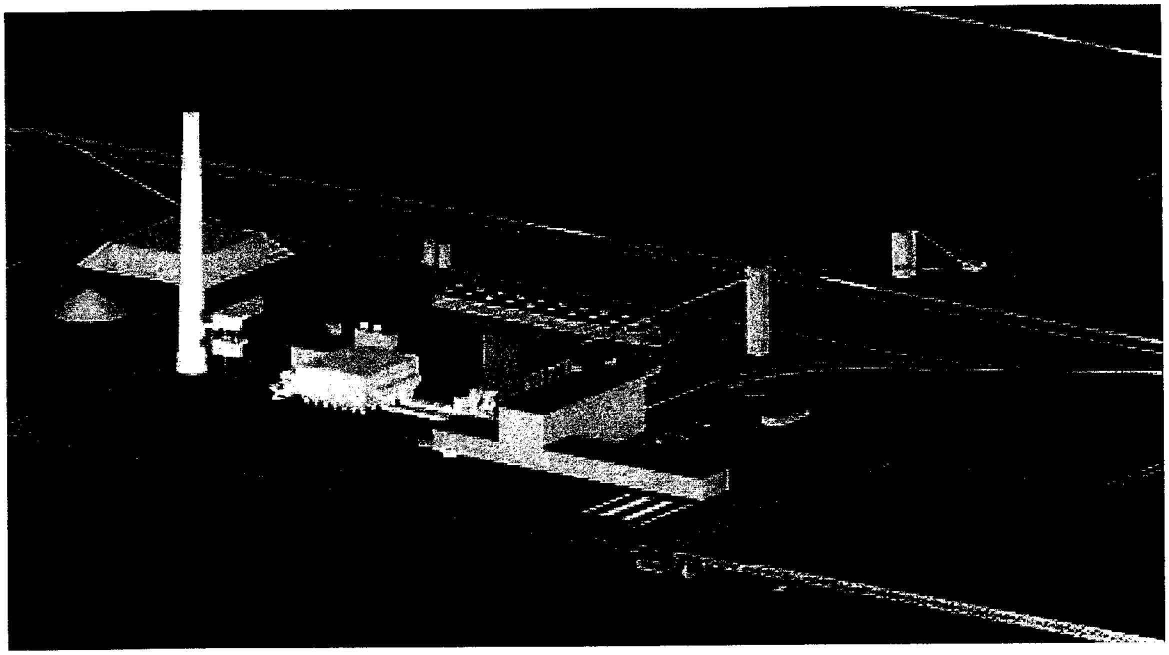
# Florida Electrical Power Plant Siting Act
# Need for Power Application

## Taylor Energy Center 060635-EU



**Submitted by:**

**Florida Municipal Power Agency**
**JEA**
**Reedy Creek Improvement District**
**City of Tallahassee**
**September 2006**
**Volume E**

FMPA
Florida Municipal Power Agency

JEA

REEDY CREEK
IMPROVEMENT DISTRICT

City of Tallahassee
Your Own Utilities

**Prepared by:**
**Black & Veatch Corporation**

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ENERGY WATER INFORMATION GOVERNMENT

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# Abbreviations

| | |
|---|---|
| AFUDC | Allowance for Funds Used During Construction |
| BEERS | Building Energy Efficient Rating System |
| CAIR | Clean Air Interstate Rule |
| CAMR | Clean Air Mercury Rule |
| CDD | Cooling Degree-Day |
| City | City of Tallahassee |
| CO | Carbon Monoxide |
| CPI | Consumer Price Index |
| CPWC | Cumulative Present Worth Cost |
| CR-3 | Crystal River Unit 3 |
| CT | Combustion Turbine |
| DR | Demand Response/Load Control |
| DSM | Demand-Side Management |
| EE | Energy Efficient |
| EPC | Engineering, Procurement, and Construction |
| FAMU | Florida A&M University |
| FEECA | Florida Energy Efficiency and Conservation Act |
| FGD | Flue Gas Desulfurization |
| FGT | Florida Gas Transmission Company |
| FMPA | Florida Municipal Power Agency |
| FPSC | Florida Public Service Commission |
| FRCC | Florida Reliability Coordinating Council |
| FSU | Florida State University |
| GDP | Gross Domestic Product |
| GE | General Electric |
| GSD | General Service Demand |
| GSLD | General Service Large Demand |
| GSND | General Service Non-Demand |
| HC3 | Hopkins Combustion Turbine Unit 3 |
| HC4 | Hopkins Combustion Turbine Unit 4 |
| HDD | Heating Degree-Day |
| Hopkins Station | Arvah B. Hopkins Generating Station |
| HVAC | Heating, Ventilation, and Air Conditioning |
| HRSG | Heat Recovery Steam Generator |
| LOLP | Loss of Load Probability |

| | |
|---|---|
| kW | Kilowatt |
| MW | Megawatt |
| NEL | Net Energy for Load |
| NOAA | National Oceanic & Atmospheric Administration |
| $NO_x$ | Nitrogen Oxide |
| OUC | Orlando Utilities Commission |
| PEF | Progress Energy Florida |
| petcoke | Petroleum Coke |
| PRB | Powder River Basin |
| Purdom Station | Sam O. Purdom Generating Station |
| RCID | Reedy Creek Improvement District |
| SCR | Selective Catalytic Reduction |
| $SO_2$ | Sulfur Dioxide |
| Southern | Southern Power Company |
| Talquin | Talquin Electric Cooperative Inc. |
| TCEC | Treasure Coast Energy Center |
| TEC | Taylor Energy Center |
| TMH | Tallahassee Memorial Hospital |
| VOC | Volatile Organic Compounds |
| WESP | Wet Electrostatic Precipitator |

# E.1.0 City of Tallahassee Introduction

## E.1.1 City of Tallahassee Overview

The City of Tallahassee (City) owns, operates, and maintains an electric generation, transmission, and distribution system that presently supplies electric power and energy to approximately 108,000 customers in a service area consisting of approximately 221 square miles. Incorporated in 1825, the City has operated since 1919 under the same charter and began generating its power requirements in 1902.

