipated that the preferred solution set will be identified in late 2013 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.


**Greater Boston Study Solution**

**Description:** The Greater Boston Study Solution is a group of reliability projects segmented in four areas of Boston (Downtown, North, West, and South) that serve as solutions developed to address reliability needs and bring power into Boston. The Greater Boston Study Solution includes: installation of new lines; reconductoring of existing lines; and upgrades to existing substations (adding new breakers and capacitor banks). Total project miles includes approximately 19 miles of new 345 kV lines and 36 miles of new 115 kV lines.

- The Downtown portion of the project includes: a 345 kV line between Woburn and North Cambridge; adding new 115 kV lines between Woburn and Mystic and between Mystic and Chelsea; installing autotransformers; reconductoring of a 115 kV line between Chelsea and Revere; and adding new breakers and a capacitor bank.
- The North portion of the project includes: a new 345 kV line from Scobie to Tewksbury to Woburn.
- The West portion of the project includes: a new 115 kV line between Sudbury and Hudson Municipal; and adding autotransformers and reconfiguring a substation.
- The South portion of the project includes: a new 115 kV line between Walpole, Canton and Holbrook; rebuilding of lines between Medway and Milford; and adding a new switching station.

**Cost:** The estimated capital cost of the project for the NU portion of the project is approximately $393 million.

**Status:** The Greater Boston solutions described above are included as “Proposed” projects in ISO-NE’s October 2012 Regional System Plan Project Listing. ISO-NE and New England Power Pool stakeholders will need to finalize the studies and planned solutions before many of the projects can proceed. The finalized study is expected in Q1 2013. Construction is expected to begin on various projects this year and over the next several years for the remainder of the projects. The target in-service date for the projects will vary from this year through the next five years.

**Investment Partners:** National Grid.

**Benefits:** The proposed solutions are the most cost effective means to meet the long-term reliability needs of the Greater Boston area. The projects will address reliability needs over the next ten years (2013-2022). Portions of the project will also increase the New England North-South interface limit as well as Boston import limits.
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 $110 million.

Status: The project received siting approval in April 2012. Construction began in October 2012 and is expected to be completed in September 2013.

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.
NORTHWESTERN ENERGY

Company Background:

- NorthWestern is an electric and natural gas utility serving the States of Montana, South Dakota, and Nebraska, as well as a small part of Wyoming.

- NorthWestern’s electric operations provide transmission and distribution services to approximately 400,500 electric customers in Montana, South Dakota, and Nebraska with over 8,300 circuit miles of transmission lines and associated terminal facilities (50 kV to 500 kV).

- Between 2002 and 2011, Northwestern Energy has invested approximately $150 million in transmission.

500 kV Upgrade Project

Description: NorthWestern, the other Colstrip Transmission System owners, and the Bonneville Power Administration have completed a technical study to increase the existing 500 kV transmission system by up to 700 MWs. This project is a series capacitor compensation upgrade to existing 500 kV transmission lines: 500 miles of double-circuit transmission line from Colstrip to Taft, Montana; 81 miles of single-circuit transmission line from Taft to Bell; and 88 miles of single-circuit transmission line from Taft to Dworshak. The 500 kV transmission system extends from Colstrip in eastern Montana to the Mid C area of the Columbia River on the border between Washington and Oregon. The Montana 500 kV transmission system is used to move the existing Colstrip generation in eastern Montana to the Northwest. Approximately 75 percent of the Colstrip generation capacity is exported to serve loads outside Montana. The primary path of this exported power is the two 500 kV lines that start at Colstrip and traverses the NorthWestern Balancing Area from east to west to exit the state near Taft. At Taft the 500 kV lines split and continue to areas in the Northwest.

Cost: The cost of the project may be up to $227 million depending on the incremental capacity increase.

Status: The 500 kV Project planning studies were completed in late 2012. The Western Electricity Coordinating Council’s rating process is expected to start in 2013. Bonneville Power Administration is doing an Environmental Impact Study on their portion of the upgrade. It is anticipated that construction will begin in 2014 and an expected in-service date of fall 2016.

**Benefits:** The overall benefit of the 500 kV Upgrade is to increase the transfer capability of an existing congested 500 kV transmission line at a low cost thereby minimizing environmental impact, to promote the development of new renewable generation in the high wind resource areas of Montana, and to move renewable energy to markets in the Northwest.

