



THE VALUE OF TRANSMISSION

A Report by Southwest Power Pool

Published January 26, 2016

ACKNOWLEDGEMENTS

This study was led by staff in SPP's Research, Development, and Special Studies Department and published by the Communications Department at the request of the SPP's Strategic Planning Committee. Its contents also reflect significant contributions from staff in SPP's Economic Studies, Market Support and Analysis, and Market Monitoring Departments. Their support was critical to the success of this effort and much appreciated.

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EXECUTIVE SUMMARY

Southwest Power Pool (SPP) has approved the construction of significant transmission expansion since becoming a Regional Transmission Organization (RTO) in 2004. In this report, SPP attempts to quantify the value of transmission expansion projects placed in service from 2012 through 2014. A portion of the value quantified in this report is captured from an analysis of the first year of operation of the Integrated Marketplace (IM) which began March 1, 2014. While many large projects installed in 2012-2014 were not in service at the launch of the IM, their value in the mid-to-late portion of 2014 are partially captured in this assessment and will continue into the future.

Traditional planning studies have previously projected economic benefits of future transmission expansion projects, but a study to quantify the *actual* benefits of major projects in SPP is needed to validate the conclusions and recommendations of prior planning studies.

From 2012 to 2014, SPP installed almost \$3.4 billion of transmission expansion projects. These include major Extra High Voltage (EHV) backbone projects approved with SPP's Balanced Portfolio and Priority Projects studies. While these costs are significant, their "bang for the buck" in creating an effective, efficient network in the SPP footprint is also noteworthy. SPP's actual costs to install EHV backbone facilities are roughly one-third the total cost of projects being built and installed by other transmission system operators during the same time period, according to EEI data.

This study determines production cost benefits realized during actual operations resulting from transmission expansion placed into service between 2012 and 2014. These production cost benefits were derived from operational models reflecting a subset of actual system conditions from March 2014 through February 2015. The estimated benefits of production cost savings are significant and higher than planning model projections. Based on actual experience during the Integrated Marketplace's first year, and excluding the full benefits of economically efficient interchange with neighbors, Adjusted Production Cost (APC) savings are calculated at

more than \$660,000 per day or \$240M per year. The net present value (NPV) of these APC benefits is expected to exceed \$10 billion over the next 40 years, which compares favorably to an NPV of the projects' costs of less than \$5 billion over the same period.

In addition to APC savings, this study also quantified benefits associated with reliability and resource adequacy, generation capacity cost savings, reduced transmission losses, increased wheeling revenues, and public policy benefits associated with optimal wind development. Some sources of additional value, which were either partially captured or excluded altogether, have not been quantified. These include environmental benefits, employment and economic development benefits, and other metrics like storm hardening and reduction in the costs of future transmission needs. The value of these benefits may be large – some even larger than those included in the study. All of these are shown in Appendix B.

Overall, the NPV of all quantified benefits for the evaluated projects, including production cost savings, are expected to exceed \$16.6 billion over the 40-year period, which results in a Benefit-to-Cost ratio of 3.5.

Following an independent assessment of the Value of Transmission study, the Brattle Group called it "a path-breaking effort" that "provides a more accurate estimate of the total benefits that a more robust and flexible transmission network delivers," concluded that the estimated present value of production cost savings are likely understated and recommended future study refinements. A letter from the Brattle Group with their comments regarding the study is presented on page 25 of this document.

BENEFITS
OF THESE
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A BENEFIT-
COST RATIO
OF 3.5



BACKGROUND

SPP staff, its members and stakeholders, and the bulk power industry as a whole have done much work to quantify the benefits of transmission. SPP has been a leader in doing so to justify economic expansion in its footprint. Typical metrics to determine the benefits of transmission expansion include: adjusted production cost savings, reliability and resource adequacy benefits and generation capacity cost savings, market benefits, environmental and public policy benefits, employment and economic stimulus benefits, and other project-specific benefits. However, transmission expansion provides other values in addition to those SPP is able to quantify.

Transmission enables and defines markets. Quantifying the benefits of bulk electric power transmission facilities is as much an art as a science. Planning studies have attempted to quantify the benefits of transmission, but actual system performance demonstrates that real world value provided by additional enabling infrastructure such as transmission is higher than what was originally projected.

While SPP members have approved billions of dollars of investment in transmission expansion to date, it's important that grid enhancements in SPP provide "bang for the buck" in a timely manner. The installed cost per mile of EHV transmission lines and substations in SPP are low compared to transmission facilities of similar design in other regions. More importantly, lead times for long linear projects like major EHV transmission lines crossing multiple jurisdictions can be problematic. SPP and its Transmission Owners have successfully gotten such projects placed in service, with a few exceptions, in noteworthy timeframes. The timely execution of approved plans is the best way to manage risks and uncertainties.

As an RTO, SPP has made significant transmission capacity additions using standard designs for EHV backbone facilities placed in service, both quickly and inexpensively compared to peers. In its most recent

*Transmission Projects: At A Glance*¹ report from March 2015, the Edison Electric Institute (EEI) documents major transmission projects which have been recently completed or are in the process of being implemented.

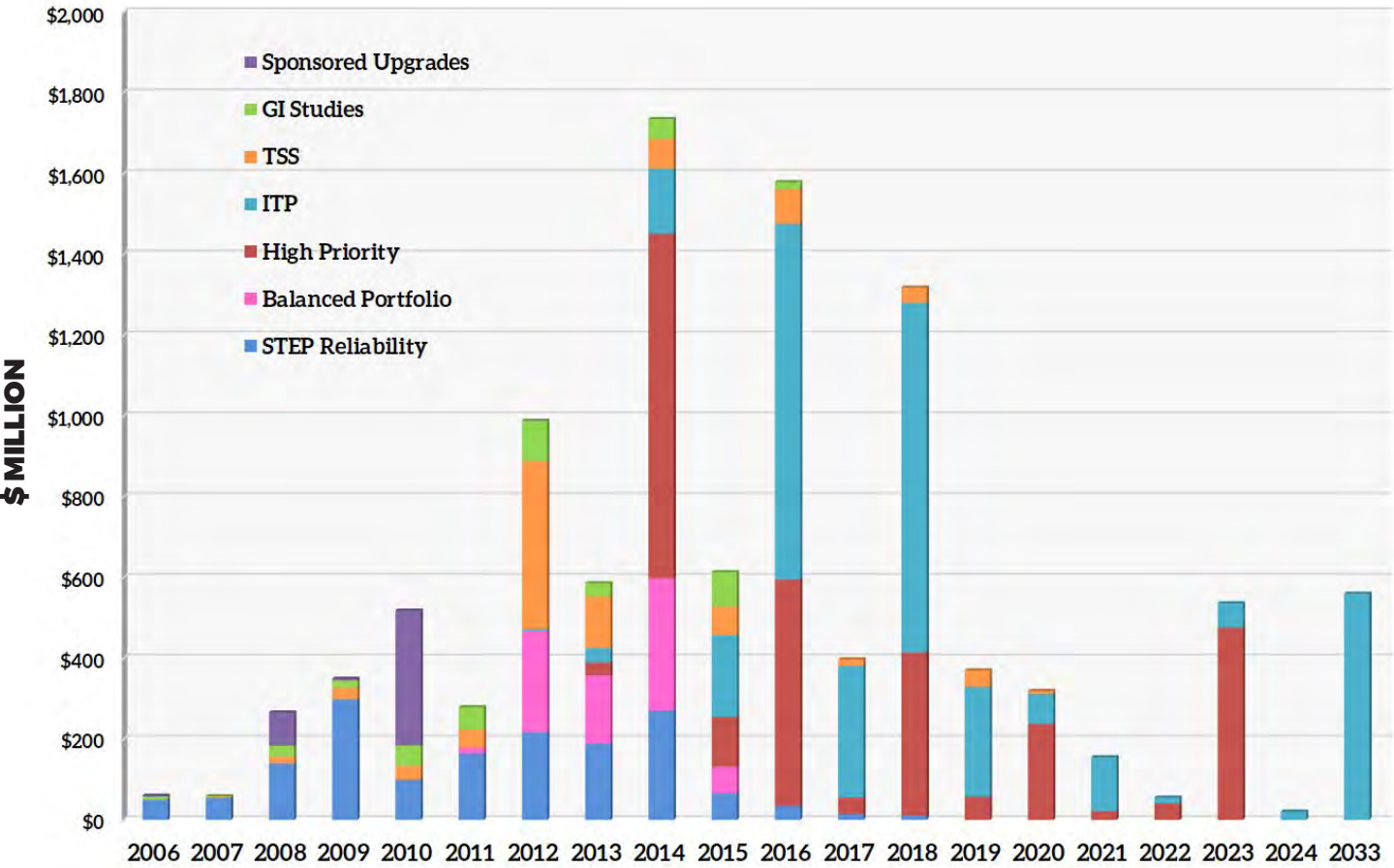
Looking at overhead 345 kV projects, EEI members expect to spend over \$10.4 billion for 23 projects representing 3,444 circuit miles of new transmission lines. Non-SPP 345 kV transmission projects among EEI members cost in excess of \$3M per circuit mile. In comparison, SPP's 345 kV Balanced Portfolio and Priority Projects installed in 2012-2014 represent an investment of \$1.64 billion, provided 1,536 circuit miles of new transmission, and cost just slightly more than \$1 million per circuit mile to construct.

Not only are SPP's actual 345 kV construction costs one-third of the cost of peer projects in the EEI report on a circuit mile basis, but SPP builds its EHV network with 3,000-Amp design standards. SPP builds for the future to create an efficient and effective EHV backbone network in the long-term.

Firm data regarding lead time for transmission expansion in SPP compared to other regions are not readily available, but some RTOs experience lead times of 10 years to plan, approve, design, route, permit and install their EHV projects. In contrast, the majority of the SPP Balanced Portfolio and Priority Projects have been placed in service in substantially less time: one factor that drives SPP's cost-per-mile of EHV transmission lower than its peers'.

1 Edison Electric Institute (March 2015), *Transmission Projects: At a Glance* http://www.eei.org/issuesandpolicy/transmission/Documents/Trans_Project_lowres_bookmarked.pdf

FIGURE 1: TOTAL INVESTMENT PER IN-SERVICE YEAR



Transmission expansion in SPP is shown in Figure 1 and Table 1.

The 345 kV projects considered in this assessment – those installed from 2012 through 2014 – represent more than 1,800 circuit miles of high-capacity backbone facilities that have been integrated into an effective bulk power network. They represent a more-than-25 percent increase in new 345 kV infrastructure, resulting in an improvement in network capability by at least 40 percent based on SPP’s approved design standards. Grid expansion in SPP positions us to address uncertainties and capture opportunities in the future and facilitates optimal network performance in the long-term as aging facilities get rebuilt. The SPP EHV overlay and subsequent Integrated Transmission Plan 20-Year Assessments (ITP20) create a visionary, evolutionary plan that moves us away from a “patchwork” grid and toward a more efficient, robust system able to support many potential futures.

It is difficult to monetize the value of enabling infrastructure, especially long-life assets in an industry which typically adjusts slowly to opportunities due to lead times of changes in portfolios, transactions, etc. New transmission is a lumpy investment and a long-life asset that works best as part of an efficient and effective grid that takes decades to plan, design, approve and install.

TABLE 1: TRANSMISSION INVESTMENTS (MILES AND COST) BY VOLTAGE

NEW LINES IN SPP: 2006-2014

Miles

| VOLTAGE | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | TOTAL |
|---------|------|------|------|-------|-------|-------|-------|-------|--------|--------|
| 69 | | 14.0 | 25.3 | 4.5 | | | | | 14.0 | 129.3 |
| 115 | | | | 8.7 | 47.4 | 130.0 | 23.0 | 3.7 | 135.5 | 486.9 |
| 138 | 30.0 | 30.0 | 27.0 | 13.5 | 29.0 | 16.5 | 50.7 | 44.9 | 37.2 | 339.5 |
| 161 | | 12.0 | | 8.0 | | 0.8 | | 14.9 | 9.0 | 44.7 |
| 230 | | | | 54.4 | | | 63.0 | 55.0 | 62.6 | 276.4 |
| 345 | | | 14.0 | 67.0 | 163.8 | | 527.7 | 118.0 | 1170.9 | 2092.3 |
| Total | 30.0 | 56.0 | 66.3 | 156.1 | 240.2 | 147.3 | 664.4 | 236.5 | 1429.2 | 3369.0 |

Cost

| VOLTAGE | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | TOTAL |
|---------|--------------|--------------|--------------|--------------|---------------|--------------|---------------|---------------|-----------------|-----------------|
| 69 | | \$9,320,377 | \$7,590,000 | | | | | | \$12,775,975 | \$113,833,739 |
| 115 | | | | \$2,632,405 | \$21,858,002 | \$82,167,931 | \$39,111,891 | \$13,379,401 | \$91,382,532 | \$352,782,211 |
| 138 | \$24,883,016 | \$24,560,016 | \$16,760,000 | \$17,440,000 | \$20,202,750 | \$11,988,400 | \$36,676,068 | \$42,152,931 | \$51,927,755 | \$291,182,457 |
| 161 | | \$9,842,225 | | | | | | \$27,154,374 | \$16,372,087 | \$53,368,686 |
| 230 | | | | \$21,688,257 | | | \$39,757,157 | \$40,215,864 | \$97,192,386 | \$257,361,437 |
| 345 | | | \$14,405,000 | | \$202,794,938 | | \$598,241,806 | \$165,000,000 | \$1,186,747,952 | \$2,173,865,627 |
| Total | \$24,883,016 | \$43,722,618 | \$38,755,000 | \$41,760,662 | \$244,855,690 | \$94,156,331 | \$713,786,922 | \$287,902,570 | \$1,456,398,687 | \$3,242,394,157 |

REBUILDS IN SPP: 2006-2014

Miles

| VOLTAGE | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | TOTAL |
|---------|------|------|------|-------|------|-------|-------|-------|-------|--------|
| 69 | 5.2 | 5.9 | 34.0 | 35.9 | 18.6 | 42.1 | 60.0 | 33.4 | 57.3 | 367.0 |
| 115 | | 1.5 | 29.2 | 55.3 | 26.4 | 31.2 | 44.0 | 80.1 | 50.1 | 317.7 |
| 138 | 13.7 | 0.2 | 4.8 | 16.5 | 20.3 | 68.9 | 1.8 | 86.5 | 33.2 | 258.8 |
| 161 | 2.0 | 20.7 | 14.7 | 45.4 | 12.0 | 33.9 | | 13.0 | 6.3 | 148.0 |
| 230 | | | | | | | | | | 0.0 |
| 345 | | | | | | | | | | 0.0 |
| Total | 20.9 | 28.3 | 82.7 | 153.1 | 77.2 | 176.0 | 105.8 | 213.0 | 146.7 | 1091.3 |

Cost

| VOLTAGE | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | TOTAL |
|---------|-------------|--------------|--------------|--------------|--------------|---------------|--------------|---------------|---------------|---------------|
| 69 | | \$8,322,741 | \$10,498,991 | \$14,848,800 | \$11,905,127 | \$23,247,319 | \$41,012,999 | \$23,460,579 | \$48,222,740 | \$237,450,481 |
| 115 | | \$3,094,877 | \$7,326,381 | \$13,773,487 | \$22,001,721 | \$18,652,609 | \$30,270,320 | \$32,412,034 | \$30,875,130 | \$158,406,558 |
| 138 | \$5,960,000 | \$85,105 | \$4,440,000 | \$13,192,530 | \$25,392,766 | \$66,096,701 | \$4,857,641 | \$47,572,321 | \$27,346,650 | \$208,310,029 |
| 161 | \$640,000 | \$7,625,399 | \$6,019,002 | \$35,810,637 | \$7,467,000 | \$13,756,472 | | \$6,782,380 | \$5,142,363 | \$83,243,253 |
| 230 | | | | | | | | | | \$0 |
| 345 | | | | | | | | | | \$0 |
| Total | \$6,600,000 | \$19,128,122 | \$28,284,374 | \$77,625,454 | \$66,766,614 | \$121,753,101 | \$76,140,961 | \$110,227,314 | \$111,586,883 | \$687,410,320 |

ALL OTHER PROJECTS
IN SPP: 2006-2014

Cost

| VOLTAGE | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | TOTAL |
|---------|-------------|--------------|--------------|---------------|--------------|--------------|---------------|---------------|---------------|-----------------|
| 69 | \$466,765 | \$969,408 | \$1,960,847 | \$2,693,587 | \$4,504,817 | \$2,595,970 | \$4,302,974 | \$2,508,753 | \$8,928,440 | \$36,466,282 |
| 115 | \$6,000,000 | \$5,613,830 | \$3,262,050 | \$126,175,946 | \$35,360,755 | \$19,234,043 | \$27,684,105 | \$35,855,634 | \$37,111,929 | \$362,235,177 |
| 138 | \$3,127,787 | \$6,008,142 | \$19,934,672 | \$10,223,518 | \$5,830,986 | \$9,106,223 | \$35,709,240 | \$66,788,412 | \$41,980,747 | \$239,818,819 |
| 161 | | \$2,894,854 | \$21,806,875 | \$31,394,877 | \$18,321,158 | \$13,397,980 | \$2,115,237 | \$10,185,312 | \$19,163,572 | \$119,279,866 |
| 230 | | \$10,073,312 | | \$26,906,550 | \$6,858,047 | \$9,329,355 | \$35,130,882 | \$32,222,848 | \$44,528,599 | \$206,685,667 |
| 345 | | \$8,852,316 | \$945,625 | \$15,173,000 | \$21,851,834 | \$21,300,052 | \$63,085,781 | \$42,330,439 | \$76,693,251 | \$366,735,044 |
| Total | \$9,594,553 | \$34,411,861 | \$47,910,069 | \$212,567,478 | \$92,727,597 | \$74,963,623 | \$168,028,219 | \$189,891,398 | \$228,406,539 | \$1,331,220,855 |

TOTAL PROJECTS
IN SPP: 2006-2014

Cost

| VOLTAGE | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | TOTAL |
|---------|--------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|-----------------|-----------------|
| 69 | \$466,765 | \$18,612,526 | \$20,049,838 | \$17,542,387 | \$16,409,944 | \$25,843,289 | \$45,315,974 | \$25,969,332 | \$69,927,155 | \$387,750,503 |
| 115 | \$6,000,000 | \$8,708,707 | \$10,588,431 | \$142,581,838 | \$79,220,478 | \$120,054,583 | \$97,066,317 | \$81,647,069 | \$159,369,591 | \$873,423,946 |
| 138 | \$33,970,803 | \$30,653,263 | \$41,134,672 | \$40,856,048 | \$51,426,502 | \$87,191,324 | \$77,242,949 | \$156,513,664 | \$121,255,152 | \$739,311,305 |
| 161 | \$640,000 | \$20,362,478 | \$27,825,877 | \$67,205,514 | \$25,788,158 | \$27,154,452 | \$2,115,237 | \$44,122,066 | \$40,678,022 | \$255,891,804 |
| 230 | | \$10,073,312 | | \$48,594,807 | \$6,858,047 | \$9,329,355 | \$74,888,039 | \$72,438,712 | \$141,720,985 | \$464,047,104 |
| 345 | | \$8,852,316 | \$15,350,625 | \$15,173,000 | \$224,646,772 | \$21,300,052 | \$661,327,587 | \$207,330,439 | \$1,263,441,203 | \$2,540,600,671 |
| Total | \$41,077,569 | \$97,262,601 | \$114,949,443 | \$331,953,593 | \$404,349,901 | \$290,873,055 | \$957,956,102 | \$588,021,282 | \$1,796,392,109 | \$5,261,025,333 |

SOUTHWEST POWER POOL, INC.

This engineering analysis is limited in its horizon and cases analyzed, only looking at the actual benefits for the Integrated Marketplace's (IM) first year of operation – March 2014 through February 2015 – for the 348 projects representing \$3.394 billion in investment, which were eligible for base plan funding and placed in service between 2012 and 2014. The 2012-2014 Portfolio of Projects evaluated in these 2014 simulations are shown in Appendix B to this study.

The Annual Transmission Revenue Requirement (ATRR) for these projects is approximately \$501 million per year at the beginning of 2015 and assumed to depreciate at 2.5% per year over the typical 40-year life of projects. Since many of these projects, especially several of the 345 kV Priority Projects, were installed in the second half of 2014, the actual ATRR going into 2014 is only \$316 million, comparable to the benefits quantified in the analyses. For example, the Woodward District EHV – Thistle and Thistle – Clark Co – Ironwood 345 kV projects were not installed until early-November and mid-December 2014, respectively, and only contributed benefits to SPP in terms of quantified production cost savings to a few of the actual 34 operational simulations used in this study.

The Thistle - Clark Co – Ironwood double-circuit 345 kV lines were the final segments of the Priority Projects in the central and south plains of KS, OK and TX which

facilitated effective integration of renewables and developed a robust network integrating western SPP into the existing EHV systems at Wichita and Oklahoma City. The benefits of the other 345 kV double-circuit Priority Projects in the central and south plains were not fully realized until mid-December 2014.

The benefits quantified in this study reflect average-study-year APC savings, compared to 2014 year-end costs.

While planning studies reflect perfect foresight and no uncertainty, actual system operations will see events due to human or mechanical issues and natural phenomena like weather fronts that create opportunities to improve the efficiency and overall effectiveness of grid operations that can only be captured with a robust transmission network. Such assumptions in modeling and analyses need to be considered in any valuation study. For example, SPP's projections of the Integrated Marketplace benefits were half of those actually realized during the market's first year. Similar adjustments would not be unreasonable in engineering analyses attempting to quantify the value of transmission using models.