Currently, the City's Electric Department operates three generating stations with a total summer net capacity of 746 megawatts (MW) and a total winter net capacity of 797 MW. The Sam O. Purdom Generating Station is located 22 miles south of the City. The facility has one steam unit, one combined cycle unit, and two combustion turbine units for a total of four generating units with total net summer and winter capacities of approximately 301 MW and 332 MW, respectively. The Arvah B. Hopkins Generating Station (Hopkins Station) is located 7 miles west of the City, and currently consists of two steam units and four combustion turbine units with total net summer and winter capacities of 434 MW and 454 MW, respectively. The City also has been generating electricity at the C.H. Corn Hydroelectric Station, which is located 20 miles southwest of the City. The facility consists of three generating units and has a total net summer and winter capacity of 11 MW.

The City is a summer peaking system and expects consistent growth throughout the forecast period. The firm summer peak demand is projected to increase from 609 MW in 2006 to 793 MW in 2025, and the firm winter peak is projected to increase from 546 MW in 2006 to 779 MW in 2025.

Taylor Energy Center (TEC) is being proposed as a joint development project by four municipal utilities, including the Florida Municipal Power Agency (FMPA), JEA, Reedy Creek Improvement District (RCID), and the City of Tallahassee (collectively, the Participants). The Participants are developing TEC to realize the benefits associated with the economies of scale inherent in constructing and operating a large power plant. TEC will be developed on a site consisting of approximately 3,000 acres to be located approximately 5 miles southeast of Perry, in Taylor County, Florida. The land is bordered by Highway 27 on the north and the Fenholloway River on the west. The plant is proposed to be a 765 MW (net) supercritical pulverized coal unit with a net heat rate of 9,238 Btu/kWh when firing a blend of Latin American coal and petroleum coke (petcoke). Additional details regarding TEC are included in Section A.3.0 of this Application. The City's ownership interest in TEC will be 20.3 percent, or about 155.4 MW (net at average ambient operating conditions).

In addition to providing a reliable, cost-effective resource to meet the City's growing electric capacity and energy needs, TEC will provide additional benefits to the State of Florida. The project will use proven supercritical boiler technology and advanced pollution control equipment to limit emissions, while burning a variety of solid fuels including Powder River Basin (PRB) coal (which has the largest coal reserves of any region within the United States), as well as Central Appalachian coals, Latin American coals, and petcoke. TEC will provide the City and the other Participants with fuel diversity. The State of Florida will benefit from the ability to source fuel from locations outside the hurricane-susceptible natural gas producing regions within the Gulf Coast. In addition, the City's customers will have access to an energy supply source with less price volatility than natural gas, which should help electric energy rates become more stable and predictable over time.

## E.1.2 City of Tallahassee Summary

Information specific to the City is included in this Volume E. The remainder of Volume E of this Application is comprised of nine additional sections:

- Section E.2.0 - Description of the City's Existing System.
- Section E.3.0 - Forecast of the City's Electrical Demand and Consumption.
- Section E.4.0 - The City's Need for Capacity.
- Section E.5.0 - The City's Economic Analysis.
- Section E.6.0 - The City's Sensitivity Analyses.
- Section E.7.0 - The City's Demand-Side Management.
- Section E.8.0 - The City's Strategic Considerations.
- Section E.9.0 - The City's Consequences of Delay.
- Section E.10.0 - The City's Financial Analysis.

The information and analyses presented throughout this Volume E and the complete Application demonstrate that the proposed TEC satisfies the requirements set forth in Section 403.519, Florida Statutes. In particular, TEC is the most cost-effective alternative available to the City to satisfy forecast capacity requirements in a reliable, environmentally responsible manner. TEC will provide the City, and the State of Florida as a whole, with increased fuel diversity and supply reliability. In selecting TEC as its next generating resource, the City considered all reasonable conservation and demand-side management (DSM) measures available beyond its existing portfolio of energy conservation offerings and found a combination of TEC with conservation, DSM, and renewable resources to be the most cost-effective means of satisfying its capacity and energy needs.

# E.2.0 Description of the City's Existing System

The City of Tallahassee (City) owns, operates, and maintains an electric generation, transmission, and distribution system that presently supplies electric power and energy to approximately 108,000 customers in a service area consisting of approximately 221 square miles. Incorporated in 1825, the City has operated since 1919 under the same charter and began generating its power requirements in 1902.

## E.2.1 Generation System

The City began generating electricity for public use in 1902, with the installation of an 87.5 kilowatt (kW) generating facility, which served approximately 3,000 customers. During the period from 1929 through 1951, the City purchased all of its electric power requirements wholesale from other generating systems. The City began generating its power requirements again on January 1, 1952, with the installation of the first of four generating units at the Sam O. Purdom Generating Station. Currently, the City's Electric Department operates three generating stations with a total summer net capacity of 746 MW, as described further in Subsection E.2.1.1.

### *E.2.1.1 Existing Generating Units*

The City has two natural gas and oil fueled generating stations that consist of combined cycle, steam, and combustion turbine (CT) electric generating facilities. The Sam O. Purdom Generating Station (Purdom Station) has been in operation since 1952, and the Hopkins Station has been in commercial operation since 1970. The City also has been generating electricity at the C.H. Corn Hydroelectric Station since August 1985.