**Mountain States Transmission Intertie (MSTI)**

- The proposed Mountain States Transmission Intertie (MSTI) project was planned to involve approximately 400 miles of new 500 kV transmission line connecting a new substation outside of Townsend, Montana to the existing Midpoint Substation near Jerome, Idaho with a designed capacity of 1,500 MWs. In October 2012, NorthWestern Energy made the decision to postpone the MSTI Project due to continued market uncertainty, permitting issues, and the recent notification that MSTI had not been selected as an option to serve a large load in southern Idaho. While NorthWestern does not anticipate incurring additional costs in the foreseeable future related to the MSTI Project, the company will, however, continue to monitor market conditions and evaluate strategic options related to the MSTI Project going forward.

- NorthWestern continues to believe that a new transmission facility like MSTI will be required at some point in the future to enhance the western electric grid and to allow development of Montana’s vast renewable and other electric generation potential to reach markets in the west. NorthWestern will continue to monitor market conditions and customer requests and respond appropriately as the need for new transmission facilities develops.
Montana Renewable Collector System (MT-RCS)

The Montana Renewable Collector System (MT-RCS) was planned to be a collection of generator lead lines to be built in the high wind areas of Montana and move renewable wind energy south to a new substation at Townsend, Montana, which was the northern terminal of the MSTI Project. Now that the decision has been made to postpone MSTI, there is no need for MT-RCS until market conditions change and MSTI becomes viable.
NV ENERGY

Company Background:

- NV Energy is an investor-owned FERC jurisdictional utility. NV Energy serves approximately 1.2 million customers over a 54,500 square mile area in southern and northern Nevada and northeastern California.
- System wide there are approximately 3,850 miles of FERC classified circuit mile transmission.
- Between 2002 and 2011, NV Energy invested approximately $700 million in transmission.

One Nevada 500 kV Transmission Intertie (NVES & NVEN)

Description: NV Energy will construct an approximately 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: $510 million (in 2011 dollars).

Status: The Joint NV Energy / Great Basin One Nevada Transmission Line Project (ON Line) transmission line construction crews are currently working in Lincoln County developing construction roads and installing below grade improvements, such as foundations. Substation work started at Robinson Summit Substation in June 2011. Construction is continuing on the project. ON Line had originally been expected to enter service in late 2012. At this time NV Energy expects that ON Line will be placed in service in the latter half of 2013 after completing efforts to address wind related damage sustained by some of the tower structures erected for the project.

NV Energy is joining the Northern Nevada Sierra Pacific Power Balancing and Operating Area (BA) and the Southern Nevada Balancing and Operating Area into one NV Energy Balancing Area after completion of One Nevada Line Project. NV Energy is currently working with the Western Electricity Coordinating Council (WECC) Planning Coordination Committee, Technical
Studies Subcommittee, and parties interested in the project review on consolidating the Western Electricity Coordinating Council ratings in both BAs. This will include 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. NV Energy is forming a new WECC Project Review Group to review this process.

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

**Benefits:**

- Combined BA will provide benefits, including:
  - scheduling,
  - optimal dispatch,
  - reduced planning and operating generation reserves.
- Deliver renewable energy from Northern to Southern Nevada.
- Utilize the Southwest Intertic Project (SWIP) for future interconnection between Southern Nevada/Arizona with Idaho System (SWIP-North).
- Deliver renewable energy & other future generation from the North/NE (Idaho, Wyoming, Utah) to Southern Nevada/Arizona/California.
Renewable Energy Transmission Initiative (RTI)

- The 2009 Nevada legislature passed Assembly Bill 387, making transmission development, to support renewable generation public policy. Assembly Bill 387 required NV Energy to identify transmission plans and cost to access Renewable Energy Transmission Access Advisory Committee (RETAAC)/Nevada Public Utilities Commission approved renewable energy zones. In the 2010 Sierra Integrated Resource Plan (IRP), a plan to access these zones was published as the Renewable Energy Conceptual Transmission Plan (RECTP). In July of 2011, NV Energy introduced its Renewable Transmission Initiative as a customer driven process to determine market interest in developing the RETAAC Zones. More information is available at http://www.nvenergy.com/RTI.

- The Renewable Energy Transmission Initiative (RTI) received a significant response. NV Energy received over 5,000 MWs of Statements of Interest in the RTI in September of 2011. Study Agreements were sent to participants in November 2011. There was sufficient interest to continue with the 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). Studies were completed in April 2012, and 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.