ANALYSIS APPROACH

ADJUSTED PRODUCTION COST SAVINGS

REDUCED PRODUCTION COSTS DUE TO LOWER UNIT COMMITMENT, ECONOMIC DISPATCH, AND ECONOMICALLY EFFICIENT TRANSACTIONS WITH NEIGHBORING SYSTEMS

Actual operational models for the Integrated Marketplace's first year were used to quantify production cost impacts due to lower unit commitment and dispatch costs for SPP resources to serve SPP obligations in five highest production cost days and five lowest production cost days in each season.

The modeling results for those simulations that show production cost savings are shown in Table 2.

To determine annual production cost savings based on these daily actual operational models, SPP validated the model results prior to any extrapolation efforts. Of the 40 days simulated, the models were not able to solve in two days (results shown as N/A) and showed negative benefits in four days.

Operations staff found that a refined simulation would result in significant positive benefits in these six days if a local modeling issue was resolved. Hence, results with N/A and negative values were considered as outliers, thus not included in average daily savings calculations.

As a final note, these analyses focused on new projects and did not capture the incremental capacity associated with transmission rebuilds and transformer upgrades which did not affect system topology. These rebuilds and upgrades to existing facilities are important and provide value but are not incorporated into this analysis and savings calculation.

TABLE 2: PRODUCTION COST SAVINGS

| DATE | SEASON | HIGH/LOW PROD. COST DAY | TRANSMISSION VALUE |
|------------|--------|-------------------------|--------------------|
| 3/10/2014 | Winter | Low | 255,945 |
| 3/11/2014 | Winter | Low | (79,548) |
| 3/13/2014 | Winter | Low | 357,094 |
| 3/20/2014 | Winter | Low | 798,336 |
| 3/21/2014 | Winter | Low | 603,442 |
| 3/22/2014 | Spring | Low | N/A |
| 3/30/2014 | Spring | Low | 579,521 |
| 4/12/2014 | Spring | Low | 783,220 |
| 4/19/2014 | Spring | Low | 783,096 |
| 4/29/2014 | Spring | Low | 372,534 |
| 5/29/2014 | Spring | High | (122,468) |
| 5/30/2014 | Spring | High | 340,300 |
| 6/4/2014 | Spring | High | 609,492 |
| 6/5/2014 | Spring | High | 1,485,418 |
| 6/19/2014 | Spring | High | 917,044 |
| 6/27/2014 | Summer | Low | 575,763 |
| 7/4/2014 | Summer | Low | 968,855 |
| 7/22/2014 | Summer | High | 2,011,082 |
| 7/23/2014 | Summer | High | (409,467) |
| 8/18/2014 | Summer | High | 781,603 |
| 8/25/2014 | Summer | High | 1,107,308 |
| 8/26/2014 | Summer | High | 906,053 |
| 9/12/2014 | Summer | Low | 521,871 |
| 9/13/2014 | Summer | Low | 44,407 |
| 9/14/2014 | Summer | Low | 704,028 |
| 10/12/2014 | Fall | Low | 515,607 |
| 11/2/2014 | Fall | Low | N/A |
| 11/9/2014 | Fall | Low | 337,043 |
| 11/13/2014 | Fall | High | 988,642 |
| 11/19/2014 | Fall | High | 2,150,285 |
| 12/1/2014 | Fall | High | 475,844 |
| 12/3/2014 | Fall | High | 161,933 |
| 12/13/2014 | Fall | Low | 386,676 |
| 12/14/2014 | Fall | Low | 428,725 |
| 12/18/2014 | Fall | High | 175,688 |
| 1/1/2015 | Winter | High | 174,185 |
| 1/9/2015 | Winter | High | 383,485 |
| 1/13/2015 | Winter | High | 190,194 |
| 1/14/2015 | Winter | High | (254,537) |
| 2/27/2015 | Winter | High | 640,288 |

Table 3 displays the count of data points used to achieve simple average seasonal daily savings figures after removing outliers (i.e., those with N/A and negative results).

TABLE 3: NUMBER OF DATA POINTS

| # OF DATA POINTS | HIGH | LOW | TOTAL |
|------------------|-----------|-----------|-----------|
| Fall | 5 | 4 | 9 |
| Spring | 4 | 4 | 8 |
| Summer | 4 | 5 | 9 |
| Winter | 4 | 4 | 8 |
| TOTAL | 17 | 17 | 34 |

In this process, simple averages were calculated from the data in Table 2, as shown in Table 4.

TABLE 4: SIMPLE AVERAGES

| SEASON | HIGH | LOW |
|--|------------------|-----------|
| Fall | \$790,478 | \$417,013 |
| Spring | \$838,064 | \$629,593 |
| Summer | \$1,201,512 | \$562,985 |
| Winter | \$347,038 | \$503,704 |
| High/Low Simple Averages | \$794,273 | \$528,324 |
| ANNUAL AVERAGE DAILY SAVINGS (SIMPLE AVERAGE) | \$661,298 | |

A simple average of the production cost savings across each seasonal high and low production cost day indicates \$661,298 of daily benefits to SPP for the first year of the IM beginning in March 2014. In future studies, it may be desirable to simulate more than 40 days (including different types of days, such as high/average/low congestion days) to represent a full 12-month period and use a study period during which all of the evaluated transmission project would have been in service.

Extrapolating the average daily savings of \$661,298 per day to the first year of the Integrated Marketplace (March 2014 through February 2015) results in an Annual Production Cost Savings of \$241.3 million associated with the 2012-2014 transmission expansion projects in SPP.

Production cost savings can be expected to increase over time, particularly since the majority of the large EHV upgrades associated with the Balanced Portfolio

and Priority Projects were added in the latter half of the production cost simulations. The 2012-2014 EHV projects installed in SPP were arguably unprecedented in terms of long-term impacts to improve grid performance and capabilities. In the 2015 ITP10 study, the annual APC savings increased by 16.5 percent per year on average, based on the different study year models. In the most recent ITP20 study, the annual APC savings increased by 29.1 percent per year on average. For this analysis, we assume that production cost savings will escalate at a rate of 10 percent per year.

The growth of APC savings over time is driven by increasing load, additional generation, and higher fuel costs in future years, which combine to cause more congestion. Transmission system topology remains essentially unchanged, but load, generation, and fuel costs change significantly over the study horizons.

With load growth, inefficient gas resources are dispatched more frequently and system marginal costs grow, which increases APC at rates higher than forecasted natural gas prices. Natural gas prices are projected to increase at 3-7 percent per year in our models, which includes growth and inflation. While natural gas prices are projected to grow at rates higher than escalation, that factor by itself is not a significant driver of APC benefit growth compared to how load and generation changes, which can be expected over the study horizon.

Economic planning studies typically identify APC savings that include the impacts of power purchases and sales between the study region and its neighboring regions. In the SPP analyses performed by the Operations staff, power transactions were assumed to be constant between the two cases simulated (with and without projects). This approach understates the value of grid expansion with respect to opportunities to reduce capacity and energy costs for purchases from adjacent regions, as well as increased revenues associated with sales to adjacent regions. More specifically, typical APC values would include the impacts associated with the ability to purchase from more suppliers at a cheaper cost or sell to more buyers at a higher price. While not reflected in these modeling results, these impacts to transactions with adjacent systems can be attributed to more enabling infrastructure to market participants, which creates efficiencies and real benefits to wholesale and retail consumers.

Actual production cost savings are typically larger than those projected in planning simulations, which is consistent with analyses conducted by Brattle and others. Transmission capabilities are most valued in extreme market conditions and events which were not captured in planning analyses, but occur in actual system operations.

Weather events such as the Polar Vortex of 2014, which occurred prior to the IM and was not captured in this study horizon, resulted in unprecedented peak system demands while fuel supplies were disrupted and generating resources failed to operate due to extreme cold weather. The value provided by the interconnected transmission system during those extreme events is often much larger compared to normal conditions. The insurance value of additional transmission capability is difficult to quantify and has not been reflected in these analyses since the market simulations typically assume perfect foresight and the study period does not include any major extreme events.

Consumers also benefit from lower production costs resulting from transmission expansion projects. Southwestern Public Service/Xcel Energy announced in a news release on September 10, 2015:

Lower fuel and purchased power costs are leading Xcel Energy to refund \$18.6 million to Texas retail customers, a move driven by continued low natural gas costs and cheaper power imports into the Panhandle and South Plains made possible by new transmission line connections.

Beginning in November, Texas residential customers using 1,000 kilowatt-hours per month will see a one-time credit, prorated over two billing cycles for most customers, amounting to \$34.42.

David Hudson, president of Southwestern Public Service Company, an Xcel Energy company, said hundreds of millions of dollars have been invested in the transmission system, and new lines connecting Xcel Energy with the Southwest Power Pool have expanded the purchase of competitively priced power. In addition, natural gas prices remained very low through the first part of this year.

The company lowered its fuel and purchased power cost factors in March, which resulted in ongoing residential customer savings of \$7.

ADDITIONAL PRODUCTION COST SAVINGS

The Adjusted Production Cost estimates obtained from traditional planning studies fail to capture the full range of the production cost savings provided by transmission investments due to the simplified nature of the market simulations used in planning studies. For example, planning studies typically do not consider the effect of multiple, concurrent transmission outages, the impact of new transmission facilities on the annual transmission-related energy losses, or the fact that real-time loads and intermittent generation output is uncertain on a day-ahead basis. To capture these additional production cost savings in planning studies typically requires additional analysis. In contrast, SPP's methodology to estimate production cost savings based on the re-run of its entire day-ahead and real-time market fully or partially captures many of these benefits as summarized below.

(A) IMPACT OF GENERATION OUTAGES AND A/S UNIT DESIGNATIONS

SPP's methodology relies on the re-run of its day-ahead and real-time energy and ancillary services markets, including actual generation outages and generation capability used to provide ancillary service. As a result, this benefit has been captured in the APC savings which were quantified in this Value of Transmission assessment.

(B) REDUCED TRANSMISSION ENERGY LOSSES

SPP's market software fully considers hourly energy losses and how they are affected by the outage or addition of transmission facilities. As a result, this benefit (i.e., the extent to which new transmission facilities can reduce energy losses) has been captured in the APC savings which were quantified in this Value of Transmission assessment.

(C) REDUCED CONGESTION DUE TO TRANSMISSION OUTAGES

The Mitigation of Transmission Outages Costs metric for the ITP planning studies is not applicable since actual outages from the Control Room Operations Window (CROW) system have been included in these operational models and simulations. Despite this, actual outages in operations can be significant and can only be expected to increase in frequency and duration with aging infrastructure and more volatile and extreme weather

patterns. As a result, it is increasingly critical for SPP planning analyses to accurately forecast outages and capture the impacts of this metric in its plans.

The inability to accommodate necessary outages and costs of rebuilding aging transmission assets may warrant the installation of overlay facilities or accelerate the installation of major EHV projects to maintain an efficient and secure network as we create the future grid. With time and load growth, it is increasingly costly and difficult to accommodate necessary maintenance and rebuild outages of major transmission facilities.

(D) MITIGATION OF EXTREME EVENTS AND SYSTEM CONTINGENCIES

The SPP methodology selected five days with the highest production costs for each of the four seasons. To the extent that high production costs during selected days are the result of extreme events and unusually challenging system conditions, this benefit has been partially captured in the APC savings which were quantified in this Value of Transmission assessment. Note that none of the selected days included clearly-identified extreme weather or system conditions, such as those experienced during the 2014 Polar Vortex.

(E) MITIGATION OF WEATHER AND LOAD UNCERTAINTY

The SPP methodology selected 5 days with the highest production costs for each of the four seasons. To the extent that high production costs during selected days are the result of challenging weather conditions and load uncertainty (such as 90/10 peak load conditions), this benefit has been partially captured in the APC savings which were quantified in this Value of Transmission assessment. Note that the days analyzed were not specifically selected based on weather or load conditions. For example, additional benefits would likely be realized in situations such as during 90/10 peak load days or during a heat wave in the southeastern portion of SPP when the northwestern portions of SPP experience more moderate temperatures.

(F) REDUCED COST DUE TO IMPERFECT FORESIGHT OF REAL-TIME SYSTEM CONDITIONS

This metric has not been fully quantified in this assessment. Since the day-ahead market was simulated based on the day-ahead forecasts but the real-time

market was simulated based on actuals, this benefit would have been captured in the 40 days simulated.

(G) REDUCED COST OF CYCLING POWER PLANTS

This metric has been partially quantified in this assessment. To the extent that variable O&M expenses are reduced due to less cycling of generators as a result of the 2012 through 2014 projects being included in the 40 operational simulations, this benefit is captured. Increased wear and tear on generating units which results in accelerated equipment replacements and other capital expenditures have not been included in these assessments.

(H) REDUCED AMOUNTS AND COSTS OF OPERATING RESERVES AND OTHER ANCILLARY SERVICES

This metric has been partially quantified in this assessment. Operating reserve requirements were not changed in these simulations to capture the impact of increased transmission capabilities on operating requirements.

(I) MITIGATION OF RELIABILITY-MUST-RUN (RMR) CONDITIONS

This metric has not been quantified in this assessment.



OTHER METRICS

In addition to APC savings, SPP has identified other benefit metrics to quantify the value of transmission projects. Some have been monetized in past and existing ITP10 efforts. The approaches to calculate these metrics have been refined over time as the industry acquires knowledge, data, and tools to more accurately quantify the value of transmission assets. The full set of benefit metrics quantified in the most recent ITP10 study consisted of:

- APC Savings
 - Reduction of Emission Rates and Values
 - Savings Due to Lower Ancillary Service Needs and Production Costs
- Avoided or Delayed Reliability Projects
- Capacity Cost Savings Due to Reduced On-Peak Transmission Losses
- Assumed Benefit of Mandated Reliability Projects
- Benefit from Meeting Public Policy Goals (Public Policy Benefits)
- Mitigation of Transmission Outage Costs
- Increased Wheeling Through and Out Revenues
- Marginal Energy Losses Benefits

A few of those metrics are appropriate to monetize above APC savings in this Value of Transmission study. Some, like emission reductions and values to society, are difficult to monetize and therefore not quantified in this assessment. For this analysis, SPP is focusing on the following additional metrics.

RELIABILITY AND RESOURCE ADEQUACY BENEFITS

(A) BENEFITS OF MANDATED RELIABILITY PROJECTS

This metric reflects the reliability benefits of the transmission projects built to meet transmission reliability standards (i.e., classified as “Reliability Projects” by the ITP Manual). Consistent with the methodologies used in ITP10 and RCAR studies, such reliability benefits are assumed to be equal to the projects’ costs. The ATRR associated with the Reliability Projects installed in SPP from 2012 through 2014 is estimated to be \$231.4 million

in 2015 and then assumed to decline with depreciation over 40 years, which results in an NPV of \$2.166 billion.

Setting benefits equal to costs may underestimate the value of reliability benefits, since it implies that reliability standards are not cost effective. Stated another way, it effectively assumes that value of reliability-related costs incurred without reliability upgrades (not meeting reliability standards) is no higher than the cost of the facilities. In fact, the value of reliability can be significantly higher than costs of reliability upgrades. This was demonstrated by the August 2003 blackout, which has been estimated to cost society about \$6–\$10 billion² for that single event.

While the industry has struggled to develop a methodology to quantify benefits of grid reliability improvements through transmission expansion, it is important to note that Westar has reported a 40% reduction in transmission Customer Average Interruption Duration Index (CAIDI) and System Average Interruption Duration Index (SAIDI) associated with transmission expansion³, and the need to value enhanced grid security and resiliency.

While reliability metrics like CAIDI and SAIDI are critically important performance measures for distribution systems, and radial or normally-open loops for transmission and sub-transmission systems, these metrics are valuable in improving operational efficiencies with regards to optimal scheduling of maintenance outages for bulk power system networks. Shorter durations of outages for transmission facilities limit the risk and exposure of customers to outages and the reliability problems that result from them, as well as dispatch of emergency generators or curtailments of interruptible loads which can be costly.

Outages of aging infrastructure to inspect and replace components of transmission facilities will become increasingly necessary and more expensive with time. It’s no coincidence that FERC is proposing transmission

2 “Transforming the Grid to Revolutionize Electric Power in North America,” Bill Parks, U.S. Department of Energy, Edison Electric Institute’s Fall 2003 Transmission, Distribution and Metering Conference, October 13, 2003 and ICF Consulting, “The Economic Cost of the Blackout: An Issue Paper on the Northeastern Blackout, August 14, 2003.”

3 “SPP Board Update: Customer impact due to building a more integrated, efficient grid,” Westar Energy, June 8, 2015

investment metrics to help the bulk power industry quantify the value of major transmission projects.

(B) AVOIDED/DEFERRED RELIABILITY PROJECTS

This metric captures the reliability benefits of economic transmission projects based on the avoided cost of delaying or avoiding reliability projects. Resources were not available to remove Economic Projects in this 2012-2014 portfolio and determine reliability needs based on traditional N 1 overloads and voltage deficiencies. However, for this benefit metric, the results from a recent SPP staff analysis were used to estimate first-year benefits of \$14.9 million and 40-year NPV benefits of \$105 million associated with reliability projects that were avoided or deferred as a result of the Priority Projects.

(C) REDUCED LOSS OF LOAD PROBABILITY OR REDUCED PLANNING RESERVE MARGIN (2 PERCENT ASSUMED)

The long-term benefits of an efficient bulk power integration and delivery network are difficult to quantify but significant. The ability to lower planning reserve margins in a region is driven largely by resource and load diversity as well as the network's ability to accommodate outages, integrate resources and maintain system reliability and security above minimum standards.

The projects installed in 2012-2014 represent a substantial portion of the new EHV backbone facilities that have been approved since SPP became an RTO. Lower planning reserve margins can be attributed to significant transmission expansion, as well as market enhancements and organic footprint growth, providing more diversity. This diversity will improve system performance and result in lower loss of load probabilities, as well as loss of load expectations, in SPP. Lower reserve margins within SPP will occur primarily due to 2012-2014 transmission projects evaluated in this study.

Using ITP10 assumptions and reasonable engineering judgment, it can be demonstrated that each percent decrease in planning reserve margins in SPP are worth approximately \$50 million per year in reduced costs. Reducing reserve margins by one percent in SPP, approximately a 50 GW system, would lower capacity

needs by 500 MW. Marginal capacity costs are estimated to be \$81.9/kW-yr in ITP10 based on the Net Cost of New Entry (CONE) for a gas-fired combustion turbine (CT).

So as to not overstate the reserve margin impacts associated with the noted transmission expansion projects, the benefits of a two-percent reduction in SPP's planning reserve margin for this Value of Transmission study is based on the methodology used in the ITP10, which only considers the avoided capacity costs of new resources, and not other related costs to integrate or support the capacity resource additions. As a result, this Value of Transmission study only reflects \$94.5 million in cost savings starting in 2017. Those benefits are included in the quantified reliability metrics, along with mandated reliability project benefits and avoided/deferred reliability projects.

The 40-year NPV of benefits associated with a two-percent reduction in planning reserve margins starting in 2017 is estimated to be \$1.354 billion assuming that the annual savings would grow at an inflation of 2.5% per year.

GENERATION CAPACITY COST SAVINGS

(A) CAPACITY COST BENEFITS FROM REDUCED ON-PEAK TRANSMISSION LOSSES

While lower unit commitment and energy dispatch costs are captured in production cost simulations and APC savings, the addition of new transmission capacity could also improve the overall system efficiency by reducing system losses. Such reduction in losses during on-peak hours provide capacity cost savings due to lower generation capacity needed. These benefits are captured in this assessment based on the analysis of actual 2014 system peak hour, which occurred on July 22, 2014.

The Operational model simulations showed that the addition of the transmission projects built in 2012-2014 has reduced SPP's system losses by 43 MW during the 2014 system peak hour. Using ITP-approved calculations and assumptions, the capacity cost savings from reduced on-peak losses for the 2012-2014 portfolio of projects is estimated to be about \$4 million per year, which is then

escalated at 5% per year over time. The 40-year NPV of these capacity cost benefits is \$92 million.

(B) DEFERRED GENERATION CAPACITY INVESTMENTS

This metric has not been quantified in this assessment. A more robust transmission grid may allow utilities to defer generation capacity investment by relying on market purchases of generation capacity in other zones (or even outside the SPP footprint) that are made deliverable by the transmission upgrades. SPP staff has not analyzed the extent to which this benefit is realized by the evaluated portfolio.

(C) ACCESS TO LOWER-COST GENERATION RESOURCES

This metric has only been partially captured in this assessment. To the extent that the transmission upgrades have allowed wind generation to be located in lower-cost/higher-capacity-factor locations, that benefit has been captured in the analysis of Public Policy Benefits below. Not included are the extent to which the more robust transmission grid allows conventional generating plants to be built in lower-cost locations (e.g., at locations with lower-cost sites or access to lower-cost fuel supply).

MARKET BENEFITS

A more robust transmission grid reduces transmission congestion and allows more suppliers and buyers to reach the available trading locations. The associated increase in competition and market liquidity offers a wide range of benefits, such as reduced bid-ask spreads of bilateral transactions, reduced price and deliverability risks associated with market transactions, and the availability and forward-horizon of financial hedging products (such as forwards and futures).

(A) INCREASED COMPETITION

This metric has not been quantified in this assessment.

(B) INCREASED MARKET LIQUIDITY

This metric has not been quantified in this assessment.

OTHER BENEFITS

(A) STORM HARDENING

This metric has not been quantified in this assessment. The focus on grid resiliency and need for effective system restoration plans are predicated on risk management of long lead time components of the bulk power system, like EHV autotransformers. This is becoming increasingly important with aging infrastructure and the difficulties in taking outages to rebuild/replace existing assets which are key elements of the bulk power network.