The Purdom Station is located on 63 acres of land adjacent to the St. Marks River in Wakulla County, 22 miles south of Tallahassee. It was first placed into commercial operation in 1952, and underwent a major renovation in 2000, when two of the plant's three boilers and steam turbines were retired and a new combined cycle unit was constructed. It currently consists of one steam unit, one combined cycle unit, and two CT units, for a total of four generating units with total net summer and winter capacities of 301 MW and 332 MW, respectively.

The Hopkins Station is located on 230 acres of land, 7 miles west of the City. In 1977, 7 years after its construction, the station was expanded with the addition of a second boiler and power generator. The Hopkins Station currently consists of two steam units and four CT units with total net summer and winter capacities of 434 MW and 454 MW, respectively. Of the net summer capacity, 130 MW is supplied by CTs, which are used primarily to provide peaking capacity.

In 2005, the City installed two CTs at the existing Hopkins Station (HC3 and HC4). The CTs are General Electric (GE) LM6000 SPRINT units, each with a net summer capability of 47 MW and a net winter capability of 49 MW. The units are dual-fueled, capable of operating either on natural gas or No. 2 fuel oil. Emissions of nitrogen oxides ($NO_x$) are controlled through water injection, and high temperature selective catalytic reduction (SCR) is included on each unit to further reduce $NO_x$ emissions. Oxidation catalysts were installed to reduce emissions of carbon monoxide (CO) and volatile organic compounds (VOC). HC3 began commercial operation in September 2005, and HC4 began commercial operation in November 2005. Both HC3 and HC4 have quick start capabilities.

In October 2005, the Tallahassee City Commission approved the repowering of the existing Hopkins Unit 2 to a 1x1 7FA combined cycle configuration. The repowering will utilize the existing steam turbine coupled with a GE 7FA CT and a heat recovery steam generator (HRSG). The 7FA CT will be dual-fueled, capable of operation on either natural gas or No. 2 fuel oil. The HRSG will convert the waste heat from the CT to steam for use in the steam turbine. Utilization of the waste heat will improve the efficiency of the combined cycle as compared to the existing steam turbine, with an expected 30 percent reduction in the unit's net heat rate.

Currently, the City is planning on the repowered 1x1 combined cycle entering commercial operation in May 2008. Preliminary engineering by Sargent & Lundy for the repowered unit estimates a net summer output of approximately 296 MW (including supplemental duct firing) and a net winter output of approximately 333 MW. The City will continue to evaluate further repowering of Hopkins Unit 2 to a 2x1 configuration. The incremental capacity gained from the 1x1 repowering of Hopkins Unit 2 is not included in the total seasonal capacity discussions in this section because of the anticipated summer 2008 in-service date. However, the incremental capacity gained from the repowering is included in the need for capacity determination that is presented in Section E.4.0, beginning in the summer of 2008.

Formerly known as the Jackson Bluff Hydroelectric Station, the C.H. Corn Hydroelectric Station is the third plant operated by the City. The plant is located 20 miles southwest of the City, on the southern tip of Lake Talquin. The facility consists of three generating units and has a total net summer and winter capacity of 11 MW.

Combined, the City's existing net generating capacity totals 746 MW in the summer and 797 MW in the winter. Table E.2-1 presents a summary of the City's existing generating units.

Table E.2-1
City of Tallahassee Existing and Committed Generating Facilities (as of December 31, 2005)

| Plant | Unit No. | Location (County) | Unit Type | Fuel | | Fuel Transport | | Commercial In-Service Month/Year | Expected Retirement Month/Year | Gen. Max. Nameplate (kW) | Net Capability | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Primary | Alternate | Primary | Alternate | | | | Summer (MW) | Winter (MW) |
| **Existing Generating Facilities** | | | | | | | | | | | | |
| Sam O. Purdom | 7 | Wakulla | ST | NG | FO6 | PL | WA | 6/66 | 3/11 | 50,000 | 48 | 50 |
| | 8 | | CC | NG | FO2 | PL | TK | 7/00 | 12/40 | 247,743 | 233 | 262 |
| | CT-1 | | CT | NG | FO2 | PL | TK | 12/63 | 3/11 | 15,000 | 10 | 10 |
| | CT-2 | | CT | NG | FO2 | PL | TK | 5/64 | 3/11 | 15,000 | 10 | 10 |
| | | | | | | | | | | PLANT TOTAL | **301** | **332** |
| A.B. Hopkins | 1 | Leon | ST | NG | FO6 | PL | TK | 5/71 | 3/16 | 75,000 | 76 | 78 |
| | 2 | | ST | NG | FO6 | PL | TK | 10/77 | 3/22 | 259,000 | 228 | 238 |
| | CT-1 | | CT | NG | FO2 | PL | TK | 2/70 | 3/15 | 16,320 | 12 | 14 |
| | CT-2 | | CT | NG | FO2 | PL | TK | 9/72 | 3/17 | 27,000 | 24 | 26 |
| | HC3 | | CT | NG | FO2 | PL | TK | 9/05 | Unknown | 50,000 | 47 | 49 |
| | HC4 | | CT | NG | FO2 | PL | TK | 11/05 | Unknown | 50,000 | 47 | 49 |
| | | | | | | | | | | PLANT TOTAL | **434** | **454** |
| C.H. Corn Hydro Plant | 1 | Leon/ Gadsden | HY | WA | WA | WA | WA | 9/85 | Unknown | 4,440 | 4 | 4 |
| | 2 | | HY | WA | WA | WA | WA | 8/85 | Unknown | 4,440 | 4 | 4 |
| | 3 | | HY | WA | WA | WA | WA | 1/86 | Unknown | 3,430 | 3 | 3 |
| | | | | | | | | | | PLANT TOTAL | **11** | **11** |
| | | | | | | | | | | TOTAL SYSTEM CAPACITY AS OF DECEMBER 31, 2005 | **746** | **797** |