- The project could address NV Energy’s and the State’s growing emphasis on development of renewable energy resources by improving access to electricity generated by renewable energy projects in the State. The project could be used to access over 80 percent of the most concentrated Renewable Energy Zones Identified in RETAAC and provide transmission access for renewable developers to reach the Desert Southwest and California.
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 2002 and 2011, 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 $172 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 $176 million.

Status: This project is estimated to be in-service by 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 is estimated to be in-service by December 2013.

Investment Partners: None.

Benefits: This project is required for transmission service as directed by the SPP.
Sooner – Rose Hill 345 kV Line

**Description:** The Sooner - Rose Hill project consists of approximately 88 miles of new 345 kV transmission line to be constructed from OG&E’s Sooner substation to WESTAR Energy’s new Rose Hill substation. OG&E will build and operate approximately 43 miles of the line from OG&E’s Sooner substation to the Oklahoma – Kansas border. WESTAR Energy will construct the portion of line from the Oklahoma – Kansas border to the Rose Hill substation.

**Cost:** OG&E’s cost is approximately $48 million.

**Status:** The project was energized June 2012.

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

**Benefits:** This project is required for transmission service, to enable economic transfers, and enhance regional transmission reliability. This project was approved as part of the SPP Balanced Portfolio 3E projects.

Sunnyside – Hugo 345 kV Line

**Description:** The Sunnyside - Hugo project consists of approximately 120 miles of new 345 kV transmission line to be built from OG&E’s Sunnyside substation to the Western Farmers Electric Cooperative’s Hugo Generation Plant Substation, as well as associated upgrades to the Sunnyside Substation. OG&E will construct and operate the entire Sunnyside - Hugo line.

**Cost:** OG&E’s estimated cost is $157 million.

**Status:** The project was energized July 2012.

**Investment Partners:** None.

**Benefits:** This project is required for transmission service.
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 $150 million.

Status: Preliminary engineering and routing 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.

Elk City - Gracemont 345 kV Line

Description: The Elk City - 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 the eastern half of the line from Gracemont substation, approximately 47 miles in length.

Cost: OG&E’s estimated cost is $76 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 $72 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 2nd Circuit 345 kV Line

**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.

**Cost:** Approximately $82 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.
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 2002 and 2011, Oncor invested approximately $3 billion in transmission.

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: In the third quarter of 2012, the Public Utility Commission of Texas (PUCT) has taken up the issue of increased congestion charges seen since March 2012 in the Electric Reliability Council of Texas (ERCOT) West Load Zone. Specifically, the PUCT has requested responsive activities at the ERCOT and PUCT Staff levels and, as a primary transmission provider in the West Zone, from Oncor.

ERCOT has indicated that the primary cause of higher prices in the West Load Zone has been rapid load growth in that part of the state due to additional oil and gas exploration and production in the area. Loads across the entire West Load Zone were 7 percent higher in the 2012 summer as compared to 2011. Further, a recent Independent Market Monitor report given at the ERCOT Board of Directors meeting in July 2012 indicated that certain locations with high impact on pertinent transmission constraints have had a 20 percent load increase from the same period last year. This type of steady load increase has caused significant congestion, primarily at specific transmission system locations in the West Load Zone.
In the ERCOT nodal market, congestion costs are assigned more directly to the load in impacted Load Zones - as opposed to the costs being spread across the entire ERCOT system as they were in the zonal market. Prior to December 2010, when ERCOT transitioned to the nodal market, local congestion was managed by ERCOT through dispatch and the market costs of the dispatch were uplifted to the entire market through Qualified Scheduling Entities (QSEs) on a Load Ratio Share. Under zonal, the costs for managing local congestion were shared by all QSEs representing load, thereby, limiting the overall costs incurred by any particular entity in a given Load Zone to manage a local congestion issue; under the nodal market rules, the cost to manage local congestion is directly assigned to the Load in the impacted Load Zone.

There are longer-term planned system improvements that ERCOT believes will reduce congestion in the West Load Zone. In August 2012, Oncor gave a presentation to the ERCOT Regional Planning Group discussing these and other proposed improvements. ERCOT, Oncor and other Transmission Service Providers (TSPs), are continuing to evaluate the need for transmission system improvements in the West Load Zone based on established technical and economic criteria as defined in the ERCOT Protocols and other related planning criteria. Planned system improvements to reduce congestion include a portfolio of projects that include the reconductoring and/or rebuild of existing transmission facilities, as well as the addition of new transmission line capacity.