(B) FUEL DIVERSITY

This metric has not been fully quantified in this assessment. Some benefits of fuel diversity may have been partially captured to the extent that fuel diversity in the integrated footprint was enhanced as a result of the transmission expansion projects installed from 2012 through 2014.

(C) SYSTEM FLEXIBILITY

This metric has not been fully quantified in this assessment. Some benefits of increased system flexibility may have been partially captured to the extent that system flexibility in the integrated footprint was enhanced as a result of the transmission expansion projects installed from 2012 through 2014.

(D) REDUCING THE COSTS OF FUTURE TRANSMISSION NEEDS

This metric has not been quantified in this assessment. The extent to which the transmission upgrades evaluated avoided or reduced the costs of future transmission upgrades has not been captured.

(E) INCREASED WHEELING REVENUES

Additional long-term firm transmission reservations for exports from SPP have been enabled by the 2012-2014 portfolio of projects evaluated in this study. In the past several years, SPP has approved about 800 MW of long-term firm transmission exports which provided \$100 million of additional annual wheeling revenues to offset wholesale transmission costs.

Leveraging prior analyses from SPP staff and applying those results to the specifics of this assessment, SPP

estimated that the annual wheeling revenues associated with these projects during the first year of the IM would be \$43.3 million with a 40-year NPV value of \$1.133 billion. The \$43.3 million annual benefit is based on MW of Firm PTP Transmission Service sold and revenues based on Schedules 7 and 11 of the SPP OATT. This credit is shown as the “wheeling” benefits in the Value of Transmission study.

Pricing of export services in SPP needs to reflect the true cost of those services, which should include appropriate contributions to offset a portion of major system enhancements. Many of these large, high-capacity projects in the 2012-2014 portfolio enable those transactions.

(F) HVDC OPERATIONAL BENEFITS

This metric is not applicable to SPP at this time, although substantial opportunities to upgrade, rightsize and potentially bypass existing HVDC ties between SPP and our neighboring systems in the Western Electricity Coordinating Council (WECC) and ERCOT, will be facilitated to a large extent by the substantial EHV network capabilities that have been installed in SPP from 2012 through 2014.

ENVIRONMENTAL BENEFITS

(A) REDUCED EMISSIONS OF AIR POLLUTANTS

This metric has not been quantified in this assessment. However, the 2012-2014 transmission portfolio has facilitated emissions reduction by (a) reducing or entirely eliminating curtailment of wind resources and (b) the development and integration of additional renewable resources.

(B) IMPROVED UTILIZATION OF TRANSMISSION CORRIDORS

This metric has not been quantified in this assessment. It is likely, however, that large, high-capacity transmission projects in the 2012-2014 portfolio utilize transmission corridors more effectively than smaller, incremental upgrades that would be required over time.

PUBLIC POLICY BENEFITS

(A) OPTIMAL WIND GENERATION DEVELOPMENT

The benefits of enabling renewable resource development have not been captured to a large extent in this study. Transmission is necessary and very effective in integrating renewable resources and creating value for these resources across the broad geographic footprint of SPP. The Integrated Marketplace, with its Consolidated Balancing Authority (CBA), helped with the integration of renewable resources, which was realized as a result of installed, enabling infrastructure.

In retrospect, 187 MW of new wind farms installed in 2014 would not have been interconnected to SPP absent the evaluated transmission projects. New wind farms are projected to cost \$1400/kW per year based on Lazard estimates being used in the ITP10. The avoided or opportunity costs, as well as economic development and jobs associated with those projects, which represent almost a direct investment of \$300 million in SPP, are large and do not count multiplier impacts for indirect benefits. None of these impacts have been quantified or included in the benefits portions of this analysis.

Operational analyses have been used to project the amount of wind curtailments avoided, based on an average of 255 MW of wind curtailments without the noted transmission expansion projects. Without considering energy value and the impact on lower market prices, 2.2 million MWh of wind curtailments annually equates to \$30-60 million in lost revenue to developers/generators in terms of Production Tax Credits (PTCs), etc. The actual value of lost wind production to developers/generators are driven by federal, state and local programs and data to identify specific costs and are not available from the analyses performed. While this lost revenue does not provide a direct benefit to consumers like other metrics, it does improve the bottom line to resource providers and can be expected to translate into lower costs to consumers in the long run since all costs and revenues to producers will ultimately be seen over time by consumers in an efficient market.

A robust system also enables the effective integration and delivery of renewables across a broad geographic area. SPP is blessed with high quality wind and solar renewable resources. The diversity of those resources increases their aggregate capacity contribution, which

is additional value that SPP's efficient and effective transmission network provides to our members and customers. Other ISO/RTOs have attempted to quantify the benefits of transmission expansion to allow members and customers access to higher quality renewable resources. Although the Balanced Portfolio and Priority Projects installed in 2012 through 2014 have enabled the integration of higher quality renewables to SPP customers, the associated incremental value has not been fully monetized in this assessment.

For the purposes of this study, the optimal wind development benefits are quantified as the avoided wind investment and local transmission costs. Estimating that the transmission expansion during 2012-2014 has enabled the development of approximately 5,000 MW of higher quality wind resources with an improvement in capacity factor, SPP staff estimated the avoided wind investment costs to be about \$22 million per year, which equates to an NPV of \$285 million over 40 years. Additionally, the 2012-2014 projects also help avoid the higher local transmission costs that would have been necessary to integrate wind resources located closer to the buyers' load centers. At an estimated cost of \$180/kW-wind, the avoided local transmission cost benefit is estimated at \$77 million per year, which equates to an NPV of \$998 million over 40 years.

(B) OTHER BENEFITS OF MEETING PUBLIC POLICY GOALS

This metric has not been quantified in this assessment. For example, it is expected that a more robust transmission system created by the portfolio of transmission upgrades evaluated in this study will reduce the compliance cost related to the future implementation of new environmental regulations (such as EPA's Clean Power Plan).

EMPLOYMENT AND ECONOMIC DEVELOPMENT BENEFITS

(A) INCREASED EMPLOYMENT AND ECONOMIC ACTIVITY; INCREASED TAX REVENUES

This metric has not been quantified in this assessment. SPP and others have attempted to quantify these benefits in the past. These benefits can be large, particularly considering the high-quality, renewable generation developed in the central and south plains of the United States, enabled by SPP's Balanced Portfolio and Priority Projects. SPP has not monetized the value of increased employment and economic activity or increased tax revenues associated with investment in excess of \$3.4 billion from 2012 through 2014 for transmission infrastructure in SPP.

Appendix B summarizes the metrics and quantified benefits in terms of NPV for the SPP transmission expansion projects placed in service over the period 2012 through 2014 based on the first full year of the Integrated Marketplace from March 2014 through February 2015.

SUMMARY

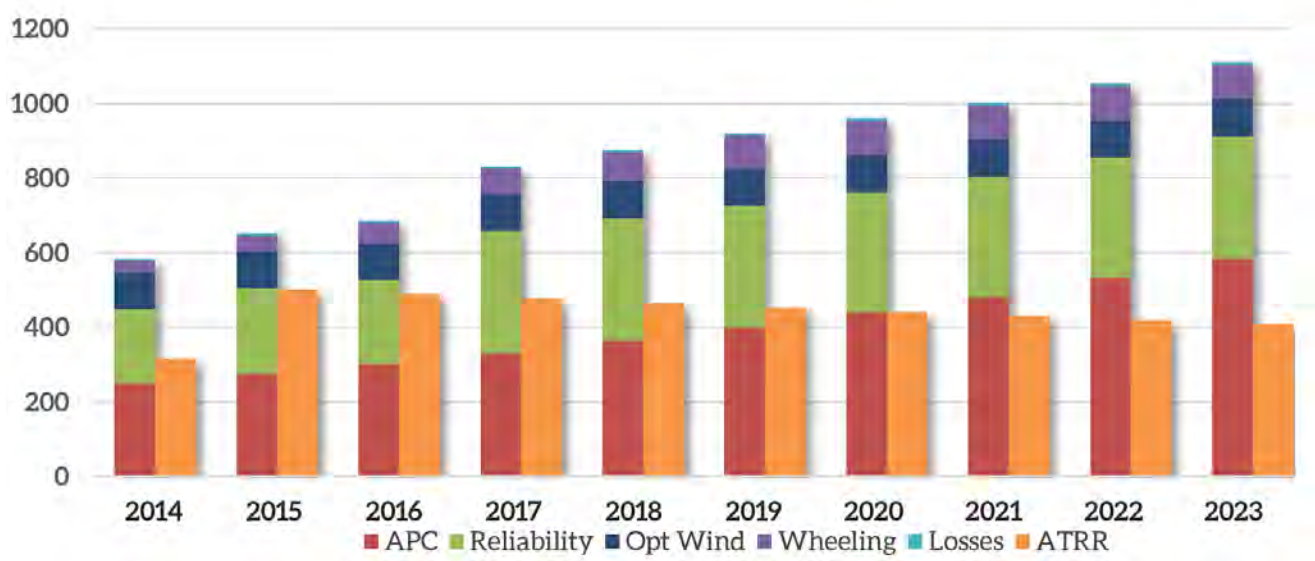
The quantified benefits as part of this Value of Transmission assessment for SPP transmission expansion projects installed from 2012 through 2014 based on the first year of the Integrated Marketplace are summarized in Table 5 and Figure 2 (in millions of nominal year dollars). Note that the benefits shown only capture metrics that have been quantified in this assessment.

Based on this analysis and quantified metrics, Net Present Value (NPV) benefits are substantial. This study contemplated a 40- year planning horizon with an eight-percent discount rate. Based on actual operations in the first year of SPP's Integrated Marketplace and using conservative approaches and assumptions, these projects are expected to provide a benefit-cost ratio of 3.5 to 1.

TABLE 5: VALUE OF TRANSMISSION BASED ON QUANTIFIED BENEFITS*

| YEAR | APC | RELIABILITY | WHEELING | ON-PEAK LOSSES | OPTIMAL WIND | TOTAL VALUE | COSTS ATRR |
|------|-------|-------------|----------|----------------|--------------|-------------|------------|
| 2014 | 241.4 | 199.9 | 31.3 | 4.0 | 99.0 | 575.6 | 316.4 |
| 2015 | 265.5 | 231.4 | 43.3 | 4.1 | 99.0 | 643.3 | 501.3 |
| 2016 | 292.1 | 225.6 | 55.3 | 4.4 | 99.0 | 676.4 | 488.8 |
| 2017 | 321.3 | 328.3 | 67.3 | 4.6 | 99.0 | 820.4 | 476.6 |
| 2018 | 353.4 | 328.4 | 79.2 | 4.8 | 99.0 | 864.8 | 464.6 |
| 2019 | 388.7 | 325.6 | 91.2 | 5.0 | 99.0 | 909.6 | 453.0 |
| 2020 | 427.6 | 323.0 | 91.5 | 5.3 | 99.0 | 946.4 | 441.7 |
| 2021 | 470.4 | 320.6 | 91.7 | 5.6 | 99.0 | 987.3 | 430.7 |
| 2022 | 517.4 | 323.6 | 92.0 | 5.8 | 99.0 | 1,037.8 | 419.9 |
| 2023 | 569.1 | 326.8 | 92.3 | 6.1 | 99.0 | 1,093.3 | 409.4 |

FIGURE 2: QUANTIFIED BENEFITS* AND COSTS FOR 2014-2023



* Conservative benefits reflect average APC savings compared to year-end costs.

TABLE 6: NET PRESENT VALUE (NPV) OF STUDY METRICS

| METRIC* | NPV (\$M) |
|---------------------------|-----------|
| APC | 10,470 |
| Reliability - Mandated | 2,166 |
| Reliability - 2% RM | 1,354 |
| Reliability - Avoided/Def | 105 |
| Losses | 92 |
| Wheeling | 1,133 |
| Opt Wind | 1,283 |
| | ----- |
| Quantified Benefits | 16,603 |
| Cost (ATRR) | 4,751 |
| | |
| B/C | 3.5 |

* Conservative benefits using quantified metrics and average APC savings compared to year-end costs.

Escalation and discount rates have a major impact on NPVs. A 2.5 percent escalation rate and an eight-percent discount rate have typically been used by SPP in performing calculations for long-term planning studies, and have been incorporated in this analysis.

Some would argue that EHV transmission is a long-term, enabling infrastructure that provides public good and should be assessed at a lower “societal” discount rate, which would be in the range of 3-5 percent per year. Applying a societal discount rate to the portfolio of transmission projects would significantly increase the B/C ratio shown above.

TRANSMISSION BENEFITS BEYOND THE QUANTIFIED METRICS ARE SIGNIFICANT

In the recent WIRES-sponsored Brattle Group report: *Toward More Effective Transmission Planning: Addressing the Costs and Risks of an Insufficiently Flexible Electricity Grid*⁴, the authors noted that one of

the three deficiencies that expose markets to higher risks and overall costs is that “planners and policy makers do not consider the full range of benefits that transmission investments can provide and thus understate the expected value of such projects.”

EHV grid expansion, which results from coordinated transmission planning in SPP, is partially responsible for footprint expansion. The KETA 345 kV line was the best solution for Kansas renewable development and became part of the Balanced Portfolio, which facilitated organic growth of the SPP footprint to include the Nebraska entities in 2009.

Transmission is a multi-faceted asset in that it not only improves grid security and system reliability but also facilitates more efficient operations and maintenance of the network and power supply assets. This effectively integrates and enhances the value of renewable resources and provides optionality for the future grid, which faces a myriad of uncertainties. The Tuco – Yoakum – Hobbs 345 kV project in High Priority Incremental Load Study (HPILS) not only improved the design and lowered the costs of a previously approved ITP solution, but also will facilitate the effective integration of the best solar resources in the entire Eastern Interconnection.

Transmission planning at SPP has been very effective to date. Although existing transmission planning processes are agile and transparent, continuous improvements are expected as a result of the efforts of the Transmission Planning Improvement Task Force (TPITF).

Aging infrastructure and the ability to accommodate transmission outages without adversely impacting grid operational efficiencies is a challenge with least-cost incremental planning based on pristine models. This value will increase significantly with time.

The benefits of grid expansion are cumulative and cannot be captured in incremental, snap-shot analyses. Standardization for backbone facilities and development of an efficient network will create significant benefits in reduced reserve margins over broad footprints with diverse resources and needs. The ability to effectively address supply adequacy needs is critically dependent upon network design and capabilities.

4 Pfeifenberger, J., Change, J., and Sheilendranath, A. (2015). *The Brattle Group: Toward More Effective Transmission Planning: Addressing the Costs and Risks of an Insufficiently Flexible Electricity Grid*.

SOUTHWEST POWER POOL, INC.

Planning a cost effective and reliable bulk power integration and delivery system in advance of implementing market mechanisms to capture efficiencies is a critical success factor. This is especially true for long-life infrastructure projects which provide optionality for resource planning decisions. Others have struggled to expand transmission capabilities after markets were placed in service.

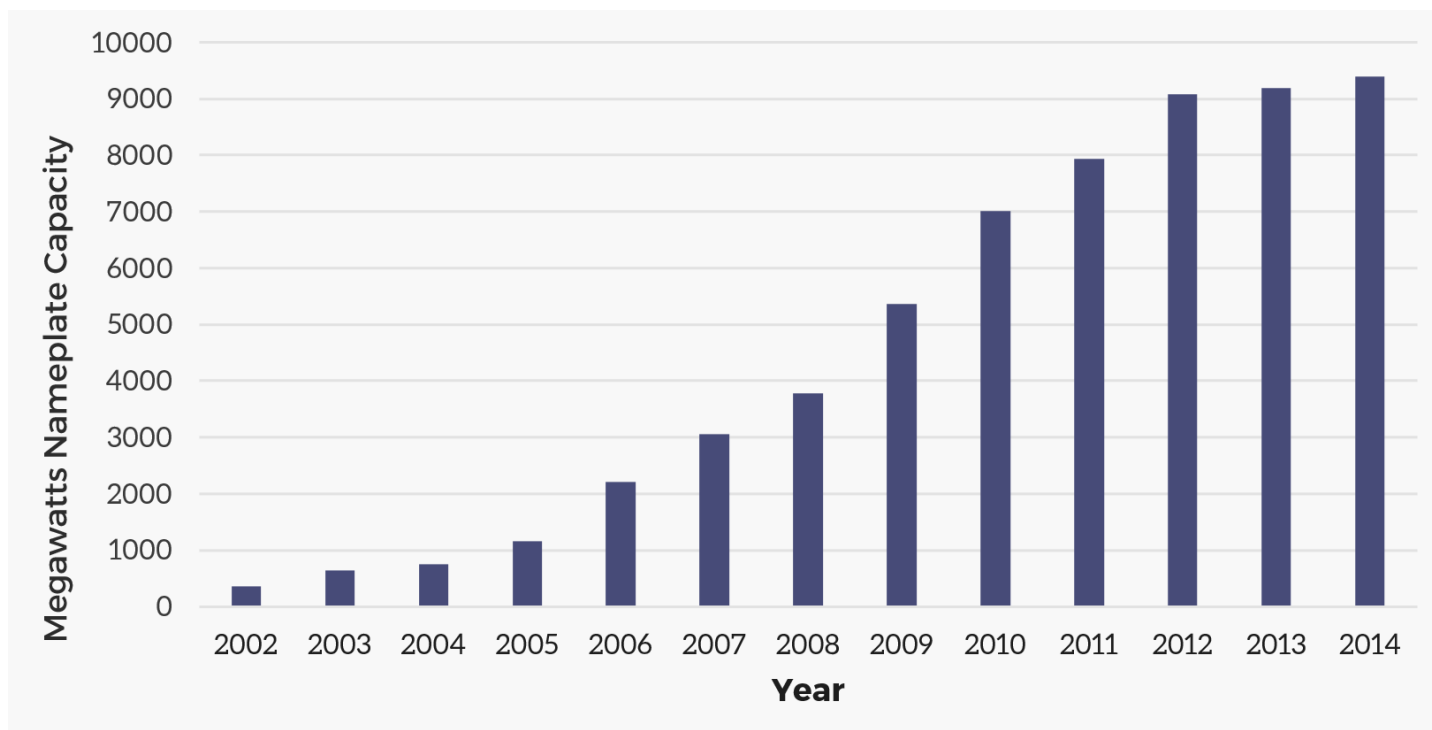
The success of the South Central Electric Companies (SCEC) in the early 1960s is important to note because it demonstrated how utilities could go beyond joint planning to the installation of EHV backbone facilities based on common design standards which lowered costs and facilitated maintenance and outage restoration. The SCEC built a 500 and 345 kV EHV network to support 1,500MW of seasonal diversity exchanges between the winter peaking TVA system with SPP members in AR, LA, OK, KS, MO and TX that were summer peaking. The SCEC facilities became the backbone for many utilities, not just a way to share diverse capacity and energy among neighboring systems, but also to enable tremendous economies of scope and scale and timely integration of new resource additions in the 1970s and beyond. Those 500 and 345 kV facilities provide tremendous value to current and future customers and will continue to be invaluable for many decades to come.

The magnitude of transmission facilities which will require rebuilds in the next twenty years is unknown. While significant rebuilds of 69-161 kV facilities have been accomplished since 2006 (as shown in Table 1), SPP has yet to experience the need to rebuild EHV facilities. Projects like the Wichita – Reno Co – Summit 345 kV expansion by Westar in central Kansas have been facilitated to a large extent by the need to rebuild aging 115 kV and 138 kV facilities and the ability to accommodate EHV expansion using double circuit towers in the existing rights-of-way.

The Integrated Marketplace in SPP has lowered operating costs and reserve requirements for its members as a result of enabling infrastructure and market rules, which are predicated on adequate transmission capability.

While lower losses and improved system efficiencies due to transmission expansion can be monetized in terms of unit commitment, system dispatch and off-system transactions, SPP has not quantified the environmental benefits of improved operations or the more effective integration of renewables in SPP for consumption, both within the SPP footprint and to support transfers to neighboring systems.

The environmental, public policy, and employment and economic stimulus benefits of transmission expansion projects can be large. The benefits of renewable developments and the resulting environmental benefits in SPP are hard to quantify for consumption within the footprint. Recently, renewable developments in SPP are being made to support exports to adjacent systems which are predicated on adequate transmission capacity to support deliveries. Pricing of transmission service needs to assign appropriate portions of backbone system facilities that are required to accommodate effective and efficient deliveries to adjacent systems.

FIGURE 3: WIND ADDITIONS IN SPP

Cumulative wind developments within SPP are shown in Figure 3.

Although 2015 data is not shown in Figure 3, significant wind resources are being installed in SPP in 2015 with minimal incremental transmission expansion beyond the projects completed in 2012 through 2014. SPP's experience shows that transmission expansion enables development of the best wind resources, and one would expect the same for solar resources in the future, as witnessed by recent Generation Interconnection (GI) queue developments.

Economies of scale are expected to persist for renewable resources. Larger scale wind and solar projects are cheaper, have greater potential and higher capacity factors, and account for the majority of installed renewable generating capacity in the US and globally. Transmission is effective at integrating variable resources to smooth out natural variability. Connecting diverse resources over large regions slashes variability, which reduces the need for more expensive resources like storage and fast-start generation.

Seams are critical and focus at SPP will need to evolve beyond managing interfaces and transmission expansion with AECI, MISO and other neighbors in the Eastern Interconnection. Opportunities with ERCOT, WestConnect and Canadian provincial utilities need to be addressed given aging infrastructure near the seams and future upgrades and system reconfigurations that may make sense in terms of improving system economics and reliability.

Joint planning studies like the proposed 2016-2017 DOE-funded and NREL-led effort to access and optimize the existing Back-to-Back HVDC stations between the Eastern Interconnection and the Western Electricity Coordinating Council are timely and critically important in effective joint planning of the bulk power system in the heartland of North America. The flexibility and optionality provided by transmission capabilities between the eastern and western grids, particularly considering the opportunity to leverage new technologies and controls, needs to be considered to effectively address challenges like the EPA's Clean Power Plan.