Unit Type Codes:
ST: Steam Turbine
CC: Combined Cycle
CT: Combustion Turbine
HY: Hydroelectric

Fuel Codes:
NG: Natural Gas
WA: Water
FO2: No. 2 Fuel Oil (distillate)
FO6: No. 6 Fuel Oil (residual)

Fuel Transportation Codes:
PL: Pipeline
TK: Truck
WA: Water

#### *E.2.1.2 FRCC Operating Reserve Capacity*

The City is a member of the Florida Reliability Coordinating Council (FRCC). As a member of the FRCC, the City complies with the *FRCC Operating Reserve Policy*, which requires that operating reserves be maintained by all FRCC control areas at a value equal to or greater than the loss of generation that would result from the most severe single generation contingency, which is currently 910 MW (according to the *FRCC Standards Handbook, FRCC Operating Reserve Policy*, revised May 2006). The *Operating Reserve Policy* further requires that FRCC control areas shall provide spinning reserves equal to or greater than 25 percent of the amount of the FRCC Operating Reserves. FRCC Operating Reserves must be fully available within 15 minutes, and each control area's operating reserve allocation shall be available to the other FRCC control areas not restricted by any transmission limitations.

The FRCC Operating Reserve requirement is allocated among the FRCC control areas in proportion to each control area's peak hour net energy load for the year 2000 and the summer gross FRCC capability of its largest unit or ownership share of a joint unit operational in 2000, whichever is greater. Fifty percent is allocated on the basis of peak hour net energy for load (NEL) and 50 percent on the basis of the summer gross FRCC capability of the largest unit.

The allocations stated in the May 2006 *FRCC Standards Handbook* require the City to maintain 31.6 MW of operating reserves and a minimum of 7.9 MW of spinning reserves.

#### *E.2.1.3 Capacity and Power Sales Contracts*

The City has no firm long-term capacity or power sales contracts in place. However, the City conducts short-term and intermediate sale transactions on a routine basis.

#### *E.2.1.4 Capacity and Power Purchase Contracts*

In an effort to provide reliable power at the lowest cost, the City has historically entered into both long-term and short-term power purchase agreements with other electric utilities. Currently, the City has a long-term firm capacity and energy purchase agreement with Progress Energy Florida (PEF, formerly Florida Power Corporation) for 11.4 MW. The 11.4 MW purchase from PEF is associated with the City's former 1.333 percent (11.4 MW) undivided ownership interest in the Crystal River Unit 3 (CR-3) nuclear unit. In September 1999, the City transferred its ownership interest in CR-3 and the decommissioning trust account balance to PEF (Florida Power Corporation at the time). The terms of the transfer include purchasing equivalent electric capacity from PEF through December 3, 2016. In addition to the PEF purchase agreement, the City will continue to evaluate other power purchase opportunities as they may become available.

### E.2.1.5 Planned Unit Retirements or Shutdowns

The City continually evaluates whether to retire existing generating units. Table E.2-2 shows the retirement schedule for the existing units within the planning horizon of this Application.

Table E.2-2
City of Tallahassee Anticipated Unit Retirements

| Unit Name | Unit Age (as of 01/01/2006) | Net Summer Capacity (MW) | Net Winter Capacity (MW) | Anticipated Retirement Date |
|---|---|---|---|---|
| Purdom CT-1 | 42 years | 10 | 10 | March 2011 |
| Purdom CT-2 | 42 years | 10 | 10 | March 2011 |
| Purdom 7 | 39 years | 48 | 50 | March 2011 |
| Hopkins CT-1 | 36 years | 12 | 14 | March 2015 |
| Hopkins 1 | 35 years | 76 | 78 | March 2016 |
| Hopkins CT-2 | 33 years | 24 | 26 | March 2017 |

### E.2.1.6 Total System Resources

The City's total summer net generating capacity is 746 MW, the majority of which (735 MW, or approximately 98.5 percent) is gas fired, with fuel oil as a backup fuel, at the Purdom and Hopkins Stations. The remaining 11 MW of the City's generating capacity comes from hydroelectric generation at the C.H. Corn Hydroelectric Station. The City's power purchase agreement with PEF brings its current total system resources to approximately 757 MW.

## E.2.2 Transmission System

The City's existing transmission system includes approximately 185 circuit miles of transmission lines operating at voltages of 230 kV and 115 kV. The 115 kV transmission network forms a 115 kV loop that extends around and through the City limits. This 115 kV system primarily performs load-servicing functions. Sixteen substations, located at various sites, transform power from the transmission voltage of 115 kV to the distribution network voltage of 12.47 kV. The transmission, distribution, and generation facilities are monitored and controlled remotely from the City's Electric Control Center via line carrier channels, microwave systems, and communication lines network. The City is interconnected with PEF at five locations on its system and with Georgia Power Company (a subsidiary of the Southern Company) at one location.

A study of the transmission system has identified a number of system improvements and additions that will be required to serve future load in a reliable manner. Figure E.2-1 depicts the City's proposed transmission system, including the existing system, as well as transmission additions proposed to be in place by 2014.

Over the past decade, the City has experienced expected, but significant, growth and development. This growth has initiated a corresponding increase in the demand for electricity. Of special interest is the fast growing eastern portion of the City and adjacent Leon County, where rapid development has resulted in the need for additional transmission and distribution facilities. Therefore, it is necessary to reinforce this area with proper substation and transmission infrastructure. The City is currently planning and, in some cases, is in the process of constructing several new substations on the east side of its system. These are intended to serve the future load in this rapidly growing area. The new substations (identified on Figure E.2-1 as 14, 15, 17, and 18) will be connected to the City's 115 kV transmission system. When complete, the area will be served by two reliable loops between Substations 7 and 9 and between Substations 9 and 5. The anticipated in-service dates for these new substations and lines are shown on Figure E.2-1. In addition, the construction of the Eastern Transmission Line (connecting Substation 9 to the proposed Substation 17) is anticipated to be complete by mid-2007.