**Cost:** Approximately $130 million.

**Status:** Of the transmission system locations identified, current transmission projects are underway and will be completed between now and 2015.

**Investment Partners:** None.

**Benefits:** Projects will improve transmission system reliability and provide economics benefits, by reducing congestion, in the West Load Zone.

### Dynamic Line Ratings

**Description:** Oncor is participating in the Department of Energy (DOE) SmartGrid Demonstration Projects program addressing the use of Dynamic Line Ratings (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 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. Oncor experienced approximately $148 million of congestion costs on transmission lines in 2011 and approximately $187 million during 2012. The 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.

Online monitoring will be completed at the end of 2012 and the formal reports for the DOE will be delivered during the first quarter of 2013.

**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 two or three 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.

**Oncor CREZ Development**

**Description:** In 2005, the Texas Legislature directed the 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.

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 represents 20 percent on Oncor’s CREZ spending, includes upgrades to existing station and transmission line facilities. The Priority Category, which represents 40 percent on Oncor’s CREZ spending, includes new transmission lines and stations for existing (constrained) wind that is currently installed but can’t come to market due to transmission flow constraints. The Subsequent Category, which represents 40 percent on Oncor’s CREZ spending, includes new transmission lines and stations for renewable generation to be brought to the market.
The Default Category projects include 11 stations and nine transmission lines totaling 249 miles. The Priority Projects include seven stations and nine transmission lines totaling 380 miles. The Subsequent Projects include eight stations and five transmission lines totaling 402 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 SVCs and series compensation equipment. Oncor has assessed the scope of work and developed revised estimates in accordance with the study results.

**Cost:** Approximately $2 billion.

**Status:** The Default Category projects received two Certificates of Convenience and Necessity (CCN) and are currently 97 percent complete. The Priority Category projects received seven CCNs and are currently 99 percent complete. Both Default and Priority projects are currently in construction and are anticipated to be finished by the end of 2012. The Subsequent Category projects have received five CCNs and are expected to be brought into service by the end of 2013.

**Investment Partners:** None.

**Benefits:** The CREZ transmission project provides the infrastructure necessary to approximately double Texas’ current renewable energy capacity. 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.

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**Phasor Measurement**

**Description:** Oncor is participating in a DOE research project for the advancement and utilization of synchrophasor data measurements to improve grid reliability and market efficiency. The project will assess and verify generator performance and load modeling, investigate the impact of high wind generation penetration on the frequency response, study dynamic performance and congestion control for the ERCOT power system, as well as study state measurement integration and application.

**Cost:** Indefinite.

**Status:** To support this project, Oncor has installed synchrophasor measurement equipment at eleven locations as well as a data concentrator to capture the streaming data. The captured data is then streamed to ERCOT’s data concentrator to be integrated with data from other ERCOT participants for utilization in the research project. Oncor plans to install additional synchrophasor measurement equipment at five CREZ stations during the first quarter of 2013.

**Investment Partners:** None.

**Benefits:** The research project is for the advancement and utilization of synchrophasor data measurements to improve grid reliability and market efficiency.
Static Var Compensation

**Description:** Oncor has deployed the world’s largest cluster of Static Var Compensators (SVC) 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 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.
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 129,260 customers.
- System-wide it has about 5,149 miles of transmission lines.
- Between 2002 and 2011, Otter Tail Power Company has invested approximately $71 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 Multi Value 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:** Big Stone South - Brookings County is part of a portfolio of projects that MISO has designated as MVPs and was approved by the MISO Board of Directors in Appendix A of MISO’s MTEP’11. As part of the MVP portfolio, this project will provide reliability and public policy and economic benefits across the MISO footprint.
Big Stone South to Ellendale

**Description:** Big Stone South - Ellendale is an approximately 145 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 $300 to $340 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 by 2019.

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

**Benefits:** Big Stone South – Ellendale is part of a portfolio of projects that MISO has designated as MVPs and was approved by the MISO Board of Directors in Appendix A of MISO’s MTEP’11. As part of the portfolio of MVPs, this project will provide reliability and public policy and economic benefits across the MISO footprint.
PEPCO HOLDINGS, INC.

Company Description

• 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 778,000 customers in Washington, D.C., and its Maryland suburbs;
  • Atlantic City Electric – a regulated electric utility serving nearly 547,000 customers in southern New Jersey;
  • Delmarva Power – a regulated utility serving more than 498,000 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 2002 and 2011, PEPCO invested approximately $1.5 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.