CONCLUSIONS

Transmission enables and defines markets. Transmission, unlike other assets in the bulk power system, provides system flexibility and optionality which improves operating efficiencies. Transmission expansion also provides other benefits to grid operations and planning, though metrics are difficult to quantify.

The actual benefits for transmission assets, similar to market benefits, exceed planning model projections due to assumptions used in those simulations. Uncertainties and volatility in real world operations increase system costs and the value of transmission. Extreme market conditions and weather events demonstrate the tremendous value that enabling infrastructure like transmission provides.

The benefits quantified for these 2012-2014 transmission expansion projects, based on the first year of the SPP

Integrated Marketplace, are significant and expected to grow in the near-term as large, high-capacity 345 kV projects from the Balanced Portfolio and Priority Projects were placed in service in the latter half of these simulations. The net present value savings and benefit-to-cost ratio for these 2012-2014 projects in SPP, based on operational analyses for the period March 1, 2014 through February 2015, are large, despite the fact that the benefits of those large, backbone EHV network upgrades were not fully captured.

Major transmission expansion is versatile and facilitates efficient resource planning and economic transfers that are very difficult, if not impossible, to forecast in advance. Transmission expansion is key to maximizing value and maintaining system flexibility when one must plan and address uncertainties.



BRATTLE GROUP LETTER

“THE SPP VALUE OF TRANSMISSION STUDY IS A PATH-BREAKING EFFORT. IT PROVIDES A MORE ACCURATE ESTIMATE OF THE TOTAL BENEFITS THAT A MORE ROBUST AND FLEXIBLE TRANSMISSION INFRASTRUCTURE PROVIDES TO POWER MARKETS, MARKET PARTICIPANTS AND, ULTIMATELY, RETAIL ELECTRIC CUSTOMERS.”

- JOHANNES PFEIFENBERGER, JUDY CHANG AND ONUR AYDIN

The Brattle Group performed an independent assessment of this SPP study and provided the letter enclosed on the following pages. Brattle noted that the SPP study provided a more accurate estimate of the total benefits that a more robust and flexible transmission network delivers. In addition to recommendations regarding future study refinements, Brattle concludes that estimate present value of the production cost savings are likely to be understated.

December 30, 2015

Mr. Jay Caspary
Director, R&D and Special Studies
Southwest Power Pool
201 Worthen Drive
Little Rock AR 72223-4936

Re: SPP Value of Transmission Study

Dear Jay:

Thank you for giving us the opportunity to review the “Value of Transmission” report and the associated PowerPoint summary presentation prepared by SPP staff in December 2015. The SPP study attempts to quantify the overall value provided by SPP transmission projects placed in service during 2012-2014. Based on our review of the final drafts of your study and several prior rounds of discussions in response to earlier drafts, we are pleased to provide the following comments:

- The SPP Value of Transmission study is a path-breaking effort. It provides a more accurate estimate of the total benefits that a more robust and flexible transmission infrastructure provides to power markets, market participants and, ultimately, retail electric customers.
- Relying on a full “re-run” of SPP’s day-ahead and real-time markets without the evaluated transmission projects for 40 representative days during the first year of operation of SPP’s Integrated Marketplace and comparing the re-run results to actual market results (which include the evaluated transmission projects after they were placed in service) yields a more complete and more accurate estimate of the production cost savings provided by the evaluated projects than the savings estimated in traditional planning studies.
- The estimated present value of the production cost savings in the SPP study likely is understated because: (a) many of major transmission projects evaluated were not yet in service during most of the 40 days that were analyzed; (b) the selected representative days did not include a full spectrum challenging system conditions (such as extreme weather or generation/transmission outage events) that must be expected to occur over the long service life of the evaluated transmission projects; and (c) based on the experience from other SPP transmission benefit studies, the growth rate of the quantified production cost savings may exceed the assumed annual rate of 10% per year.
- The methodologies applied by SPP staff to quantify the range of other transmission-related benefits are consistent with the methodologies applied in the ITP and RCAR evaluation process. Where deviations from the ITP and RCAR processes exist (e.g., in the estimation of public policy benefits), the methodologies applied are reasonable and represent best available industry practice.

For future Value of Transmission studies, we also offer the following recommendations for further consideration:

- Reassess the selection of the typical days used to approximate each season of a study period. For example, in addition to highest and lowest production cost days, more reliable annual estimates might be obtained if (a subset of) the selected days also included a few average production cost days, or represented a combination of highest/lowest/average load days, highest/lowest/average market-price days, or highest/lowest/average congestion-cost days. Additional research would be necessary to establish which combination of typical days would most accurately capture the value of transmission for an entire study period.
- Select a study period which starts after all of the evaluated projects have been placed in service to ensure that the production cost analysis captures the benefit of the entire portfolio in each of the representative days simulated.
- Analyze the actual annual rates at which the production cost savings estimated for the study period are growing over time.
- Refine the methodologies used to estimate public policy benefits and wheeling revenue offsets to more accurately capture the benefits specifically attributable to the portfolio of transmission projects evaluated.
- Quantify the transmission-related benefits that are qualitatively discussed in the report as data and methodologies to estimate the value of those benefits become available. Some of the benefits discussed but not quantified are likely to provide significant additional value. Examples are “insurance” benefits that: (a) reduce the risks of high-cost outcomes during challenging system conditions (such as extreme weather or generation/transmission outage events), or (b) facilitate lower-cost options to address challenging future market conditions (such as those encountered under uncertain but plausible future environmental compliance scenarios).

We appreciate the opportunity to provide these comments on the Value of Transmission study, which we believe is a path-breaking effort that provides a more accurate estimate of the benefits that a more robust and flexible transmission infrastructure provides to power markets, its participants, and retail electric customers.

Sincerely,



Johannes Pfeifenberger
Principal



Judy Chang
Principal



Onur Aydin
Senior Associate

APPENDIX A: ACRONYMS

| ACRONYM | DESCRIPTION |
|---------|---|
| APC | Adjusted production cost |
| ATRR | Annual Transmission Revenue Requirement |
| CAIDI | Customer average interruption duration index. CAIDI is a measure of duration that provides the average amount of time a customer is without power per interruption. |
| CMTF | Capacity Margin Task Force |
| CONE | Cost of new entry |
| CPP | Clean Power Plan |
| CROW | Control Room Operations Window software |
| CT | Current transformer |
| EEI | Edison Electric Institute |
| EHV | Extra high voltage |
| FERC | Federal Energy Regulatory Commission |
| HPILS | High Priority Incremental Loads Study |
| ITP | Integrated Transmission Plan |
| ITP10 | ITP 10-Year Assessment |
| ITP20 | ITP 20-Year Assessment |
| MISO | Midcontinent Independent System Operator |
| MVP | Multi-value project |
| NYISO | New York Independent System Operator |
| PTC | Production Tax Credit |
| REC | Renewable Energy Credit |
| RPS | Renewable Portfolio Standards |
| RTO | Regional Transmission Organization |
| SAIDI | System average interruption duration index. SAIDI is a measure of duration. It measures the number of minutes over the year that the average customer is without power. |
| SCEC | South Central Electric Companies |
| SONGS | SDG&E's Steam Generator Replacement Project |
| SDG&E | San Diego Gas & Electric |
| SPP | Southwest Power Pool |
| TVA | Tennessee Valley Authority |

APPENDIX B:

Projected NPV of SPP Transmission Projects Installed in 2012-14, Based on the First Year of SPP's Integrated Marketplace (Mar 2014 - Feb 2015)

| BENEFIT CATEGORY | TRANSMISSION BENEFIT | NPV (\$M) |
|---|--|-----------------|
| Adjusted Production Cost Savings | Reduced production costs due to lower unit commitment, economic dispatch, and economically efficient transactions with neighboring systems | 10,442* |
| 1. Additional Production Cost Savings ** | a. Impact of generation outages and A/S unit designations | INCLUDED |
| | b. Reduced transmission energy losses | INCLUDED |
| | c. Reduced congestion due to transmission outages | INCLUDED |
| | d. Mitigation of extreme events and system contingencies | PARTIAL |
| | e. Mitigation of weather and load uncertainty | PARTIAL |
| | f. Reduced cost due to imperfect foresight of real-time system conditions | INCLUDED |
| | g. Reduced cost of cycling power plants | PARTIAL |
| | h. Reduced amounts and costs of operating reserves and other ancillary services | PARTIAL |
| | i. Mitigation of reliability-must-run (RMR) conditions | N/Q |
| | j. More realistic "Day 1" market representation | N/Q |
| 2. Reliability and Resource Adequacy Benefits | a. Avoided/deferred reliability projects | 105 |
| | b. Reduced loss of load probability or c. reduced planning reserve margin (2% assumed) | 1,354 |
| | d. Mandated reliability projects | 2,166 |
| 3. Generation Capacity Cost Savings | a. Capacity cost benefits from reduced peak energy losses | 171 |
| | b. Deferred generation capacity investments | N/Q |
| | c. Access to lower-cost generation resources | PARTIAL |
| 4. Market Benefits | a. increased competition | N/Q |
| | b. Increased market liquidity | N/Q |
| 5. Other Benefits | a. storm hardening | N/Q |
| | b. fuel diversity | N/Q |
| | c. flexibility | N/Q |
| | d. reducing the costs of future transmission needs | N/Q |
| | e. wheeling revenues | 1,133 |
| | f. HVDC operational benefits | N/A |
| 6. Environmental Benefits | a. Reduced emissions of air pollutants | N/Q |
| | b. Improved utilization of transmission corridors | N/Q |
| 7. Public Policy Benefits | a. Optimal wind development | 1,283 |
| 8. Employment and Economic Development Benefits | b. Other benefits of meeting public policy goals | N/Q |
| | Increased employment and economic activity; Increased tax revenues | N/Q |
| | TOTAL | 16,670 + |

* Benefits limited to SPP footprint since transactions with neighbors fixed

**Partially captured since APC savings based on 40 days and did not include weather events like polar vortex, increased capital investments for rebuilds to address wear and tear impacts beyond in variable O&M, etc.

APPENDIX C: INCLUDED TRANSMISSION PROJECTS

| UPGRADE ID | PROJECT NAME | REL/ ECO | TYPE | IN-SERVICE DATE | BEST COST | 1-YEAR COST | PRORATED COST 2014 | 3/1/14 - 2/28/15 | PRORATED COST 2015 | INFLATED COST | 40-YEAR NPV |
|------------|--|----------|----------------------------|-----------------|---------------|--------------|--------------------|------------------|--------------------|---------------|---------------|
| 10927 | Line - Sooner - Cleveland 345 kV (GRDA) | E | Balanced Portfolio | 1/31/13 | \$3,718,139 | \$1,020,328 | \$1,020,328 | \$1,020,328 | \$1,020,328 | \$3,627,453 | \$9,012,312 |
| 10929 | Line - Sooner - Cleveland 345 kV (OGE) | E | Balanced Portfolio | 12/31/12 | \$46,000,000 | \$5,845,866 | \$5,845,866 | \$5,845,866 | \$5,845,866 | \$43,783,462 | \$49,768,061 |
| 10930 | Line - Seminole - Muskogee 345 kV | E | Balanced Portfolio | 12/31/13 | \$165,000,000 | \$21,493,088 | \$21,493,088 | \$21,493,088 | \$21,493,088 | \$160,975,610 | \$189,843,221 |
| 10932 | Multi - Tuco - Woodward 345 kV (OGE) | E | Balanced Portfolio | 5/19/14 | \$115,000,000 | \$15,354,532 | \$9,533,308 | \$12,022,092 | \$15,354,532 | \$115,000,000 | \$140,547,378 |
| 10933 | Multi - Tuco - Woodward 345 kV (OGE) | E | Balanced Portfolio | 5/19/14 | | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 10934 | Tap - Swissvale - Stillwell | E | Balanced Portfolio | 1/31/13 | \$2,866,604 | \$546,695 | \$546,695 | \$546,695 | \$546,695 | \$2,796,687 | \$4,828,821 |
| 10936 | Multi - Tuco - Woodward 345 kV (SPS) | E | Balanced Portfolio | 9/30/14 | \$192,875,814 | \$24,652,394 | \$6,230,825 | \$10,226,680 | \$24,652,394 | \$192,875,814 | \$225,655,156 |
| 10937 | Multi - Tuco - Woodward 345 kV (OGE) | E | Balanced Portfolio | 5/19/14 | | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 10938 | Tap Anadarko - Washita 138 kV line into Gracemont 345 kV | E | Balanced Portfolio | 10/12/12 | \$1,136,240 | \$197,264 | \$197,264 | \$197,264 | \$197,264 | \$1,081,489 | \$1,679,380 |
| 10940 | Multi - Axtell - Post Rock - Spearville 345 kV | E | Balanced Portfolio | 6/18/12 | \$79,171,915 | \$17,613,648 | \$17,613,648 | \$17,613,648 | \$17,613,648 | \$75,356,968 | \$149,951,630 |
| 10941 | Multi - Axtell - Post Rock - Spearville 345 kV | E | Balanced Portfolio | 6/18/12 | \$6,138,472 | \$1,365,647 | \$1,365,647 | \$1,365,647 | \$1,365,647 | \$5,842,686 | \$11,626,268 |
| 10942 | Line - Axtell - Kansas Border 345 kV (NPPD) | E | Balanced Portfolio | 12/10/12 | \$55,559,673 | \$6,171,746 | \$6,171,746 | \$6,171,746 | \$6,171,746 | \$52,882,497 | \$52,542,399 |
| 10943 | Multi - Axtell - Post Rock - Spearville 345 kV | E | Balanced Portfolio | 12/15/2012 | \$62,906,085 | \$13,994,933 | \$13,994,933 | \$13,994,933 | \$13,994,933 | \$59,874,917 | \$119,144,143 |
| 11085 | Multi - Tuco - Woodward 345 kV (SPS) | E | Balanced Portfolio | 6/2/2014 | \$12,550,762 | \$1,604,174 | \$934,299 | \$1,194,316 | \$1,604,174 | \$12,550,762 | \$14,683,770 |
| 10296 | Line - Turk - SE Texarkana - 138 kV | X | Generation Interconnection | 3/12/2012 | \$26,565,750 | \$3,363,691 | \$3,363,691 | \$3,363,691 | \$3,363,691 | \$25,285,663 | \$28,636,374 |
| 50459 | SUB - PAWNEE 138 KV | X | Generation Interconnection | 10/3/2014 | \$2,500,000 | \$703,199 | \$171,936 | \$285,916 | \$703,199 | \$2,500,000 | \$6,436,716 |

| UPGRADE ID | PROJECT NAME | REL/ ECO | TYPE | IN-SERVICE DATE | BEST COST | 1-YEAR COST | PRORATED COST 2014 | 3/1/14 - 2/28/15 | PRORATED COST 2015 | INFLATED COST | 40-YEAR NPV |
|------------|--|----------|----------------------------|-----------------|--------------|-------------|--------------------|------------------|--------------------|---------------|--------------|
| 50460 | LINE - FAIRFAX - PAWNEE 138 KV | X | Generation Interconnection | 10/14/2014 | \$11,900,000 | \$3,347,227 | \$717,263 | \$1,259,808 | \$3,347,227 | \$11,900,000 | \$30,638,769 |
| 50461 | SUB - SHIDLER 138KV OG&E Osage Sub work | X | Generation Interconnection | 4/30/2014 | \$399,000 | \$53,078 | \$35,726 | \$44,329 | \$53,078 | \$399,000 | \$485,848 |
| 50462 | Line - Washita - Gracemont 138 kv ckt 2 | X | Generation Interconnection | 10/12/2012 | \$4,740,546 | \$823,011 | \$823,011 | \$823,011 | \$823,011 | \$4,512,120 | \$7,006,600 |
| 50463 | SUB - SLICK HILLS 138KV | X | Generation Interconnection | 2/1/2012 | \$1,500,000 | \$260,416 | \$260,416 | \$260,416 | \$260,416 | \$1,427,722 | \$2,217,023 |
| 50464 | MULTI - RICE - CIRCLE 230KV CONVERSION | X | Generation Interconnection | 11/7/2012 | \$10,225,261 | \$1,348,228 | \$1,348,228 | \$1,348,228 | \$1,348,228 | \$9,732,551 | \$11,477,971 |
| 50465 | MULTI - RICE - CIRCLE 230KV CONVERSION | X | Generation Interconnection | 11/29/2012 | \$5,373,496 | \$723,986 | \$723,986 | \$723,986 | \$723,986 | \$5,114,571 | \$6,163,568 |
| 50466 | LINE - RICE COUNTY - LYONS 115KV | X | Generation Interconnection | 4/1/2013 | \$3,245,758 | \$438,661 | \$438,661 | \$438,661 | \$438,661 | \$3,166,593 | \$3,874,584 |
| 50467 | MULTI - RICE - CIRCLE 230KV CONVERSION | X | Generation Interconnection | 10/1/2012 | \$2,473,404 | \$326,125 | \$326,125 | \$326,125 | \$326,125 | \$2,354,222 | \$2,776,424 |
| 50508 | SUB - POI for GEN-2008-079 (Crooked Creek 115kV) | X | Generation Interconnection | 10/2/2012 | \$665,522 | \$148,061 | \$148,061 | \$148,061 | \$148,061 | \$633,453 | \$1,260,499 |
| 50511 | Sub - Wheatland 115 kV | X | Generation Interconnection | 12/31/2012 | \$80,326 | \$10,591 | \$10,591 | \$10,591 | \$10,591 | \$76,455 | \$90,167 |
| 50562 | Line(s) - Harrington - Nichols 230kV DBL CKT | X | Generation Interconnection | 12/1/2012 | \$1,142,058 | \$138,938 | \$138,938 | \$138,938 | \$138,938 | \$1,087,027 | \$1,182,834 |
| 50614 | Sub - POI for GEN-2012-001 | X | Generation Interconnection | 12/20/2012 | \$7,316,677 | \$890,118 | \$890,118 | \$890,118 | \$890,118 | \$6,964,119 | \$7,577,909 |
| 50617 | Sub - Lopez 115kV | X | Generation Interconnection | 2/8/2013 | \$151,581 | \$18,902 | \$18,902 | \$18,902 | \$18,902 | \$147,884 | \$166,955 |
| 50646 | SUB - SHIDLER 138KV OG&E Osage Sub work | X | Generation Interconnection | 7/1/2014 | \$399,300 | \$53,314 | \$26,803 | \$35,445 | \$53,314 | \$399,300 | \$488,005 |
| 50664 | Sub - Spearville 345kV GEN-2005-012 Addition | X | Generation Interconnection | 6/1/2012 | \$2,903,000 | \$695,193 | \$695,193 | \$695,193 | \$695,193 | \$2,763,117 | \$5,918,443 |

| UPGRADE ID | PROJECT NAME | REL/ ECO | TYPE | IN-SERVICE DATE | BEST COST | 1-YEAR COST | PRORATED COST 2014 | 3/1/14 - 2/28/15 | PRORATED COST 2015 | INFLATED COST | 40-YEAR NPV |
|------------|---|----------|----------------------------|-----------------|-------------|-------------|--------------------|------------------|--------------------|---------------|--------------|
| 50667 | Sub - Sweetwater 230kV GEN-2006-035 Addition | X | Generation Interconnection | 10/5/2012 | \$624,000 | \$79,009 | \$79,009 | \$79,009 | \$79,009 | \$593,932 | \$672,637 |
| 50670 | Sub - Viola 345kV | X | Generation Interconnection | 6/1/2012 | \$9,567,558 | \$1,289,064 | \$1,289,064 | \$1,289,064 | \$1,289,064 | \$9,106,539 | \$10,974,289 |
| 50671 | Sub - Buckner 345kV | X | Generation Interconnection | 4/10/2012 | \$5,395,772 | \$1,292,148 | \$1,292,148 | \$1,292,148 | \$1,292,148 | \$5,135,773 | \$11,000,540 |
| 50674 | Sub - Hunter 345kV | X | Generation Interconnection | 9/26/2012 | \$8,226,915 | \$1,045,510 | \$1,045,510 | \$1,045,510 | \$1,045,510 | \$7,830,496 | \$8,900,818 |
| 50676 | Line(s) - Harrington - Nichols 230kV DBL CKT | X | Generation Interconnection | 12/1/2012 | \$1,142,058 | \$138,938 | \$138,938 | \$138,938 | \$138,938 | \$1,087,027 | \$1,182,834 |
| 50677 | Sub - Potter County 345kV GEN-2008-051 Addition | X | Generation Interconnection | 5/1/2012 | \$3,005,283 | \$365,611 | \$365,611 | \$365,611 | \$365,611 | \$2,860,472 | \$3,112,582 |
| 50678 | Sub - Deer Creek - Sinclair 69kV Ckt 1 | X | Generation Interconnection | 10/1/2012 | \$2,079,212 | \$264,235 | \$264,235 | \$264,235 | \$264,235 | \$1,979,024 | \$2,249,529 |
| 50679 | Sub - Viola 345kV GEN-2010-005 Addition | X | Generation Interconnection | 10/1/2012 | \$26,000 | \$3,503 | \$3,503 | \$3,503 | \$3,503 | \$24,747 | \$29,823 |
| 50681 | Sub - Buckner 345kV GEN-2010-009 Addition | X | Generation Interconnection | 9/15/2012 | \$570,131 | \$136,532 | \$136,532 | \$136,532 | \$136,532 | \$542,659 | \$1,162,345 |
| 50682 | Sub - Cimarron 345kV GEN-2010-040 Addition | X | Generation Interconnection | 12/31/2012 | \$4,516,234 | \$573,941 | \$573,941 | \$573,941 | \$573,941 | \$4,298,617 | \$4,886,179 |
| 50683 | Sub - Minco 345kV GEN-2011-010 Addition | X | Generation Interconnection | 8/30/2012 | \$2,554,395 | \$324,623 | \$324,623 | \$324,623 | \$324,623 | \$2,431,310 | \$2,763,637 |
| 50684 | Sub - Lopez 115kV | X | Generation Interconnection | 2/15/2013 | \$3,371,204 | \$420,380 | \$420,380 | \$420,380 | \$420,380 | \$3,288,980 | \$3,713,118 |
| 50685 | Sub - POI for GEN-2012-001 | X | Generation Interconnection | 12/20/2012 | \$7,086,677 | \$862,137 | \$862,137 | \$862,137 | \$862,137 | \$6,745,201 | \$7,339,697 |
| 50686 | Sub - Petersburg North 115kV | X | Generation Interconnection | 11/9/2012 | \$450,000 | \$49,987 | \$49,987 | \$49,987 | \$49,987 | \$428,316 | \$425,562 |
| 50687 | Sub - Petersburg North 115kV | X | Generation Interconnection | 11/9/2012 | \$450,000 | \$49,987 | \$49,987 | \$49,987 | \$49,987 | \$428,316 | \$425,562 |