## E.2.3 Service Area

The City currently provides electric service to customers within an area of approximately 221 square miles, which includes the City and certain adjacent unincorporated areas of Leon County. The City's territorial agreement with Florida Power Corporation (now PEF) expired on December 23, 1998. A new agreement with similar terms has been negotiated; however, it has not been executed pending resolution of other outstanding issues not related to the territorial agreement. Both parties are operating within the terms of the expired agreement. Any new agreement would require approval by the City Commission and, subsequently, the Florida Public Service Commission (FPSC).

The City and Talquin Electric Cooperative, Inc. (Talquin) operate under a 30 year territorial agreement, which was approved by the FPSC in February 1990. Because of the physical location of specific customers, certain City electric customers are connected to the Talquin distribution system, and certain Talquin customers are connected to the City's system. To avoid unnecessary costs and unnecessary inconvenience to their respective customers, the City and Talquin have agreed to a reciprocal arrangement in which the City and Talquin purchase and sell capacity from and to each other to serve their respective customers.

## E.2.4 Load and Electrical Characteristics

The City has historically experienced peak annual demand in the summer months. The City's actual total peak demand in the summer of 2005 was 598 MW, after accounting for the demand reductions from DSM programs offered by the City, representing an all-time high peak demand. This compares to an actual peak in the winter of 2005/2006 of 537 MW, after accounting for the demand reductions from DSM programs offered by the City. It should be noted that the City's forecast winter and summer peak demands show a tendency to converge, although the forecast summer peak demands are higher than the forecast winter peak demands throughout the forecast period. Furthermore, the City's existing generating system is capable of providing approximately 51 MW more capacity in the winter than in the summer.

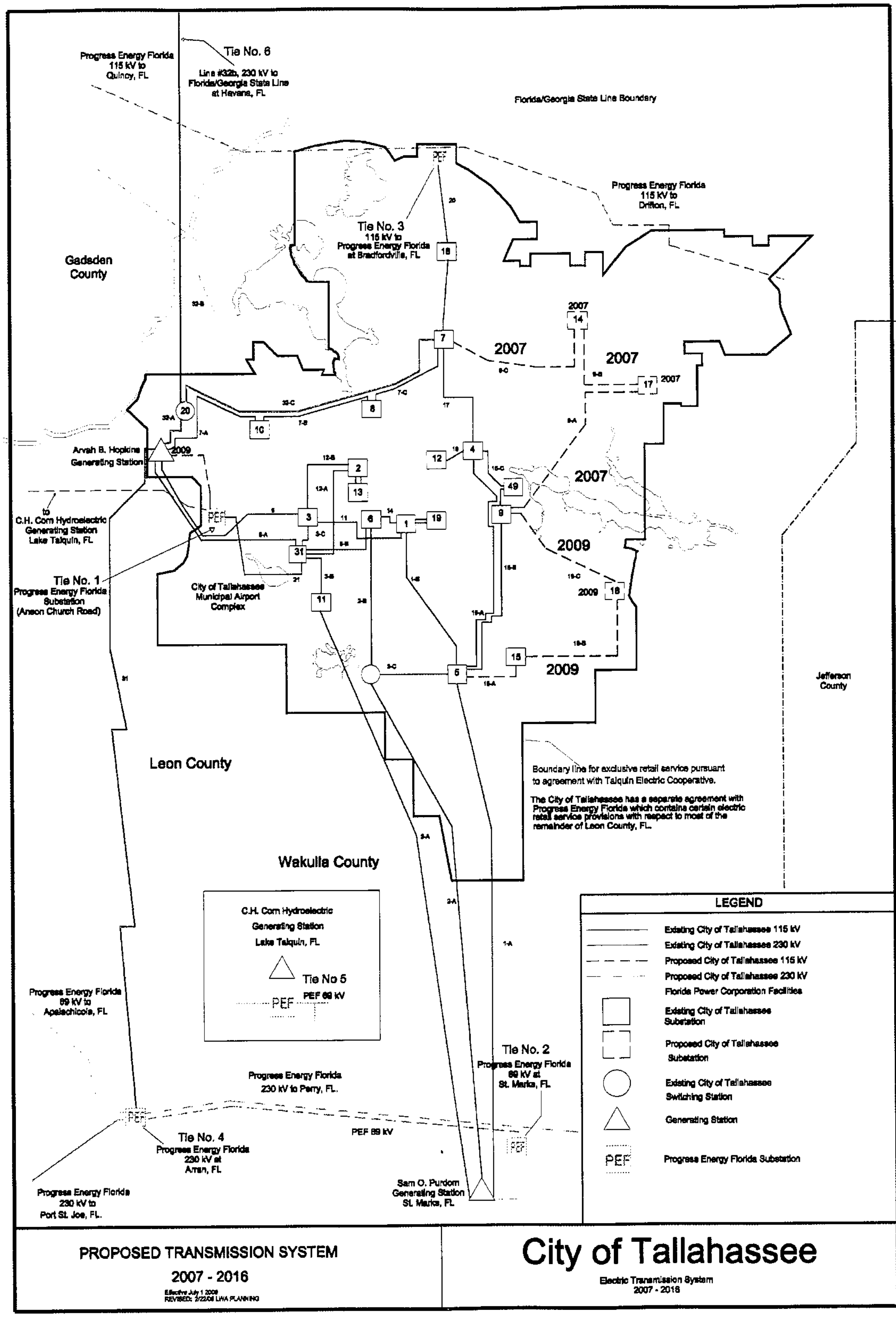


Figure E.2-1
City of Tallahassee's Transmission System

# E.3.0 Forecast of the City's Electrical Demand and Consumption

The City's forecasts for peak demand and energy requirements are developed utilizing a methodology first employed by the City in 1980, and are updated and revised every year. The remainder of this section provides details of the methodology used to develop the City's base case load forecast, and presents the base case load forecast as well as high and low load growth sensitivity cases.