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**Benning Transmission Project**

**Description:** The Benning Transmission Project consists of two new 5.5 mile 230 kV underground transmission lines from Benning Station A, located in the northeast portion of the District of Columbia, to Pepco’s Ritchie Substation, located in Seat Pleasant, Maryland. The project also includes the expansion of the 230 kV substation and the addition of a new 230/115 substation with two new 230/115 kV transformers. The project is required to resolve reliability problems arising from the retirement of Benning generating facility in the District of Columbia.

**Cost:** Approximately $130 million.

**Status:** This project was substantially completed in 2012 with the final element (installation of two 69 kV capacitor banks) expected during the first quarter of 2013.

**Investment Partners:** None.

**Benefits:** The addition of this project will allow the retirement of approximately 550 MWs of aging capacity at the Benning station. In addition, the project will maintain reliability of the electric system and ensure the continuity of electricity supply to the customers in the District of Columbia.
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.
PG&E serves over five million electric customers in northern California over a 70,000 square-mile service area.

PG&E owns and operates 18,500 circuit miles of electric transmission lines at voltages of 60 kV, 70 kV, 115 kV, 230 kV, and 500 kV.

PG&E is a member of the California Transmission Planning Group (CTPG).

Between 2002 and 2011, PG&E invested approximately $5.3 billion in transmission.

Greater Fresno Area Upgrade Project

Description: In September 2012, PG&E proposed the 100-mile Greater Fresno Area Upgrade project to the California Independent System Operator which is an important step in addressing Central California transmission needs. Proposed scope includes installing a double-circuit 230 kV line from Gates to Raisin City, installing a 230 kV line from Raisin City to Gregg, installing one 230 kV line from Raisin City to a proposed North Fresno Substation, and a new 230 kV switching station near Raisin City. The Greater Fresno area is served by local area generation including the Helms Pumped Storage Project, hydro-generation, thermal generation, and solar generation.

Cost: Estimated to be $400-$500 million (direct cost only).

Status: Project is in the development stage with work focused on preliminary environmental and engineering feasibility studies and screening of potential project partners. Construction is expected to begin mid-2018. Anticipated in-service date is 2022.

Investment Partners: In discussions.

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) allowing the operation of all three units to pump at Helms Pumped Storage Plant, providing incremental energy storage capability that would be increasingly valuable as more intermittent renewables are integrated onto the grid.
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 1,400 circuit miles of transmission line.
• Between 2002 and 2011, PSE&G invested approximately $1.8 billion in transmission.

Transmission Related Smart Grid Initiatives:
• PSE&G along with PJM and 11 other PJM Transmission Owners, with support from Quanta Technology, Electric Power Group, and Virginia Tech, are deploying SynchroPhasor technology across the PJM footprint.

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 95 percent engineered and construction commenced on the project in July 2012 after receiving the required construction permits.

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 $895 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. A number of permit applications have been submitted and others are being prepared. Some approvals have been received. Additionally, long lead time material is being ordered.

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. Based on the anticipated completion of the NPS review, 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.
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 2005 and 2011, SCE invested approximately $2.7 billion (direct costs in nominal dollars, excluding corporate overheads) in transmission.
- SCE plans to invest over $3.1 billion (estimated direct costs in nominal dollars, excluding corporate overheads) of capital in transmission projects from 2012 through 2014.

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 Wide-Area Situation Awareness System (WASAS), Centralized Remedial Action System (CRAS), and Tehachapi Wind Energy Storage Project (TSP).

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

Description: The DPV2 project consisted of approximately 230 miles of new 500 kV transmission line connecting SCE’s Devers Substation, near Palm Springs, California to a Harquahala switchyard near Palo Verde, west of Phoenix, Arizona, and a 42 mile, 500 kV transmission line connecting Devers Substation to SCE’s Valley Substation, in the city of Romoland, California. The original plan also included the prospect for a proposed new SCE Substation near Blythe (originally called Midpoint, but now named the Colorado River Substation). The proposed transmission lines would parallel the existing DPV1 and Devers-Valley No. 1 transmission lines.
**Cost:** Approximately $860 million (estimated direct costs in nominal dollars, excluding corporate overheads).

**Status:** Despite approvals by the California Public Utilities Commission (CPUC) and the Arizona Power Plant and Transmission Line Siting Committee, the Arizona Corporation Commission (ACC) denied approval of the DPV2 Project in Arizona in June 2007.