| UPGRADE ID | PROJECT NAME | REL/ ECO | TYPE | IN-SERVICE DATE | BEST COST | 1-YEAR COST | PRORATED COST 2014 | 3/1/14 - 2/28/15 | PRORATED COST 2015 | INFLATED COST | 40-YEAR NPV |
|------------|--|----------|----------------------------|-----------------|---------------|--------------|--------------------|------------------|--------------------|---------------|---------------|
| 50751 | SUB - Finney 345kV GEN-2008-018 Addition | X | Generation Interconnection | 11/2/2013 | \$2,252,249 | \$280,850 | \$280,850 | \$280,850 | \$280,850 | \$2,197,316 | \$2,480,677 |
| 51009 | Sub - Steele City 115kV GEN-2011-018 Addition | X | Generation Interconnection | 11/15/2013 | \$200,000 | \$22,772 | \$22,772 | \$22,772 | \$22,772 | \$195,122 | \$201,140 |
| 51010 | Sub - Jones 230kV GEN-2011-045 Addition | X | Generation Interconnection | 2/15/2013 | \$1,957,010 | \$244,034 | \$244,034 | \$244,034 | \$244,034 | \$1,909,278 | \$2,155,494 |
| 51011 | Sub - Mustang 230kV GEN-2011-048 Addition | X | Generation Interconnection | 11/26/2012 | \$878,667 | \$106,895 | \$106,895 | \$106,895 | \$106,895 | \$836,328 | \$910,039 |
| 51012 | Sub - Rubart 115kV | X | Generation Interconnection | 11/15/2013 | \$11,209,762 | \$2,751,559 | \$2,751,559 | \$2,751,559 | \$2,751,559 | \$10,936,353 | \$24,303,848 |
| 51023 | Sub - Tatonga 345kV GEN-2007-021 Addition | X | Generation Interconnection | 11/1/2014 | \$1,973,375 | \$263,480 | \$43,431 | \$86,138 | \$263,480 | \$1,973,375 | \$2,411,762 |
| 51024 | Sub - Tatonga 345kV GEN-2007-044 Addition | X | Generation Interconnection | 10/1/2014 | \$1,973,375 | \$263,480 | \$65,870 | \$108,577 | \$263,480 | \$1,973,375 | \$2,411,762 |
| 51038 | Sub - Beaver County 345kV Substation | X | Generation Interconnection | 9/29/2014 | \$15,744,936 | \$2,102,227 | \$537,107 | \$877,853 | \$2,102,227 | \$15,744,936 | \$19,242,691 |
| 51041 | Sub - Madison County 230kV Substation | X | Generation Interconnection | 12/23/2013 | \$1,450,000 | \$165,097 | \$165,097 | \$165,097 | \$165,097 | \$1,414,634 | \$1,458,265 |
| 51042 | Sub - Madison County 230kV Substation | X | Generation Interconnection | 12/23/2013 | \$1,450,000 | \$165,097 | \$165,097 | \$165,097 | \$165,097 | \$1,414,634 | \$1,458,265 |
| 51043 | Sub - Madison County 230kV Substation | X | Generation Interconnection | 12/23/2013 | \$5,900,000 | \$671,776 | \$671,776 | \$671,776 | \$671,776 | \$5,756,098 | \$5,933,630 |
| 11241 | Multi - Hitchland - Woodward 345 kV (SPS) | E | High Priority | 5/1/2014 | | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 11242 | Multi - Hitchland - Woodward 345 kV (SPS) | E | High Priority | 5/1/2014 | \$56,479,846 | \$7,218,963 | \$4,839,085 | \$6,009,192 | \$7,218,963 | \$56,479,846 | \$66,078,624 |
| 11243 | Multi - Hitchland - Woodward 345 kV (SPS) | R | High Priority | 5/1/2014 | \$4,723,219 | \$603,698 | \$404,676 | \$502,528 | \$603,698 | \$4,723,219 | \$5,525,932 |
| 11244 | Line - Hitchland - Woodward 345 kV dbl Ckt (OGE) | E | High Priority | 5/16/2014 | \$168,000,000 | \$22,430,969 | \$14,111,791 | \$17,747,580 | \$22,430,969 | \$168,000,000 | \$205,321,387 |

| UPGRADE ID | PROJECT NAME | REL/ ECO | TYPE | IN-SERVICE DATE | BEST COST | 1-YEAR COST | PRORATED COST 2014 | 3/1/14 - 2/28/15 | PRORATED COST 2015 | INFLATED COST | 40-YEAR NPV |
|------------|---|----------|---------------|-----------------|---------------|--------------|--------------------|------------------|--------------------|---------------|---------------|
| 11245 | Line - Hitchland - Woodward 345 kV dbl Ckt (OGE) | E | High Priority | 5/16/2014 | | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 11246 | Line - Thistle - Woodward 345 kV dbl Ckt (OGE) | E | High Priority | 11/4/2014 | \$142,040,000 | \$18,964,850 | \$2,969,770 | \$6,043,743 | \$18,964,850 | \$142,040,000 | \$173,594,344 |
| 11247 | Line - Thistle - Woodward 345 kV dbl Ckt (OGE) | E | High Priority | 11/4/2014 | | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 11248 | Line - Thistle - Woodward 345 kV dbl Ckt (PW) | E | High Priority | 11/4/2014 | \$22,610,000 | \$5,284,774 | \$827,561 | \$1,684,159 | \$5,284,774 | \$22,610,000 | \$48,374,069 |
| 11249 | Line - Thistle - Woodward 345 kV dbl Ckt (PW) | E | High Priority | 11/4/2014 | \$22,610,000 | \$5,284,774 | \$827,561 | \$1,684,159 | \$5,284,774 | \$22,610,000 | \$48,374,069 |
| 11252 | Multi - Spearville - Ironwood - Clark Co. - Thistle 345 kV Double Circuit | E | High Priority | 12/17/2014 | \$50,565,144 | \$11,818,902 | \$454,573 | \$2,370,274 | \$11,818,902 | \$50,565,144 | \$108,184,067 |
| 11253 | Multi - Spearville - Ironwood - Clark Co. - Thistle 345 kV Double Circuit | E | High Priority | 12/17/2014 | \$50,565,144 | \$11,818,902 | \$454,573 | \$2,370,274 | \$11,818,902 | \$50,565,144 | \$108,184,067 |
| 11254 | Multi - Spearville - Ironwood - Clark Co. - Thistle 345 kV Double Circuit | E | High Priority | 12/17/2014 | \$91,618,023 | \$21,414,444 | \$823,632 | \$4,294,655 | \$21,414,444 | \$91,618,023 | \$196,016,654 |
| 11255 | Multi - Spearville - Ironwood - Clark Co. - Thistle 345 kV Double Circuit | E | High Priority | 12/17/2014 | \$91,618,023 | \$21,414,444 | \$823,632 | \$4,294,655 | \$21,414,444 | \$91,618,023 | \$196,016,654 |
| 11258 | Line - Thistle - Wichita 345 kV dbl Ckt | E | High Priority | 5/19/2014 | \$58,140,000 | \$13,589,420 | \$8,437,387 | \$10,640,068 | \$13,589,420 | \$58,140,000 | \$124,390,463 |
| 11259 | Line - Thistle - Wichita 345 kV dbl Ckt | E | High Priority | 5/19/2014 | \$58,140,000 | \$13,589,420 | \$8,437,387 | \$10,640,068 | \$13,589,420 | \$58,140,000 | \$124,390,463 |
| 11260 | Multi - Spearville - Ironwood - Clark Co. - Thistle 345 kV Double Circuit | E | High Priority | 12/17/2014 | \$6,284,694 | \$1,468,960 | \$56,498 | \$294,599 | \$1,468,960 | \$6,284,694 | \$13,446,096 |
| 11497 | Line - Thistle - Wichita 345 kV dbl Ckt | E | High Priority | 6/4/2014 | \$10,746,938 | \$1,521,269 | \$877,655 | \$1,124,234 | \$1,521,269 | \$10,746,938 | \$13,924,899 |
| 50384 | Multi - Spearville - Ironwood - Clark Co. - Thistle 345 kV Double Circuit | E | High Priority | 12/17/2014 | \$7,106,987 | \$1,661,160 | \$63,891 | \$333,145 | \$1,661,160 | \$7,106,987 | \$15,205,390 |

| UPGRADE ID | PROJECT NAME | REL/ECO | TYPE | IN-SERVICE DATE | BEST COST | 1-YEAR COST | PRORATED COST 2014 | 3/1/14 - 2/28/15 | PRORATED COST 2015 | INFLATED COST | 40-YEAR NPV |
|------------|---|---------|----------------------|-----------------|--------------|-------------|--------------------|------------------|--------------------|---------------|--------------|
| 50705 | Device - Spalding 115 kV Cap Bank | R | High Priority | 1/1/2014 | \$538,071 | \$62,797 | \$62,797 | \$62,797 | \$62,797 | \$538,071 | \$574,807 |
| 50792 | Multi - Spearville - Ironwood - Clark Co. - Thistle 345 kV Double Circuit | E | High Priority | 12/17/2014 | \$1,850,000 | \$432,412 | \$16,631 | \$86,720 | \$432,412 | \$1,850,000 | \$3,958,073 |
| 50793 | Multi - Spearville - Ironwood - Clark Co. - Thistle 345 kV Double Circuit | E | High Priority | 12/17/2014 | \$9,191,986 | \$2,148,499 | \$82,635 | \$430,880 | \$2,148,499 | \$9,191,986 | \$19,666,243 |
| 50810 | Line - Jenson - Jenson Tap 138 kV Ckt 1 | R | High Priority | 8/1/2014 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 50824 | Line - Garden City - Kansas Avenue 115 kV Ckt 1 | R | High Priority | 3/20/2014 | \$112,722 | \$26,347 | \$20,701 | \$24,972 | \$26,347 | \$112,722 | \$241,169 |
| 51013 | Line - Darlington - Red Rock 138 kV Ckt 1 | R | High Priority | 10/4/2013 | \$15,277,233 | \$1,982,726 | \$1,982,726 | \$1,982,726 | \$1,982,726 | \$14,904,618 | \$17,512,934 |
| 51015 | Line - Grady - Phillips Gas 138 kV Ckt 1 and 2 | R | High Priority | 12/31/2014 | \$8,318,584 | \$1,106,601 | \$0 | \$179,367 | \$1,106,601 | \$8,318,584 | \$10,129,252 |
| 51029 | Multi - Spearville - Ironwood - Clark Co. - Thistle 345 kV Double Circuit | E | High Priority | 12/17/2014 | \$200,000 | \$46,747 | \$1,798 | \$9,375 | \$46,747 | \$200,000 | \$427,900 |
| 51045 | Line - Benteler - Port Robson 138 kV Ckt 1 and 2 | R | High Priority | 9/5/2014 | \$2,248,743 | \$299,145 | \$96,154 | \$144,641 | \$299,145 | \$2,248,743 | \$2,738,217 |
| 51046 | Line - Benteler - Port Robson 138 kV Ckt 1 and 2 | R | High Priority | 12/11/2014 | \$2,548,575 | \$339,031 | \$18,628 | \$73,581 | \$339,031 | \$2,548,575 | \$3,103,312 |
| 51047 | Sub - Ellis 138 kV | R | High Priority | 6/1/2013 | \$4,100,000 | \$532,110 | \$532,110 | \$532,110 | \$532,110 | \$4,000,000 | \$4,700,002 |
| 51052 | Sub - S1260 161 kV | R | High Priority | 11/7/2014 | \$4,636,045 | \$489,595 | \$72,632 | \$151,990 | \$489,595 | \$4,636,045 | \$4,481,495 |
| 51053 | Sub - S1398 161 kV | R | High Priority | 6/28/2013 | \$2,824,664 | \$291,026 | \$291,026 | \$291,026 | \$291,026 | \$2,755,770 | \$2,570,563 |
| 51055 | Sub - Tallgrass 138 kV | R | High Priority | 3/1/2014 | \$4,100,000 | \$580,370 | \$486,299 | \$580,370 | \$580,370 | \$4,100,000 | \$5,312,405 |
| 10140 | Multi - Wallace Lake - Port Robson - RedPoint 138 kV | R | Regional Reliability | 4/16/2012 | \$9,480,000 | \$1,200,335 | \$1,200,335 | \$1,200,335 | \$1,200,335 | \$9,023,200 | \$10,218,903 |
| 10141 | Multi - Wallace Lake - Port Robson - RedPoint 138 kV | R | Regional Reliability | 3/1/2012 | \$19,482,000 | \$2,466,764 | \$2,466,764 | \$2,466,764 | \$2,466,764 | \$18,543,248 | \$21,000,493 |

| UPGRADE ID | PROJECT NAME | REL/ECO | TYPE | IN-SERVICE DATE | BEST COST | 1-YEAR COST | PRORATED COST 2014 | 3/1/14 - 2/28/15 | PRORATED COST 2015 | INFLATED COST | 40-YEAR NPV |
|------------|---|---------|----------------------|-----------------|--------------|-------------|--------------------|------------------|--------------------|---------------|--------------|
| 10173 | Multi - Lindsey - Lindsey SW and Bradley-Rush Springs | R | Regional Reliability | 12/5/2012 | \$2,769,825 | \$480,872 | \$480,872 | \$480,872 | \$480,872 | \$2,636,360 | \$4,093,845 |
| 10179 | Line - ACME - W Norman 69 kV | R | Regional Reliability | 12/1/2014 | \$912,000 | \$166,349 | \$13,710 | \$40,673 | \$166,349 | \$912,000 | \$1,522,670 |
| 10195 | XFR - Tucco 115/69 kV Transformer Ckt 3 | R | Regional Reliability | 5/16/2014 | \$3,212,132 | \$410,558 | \$258,291 | \$324,837 | \$410,558 | \$3,212,132 | \$3,758,035 |
| 10215 | Line - Holcomb - Plymouth 115 kV | R | Regional Reliability | 6/1/2012 | \$3,986,076 | \$954,562 | \$954,562 | \$954,562 | \$954,562 | \$3,794,005 | \$8,126,546 |
| 10221 | Line - Tecumseh Energy Center - Midland 115 kV | R | Regional Reliability | 7/19/2013 | \$5,498,564 | \$759,358 | \$759,358 | \$759,358 | \$759,358 | \$5,364,453 | \$6,707,224 |
| 10231 | Line - Chase - White Junction 69 kV | R | Regional Reliability | 5/29/2013 | \$4,520,009 | \$624,218 | \$624,218 | \$624,218 | \$624,218 | \$4,409,765 | \$5,513,569 |
| 10300 | Line - Fort Smith - Colorado 161 kV 2 | R | Regional Reliability | 6/15/2014 | \$2,120,000 | \$283,057 | \$154,748 | \$200,629 | \$283,057 | \$2,120,000 | \$2,590,960 |
| 10303 | Line - Atoka - WFEC Tupelo - Lane 138 kV | R | Regional Reliability | 6/1/2013 | \$6,784,050 | \$1,207,230 | \$1,207,230 | \$1,207,230 | \$1,207,230 | \$6,618,585 | \$10,663,168 |
| 10305 | Line - WFEC Snyder - AEP Snyder | R | Regional Reliability | 3/1/2012 | \$1,273,772 | \$221,141 | \$221,141 | \$221,141 | \$221,141 | \$1,212,395 | \$1,882,655 |
| 10309 | Multi - OU SW - Goldsby - Canadian SW 138 kV | R | Regional Reliability | 10/25/2013 | \$369,740 | \$65,796 | \$65,796 | \$65,796 | \$65,796 | \$360,722 | \$581,157 |
| 10310 | Multi - OU SW - Goldsby - Canadian SW 138 kV | R | Regional Reliability | 10/15/2013 | \$369,740 | \$65,796 | \$65,796 | \$65,796 | \$65,796 | \$360,722 | \$581,157 |
| 10311 | Multi - OU SW - Goldsby - Canadian SW 138 kV | R | Regional Reliability | 10/31/2013 | \$3,469,399 | \$617,384 | \$617,384 | \$617,384 | \$617,384 | \$3,384,780 | \$5,453,201 |
| 10326 | Multi - Hitchland - Texas Co. 230 kV and 115 kV | R | Regional Reliability | 6/8/2012 | \$36,991,437 | \$4,500,231 | \$4,500,231 | \$4,500,231 | \$4,500,231 | \$35,208,982 | \$38,312,164 |
| 10330 | Multi - Hitchland - Texas Co. 230 kV and 115 kV | R | Regional Reliability | 4/9/2013 | \$20,137,782 | \$2,511,129 | \$2,511,129 | \$2,511,129 | \$2,511,129 | \$19,646,617 | \$22,180,195 |
| 10331 | Multi - Hitchland - Texas Co. 230 kV and 115 kV | R | Regional Reliability | 4/9/2013 | \$8,121,300 | \$1,012,705 | \$1,012,705 | \$1,012,705 | \$1,012,705 | \$7,923,220 | \$8,944,978 |
| 10351 | Line - Halstead - Mud Creek Jct. - 69 kV | R | Regional Reliability | 2/24/2012 | \$703,186 | \$94,742 | \$94,742 | \$94,742 | \$94,742 | \$669,303 | \$806,576 |
| 10352 | Line - Halstead - Mud Creek Jct. - 69 kV | R | Regional Reliability | 5/23/2012 | \$4,313,368 | \$581,152 | \$581,152 | \$581,152 | \$581,152 | \$4,105,526 | \$4,947,568 |
| 10385 | Multi - Kansas Tap - Siloam City 161KV | R | Regional Reliability | 11/15/2013 | \$4,780,359 | \$1,311,822 | \$1,311,822 | \$1,311,822 | \$1,311,822 | \$4,663,765 | \$11,587,003 |

| UPGRADE ID | PROJECT NAME | REL/ ECO | TYPE | IN-SERVICE DATE | BEST COST | 1-YEAR COST | PRORATED COST 2014 | 3/1/14 - 2/28/15 | PRORATED COST 2015 | INFLATED COST | 40-YEAR NPV |
|------------|---|----------|----------------------|-----------------|--------------|-------------|--------------------|------------------|--------------------|---------------|--------------|
| 10386 | Multi - Kansas Tap - Siloam City 161kV | R | Regional Reliability | 11/15/2013 | \$2,002,021 | \$549,393 | \$549,393 | \$549,393 | \$549,393 | \$1,953,191 | \$4,852,653 |
| 10388 | XFR - Sallisaw 161/69 kV Auto #2 | R | Regional Reliability | 7/15/2012 | \$2,115,237 | \$566,304 | \$566,304 | \$566,304 | \$566,304 | \$2,013,313 | \$4,821,158 |
| 10415 | Multi - Cowskin - Westlink - Tyler - Hoover 69 kV | R | Regional Reliability | 5/9/2014 | \$4,737,867 | \$670,662 | \$434,825 | \$543,531 | \$670,662 | \$4,737,867 | \$6,138,895 |
| 10417 | Line - Oaklawn - Oliver 69 kV | R | Regional Reliability | 7/25/2012 | \$2,709,837 | \$365,104 | \$365,104 | \$365,104 | \$365,104 | \$2,579,262 | \$3,108,268 |
| 10480 | Line - Plymell - Pioneer Tap 115 kV | R | Regional Reliability | 6/1/2012 | \$5,534,364 | \$1,325,337 | \$1,325,337 | \$1,325,337 | \$1,325,337 | \$5,267,687 | \$11,283,092 |
| 10505 | Line - Riverside - Okmulgee 138 kV | R | Regional Reliability | 3/1/2012 | \$125,000 | \$15,827 | \$15,827 | \$15,827 | \$15,827 | \$118,977 | \$134,743 |
| 10509 | Line - Lone Star South - Pittsburg 138kV Ckt 1 | R | Regional Reliability | 5/11/2012 | \$300,000 | \$37,985 | \$37,985 | \$37,985 | \$37,985 | \$285,544 | \$323,383 |
| 10510 | Line - Howell - Kilgore 69 kV | R | Regional Reliability | 5/7/2012 | \$3,986,000 | \$504,698 | \$504,698 | \$504,698 | \$504,698 | \$3,793,932 | \$4,296,682 |
| 10520 | Line - Pharoah - Weleetka 138 kV | R | Regional Reliability | 9/28/2012 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 10521 | Line - WFEC Russell - AEP Altus Jct Tap 138 kV | R | Regional Reliability | 6/1/2012 | \$50,000 | \$8,681 | \$8,681 | \$8,681 | \$8,681 | \$47,591 | \$73,901 |
| 10575 | Line - Osborne - Osborne Tap | R | Regional Reliability | 11/12/2013 | \$2,000,000 | \$259,566 | \$259,566 | \$259,566 | \$259,566 | \$1,951,220 | \$2,292,684 |
| 10582 | Multi - Flint Creek - Centerton 345 kV and Centerton- East Centerton 161 kV | R | Regional Reliability | 4/28/2014 | \$11,962,000 | \$1,591,276 | \$1,079,795 | \$1,337,721 | \$1,591,276 | \$11,962,000 | \$14,565,713 |
| 10584 | Multi - Flint Creek - Centerton 345 kV and Centerton- East Centerton 161 kV | R | Regional Reliability | 4/28/2014 | \$13,104,000 | \$1,743,194 | \$1,482,882 | \$1,465,432 | \$1,743,194 | \$13,104,000 | \$15,956,287 |
| 10585 | Multi - Flint Creek - Centerton 345 kV and Centerton- East Centerton 161 kV | R | Regional Reliability | 4/28/2014 | \$34,085,000 | \$4,534,246 | \$3,076,810 | \$3,811,756 | \$4,534,246 | \$34,085,000 | \$41,504,125 |
| 10603 | Line - Gill - Interstate 138 kV | R | Regional Reliability | 12/4/2013 | \$67,008 | \$9,254 | \$9,254 | \$9,254 | \$9,254 | \$65,374 | \$81,737 |
| 10647 | Line - Northwest Henderson - Poynter 69 kV | R | Regional Reliability | 6/6/2014 | \$7,815,833 | \$1,039,722 | \$594,127 | \$762,653 | \$1,039,722 | \$7,815,833 | \$9,517,069 |
| 10648 | Line - Diana - Perdue 138 kV | R | Regional Reliability | 12/31/2014 | \$1,004,187 | \$133,585 | \$0 | \$21,652 | \$133,585 | \$1,004,187 | \$1,222,763 |
| 10668 | Line - Rose Hill - Sooner 345 kV (OGE) | R | Regional Reliability | 6/1/2012 | \$45,935,000 | \$5,837,605 | \$5,837,605 | \$5,837,605 | \$5,837,605 | \$43,721,594 | \$49,697,737 |