## E.3.1 Load Forecast Methodology

The methodology used to develop the load forecast consists of approximately 10 multi-variable linear regression models that are based on detailed examination of the system's historical growth, usage patterns, and population statistics. Several key regression formulas utilize econometric variables.

Table E.3-1 presents the econometric-based linear regression forecasting models that are used in the development of the load forecast. The City uses regression models with the capability of separately predicting commercial customers and consumption by rate sub-class: general service non-demand (GSND), general service demand (GSD), and general service large demand (GSLD). Along with the residential class, these represent the major classes of the City's electric customers. The City also uses two additional regression models to separately predict summer and winter peak demand. The key explanatory variables used in each of the models are indicated by an "X" on Table E.3-1.

Table E.3-2 documents the City's internal and external sources for historical and forecast economic, weather, and demographic data. In conjunction, Tables E.3-1 and E.3-2 summarize the details of the models used to generate the City's customer, consumption, and seasonal peak load forecasts. Among the explanatory variables listed is a component included in the models that reflects the acquisition of certain Talquin customers over the study period, consistent with the territorial agreement negotiated between the City and Talquin and approved by the FPSC.

Using the 5 year average of the actual temperature extremes at the times of seasonal peak demands, routinely updating the forecast model coefficients, and incorporating other model refinements have improved the accuracy of the forecast so that it is more consistent with the historical trend of growth in seasonal peak demand and energy consumption.

Table E.3-1
Key Explanatory Variables

| Model Name | Leon County Population | Residential Customers | Total Customers | Cooling Degree-Days (CDDs) | Heating Degree-Days (HDDs) | Tallahassee per Capita Taxable Sales | Price of Electricity | State of Florida Population | Minimum Winter Peak Day Temperature | Maximum Summer Peak Day Temperature | Appliance Saturation | R Squared[1] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Residential Customers | X | | | | | | | | | | | 0.989 |
| Residential Consumption | | X | | X | X | X | X | | | | X | 0.921 |
| Florida State University Consumption | | | | X | | | X | X | | | | 0.930 |
| State Capitol Consumption | | | | X | | | X | X | | | | 0.892 |
| Florida A&M University Consumption | | | | X | | | | X | | | | 0.926 |
| Street Lighting Consumption | X | | | | | | | | | | | 0.961 |
| GSND Customers | | X | | | | | | | | | | 0.958 |
| GSD Customers | | X | | | | | | | | | | 0.927 |
| GSND Consumption | X | | | X | X | X | X | | | | | 0.961 |
| GSD Consumption | X | | | X | X | | | | | | | 0.960 |
| GSLD Consumption | X | | | X | X | | | | | | | 0.974 |
| Summer Peak Demand | | | X | | | | | | | X | X | 0.982 |
| Winter Peak Demand | | | | | | | | | X | | X | 0.965 |

[1]R Squared, also referred to as the coefficient of determination, is a commonly used measure of goodness of fit of a linear model. If the observations fall on the model regression line, R Squared is 1. If there is no linear relationship between the dependent and independent variables, R Squared is 0. A reasonably good R Squared value may be anywhere between 0.6 to 1.0.

Table E.3-2
Sources of Forecast Model Input Information

| Energy Model Input Data | | Source |
|---|---|---|
| 1. | Leon County Population | City Planning Office |
| 2. | Talquin Customers Transferred | City Power Engineering |
| 3. | CDDs | National Oceanic & Atmospheric Administration (NOAA) Reports |
| 4. | HDDs | NOAA Reports |
| 5. | Air Conditioning Saturation Rate | Residential Utility Customer Trends |
| 6. | Heating Saturation Rate | City Utility Research |
| 7. | Real Tallahassee Taxable Sales | Department of Revenue |
| 8. | Florida Population | Governor's Office of Budget and Planning |
| 9. | State Capitol Incremental | Department of Management Services |
| 10. | FSU Incremental Additions | FSU Planning Department |
| 11. | FAMU Incremental Additions | FAMU Planning Department |
| 12. | GSLD Incremental Additions | City Utility Services |
| 13. | Other Commercial Customers | City Utility Services |
| 14. | Tallahassee Memorial Curtailable | City System Planning/Utilities Accounting |
| 15. | FSU 4th Meter Additions | City System Planning/Utilities Accounting |
| 16. | State Capitol Center 2 Special Accounts | Utilities Accounting |
| 17. | Customer Definitions | City Utility Services |
| 18. | System Peak Historical Data | City System Planning |
| 19. | Historical Customer Projections by Class | City System Planning and Customer Accounting |
| 20. | Historical Customer Class Energy | City System Planning and Customer Accounting |
| 21. | Gross Domestic Product (GDP) Forecast | Governor's Planning and Budgeting Office |
| 22. | Consumer Price Index (CPI) Forecast | Governor's Planning and Budgeting Office |
| 23. | Florida Taxable Sales | Governor's Planning and Budgeting Office |
| 24. | Interruptible, Traffic Light Sales, and Security Light Additions | City System Planning and Customer Accounting |
| 25. | Historical Residential Real Price of Electricity | City Utility Services |
| 26. | Historical Commercial Real Price of Electricity | City Utility Services |

Important input assumptions for the sales forecast include the incremental load modifications at Florida State University (FSU), Florida A&M University (FAMU), Tallahassee Memorial Hospital (TMH), and the State Capitol Center. These four customers represent approximately 14 percent of the City's annual energy sales. Each entity submits its proposed incremental additions/reductions to the City, and these modifications are included as submitted in the load and energy forecast.