In May 2008, SCE filed a petition for modification of the Certificate of Public Convenience and Necessity (CPCN) received from the CPUC to build only the California portion of DPV2. As modified, the project would install the Devers-Valley No. 2 500 kV transmission line and a 500 kV transmission line from Devers Substation terminating at the new Colorado River Substation, near Blythe, California. In November 2009, the CPUC granted approval of SCE’s petition to build the California portion of DPV2, including the Colorado River Substation contingent upon subsequent CAISO approval which was secured in August 2010. CPUC and Bureau of Land Management permitting was completed in July 2011. Construction commenced January 2012 to meet the forecast in-service date of August 2013.

**Investment Partners:** None.

**Benefits:** This project will facilitate the development of renewable and conventional resources.

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**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 $400 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, to meet the forecast in-service date of 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. Land acquisition activities are in escrow or condemnation proceedings. As of October 2011, SCE engaged in the development of a Section 10 - Habitat Conservation Plan (HCP) consultation after the Army Corp of Engineering declined to accept the role as lead federal agency on the project. Construction activities were separated into four work packages to allow for construction to commence in non-environmentally sensitive areas of existing right-of way in second quarter 2012. Work package 1 was completed September 2012 and construction began for work package 2 in September 2012. SCE is working to minimize the impacts of the HCP and keep the project on schedule for the current forecast in-service date of March 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 15 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.

Cost: Approximately $2.5 billion (estimated direct costs in nominal dollars, excluding corporate overheads).


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.

**South of Kramer (SOK)**

**Description:** The proposed South of Kramer 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, through a new proposed Jasper 220 kV Substation which will be a new point of interconnection for new renewable generation, 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 between the new Jasper Substation and SCE’s existing Lugo Substation, and 16 miles of transmission line between Desert View & 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 $500 million (estimated direct costs in nominal dollars, excluding corporate overheads).

**Status:** The SOK project is in the early development stage. Site and route evaluation, community and agency outreach, and other pre-licensing activities are underway. SCE is targeting to file a CPCN with the CPUC in 2013 with a forecast in-service date of April 2018.

**Investment Partners:** None.

**Benefits:** Construction of SOK 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)

Description: The proposed West of Devers 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 $600 million (estimated direct costs in nominal dollars, excluding corporate overheads).

Status: The WOD project is in the early development stage. Site and route evaluation, community and agency outreach, and other pre-licensing activities are underway. SCE is targeting to file a CPCN with the CPUC in 2013 and forecasts the project to be in-service by 2019.

Investment Partners: None.

Benefits: Construction of West of Devers 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 by April 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.

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**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 2013. Operations, measurement, and testing scheduled to be completed in 2015.

**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 $51 million (estimated direct costs in nominal dollars, excluding corporate overheads).

**Status:** The project is anticipated to be completed during the third 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.

Wide-Area Situation Awareness System (WASAS)

**Description:** WASAS involves the installation of combined Digital Fault Recorder/Phasor Measurement Unit (DFR/PMU) devices to enable SCE 500 kV and 220 kV transmission substations to have SynchroPhasor measurement capability. WASAS will be able to exchange SynchroPhasor data with other Western Electricity Coordinating Council (WECC) utilities and system operators through the Western Interconnection Synchrophasor Program (WISP).

**Cost:** Approximately $75 million (estimated direct costs in nominal dollars, excluding corporate overheads).

**Status:** The system is forecast to be 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.
SOUTHERN COMPANY

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 2002 and 2011, Southern Company invested over $3.4 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 proposing to invest over $140 million through 2013 by installing Smart Grid technologies that advance Smart Substation applications, Transmission Line Automation and Phasor Measurement Unit's (PMU).

Central Alabama Projects

Description: The Central Alabama CC projects consist of a new 500/230 kV autobank at Autagaville TS and 1.3 miles of new single-circuit, 230 kV transmission line 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.

Douglas - Pine Grove Primary 230 kV Line Project

Description: The Douglas - Pine Grove 230 kV line project consists of approximately 53 miles of new single-circuit, 230 kV transmission line between Douglas 230/115 kV and Pine Grove Primary 230/115 kV Substations.

Cost: Approximately $51 million.

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

Investment Partners: Georgia Transmission Corporation (GTC).

Benefits: This project is for infrastructure reliability in the Tifton and Valdosta areas of Georgia.

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 in the Birmingham, Alabama area. This project will also alleviate thermal overloads and reduce transmission losses 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.