| UPGRADE ID | PROJECT NAME | REL/ECO | TYPE | IN-SERVICE DATE | BEST COST | 1-YEAR COST | PRORATED COST 2014 | 3/1/14 - 2/28/15 | PRORATED COST 2015 | INFLATED COST | 40-YEAR NPV |
|------------|--|---------|----------------------|-----------------|--------------|--------------|--------------------|------------------|--------------------|---------------|--------------|
| 10674 | Line - Rose Hill - Sooner 345 kV Ckt 1 (WR) | R | Regional Reliability | 4/27/2012 | \$84,379,298 | \$11,368,661 | \$11,368,661 | \$11,368,661 | \$11,368,661 | \$80,313,431 | \$96,785,701 |
| 10698 | Line - Maid - Pryor Foundry South 69 kV | R | Regional Reliability | 1/15/2014 | \$1,993,805 | \$560,817 | \$539,247 | \$560,817 | \$560,817 | \$1,993,805 | \$5,133,423 |
| 10699 | Line - Maid - Redden 69 kV | R | Regional Reliability | 5/1/2014 | \$2,104,778 | \$592,031 | \$396,856 | \$492,817 | \$592,031 | \$2,104,778 | \$5,419,144 |
| 10701 | Multi - Johnson - Marsard 161 kV | R | Regional Reliability | 3/29/2013 | \$9,684,152 | \$1,261,469 | \$1,261,469 | \$1,261,469 | \$1,261,469 | \$9,447,953 | \$11,142,246 |
| 10705 | Multi: Dallam - Channing - Tascosa - Potter | R | Regional Reliability | 5/29/2012 | \$9,590,276 | \$1,166,715 | \$1,166,715 | \$1,166,715 | \$1,166,715 | \$9,128,163 | \$9,932,683 |
| 10713 | Multi - Litchfield - Aquarius - Hudson Jct. 69 kV Uprate | R | Regional Reliability | 6/1/2013 | \$181,444 | \$25,058 | \$25,058 | \$25,058 | \$25,058 | \$177,019 | \$221,328 |
| 10757 | Line - Ocotillo sub conversion 115 kV | R | Regional Reliability | 3/23/2012 | \$3,102,202 | \$377,402 | \$377,402 | \$377,402 | \$377,402 | \$2,952,721 | \$3,212,962 |
| 10792 | Multi: Dover-Twin Lake-Crescent-Cottonwood conversion 138 kV | R | Regional Reliability | 10/30/2014 | \$8,100,000 | \$1,081,493 | \$184,210 | \$359,507 | \$1,081,493 | \$8,100,000 | \$9,899,424 |
| 10794 | Multi: WFEC-Dover-Twin Lake, Crescent-Cottonwood conversion 138 kV | R | Regional Reliability | 12/11/2013 | \$5,765,600 | \$1,025,996 | \$1,025,996 | \$1,025,996 | \$1,025,996 | \$5,624,976 | \$9,062,369 |
| 10795 | Multi: WFEC-Dover-Twin Lake, Crescent-Cottonwood conversion 138 kV | R | Regional Reliability | 12/9/2013 | \$5,315,700 | \$945,935 | \$945,935 | \$945,935 | \$945,935 | \$5,186,049 | \$8,355,216 |
| 10796 | Multi: WFEC-Dover-Twin Lake, Crescent-Cottonwood conversion 138 kV | R | Regional Reliability | 10/31/2013 | \$3,164,000 | \$563,038 | \$563,038 | \$563,038 | \$563,038 | \$3,086,829 | \$4,973,175 |
| 10797 | Multi: WFEC-Dover-Twin Lake, Crescent-Cottonwood conversion 138 kV | R | Regional Reliability | 10/31/2013 | \$3,937,500 | \$700,683 | \$700,683 | \$700,683 | \$700,683 | \$3,841,463 | \$6,188,962 |
| 10799 | Multi - Lindsay - Lindsey SW and Bradley-Rush Springs | R | Regional Reliability | 11/20/2012 | \$1,248,750 | \$216,797 | \$216,797 | \$216,797 | \$216,797 | \$1,188,578 | \$1,845,672 |
| 10806 | Multi - NW Manhattan | R | Regional Reliability | 5/11/2012 | \$4,249,559 | \$572,555 | \$572,555 | \$572,555 | \$572,555 | \$4,044,791 | \$4,874,377 |
| 10808 | Multi - NW Manhattan | R | Regional Reliability | 3/19/2012 | \$18,624,222 | \$2,509,294 | \$2,509,294 | \$2,509,294 | \$2,509,294 | \$17,726,803 | \$21,362,567 |
| 10812 | Line - Fort Junction - West Junction City 115 kV | R | Regional Reliability | 5/21/2013 | \$5,569,785 | \$769,194 | \$769,194 | \$769,194 | \$769,194 | \$5,433,937 | \$6,794,101 |

| UPGRADE ID | PROJECT NAME | REL/ ECO | TYPE | IN-SERVICE DATE | BEST COST | 1-YEAR COST | PRORATED COST 2014 | 3/1/14 - 2/28/15 | PRORATED COST 2015 | INFLATED COST | 40-YEAR NPV |
|------------|---|----------|----------------------|-----------------|--------------|-------------|--------------------|------------------|--------------------|---------------|--------------|
| 10829 | Line - Chaves Co - Roswell Int 69/115 kV Voltage Conversion | R | Regional Reliability | 1/31/2014 | \$8,610,000 | \$1,100,486 | \$1,009,787 | \$1,100,486 | \$1,100,486 | \$8,610,000 | \$10,073,274 |
| 10830 | Multi - Loma Vista - Montrose 161 kV - Tap into K.C. South | R | Regional Reliability | 1/14/2013 | \$6,238,437 | \$788,087 | \$788,087 | \$788,087 | \$788,087 | \$6,086,280 | \$6,960,977 |
| 10837 | Multi - Johnson - Mas-sard 161 kV | R | Regional Reliability | 3/29/2013 | | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 10839 | Line - Sub 170 Nichols - Sub 80 Sedalia 69 kV | R | Regional Reliability | 5/1/2012 | \$5,352,187 | \$814,930 | \$814,930 | \$814,930 | \$814,930 | \$5,094,289 | \$6,937,808 |
| 10843 | Line - Kilgore - VBI 69 kV | R | Regional Reliability | 11/23/2013 | \$33,267 | \$4,333 | \$4,333 | \$4,333 | \$4,333 | \$32,456 | \$38,276 |
| 10847 | XFR - Clinton 161/69 kV | R | Regional Reliability | 4/2/2014 | \$1,972,428 | \$255,401 | \$191,551 | \$232,949 | \$255,401 | \$1,972,428 | \$2,337,811 |
| 10853 | Line - Lone Star-Locust Grove 115 kV | R | Regional Reliability | 2/13/2014 | \$2,150,000 | \$286,009 | \$252,223 | \$286,009 | \$286,009 | \$2,150,000 | \$2,617,981 |
| 10854 | Multi - South Harper 161 kV cut-in to Stillwell-Archie Junction 161 kV line | R | Regional Reliability | 1/25/2013 | \$4,672,809 | \$590,305 | \$590,305 | \$590,305 | \$590,305 | \$4,558,838 | \$5,214,017 |
| 10858 | Line - Pratt - St. John 115 kV rebuild | R | Regional Reliability | 6/15/2014 | \$15,079,303 | \$3,524,578 | \$1,926,899 | \$2,498,190 | \$3,524,578 | \$15,079,303 | \$32,262,151 |
| 10865 | Line - Reeding - Twin Lakes Switchyard conversion to 138 kV | R | Regional Reliability | 10/31/2013 | \$1,971,000 | \$350,742 | \$350,742 | \$350,742 | \$350,742 | \$1,922,927 | \$3,098,017 |
| 10870 | Line - GEC West - Waco 138 kV | R | Regional Reliability | 10/30/2012 | \$4,857,641 | \$654,484 | \$654,484 | \$654,484 | \$654,484 | \$4,623,573 | \$5,571,867 |
| 10875 | Line - Pecan Creek - Five Tribes 161 kV Ckt 1 | R | Regional Reliability | 2/1/2014 | \$3,022,363 | \$403,539 | \$369,172 | \$403,539 | \$403,539 | \$3,022,363 | \$3,693,784 |
| 10878 | Line - El Reno - El Reno SW 69 kV | R | Regional Reliability | 6/1/2012 | \$1,950,000 | \$338,541 | \$338,541 | \$338,541 | \$338,541 | \$1,856,038 | \$2,882,130 |
| 10879 | Line - Bradley - Lindsay 69 kV Ckt 1 reconduc-tor | R | Regional Reliability | 9/11/2012 | \$3,712,500 | \$644,531 | \$644,531 | \$644,531 | \$644,531 | \$3,533,611 | \$5,487,132 |
| 10898 | Line - Broadmoor - Fern Street 69 kV | R | Regional Reliability | 12/31/2014 | \$4,923,124 | \$654,911 | \$0 | \$106,153 | \$654,911 | \$4,923,124 | \$5,994,718 |
| 10952 | Line - Glenare - Liberty 69 kV Ckt 1 | R | Regional Reliability | 3/31/2014 | \$1,950,000 | \$252,497 | \$190,760 | \$231,687 | \$252,497 | \$1,950,000 | \$2,311,228 |
| 10953 | Line - Blue Spring South - Prairie Lee 161 kV Ckt 1 | R | Regional Reliability | 6/20/2013 | \$24,933 | \$3,150 | \$3,150 | \$3,150 | \$3,150 | \$24,325 | \$27,821 |
| 10986 | Line - Maloney - North Platte 115 kV | R | Regional Reliability | 6/1/2012 | \$1,451,500 | \$161,237 | \$161,237 | \$161,237 | \$161,237 | \$1,381,559 | \$1,372,674 |

| UPGRADE ID | PROJECT NAME | REL/ECO | TYPE | IN-SERVICE DATE | BEST COST | 1-YEAR COST | PRORATED COST 2014 | 3/1/14 - 2/28/15 | PRORATED COST 2015 | INFLATED COST | 40-YEAR NPV |
|------------|--|---------|----------------------|-----------------|--------------|-------------|--------------------|------------------|--------------------|---------------|--------------|
| 10993 | Line - Harper - Milan Tap 138 kV | R | Regional Reliability | 8/1/2013 | \$19,662 | \$4,484 | \$4,484 | \$4,484 | \$4,484 | \$19,182 | \$39,603 |
| 11011 | Multi - Canadian River - McAlester City - Dustin 138 kV | R | Regional Reliability | 6/28/2013 | \$24,965,000 | \$3,240,034 | \$3,240,034 | \$3,240,034 | \$3,240,034 | \$24,356,098 | \$28,618,428 |
| 11012 | Multi - Canadian River - McAlester City - Dustin 138 kV | R | Regional Reliability | 6/28/2013 | \$9,513,000 | \$1,234,626 | \$1,234,626 | \$1,234,626 | \$1,234,626 | \$9,280,976 | \$10,905,151 |
| 11015 | Line - Ashdown - Craig Junction 138 kV Rebuild | R | Regional Reliability | 2/8/2013 | \$2,500,000 | \$324,458 | \$324,458 | \$324,458 | \$324,458 | \$2,439,024 | \$2,865,855 |
| 11019 | Multi - Cherry Sub add 230kV source and 115 kV Hastings Conversion | R | Regional Reliability | 3/21/2014 | \$3,792,408 | \$484,726 | \$379,525 | \$458,093 | \$484,726 | \$3,792,408 | \$4,436,930 |
| 11020 | Multi - Cherry Sub add 230kV source and 115 kV Hastings Conversion | R | Regional Reliability | 3/21/2014 | \$9,736,187 | \$1,244,429 | \$974,347 | \$1,176,054 | \$1,244,429 | \$9,736,187 | \$11,390,857 |
| 11021 | Multi - Cherry Sub add 230kV source and 115 kV Hastings Conversion | R | Regional Reliability | 5/1/2014 | \$1,048,295 | \$133,988 | \$89,816 | \$111,534 | \$133,988 | \$1,048,295 | \$1,226,453 |
| 11029 | Line - Maddox - Sanger SW 115 kV | R | Regional Reliability | 5/4/2012 | \$1,912,542 | \$232,672 | \$232,672 | \$232,672 | \$232,672 | \$1,820,385 | \$1,980,827 |
| 11033 | XFR - Install 2nd Randall 230/115 kV transformer | R | Regional Reliability | 5/13/2013 | \$7,997,141 | \$997,223 | \$997,223 | \$997,223 | \$997,223 | \$7,802,089 | \$8,808,227 |
| 11036 | Line - Maddox Station - Monument 115 kV Ckt 1 | R | Regional Reliability | 11/30/2012 | \$1,689,108 | \$205,490 | \$205,490 | \$205,490 | \$205,490 | \$1,607,717 | \$1,749,415 |
| 11038 | Line - Brasher Tap - Roswell Interchange 115 kV | R | Regional Reliability | 10/25/2013 | \$75,000 | \$9,352 | \$9,352 | \$9,352 | \$9,352 | \$73,171 | \$82,607 |
| 11040 | Multi - New Hart Interchange 230/115 kV | R | Regional Reliability | 1/31/2014 | \$12,864,507 | \$1,644,275 | \$1,508,758 | \$1,644,275 | \$1,644,275 | \$12,864,507 | \$15,050,836 |
| 11041 | Multi - New Hart Interchange 230/115 kV | R | Regional Reliability | 12/19/2014 | \$19,959,385 | \$2,551,106 | \$84,102 | \$497,606 | \$2,551,106 | \$19,959,385 | \$23,351,493 |
| 11042 | Multi - New Hart Interchange 230/115 kV | R | Regional Reliability | 3/25/2014 | \$16,108,465 | \$2,058,901 | \$1,589,426 | \$1,923,149 | \$2,058,901 | \$16,108,465 | \$18,846,107 |
| 11043 | Multi - New Hart Interchange 230/115 kV | R | Regional Reliability | 1/31/2014 | \$15,491,109 | \$1,979,994 | \$1,816,808 | \$1,979,994 | \$1,979,994 | \$15,491,109 | \$18,123,831 |
| 11044 | Multi - New Hart Interchange 230/115 kV | R | Regional Reliability | 1/31/2014 | \$2,568,905 | \$328,344 | \$301,283 | \$328,344 | \$328,344 | \$2,568,905 | \$3,005,492 |
| 11045 | Multi - New Hart Interchange 230/115 kV | R | Regional Reliability | 12/19/2014 | \$17,384,254 | \$2,221,966 | \$73,252 | \$433,405 | \$2,221,966 | \$17,384,254 | \$20,338,717 |

| UPGRADE ID | PROJECT NAME | REL/ ECO | TYPE | IN-SERVICE DATE | BEST COST | 1-YEAR COST | PRORATED COST 2014 | 3/1/14 - 2/28/15 | PRORATED COST 2015 | INFLATED COST | 40-YEAR NPV |
|------------|--|----------|----------------------|-----------------|--------------|-------------|--------------------|------------------|--------------------|---------------|--------------|
| 11046 | Line - Cunningham - Buckley Tap 115 kV reconductor | R | Regional Reliability | 6/27/2013 | \$3,516,246 | \$438,467 | \$438,467 | \$438,467 | \$438,467 | \$3,430,484 | \$3,872,871 |
| 11052 | Multi - Pleasant Hill-Potter 230 kV Ckt 1 | R | Regional Reliability | 12/31/2014 | \$15,713,303 | \$2,008,394 | \$0 | \$325,536 | \$2,008,394 | \$15,713,303 | \$18,383,787 |
| 11053 | Multi - Pleasant Hill-Potter 230 kV Ckt 1 | R | Regional Reliability | 12/31/2014 | \$13,694,777 | \$1,750,396 | \$0 | \$283,718 | \$1,750,396 | \$13,694,777 | \$16,022,211 |
| 11054 | Multi - Pleasant Hill-Potter 230 kV Ckt 1 | R | Regional Reliability | 12/31/2014 | \$15,180,231 | \$1,940,259 | \$0 | \$314,493 | \$1,940,259 | \$15,180,231 | \$17,760,119 |
| 11078 | Line - Albion - Genoa 115 kV | R | Regional Reliability | 6/1/2014 | \$773,349 | \$90,255 | \$52,814 | \$67,443 | \$90,255 | \$773,349 | \$826,148 |
| 11079 | Line - Albion - Spalding 115 kV | R | Regional Reliability | 6/1/2013 | \$1,214,028 | \$138,230 | \$138,230 | \$138,230 | \$138,230 | \$1,184,418 | \$1,220,948 |
| 11080 | Line - Loup City - North Loup 115 kV | R | Regional Reliability | 6/1/2012 | \$1,818,986 | \$202,059 | \$202,059 | \$202,059 | \$202,059 | \$1,731,337 | \$1,720,202 |
| 11096 | XFR - Kingsmill 115/69 kV Ckt 2 | R | Regional Reliability | 6/28/2013 | \$4,400,000 | \$548,669 | \$548,669 | \$548,669 | \$548,669 | \$4,292,683 | \$4,846,257 |
| 11100 | XFR - Northeast Hereford 115/69 kV Transformer Ckt 2 | R | Regional Reliability | 8/29/2013 | \$4,200,902 | \$523,842 | \$523,842 | \$523,842 | \$523,842 | \$4,098,441 | \$4,626,966 |
| 11102 | Multi - Move Load from East Clovis 69 kV to East Clovis 115 kV | R | Regional Reliability | 6/30/2013 | \$2,125,000 | \$264,982 | \$264,982 | \$264,982 | \$264,982 | \$2,073,171 | \$2,340,522 |
| 11107 | Multi - Kress Inter-change - Kiser - Cox 115 kV | R | Regional Reliability | 11/21/2014 | \$13,584,121 | \$1,736,252 | \$190,797 | \$472,223 | \$1,736,252 | \$13,584,121 | \$15,892,749 |
| 11109 | Multi - Kress Inter-change - Kiser - Cox 115 kV | R | Regional Reliability | 3/7/2014 | \$6,850,000 | \$875,532 | \$719,187 | \$861,100 | \$875,532 | \$6,850,000 | \$8,014,161 |
| 11117 | Line - Wakita - Nash 69 kV Ckt 1 | R | Regional Reliability | 12/15/2013 | \$6,705,000 | \$1,193,163 | \$1,193,163 | \$1,193,163 | \$1,193,163 | \$6,541,463 | \$10,538,918 |
| 11121 | Line - Harrington - Randall County 230 kV | R | Regional Reliability | 5/13/2013 | \$159,060 | \$19,834 | \$19,834 | \$19,834 | \$19,834 | \$155,180 | \$175,192 |
| 11129 | Multi - Cushing Area 138 kV | R | Regional Reliability | 6/1/2014 | | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 11130 | Multi - Cushing Area 138 kV | R | Regional Reliability | 6/1/2014 | | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 11131 | Multi - Cushing Area 138 kV | R | Regional Reliability | 12/1/2013 | | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 11132 | Multi - Cushing Area 138 kV | R | Regional Reliability | 6/1/2014 | \$10,600,000 | \$1,415,287 | \$828,176 | \$1,057,577 | \$1,415,287 | \$10,600,000 | \$12,954,802 |
| 11133 | Multi - Cushing Area 138 kV | R | Regional Reliability | 6/1/2014 | | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |

| UPGRADE ID | PROJECT NAME | REL/ ECO | TYPE | IN-SERVICE DATE | BEST COST | 1-YEAR COST | PRORATED COST 2014 | 3/1/14 - 2/28/15 | PRORATED COST 2015 | INFLATED COST | 40-YEAR NPV |
|------------|---|----------|----------------------|-----------------|--------------|-------------|--------------------|------------------|--------------------|---------------|--------------|
| 11134 | Multi - Cushing Area 138 kV | R | Regional Reliability | 3/1/2013 | | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 11151 | Line - Twin Church - S. Sioux City 115 kV | R | Regional Reliability | 9/27/2012 | \$29,030,640 | \$3,224,816 | \$3,224,816 | \$3,224,816 | \$3,224,816 | \$27,631,781 | \$27,454,076 |
| 11152 | Line - Twin Church - S. Sioux City 115 kV | R | Regional Reliability | 12/19/2012 | | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 11171 | Line - Carthage - Rock Hill 69 kV Ckt 1 rebuild | R | Regional Reliability | 6/1/2014 | \$11,830,128 | \$1,573,734 | \$920,894 | \$1,175,977 | \$1,573,734 | \$11,830,128 | \$14,405,137 |
| 11173 | XFR - Eddy County 230/115 kV Transformer Ckt 2 | R | Regional Reliability | 6/6/2013 | \$4,863,725 | \$606,494 | \$606,494 | \$606,494 | \$606,494 | \$4,745,098 | \$5,357,014 |
| 11177 | Line - Randall - Amarillo S 230 kV Ckt 1 | R | Regional Reliability | 5/13/2013 | \$20,078,082 | \$2,503,685 | \$2,503,685 | \$2,503,685 | \$2,503,685 | \$19,588,373 | \$22,114,440 |
| 11182 | Sub - Canadian River Substation | R | Regional Reliability | 6/30/2013 | \$9,643,276 | \$1,256,144 | \$1,256,144 | \$1,256,144 | \$1,256,144 | \$9,408,074 | \$11,095,216 |
| 11183 | Multi - Canadian River - McAlester City - Dustin 138 kV | R | Regional Reliability | 5/16/2012 | \$4,096,000 | \$518,626 | \$518,626 | \$518,626 | \$518,626 | \$3,898,632 | \$4,415,256 |
| 11184 | Multi - Canadian River - McAlester City - Dustin 138 kV | R | Regional Reliability | 2/8/2013 | \$4,096,000 | \$531,591 | \$531,591 | \$531,591 | \$531,591 | \$3,996,098 | \$4,695,417 |
| 11195 | Line - Holcomb - Fletcher 115 kV Ckt 1 | R | Regional Reliability | 12/31/2013 | \$4,091,866 | \$1,004,393 | \$1,004,393 | \$1,004,393 | \$1,004,393 | \$3,992,064 | \$8,871,561 |
| 11311 | XFR - Colby 69/34.5 kV Tr-XFR - Colby 115/34.5 kV Transformer Ckt 4 | R | Regional Reliability | 5/1/2013 | \$1,097,586 | \$148,338 | \$148,338 | \$148,338 | \$148,338 | \$1,070,816 | \$1,310,230 |
| 11312 | Line - MIDW Heizer - Mullergren 115kV | R | Regional Reliability | 12/31/2012 | \$637,135 | \$84,008 | \$84,008 | \$84,008 | \$84,008 | \$606,434 | \$715,191 |
| 11316 | Line - OXY Permian Sub - Sanger SW Station 115 kV Ckt 1 Reconductor | R | Regional Reliability | 6/1/2012 | \$242,156 | \$29,460 | \$29,460 | \$29,460 | \$29,460 | \$230,488 | \$250,802 |
| 11319 | Line - Wolford-Yuma 115 kV Ckt 1 Wave Trap | R | Regional Reliability | 5/9/2013 | \$116,520 | \$14,530 | \$14,530 | \$14,530 | \$14,530 | \$113,678 | \$128,338 |
| 11321 | Multi: Dallam - Channing - Tascosa - Potter | R | Regional Reliability | 5/29/2012 | \$19,180,552 | \$2,333,430 | \$2,333,430 | \$2,333,430 | \$2,333,430 | \$18,256,326 | \$19,865,366 |
| 11322 | Multi: Dallam - Channing - Tascosa - Potter | R | Regional Reliability | 5/23/2012 | \$3,412,108 | \$415,103 | \$415,103 | \$415,103 | \$415,103 | \$3,247,694 | \$3,533,932 |
| 11323 | Line - Heizer - Mullergren 115kV | R | Regional Reliability | 11/15/2012 | \$850,000 | \$189,102 | \$189,102 | \$189,102 | \$189,102 | \$809,042 | \$1,609,900 |
| 11331 | Line - Diana - Perdue 138 kV Reconductor | R | Regional Reliability | 12/31/2014 | \$18,805,489 | \$2,501,649 | \$0 | \$405,487 | \$2,501,649 | \$18,805,489 | \$22,898,793 |
| 11339 | Line - Classen - Southwest 5 Tap 138 kV | R | Regional Reliability | 2/15/2014 | \$109,481 | \$14,618 | \$12,811 | \$14,618 | \$14,618 | \$109,481 | \$133,802 |

| UPGRADE ID | PROJECT NAME | REL/ ECO | TYPE | IN-SERVICE DATE | BEST COST | 1-YEAR COST | PRORATED COST 2014 | 3/1/14 - 2/28/15 | PRORATED COST 2015 | INFLATED COST | 40-YEAR NPV |
|------------|--|----------|----------------------|-----------------|--------------|-------------|--------------------|------------------|--------------------|---------------|--------------|
| 11344 | Multi - Craig - 87th - Stranger 345 kV Ckt 1 | R | Regional Reliability | 11/15/2012 | \$9,866,277 | \$1,329,311 | \$1,329,311 | \$1,329,311 | \$1,329,311 | \$9,390,864 | \$11,316,929 |
| 11345 | Multi - Craig - 87th - Stranger 345 kV Ckt 1 | R | Regional Reliability | 11/15/2012 | \$15,119,789 | \$2,037,132 | \$2,037,132 | \$2,037,132 | \$2,037,132 | \$14,391,233 | \$17,342,872 |
| 11346 | Multi - Craig - 87th - Stranger 345 kV Ckt 1 | R | Regional Reliability | 11/15/2012 | \$12,277,385 | \$1,654,167 | \$1,654,167 | \$1,654,167 | \$1,654,167 | \$11,685,792 | \$14,082,546 |
| 11355 | XFR - Crosby Co. 115/69 kV Transformers Ckt 1 and Ckt 2 | R | Regional Reliability | 2/6/2015 | \$2,378,798 | \$311,647 | \$0 | \$18,836 | \$280,825 | \$2,438,268 | \$2,952,992 |
| 11359 | Line - Hereford - North-east Hereford 115 kV Ckt 1 | R | Regional Reliability | 2/11/2014 | \$4,139,406 | \$529,078 | \$469,484 | \$529,078 | \$529,078 | \$4,139,406 | \$4,842,900 |
| 11378 | Multi - Cherry Sub add 230kV source and 115 kV Hastings Conversion | R | Regional Reliability | 5/1/2014 | \$5,540,583 | \$708,169 | \$474,707 | \$589,492 | \$708,169 | \$5,540,583 | \$6,482,208 |
| 11383 | Line - North Plainview line tap 115 kV | R | Regional Reliability | 1/15/2015 | \$330,000 | \$43,233 | \$0 | \$5,226 | \$41,571 | \$338,250 | \$409,655 |
| 11384 | Line - Kress Rural line tap 115 kV | R | Regional Reliability | 12/9/2014 | \$400,000 | \$51,126 | \$3,090 | \$11,377 | \$51,126 | \$400,000 | \$467,980 |
| 11389 | Multi - Hirschland - Texas Co. 230 kV and 115 kV | R | Regional Reliability | 3/19/2013 | \$1,491,086 | \$185,935 | \$185,935 | \$185,935 | \$185,935 | \$1,454,718 | \$1,642,315 |
| 11411 | Multi - Mulberry - Franklin - Sheffield 161 kV | R | Regional Reliability | 7/25/2014 | \$6,949,300 | \$983,699 | \$429,693 | \$589,138 | \$983,699 | \$6,949,300 | \$9,004,267 |
| 11412 | Multi - Mulberry - Franklin - Sheffield 161 kV | R | Regional Reliability | 7/25/2014 | \$1,320,792 | \$186,963 | \$81,668 | \$111,972 | \$186,963 | \$1,320,792 | \$1,711,361 |
| 11413 | Multi - Mulberry - Franklin - Sheffield 161 kV | R | Regional Reliability | 6/4/2014 | \$8,063,989 | \$1,141,487 | \$658,550 | \$843,572 | \$1,141,487 | \$8,063,989 | \$10,448,579 |
| 11421 | Line - Hooks - Lone Star Ordinance 69 kV Ckt 1 | R | Regional Reliability | 9/1/2013 | \$2,100,000 | \$272,544 | \$272,544 | \$272,544 | \$272,544 | \$2,048,780 | \$2,407,318 |
| 11424 | Line - Alva - Freedom 69 kV Ckt 1 | R | Regional Reliability | 3/28/2014 | \$6,243,750 | \$1,138,860 | \$869,789 | \$1,054,384 | \$1,138,860 | \$6,243,750 | \$10,424,530 |
| 11438 | Line - Canaday - Lexington 115Kv Ckt1 | R | Regional Reliability | 4/1/2013 | \$513,981 | \$58,522 | \$58,522 | \$58,522 | \$58,522 | \$501,445 | \$516,911 |
| 11439 | Line - OGE Alva - WFEC Alva 69 kV Ckt 1 | R | Regional Reliability | 11/20/2012 | \$363,184 | \$46,155 | \$46,155 | \$46,155 | \$46,155 | \$345,684 | \$392,934 |
| 11440 | PRA TT - ST JOHN 115 KV CKT 1 | R | Regional Reliability | 6/15/2014 | \$100,000 | \$23,374 | \$12,778 | \$16,567 | \$23,374 | \$100,000 | \$213,950 |
| 11444 | Multi - Mulberry - Franklin - Sheffield 161 kV | R | Regional Reliability | 7/28/2014 | \$5,348,455 | \$757,093 | \$324,469 | \$447,184 | \$757,093 | \$5,348,455 | \$6,930,039 |

| UPGRADE ID | PROJECT NAME | REL/ ECO | TYPE | IN-SERVICE DATE | BEST COST | 1-YEAR COST | PRORATED COST 2014 | 3/1/14 - 2/28/15 | PRORATED COST 2015 | INFLATED COST | 40-YEAR NPV |
|------------|--|----------|----------------------|-----------------|-------------|-------------|--------------------|------------------|--------------------|---------------|-------------|
| 11498 | Line - Loma Vista East - Winchester Junction North 161kV Ckt 1 | R | Regional Reliability | 1/14/2013 | \$176,118 | \$33,588 | \$33,588 | \$33,588 | \$33,588 | \$171,822 | \$296,672 |
| 11505 | XFR - Spearman 115/69/13.2 Ckt 1 Upgrade | R | Regional Reliability | 6/23/2013 | \$908,719 | \$113,315 | \$113,315 | \$113,315 | \$113,315 | \$886,555 | \$1,000,883 |
| 11507 | XFR - Lubbock South 230/115/13.2 kV Ckt 2 | R | Regional Reliability | 2/3/2015 | \$4,063,897 | \$532,412 | \$0 | \$36,567 | \$484,144 | \$4,165,494 | \$5,044,840 |
| 50047 | Device - Comanche | R | Regional Reliability | 6/1/2012 | \$350,000 | \$60,764 | \$60,764 | \$60,764 | \$60,764 | \$333,135 | \$517,305 |
| 50073 | Device - Quapaw Cap 69 kV | R | Regional Reliability | 12/1/2012 | \$622,437 | \$94,773 | \$94,773 | \$94,773 | \$94,773 | \$592,444 | \$806,838 |
| 50080 | Device - Tahlequah West 69 Cap kV | R | Regional Reliability | 7/1/2012 | \$779,000 | \$208,559 | \$208,559 | \$208,559 | \$208,559 | \$741,463 | \$1,775,537 |
| 50092 | Device - Jay Cap 69 kV | R | Regional Reliability | 6/25/2012 | \$1,013,318 | \$271,291 | \$271,291 | \$271,291 | \$271,291 | \$964,490 | \$2,309,607 |
| 50093 | Device - Bushland Interchange 230 kV Capacitor | R | Regional Reliability | 12/19/2013 | \$1,865,510 | \$232,624 | \$232,624 | \$232,624 | \$232,624 | \$1,820,010 | \$2,054,714 |
| 50098 | Device - Kolache 69 kV Capacitor | R | Regional Reliability | 12/31/2013 | \$737,743 | \$96,099 | \$96,099 | \$96,099 | \$96,099 | \$719,749 | \$848,821 |
| 50104 | Device - Plainville Cap 115 kV | R | Regional Reliability | 3/27/2013 | \$1,169,968 | \$266,794 | \$266,794 | \$266,794 | \$266,794 | \$1,141,432 | \$2,356,526 |
| 50156 | Line - Bann - Lone Star Ordinance 69 kV Ckt 1 | R | Regional Reliability | 6/1/2013 | \$6,600,000 | \$856,568 | \$856,568 | \$856,568 | \$856,568 | \$6,439,024 | \$7,565,857 |
| 50184 | Device - Kinsley Capacitor 115 kV | R | Regional Reliability | 6/27/2012 | \$926,685 | \$122,186 | \$122,186 | \$122,186 | \$122,186 | \$882,032 | \$1,040,214 |
| 50186 | Device - Electra 69 kV Capacitor | R | Regional Reliability | 8/31/2012 | \$240,000 | \$41,667 | \$41,667 | \$41,667 | \$41,667 | \$228,435 | \$354,724 |
| 50197 | Device-Pawnee 115 kV | R | Regional Reliability | 1/31/2013 | \$712,979 | \$96,358 | \$96,358 | \$96,358 | \$96,358 | \$695,589 | \$851,110 |
| 50213 | Device - Gordon 115 kV | R | Regional Reliability | 6/1/2012 | \$673,574 | \$74,823 | \$74,823 | \$74,823 | \$74,823 | \$641,117 | \$636,994 |
| 50214 | Device - Cozad 115 kV | R | Regional Reliability | 4/1/2014 | \$518,350 | \$60,495 | \$45,537 | \$55,343 | \$60,495 | \$518,350 | \$553,739 |
| 50246 | Device - Johnson Corner 115 kV Capacitor | R | Regional Reliability | 5/23/2012 | \$740,000 | \$177,211 | \$177,211 | \$177,211 | \$177,211 | \$704,343 | \$1,508,663 |
| 50247 | Device - Johnson Corner 115 kV 2nd Capacitor | R | Regional Reliability | 5/23/2012 | \$370,000 | \$88,605 | \$88,605 | \$88,605 | \$88,605 | \$352,171 | \$754,331 |
| 50248 | Device - Kearney 115 kV | R | Regional Reliability | 6/1/2012 | \$748,743 | \$83,173 | \$83,173 | \$83,173 | \$83,173 | \$712,664 | \$708,081 |
| 50249 | Device - Holdrege 115 kV | R | Regional Reliability | 6/1/2013 | \$496,486 | \$56,530 | \$56,530 | \$56,530 | \$56,530 | \$484,377 | \$499,316 |

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|------------|---|----------|----------------------|-----------------|--------------|-------------|--------------------|------------------|--------------------|---------------|--------------|
| 50319 | XFR - Ogallala 230/115kV Replacement | R | Regional Reliability | 6/1/2014 | \$4,384,489 | \$511,700 | \$299,429 | \$382,369 | \$511,700 | \$4,384,489 | \$4,683,831 |
| 50346 | XFR - Paoli 138/69 kV | R | Regional Reliability | 3/22/2013 | \$1,537,212 | \$200,239 | \$200,239 | \$200,239 | \$200,239 | \$1,499,719 | \$1,768,662 |
| 50347 | Device - Little River Lake 69 kV | R | Regional Reliability | 10/1/2012 | \$530,068 | \$67,363 | \$67,363 | \$67,363 | \$67,363 | \$504,527 | \$573,489 |
| 50363 | Line - Easton Rec - Knox Lee 138 kV ckt 1 | R | Regional Reliability | 10/16/2012 | \$150,000 | \$18,993 | \$18,993 | \$18,993 | \$18,993 | \$142,772 | \$161,692 |
| 50364 | Line - Easton Rec - Pirkey 138 kV ckt 1 | R | Regional Reliability | 11/10/2012 | \$500,000 | \$63,309 | \$63,309 | \$63,309 | \$63,309 | \$475,907 | \$538,972 |
| 50365 | Line - Pirkey - Whitney 115 kV ckt 1 | R | Regional Reliability | 2/10/2013 | \$900,000 | \$116,805 | \$116,805 | \$116,805 | \$116,805 | \$878,049 | \$1,031,708 |
| 50397 | Line - Cowskin - Centennial 138 kV rebuild | R | Regional Reliability | 5/19/2013 | \$2,038,528 | \$281,523 | \$281,523 | \$281,523 | \$281,523 | \$1,988,808 | \$2,486,625 |
| 50398 | XFR - Auburn Road 230/115 kV Transformer Ckt 1 | R | Regional Reliability | 5/28/2014 | \$32,936,593 | \$4,662,296 | \$2,779,446 | \$3,535,147 | \$4,662,296 | \$32,936,593 | \$42,676,223 |
| 50402 | Sub - Move lines from Lea Co 230/115 kV sub to Hobbs Interchange 230/115 kV | R | Regional Reliability | 5/16/2014 | \$11,628,992 | \$1,486,358 | \$935,099 | \$1,176,019 | \$1,486,358 | \$11,628,992 | \$13,605,345 |
| 50403 | Line - Folsom & Pleasant Hill - Sheldon 115 kV Ckt 2 | R | Regional Reliability | 8/12/2013 | \$5,197,561 | \$550,645 | \$550,645 | \$550,645 | \$550,645 | \$5,070,791 | \$4,863,710 |
| 50405 | Device - Coweta 69 kV Capacitor | R | Regional Reliability | 6/1/2014 | \$1,428,440 | \$190,022 | \$111,194 | \$141,994 | \$190,022 | \$1,428,440 | \$1,739,363 |
| 50408 | Device - Lula 69 kV | R | Regional Reliability | 9/23/2013 | \$737,743 | \$96,099 | \$96,099 | \$96,099 | \$96,099 | \$719,749 | \$848,821 |
| 50411 | Multi - Ellsworth - Bushton - Rice 115 kV | R | Regional Reliability | 9/28/2012 | \$575,964 | \$75,942 | \$75,942 | \$75,942 | \$75,942 | \$548,211 | \$646,526 |
| 50438 | Sub - Cornville 138 kV | R | Regional Reliability | 12/31/2014 | \$21,664,838 | \$2,882,022 | \$0 | \$467,141 | \$2,882,022 | \$21,664,838 | \$26,380,523 |
| 50448 | Multi - Ellsworth - Bushton - Rice 115 kV | R | Regional Reliability | 7/10/2012 | \$2,604,440 | \$343,402 | \$343,402 | \$343,402 | \$343,402 | \$2,478,943 | \$2,923,513 |
| 50450 | Multi - Kress Interchange - Kiser - Cox 115 kV | R | Regional Reliability | 11/21/2014 | \$6,780,000 | \$866,585 | \$95,229 | \$235,692 | \$866,585 | \$6,780,000 | \$7,932,264 |
| 50504 | XFR - Howard 115/69 kV Transformers | R | Regional Reliability | 12/31/2014 | \$1,516,548 | \$193,837 | \$0 | \$31,419 | \$193,837 | \$1,516,548 | \$1,774,286 |
| 50505 | Device - Kingsmill 115 kV Capacitors | R | Regional Reliability | 11/14/2014 | \$937,420 | \$119,816 | \$15,471 | \$34,892 | \$119,816 | \$937,420 | \$1,096,735 |