The customer models are used to predict the number of customers by customer class, which in turn serve as inputs into the customer class consumption models. The customer class consumption models are aggregated to form a total base system sales forecast. The effects of conservation and DSM programs, estimated reductions from interruptible and curtailable customers, and system losses are incorporated into the base forecasts of seasonal peak demand and sales to produce the forecasts of system seasonal net peak demand and NEL requirements.

## E.3.2 Forecast System Demand and Energy Requirements – Base Case

Table E.3-3 presents the City's base case load forecast. The City produced the forecasts with the assistance of R.W. Beck, Inc., for the years 2006 through 2025.

## E.3.3 Forecast System Demand and Energy Requirements – Sensitivity Cases

The City's high and low load growth sensitivity cases were developed to address the uncertainty associated with forecast input variables by adjusting selected input variables in the load forecast models. For the sensitivities to the base energy forecast that was developed, the key explanatory variables that were changed included Leon County population, Florida population, HDDs, and CDDs. For the peak demand forecasts, the number of customers, maximum summer temperature, and minimum winter temperature were changed. As with the base case forecast, the high and low load growth forecasts were developed for the years 2006 through 2025. Table E.3-4 presents the City's high and low load growth sensitivity cases.

| Table E.3-3<br>City of Tallahassee Load Forecast – Base Case | | | |
|---|---|---|---|
| Calendar Year | Net Summer Peak Demand (MW) | Net Winter Peak Demand (MW) | Annual NEL (GWh) |
| 2006 | 609 | 546 | 2,895 |
| 2007 | 626 | 570 | 2,976 |
| 2008 | 637 | 584 | 3,056 |
| 2009 | 646 | 596 | 3,115 |
| 2010 | 656 | 608 | 3,170 |
| 2011 | 666 | 621 | 3,225 |
| 2012 | 676 | 633 | 3,280 |
| 2013 | 686 | 645 | 3,336 |
| 2014 | 696 | 658 | 3,394 |
| 2015 | 705 | 670 | 3,451 |
| 2016 | 714 | 681 | 3,506 |
| 2017 | 723 | 692 | 3,562 |
| 2018 | 732 | 703 | 3,618 |
| 2019 | 741 | 714 | 3,675 |
| 2020 | 750 | 726 | 3,732 |
| 2021 | 758 | 736 | 3,789 |
| 2022 | 767 | 747 | 3,847 |
| 2023 | 775 | 758 | 3,906 |
| 2024 | 784 | 768 | 3,965 |
| 2025 | 793 | 779 | 4,025 |

Table E.3-4
City of Tallahassee Load Forecast – Sensitivity Cases

| | Low Load and Energy Growth | | | High Load and Energy Growth | | |
|---|---|---|---|---|---|---|
| Calendar Year | Net Summer Peak Demand (MW) | Net Winter Peak Demand (MW) | Annual NEL (GWh) | Net Summer Peak Demand (MW) | Net Winter Peak Demand (MW) | Annual NEL (GWh) |
| 2006 | 588 | 496 | 2,721 | 636 | 596 | 3,102 |
| 2007 | 605 | 519 | 2,800 | 654 | 620 | 3,185 |
| 2008 | 616 | 533 | 2,878 | 665 | 635 | 3,268 |
| 2009 | 625 | 545 | 2,935 | 674 | 647 | 3,330 |
| 2010 | 635 | 557 | 2,987 | 684 | 660 | 3,387 |
| 2011 | 644 | 569 | 3,040 | 695 | 672 | 3,445 |
| 2012 | 654 | 581 | 3,093 | 705 | 685 | 3,503 |
| 2013 | 664 | 593 | 3,147 | 715 | 697 | 3,561 |
| 2014 | 673 | 606 | 3,203 | 725 | 710 | 3,622 |
| 2015 | 683 | 618 | 3,258 | 735 | 723 | 3,682 |
| 2016 | 691 | 629 | 3,311 | 744 | 734 | 3,740 |
| 2017 | 700 | 640 | 3,364 | 753 | 746 | 3,798 |
| 2018 | 709 | 651 | 3,419 | 762 | 757 | 3,857 |
| 2019 | 718 | 661 | 3,474 | 771 | 768 | 3,916 |
| 2020 | 726 | 672 | 3,529 | 780 | 780 | 3,976 |
| 2021 | 735 | 683 | 3,584 | 789 | 791 | 4,036 |
| 2022 | 743 | 693 | 3,640 | 798 | 802 | 4,096 |
| 2023 | 752 | 704 | 3,696 | 807 | 813 | 4,157 |
| 2024 | 760 | 714 | 3,754 | 816 | 824 | 4,219 |
| 2025 | 769 | 725 | 3,812 | 824 | 835 | 4,282 |

# E.4.0 The City's Need for Capacity

Prudent utility practices require a utility to plan for sufficient capacity resources to meet its peak demand and to maintain an additional margin of capacity should unforeseen events result in higher system demand or lower than anticipated availability of capacity resources. This section presents the development and analysis of the reliability criteria used by the City.

For capacity planning purposes, the City plans to maintain a 17 percent reserve margin for the summer and winter seasons. The planning reserve margin covers uncertainties in extreme weather, forced outages for generators, and uncertainty in load projections. The 17 percent reserve margin was determined to be appropriate through analysis performed as part of the City's 2002 integrated resource plan.