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 2013.

**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 $65 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 $51 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; add a new Laguna Beach - Santa Rosa 230 kV #2 transmission line; and a new Santa Rosa 230 kV Substation with two, 400 MVA transformer banks (in the Central Florida Panhandle, Destin, and Panama City Beach areas).

**Cost:** Approximately $68 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 $128 million.

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

**Investment Partners:** None.

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

South Tuscaloosa - Eutaw Area Network Project

**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 27.4 miles of new single-circuit, 115 kV transmission line; reconductoring 8.6 miles of existing single-circuit, 115 kV transmission line; and converting two 46 kV substations to 115 kV operation.

**Cost:** Approximately $77 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 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 2017.

**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.
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 and 55 substations.

- 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 2002 and 2011, VELCO invested approximately $600 million in transmission.

- In the next five years, VELCO expects to invest $323 million in planned transmission upgrades.

Connecticut River Valley Upgrades

Description: The project involves the addition of a second 17.2 mile, 345 kV transmission line operated at 115 kV from VELCO’s Coolidge Substation to Ascutney Substation. The project includes the expansion of Coolidge and Ascutney Substations to accommodate the new line.

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 as designed will address these areas of concern and meet present and future system needs.
Substations Additions and Upgrades

**Description:** The project involves building a new 115 kV substation, the refurbishment of a HVDC controls and cooling system’s converter station, and rebuilding three 115 kV substations interconnecting the transmission and sub-transmission networks. The three stations rebuilt will be in a ring configuration to meet reliability needs as identified by the planning studies. They interconnect the 115 kV, 46 kV systems. The substations are located in Georgia, Ascutney, and Bennington townships. The new substation in Jay township interconnects the 115 kV and 46 kV systems. The refurbishment of the controls and cooling system of the HVDC Back to Back converter station interconnecting VELCO and HQ TransEnergie transmission network is located in the town of Highgate.

**Cost:** Approximately $120 million.

**Status:** These substations are under construction and final permitting, and are scheduled to be put in-service between fall 2012 and spring 2013.

**Investment Partners:** None.

**Benefits:** This project addresses system deficiency of large load area of VELCO’s transmission network. The substations as designed to improve the reliability of the 115 kV transmission network and its interconnection to the sub-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 2002 and 2011, Westar Energy invested approximately $850 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 30 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 28 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 $60 million.

Status: The following is an approximate timeline for the Summit - Elm Creek Project:

- 2012 - 2013 Routing
- 2014 - 2015 Right-of-Way acquisition and engineering design
- 2016 - 2017 Construction
- 2018 Project in-service
Investment Partners: ITC Great Plains, LLC under co-development agreement with MKEC.

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.

Rose Hill - Sooner 345 kV Transmission Line

Description: The Rose Hill - Sooner 345 kV Transmission Line project consists of approximately 49 miles of new 345 kV transmission line from Rose Hill Substation to the Kansas-Oklahoma border, constructed by Westar Energy. Oklahoma Gas and Electric (OG&E) built a 43 mile line from the Kansas-Oklahoma border to the Sooner Substation.

Cost: Westar Energy’s cost is approximately $73.6 million.

Status: This project has been approved as part of a SPP transmission service request and will enable additional economic transfers and enhance regional transmission reliability. Westar line construction is 100 percent complete and the project was placed in-service April 2012.

Investment Partners: OG&E.

Benefits: This project is required for transmission service and will also enable additional transfer capability for the region.
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 a new 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 80 miles of line from the border to Woodward Substation.

**Cost:** Prairie Wind Transmission’s cost is approximately $180 million. Westar Energy and ETA will each invest $90 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 2002 and 2011, Xcel Energy invested over $2.5 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 $738 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.

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**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. NSP and OTP expect to file an application for the Big Stone South-Brookings County project with the South Dakota Public Utilities Commission in 2013 with construction starting by 2015. NSP and ATC expect to file 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.
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 110 miles of double-circuit, 345 kV transmission line 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 planned 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 29 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 portion of the Pawnee - Daniels Park 345 kV line. The second circuit would create a new 345 kV transmission line between PSCo’s Smoky Hill and Daniels Park Substations.

Cost: Approximately $100 million.

Status: This is a potential 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 approximately 300-500 MWs of resources, interconnecting at or near the Pawnee Substation in north central and northeastern Colorado.