| UPGRADE ID | PROJECT NAME | REL/ ECO | TYPE | IN-SERVICE DATE | BEST COST | 1-YEAR COST | PRORATED COST 2014 | 3/1/14 - 2/28/15 | PRORATED COST 2015 | INFLATED COST | 40-YEAR NPV |
|------------|---|----------|----------------------|-----------------|--------------|-------------|--------------------|------------------|--------------------|---------------|--------------|
| 50506 | XFR - Grapevine 230/115 kV Transformer Ckt 1 | R | Regional Reliability | 3/21/2014 | \$2,505,545 | \$320,246 | \$250,742 | \$302,650 | \$320,246 | \$2,505,545 | \$2,931,364 |
| 50507 | Device - Howard 115 kV Capacitors | R | Regional Reliability | 5/29/2014 | \$1,256,000 | \$160,535 | \$95,263 | \$121,284 | \$160,535 | \$1,256,000 | \$1,469,458 |
| 50512 | Device - St. Joe 161 kV | R | Regional Reliability | 9/27/2013 | \$300,109 | \$37,912 | \$37,912 | \$37,912 | \$37,912 | \$292,789 | \$334,868 |
| 50519 | Line - Pheasant Run - Seguin 115 kV Ckt 1 | R | Regional Reliability | 7/15/2014 | \$7,811,905 | \$1,082,165 | \$502,434 | \$677,840 | \$1,082,165 | \$7,811,905 | \$9,905,575 |
| 50521 | Device - Red Bluff 115 kV Capacitor | R | Regional Reliability | 6/20/2013 | \$1,999,300 | \$249,308 | \$249,308 | \$249,308 | \$249,308 | \$1,950,537 | \$2,202,073 |
| 50526 | Line - El Paso - Farber 138 kV Ckt 1 | R | Regional Reliability | 4/8/2014 | \$3,917,751 | \$554,572 | \$406,788 | \$496,677 | \$554,572 | \$3,917,751 | \$5,076,263 |
| 50529 | Line - Arcadia - Redbud 345 kV | R | Regional Reliability | 11/17/2013 | \$983,369 | \$128,095 | \$128,095 | \$128,095 | \$128,095 | \$959,384 | \$1,131,430 |
| 50531 | Line - New Gladewater - Perdue 138 kV | R | Regional Reliability | 12/31/2014 | \$1,000,000 | \$133,028 | \$0 | \$21,562 | \$133,028 | \$1,000,000 | \$1,217,665 |
| 50547 | Line - Oxy Permian - Sanger Switching Station 115 kV Ckt 1 | R | Regional Reliability | 5/4/2012 | \$299,150 | \$36,393 | \$36,393 | \$36,393 | \$36,393 | \$284,735 | \$309,831 |
| 50561 | XFR - Potash Junction 115/69 kV Ckt 2 | R | Regional Reliability | 7/24/2014 | \$2,289,368 | \$292,615 | \$128,622 | \$176,051 | \$292,615 | \$2,289,368 | \$2,678,447 |
| 50575 | Sub - Sub 1366 161 kV | R | Regional Reliability | 5/20/2013 | \$11,179,602 | \$1,151,838 | \$1,151,838 | \$1,151,838 | \$1,151,838 | \$10,906,929 | \$10,173,908 |
| 50586 | Multi - Renfrow 345/138 kV substation and Renfrow - Grant 138 kV line | R | Regional Reliability | 3/15/2014 | \$3,079,700 | \$411,194 | \$328,730 | \$395,379 | \$411,194 | \$3,079,700 | \$3,763,859 |
| 50587 | Multi - Renfrow 345/138 kV substation and Renfrow - Grant 138 kV line | R | Regional Reliability | 3/15/2014 | \$11,659,600 | \$1,556,763 | \$1,244,555 | \$1,496,887 | \$1,556,763 | \$11,659,600 | \$14,249,793 |
| 50588 | Multi - Renfrow 345/138 kV substation and Renfrow - Grant 138 kV line | R | Regional Reliability | 9/15/2014 | \$4,998,388 | \$667,373 | \$196,178 | \$304,351 | \$667,373 | \$4,998,388 | \$6,108,785 |
| 50589 | Multi - Renfrow 345/138 kV substation and Renfrow - Grant 138 kV line | R | Regional Reliability | 5/1/2014 | \$1,173,170 | \$156,639 | \$105,000 | \$130,389 | \$156,639 | \$1,173,170 | \$1,433,791 |
| 50590 | Multi - Renfrow 345/138 kV substation and Renfrow - Grant 138 kV line | R | Regional Reliability | 10/1/2014 | \$4,540,425 | \$606,227 | \$151,557 | \$249,819 | \$606,227 | \$4,540,425 | \$5,549,086 |
| 50591 | XFR - Howard 115/69 kV Transformers | R | Regional Reliability | 9/13/2013 | \$3,300,000 | \$411,501 | \$411,501 | \$411,501 | \$411,501 | \$3,219,512 | \$3,634,692 |

| UPGRADE ID | PROJECT NAME | REL/ ECO | TYPE | IN-SERVICE DATE | BEST COST | 1-YEAR COST | PRORATED COST 2014 | 3/1/14 - 2/28/15 | PRORATED COST 2015 | INFLATED COST | 40-YEAR NPV |
|------------|---|----------|----------------------|-----------------|--------------|-------------|--------------------|------------------|--------------------|---------------|--------------|
| 50592 | Multi - Renfrow 345/138 kV substation and Renfrow - Grant 138 kV line | R | Regional Reliability | 9/1/2014 | \$587,690 | \$78,467 | \$26,084 | \$38,802 | \$78,467 | \$587,690 | \$718,246 |
| 50594 | Multi - Cushing Area 138 kV | R | Regional Reliability | 3/1/2013 | | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 50595 | Multi - Renfrow - Wakita - Noel Switch 138 kV | R | Regional Reliability | 1/28/2013 | \$17,928,848 | \$3,190,460 | \$3,190,460 | \$3,190,460 | \$3,190,460 | \$17,491,559 | \$28,180,560 |
| 50596 | Multi - Renfrow - Wakita - Noel Switch 138 kV | R | Regional Reliability | 6/30/2013 | \$7,220,000 | \$1,284,808 | \$1,284,808 | \$1,284,808 | \$1,284,808 | \$7,043,902 | \$11,348,395 |
| 50597 | Multi - Renfrow - Wakita - Noel Switch 138 kV | R | Regional Reliability | 6/24/2013 | \$3,573,553 | \$635,918 | \$635,918 | \$635,918 | \$635,918 | \$3,486,393 | \$5,616,910 |
| 50610 | Line - Buffalo - Buffalo Bear - Ft. Supply 69 kV | R | Regional Reliability | 12/19/2014 | \$1,500,000 | \$273,600 | \$9,020 | \$53,367 | \$273,600 | \$1,500,000 | \$2,504,392 |
| 50611 | Line - Buffalo - Buffalo Bear - Ft. Supply 69 kV | R | Regional Reliability | 12/19/2014 | \$6,000,000 | \$1,094,400 | \$36,079 | \$213,468 | \$1,094,400 | \$6,000,000 | \$10,017,567 |
| 50619 | Multi - Renfrow - Wakita - Noel Switch 138 kV | R | Regional Reliability | 4/30/2014 | \$2,000,000 | \$364,800 | \$245,538 | \$304,668 | \$364,800 | \$2,000,000 | \$3,339,189 |
| 50622 | Multi - Renfrow - Medford Tap - Chikaskia 138 kV | R | Regional Reliability | 1/1/2015 | \$2,056,746 | \$281,477 | \$0 | \$44,851 | \$281,477 | \$2,108,165 | \$2,667,121 |
| 50627 | Multi - Renfrow - Medford Tap - Chikaskia 138 kV | R | Regional Reliability | 1/1/2015 | \$5,256,327 | \$719,358 | \$0 | \$114,623 | \$719,358 | \$5,387,735 | \$6,816,234 |
| 50629 | Multi - Renfrow - Medford Tap - Chikaskia 138 kV | R | Regional Reliability | 1/1/2015 | \$3,041,661 | \$416,268 | \$0 | \$66,328 | \$416,268 | \$3,117,703 | \$3,944,327 |
| 50630 | Multi - Renfrow - Medford Tap - Chikaskia 138 kV | R | Regional Reliability | 5/1/2014 | \$185,400 | \$24,754 | \$16,593 | \$20,606 | \$24,754 | \$185,400 | \$226,587 |
| 50634 | Line - Hays Plant - Vine Street 115 kV Ckt 1 | R | Regional Reliability | 10/1/2014 | \$15,720 | \$2,178 | \$544 | \$897 | \$2,178 | \$15,720 | \$19,933 |
| 50704 | Line - Maxwell - North Platt 115 kV Ckt 1 | R | Regional Reliability | 1/1/2014 | \$25,767 | \$3,007 | \$3,007 | \$3,007 | \$3,007 | \$25,767 | \$27,526 |
| 50741 | XFR - Harrisonville 161/69 kV Ckt 2 | R | Regional Reliability | 2/10/2014 | \$2,773,480 | \$359,126 | \$319,662 | \$359,126 | \$359,126 | \$2,773,480 | \$3,287,254 |
| 50762 | XFR - Harrisonville 161/69 kV Ckt 2 | R | Regional Reliability | 4/14/2014 | \$1,005,220 | \$130,162 | \$93,330 | \$114,428 | \$130,162 | \$1,005,220 | \$1,191,432 |
| 10374 | Line - Valliant Substation - Install 345 kV terminal equipment | R | Transmission Service | 4/17/2012 | \$3,840,000 | \$486,212 | \$486,212 | \$486,212 | \$486,212 | \$3,654,967 | \$4,139,303 |

| UPGRADE ID | PROJECT NAME | REL/ECO | TYPE | IN-SERVICE DATE | BEST COST | 1-YEAR COST | PRORATED COST 2014 | 3/1/14 - 2/28/15 | PRORATED COST 2015 | INFLATED COST | 40-YEAR NPV |
|------------|--|---------|----------------------|-----------------|--------------|-------------|--------------------|------------------|--------------------|---------------|--------------|
| 10405 | Line - Valliant - Hugo 345 kV | R | Transmission Service | 6/8/2012 | \$23,189,835 | \$5,159,122 | \$5,159,122 | \$5,159,122 | \$5,159,122 | \$22,072,419 | \$43,921,554 |
| 10406 | XFR - Hugo 345/138 kV | R | Transmission Service | 6/30/2012 | \$6,328,605 | \$1,407,946 | \$1,407,946 | \$1,407,946 | \$1,407,946 | \$6,023,657 | \$11,986,380 |
| 10410 | Line - South Hays - Hays Plant - Vine St. 115 kV Ckt 1 #2 | R | Transmission Service | 6/1/2012 | \$35,000 | \$4,615 | \$4,615 | \$4,615 | \$4,615 | \$33,314 | \$39,288 |
| 10456 | Multi - McNab REC - Turk 115 kV | R | Transmission Service | 6/30/2012 | \$7,310,000 | \$925,575 | \$925,575 | \$925,575 | \$925,575 | \$6,957,763 | \$7,879,766 |
| 10467 | XFR - Anadarko 138/69 kV | R | Transmission Service | 12/4/2012 | \$2,000,000 | \$347,222 | \$347,222 | \$347,222 | \$347,222 | \$1,903,629 | \$2,956,031 |
| 10487 | Line - Creswell - Oak 69 kV Ckt 1 | R | Transmission Service | 11/8/2013 | \$150,000 | \$20,715 | \$20,715 | \$20,715 | \$20,715 | \$146,341 | \$182,972 |
| 10488 | XFR - Rose Hill 345/138 kV Ckt 3 | R | Transmission Service | 5/30/2013 | \$7,395,975 | \$1,021,393 | \$1,021,393 | \$1,021,393 | \$1,021,393 | \$7,215,585 | \$9,021,712 |
| 10876 | XFR - 3rd Arcadia 345/138 kV | R | Transmission Service | 6/1/2012 | \$10,550,000 | \$1,340,737 | \$1,340,737 | \$1,340,737 | \$1,340,737 | \$10,041,642 | \$11,414,197 |
| 10994 | XFR - Medicine Lodge 138/115 kV | R | Transmission Service | 2/1/2013 | \$10,619,760 | \$2,421,680 | \$2,421,680 | \$2,421,680 | \$2,421,680 | \$10,360,741 | \$21,390,109 |
| 11200 | Line - Clifton - Greenleaf 115 kV | R | Transmission Service | 1/31/2013 | \$5,114,563 | \$1,166,301 | \$1,166,301 | \$1,166,301 | \$1,166,301 | \$4,989,818 | \$10,301,651 |
| 11201 | Line - Flatridge - Medicine Lodge 138 kV | R | Transmission Service | 1/20/2014 | \$4,631,255 | \$1,082,492 | \$1,025,988 | \$1,082,492 | \$1,082,492 | \$4,631,255 | \$9,908,565 |
| 11202 | Line - Flatridge - Harper 138 kV | R | Transmission Service | 6/20/2013 | \$11,008,945 | \$2,510,428 | \$2,510,428 | \$2,510,428 | \$2,510,428 | \$10,740,434 | \$22,173,998 |
| 11203 | Line - Medicine Lodge - Pratt 115 kV | R | Transmission Service | 5/16/2014 | \$13,645,827 | \$3,189,523 | \$2,006,596 | \$2,523,579 | \$3,189,523 | \$13,645,827 | \$29,195,231 |
| 11204 | Line - Macarthur - Oatville 69 kV Ckt 1 | R | Transmission Service | 3/12/2012 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 11262 | Line - Arcadia - OMPA Edmond Garber 138 kV Ckt 1 | R | Transmission Service | 6/18/2012 | \$30,000 | \$3,813 | \$3,813 | \$3,813 | \$3,813 | \$28,554 | \$32,457 |
| 11314 | Line - Jones Station Bus#2 - Lubbock South Interchange 230 kV Ckt 2 terminal upgrade | R | Transmission Service | 1/13/2015 | \$190,000 | \$24,892 | \$0 | \$3,146 | \$24,071 | \$194,750 | \$235,862 |
| 11342 | Line - Greenleaf - Knob Hill 115kV Ckt 1 | R | Transmission Service | 1/31/2013 | \$4,462,093 | \$1,017,515 | \$1,017,515 | \$1,017,515 | \$1,017,515 | \$4,353,261 | \$8,987,459 |
| 11347 | Line - Southwest Shreveport - Springridge REC 138 kV | R | Transmission Service | 6/1/2013 | \$7,200,000 | \$934,438 | \$934,438 | \$934,438 | \$934,438 | \$7,024,390 | \$8,253,662 |
| 11348 | Line - Eastex - Whitney 138 kV Accelerated | R | Transmission Service | 6/1/2013 | \$2,800,000 | \$363,393 | \$363,393 | \$363,393 | \$363,393 | \$2,731,707 | \$3,209,758 |

| UPGRADE ID | PROJECT NAME | REL/ECO | TYPE | IN-SERVICE DATE | BEST COST | 1-YEAR COST | PRORATED COST 2014 | 3/1/14 - 2/28/15 | PRORATED COST 2015 | INFLATED COST | 40-YEAR NPV |
|------------|--|---------|----------------------|-----------------|---------------|--------------|--------------------|------------------|--------------------|---------------|---------------|
| 11350 | ALTUS SW - NAVAJO 69KV CKT 1 | R | Transmission Service | 6/1/2013 | \$150,000 | \$26,693 | \$26,693 | \$26,693 | \$26,693 | \$146,341 | \$235,770 |
| 11351 | G03-05T - PARADISE 138KV CKT 1 | R | Transmission Service | 12/4/2012 | \$150,000 | \$26,042 | \$26,042 | \$26,042 | \$26,042 | \$142,772 | \$221,702 |
| 50148 | Line - Turk - NW Texarkana 345 kV | R | Transmission Service | 8/28/2012 | \$44,200,000 | \$5,596,498 | \$5,596,498 | \$5,596,498 | \$5,596,498 | \$42,070,196 | \$47,645,097 |
| 50149 | Line - Turk - NW Texarkana 345 kV | R | Transmission Service | 8/28/2012 | | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 50150 | Line - Turk - NW Texarkana 345 kV | R | Transmission Service | 8/28/2012 | | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 50160 | Line - Linwood - Powell Street 138 kV | R | Transmission Service | 6/1/2012 | \$456,000 | \$57,738 | \$57,738 | \$57,738 | \$57,738 | \$434,027 | \$491,542 |
| 50164 | Line - SE Texarkana - Texarkana Plant 69 kV | R | Transmission Service | 3/1/2012 | \$128,000 | \$16,207 | \$16,207 | \$16,207 | \$16,207 | \$121,832 | \$137,977 |
| 50165 | Line - South Texarkana REC - Texarkana Plant 69 kV | R | Transmission Service | 5/30/2012 | \$8,193,000 | \$1,037,378 | \$1,037,378 | \$1,037,378 | \$1,037,378 | \$7,798,215 | \$8,831,590 |
| 50169 | Multi - Hugo - Sunny-side 345 kV (OGE) | R | Transmission Service | 4/1/2012 | \$156,900,000 | \$19,939,486 | \$19,939,486 | \$19,939,486 | \$19,939,486 | \$149,339,679 | \$169,752,366 |
| 50171 | Multi - Hugo - Sunny-side 345 kV (OGE) | R | Transmission Service | 4/1/2012 | | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 50172 | Line - VBI - VBI North 69 kV | R | Transmission Service | 6/1/2014 | \$100,000 | \$13,352 | \$7,813 | \$9,977 | \$13,352 | \$100,000 | \$122,215 |
| 50173 | Line - Hugo - Sunnyside 345 kV | R | Transmission Service | 6/8/2012 | \$6,775,042 | \$1,507,267 | \$1,507,267 | \$1,507,267 | \$1,507,267 | \$6,448,583 | \$12,831,932 |
| 50228 | Multi - Green - Coffey County No. 3 - Burlington Junction - Wolf Creek 69 kV | R | Transmission Service | 12/18/2012 | \$4,380,845 | \$590,244 | \$590,244 | \$590,244 | \$590,244 | \$4,169,751 | \$5,024,967 |
| 50229 | Device - Allen 69 kV Capacitor | R | Transmission Service | 5/31/2012 | \$1,405,967 | \$189,430 | \$189,430 | \$189,430 | \$189,430 | \$1,338,220 | \$1,612,688 |
| 50231 | Device - Athens 69 kV Capacitor | R | Transmission Service | 10/14/2013 | \$700,000 | \$96,671 | \$96,671 | \$96,671 | \$96,671 | \$682,927 | \$853,870 |
| 50233 | Multi - Green - Coffey County No. 3 - Burlington Junction - Wolf Creek 69 kV | R | Transmission Service | 6/23/2014 | \$3,027,106 | \$428,498 | \$224,844 | \$294,298 | \$428,498 | \$3,027,106 | \$3,922,247 |
| 50234 | Multi - Green - Coffey County No. 3 - Burlington Junction - Wolf Creek 69 kV | R | Transmission Service | 10/1/2013 | \$3,535,570 | \$488,266 | \$488,266 | \$488,266 | \$488,266 | \$3,449,337 | \$4,312,737 |
| 50236 | Multi - Green - Coffey County No. 3 - Burlington Junction - Wolf Creek 69 kV | R | Transmission Service | 7/16/2014 | \$6,726,750 | \$952,196 | \$439,475 | \$593,815 | \$952,196 | \$6,726,750 | \$8,715,907 |

| UPGRADE ID | PROJECT NAME | REL/ECO | TYPE | IN-SERVICE DATE | BEST COST | 1-YEAR COST | PRORATED COST 2014 | 3/1/14 - 2/28/15 | PRORATED COST 2015 | INFLATED COST | 40-YEAR NPV |
|------------|--|---------|----------------------|-----------------|-------------|-------------|--------------------|------------------|--------------------|---------------|-------------|
| 50240 | Multi - Green - Coffey County No. 3 - Burlington Junction - Wolf Creek 69 kV | R | Transmission Service | 3/29/2012 | \$1,693,501 | \$228,170 | \$228,170 | \$228,170 | \$228,170 | \$1,611,899 | \$1,942,499 |
| 50284 | Device - Dearing 138 kV Capacitor | R | Transmission Service | 6/30/2013 | \$581,038 | \$80,242 | \$80,242 | \$80,242 | \$80,242 | \$566,866 | \$708,758 |
| 50327 | Line - East Manhattan - NW Manhattan 230 kV Ckt 1 | R | Transmission Service | 3/19/2012 | \$199,416 | \$26,868 | \$26,868 | \$26,868 | \$26,868 | \$189,807 | \$228,736 |
| 50329 | Line - Stillwell - West Gardner 345 kV Ckt 1 | R | Transmission Service | 2/1/2013 | \$457,827 | \$87,313 | \$87,313 | \$87,313 | \$87,313 | \$446,661 | \$771,214 |
| 50375 | XFR - Diana 345/138 kV ckt 3 | R | Transmission Service | 6/1/2013 | \$5,500,000 | \$713,807 | \$713,807 | \$713,807 | \$713,807 | \$5,365,854 | \$6,304,881 |
| 50498 | Line - Greenleaf - Knob Hill 115 kV CKT 1 WR | R | Transmission Service | 3/1/2013 | \$329,538 | \$45,510 | \$45,510 | \$45,510 | \$45,510 | \$321,500 | \$401,975 |
| 50368 | Sub - Chapman Junction 115 kV | R | Zonal Reliability | 12/7/2012 | \$5,425,273 | \$730,962 | \$730,962 | \$730,962 | \$730,962 | \$5,163,853 | \$6,222,958 |
| 50369 | Sub - Clay Center Junction 115 kV | R | Zonal Reliability | 12/7/2012 | \$2,849,367 | \$383,903 | \$383,903 | \$383,903 | \$383,903 | \$2,712,069 | \$3,268,313 |
| 50370 | Device - Chapman Junction 115 kV Capacitor | R | Zonal Reliability | 11/6/2012 | \$406,402 | \$54,756 | \$54,756 | \$54,756 | \$54,756 | \$386,819 | \$466,156 |
| 50371 | Line - Clay Center Junction - Clay Center Switching Station 115 kV | R | Zonal Reliability | 12/7/2012 | \$7,476,811 | \$1,007,372 | \$1,007,372 | \$1,007,372 | \$1,007,372 | \$7,116,536 | \$8,576,137 |
| 50373 | Sub - Clay Center Switching Station 115 kV | R | Zonal Reliability | 12/7/2012 | \$2,774,851 | \$373,864 | \$373,864 | \$373,864 | \$373,864 | \$2,641,143 | \$3,182,841 |
| 50383 | Device - Northwest Manhattan 115 kV Capacitor | R | Zonal Reliability | 10/10/2012 | \$957,660 | \$129,028 | \$129,028 | \$129,028 | \$129,028 | \$911,515 | \$1,098,466 |

| REL/ECO | TYPE | BEST COST | 1-YEAR COST | PRORATED COST 2014 | 3/1/14 - 2/28/15 | PRORATED COST 2015 | 40-YEAR NPV |
|---------|-------------------|------------------------|---------------|--------------------|------------------|--------------------|-----------------|
| | Total | \$3,411,660,964 | | | | | |
| E | Economic Total | \$1,590,690,489 | | \$129,053,708 | \$161,750,083 | \$269,969,225 | \$2,434,836,003 |
| X | GI Total | \$175,636,492 | 1-Year Cost | \$22,087,743 | \$23,187,672 | \$27,275,612 | \$238,205,412 |
| R | Reliability Total | \$1,645,333,984 | \$231,421,630 | \$187,345,196 | \$199,875,039 | \$231,340,056 | \$2,041,188,617 |

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