Pawnee - Smoky Hill 345 kV Transmission Project

Description: The Pawnee - Smoky Hill 345 kV Transmission Project is a new, double-circuit capable, 345 kV transmission line to connect PSCo’s existing Pawnee Substation near Brush, Colorado, to PSCo’s Smoky Hill Substation near Aurora, Colorado.
The project consists of three sections. The first section is approximately 79 miles of new 345 kV double-circuit capable transmission line extending from PSCo’s existing Pawnee Substation to the Missile Site Substation, south of Bennett, Colorado. The second section, or center section, consists of rebuilding approximately 15 miles of existing 230 kV wood pole structures to double-circuit, 345 kV capable, steel pole transmission. The third section is the last mile of transmission into the Smoky Hill Substation and consists of approximately one mile of new 345 kV transmission line. The last section also will be built to allow for double-circuit, 345 kV capability.

Cost: Approximately $140 million.

Status: PSCo filed for regulatory approval in October 2007, which was approved in February 2009. This project is in progress with an expected in-service date of 2013. The Missile Site-Smokey Hill segment was completed on December 13, 2012. The Pawnee-Missile site line and substation are scheduled to be placed in-service at the end of the second quarter 2013.

Investment Partners: None.

Benefits: The line will accommodate additional electric generation in northeast Colorado, particularly wind energy, and ensure reliable delivery of power to customers. The project will allow 300-500 MWs of additional generation.

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 6,520 circuit miles of transmission lines.

Hitchland - Woodward 345 kV Transmission Line

Description: The Hitchland - Woodward 345 kV Transmission Line project consists of approximately 121 miles of new 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 additional generation outlet including renewable resources.
**Cost:** Approximately $226 million, of which approximately $48 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.

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**Tuco - Woodward District 345 kV Transmission Line**

**Description:** The Tuco - Woodward District 345 kV Transmission Line project consists of approximately 183 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 $319 million, of which approximately $185 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 10,000 miles and $26.5 billion of the total $51.1 billion in this report (nominal $).

- 500 kV Upgrade Project
- Benning Transmission Project
- Big Stone South to Ellendale
- CapX2020 Transmission Plan
- Cardinal Bluffs
- Energy Gateway
- Grand Rivers Projects
- Great Northern Transmission Line
- Greater Springfield Reliability Project
- Interstate Reliability Project
- KETA Project
- MidAmerican Energy Expansion Projects
- Midwest Portfolio Phase 1-7
- New England East - West Solutions (NEEWS)
- Northeast Energy Link
- Northern Pass Transmission Project
- PJM N-1-1 Projects (Southern Delmarva)
- Ritchie to Buzzard Point N-1-1 Compliance Project
- RITELine
- Rose Hill - Sooner 345 kV Transmission Line
- Sooner - Rose Hill 345 kV Line
- 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 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 13,300 miles of transmission with an accompanying investment cost of approximately $38.7 billion of the total $51.1 billion in this report (nominal $).

- 500 kV Upgrade Project
- Badger Coulee
- Big Stone South to Ellendale
- CapX2020 Transmission Plan
- Cardinal Bluffs
- Cimarron - Mathewson Double Circuit 345 kV Line
- Devers - Colorado River and Devers - Valley No. 2 Transmission Project
- Eldorado - Ivanpah Transmission Project
- Elk City - Gracemont 345 kV Line
- ETT CREZ
- G905 Generator Interconnection
- Grand Rivers Projects
- Great Northern Transmission Line
- Greater Fresno Area Upgrade Project
- Hitchland - Woodward 345 kV Transmission Line
- Hitchland - Woodward District EHV Double Circuit 345 kV Line
- Kansas V-Plan
- KETA Project
- Mathewson - Tatonga 2nd Circuit 345 kV Line
- Michigan Thumb Loop Transmission Project
- MidAmerican Energy Expansion Projects
- Midwest Portfolio Phase 1-7
- Multi-Value Projects 3 & 4
- 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
- Pioneer Transmission, LLC
- Prairie Wind Transmission, LLC
- RITELine
- San Joaquin Cross Valley Loop
- Sibley - Nebraska City 345 kV Transmission Line
- South of Devers
- South of Kramer
- Straits Flow Control
- Tehachapi Renewable Transmission Project
- Tehachapi Wind Energy Storage Project
- Tuco - Woodward District 345 kV Transmission Line
- 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
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 utilities are collaborating account for approximately 11,000 miles, representing a cost of approximately $29.1 billion of the total $51.1 billion in this report (nominal $).