## E.4.1 Reliability Criteria

A number of methods are used in the electric utility industry to calculate a utility's system reliability. One method is the reserve margin and another is the Loss of Load Probability (LOLP), which apply deterministic and probabilistic methods, respectively, to calculate the reliability of a system. The City uses a reserve margin for planning purposes. These two methods are discussed below.

### *E.4.1.1 Reserve Margin*

The most commonly used deterministic method is the reserve margin method, which is calculated as follows:

$$\frac{\text{System Net Capacity - System Firm Peak Demand (After Interruptible Load)}}{\text{System Firm Peak Demand (After Interruptible Load)}}$$

### *E.4.1.2 Loss of Load Probability*

The second commonly used method of calculating the reliability of a utility system is the LOLP method. This method is advantageous in that it can result in a measure of how much capacity (and reserves) is needed to meet a target level of reliability (typically, an LOLP criterion of no more than 1 day in 10 years is used). FRCC utilizes a reserve margin criterion (Resource Adequacy Standard) for capacity planning purposes that results in resource levels that meet an LOLP criterion of no more than 1 day in 10 years. The Resource Adequacy Standard calls for a reserve margin of 15 percent versus firm load. Therefore, the City uses the reserve margin method as the planning criterion that produces the most conservative reliability level.

## E.4.2 Need for Capacity

Tables E.4-1 and E.4-2 present the capacity additions required to maintain the City's 17 percent reserve margin for the summer and winter seasons, respectively. The capacity balances are based on the City's base case forecast peak demands as presented in Section E.3.0, as well as the existing and committed capacity resources (including purchased power) and the schedule of unit retirements presented in Section E.2.0. The planned combined cycle repowering of Hopkins Unit 2 in the summer of 2008 (discussed in more detail in Section E.2.0) is also reflected in the capacity balances. An analysis of Table E.4-1 shows that the City is expected to encounter a capacity shortfall in the summer of 2011, at which time approximately 22 MW of additional capacity will be required. The need for additional summer capacity increases to approximately 294 MW by 2025. Table E.4-2 shows that the City is expected to have sufficient capacity in the winter until 2017, at which time approximately 79 MW of additional capacity will be required. The need for additional winter capacity increases to approximately 206 MW by 2025.

The characteristics of the City's electric system dictate that summer generating capability versus summer peak load drive the forecast need for capacity. Therefore, the City's capacity additions presented in this Application will be scheduled to address projected summer capacity shortfalls and are assumed to be operational by May 1 of the year in which they are installed.

Table E.4-1
City of Tallahassee Summer Capacity Balance

| | Generating Resources (MW) | | | Capacity Requirements (MW) | | | Excess/(Deficit) Capacity to Maintain 17 Percent Reserves |
|---|---|---|---|---|---|---|---|
| Year | Owned(1) | Purchased Power | Total | Peak Demand(2) | 17 Percent Reserves | Total | |
| 2006 | 746 | 11 | 757 | 609 | 104 | 713 | 45 |
| 2007 | 746 | 11 | 757 | 626 | 106 | 732 | 25 |
| 2008 | 814 | 11 | 825 | 637 | 108 | 745 | 80 |
| 2009 | 814 | 11 | 825 | 646 | 110 | 756 | 70 |
| 2010 | 814 | 11 | 825 | 656 | 112 | 768 | 58 |
| 2011 | 746 | 11 | 757 | 666 | 113 | 779 | (22) |
| 2012 | 746 | 11 | 757 | 676 | 115 | 791 | (34) |
| 2013 | 746 | 11 | 757 | 686 | 117 | 803 | (45) |
| 2014 | 746 | 11 | 757 | 696 | 118 | 814 | (57) |
| 2015 | 734 | 11 | 745 | 705 | 120 | 825 | (80) |
| 2016 | 658 | 11 | 669 | 714 | 121 | 835 | (166) |
| 2017 | 634 | 0 | 634 | 723 | 123 | 846 | (212) |
| 2018 | 634 | 0 | 634 | 732 | 124 | 856 | (222) |
| 2019 | 634 | 0 | 634 | 741 | 126 | 867 | (233) |
| 2020 | 634 | 0 | 634 | 750 | 128 | 878 | (244) |
| 2021 | 634 | 0 | 634 | 758 | 129 | 887 | (253) |
| 2022 | 634 | 0 | 634 | 767 | 130 | 897 | (263) |
| 2023 | 634 | 0 | 634 | 775 | 132 | 907 | (273) |
| 2024 | 634 | 0 | 634 | 784 | 133 | 917 | (283) |
| 2025 | 634 | 0 | 634 | 793 | 135 | 928 | (294) |

(1)Owned capacity reflects all unit retirements presented in Section E.2.0, as well as the combined cycle repowering of Hopkins Unit 2 in May 2008.
(2)Peak demand forecast includes expected reductions associated with the City's existing conservation and DSM programs.

Table E.4-2
City of Tallahassee Winter Capacity Balance

| Year | Generating Resources (MW) | | | Capacity Requirements (MW) | | | Excess/(Deficit) Capacity to Maintain 17 Percent Reserves |
|---|---|---|---|---|---|---|---|
| | Owned[1] | Purchased Power | Total | Peak Demand[2] | 17 Percent Reserves | Total | |
| 2006 | 797 | 11 | 808 | 546 | 93 | 639 | 170 |
| 2007 | 797 | 11 | 808 | 570 | 97 | 667 | 142 |
| 2008 | 797 | 11 | 808 | 584 | 99 | 683 | 125 |
| 2009 | 893 | 11 | 904 | 596 | 101 | 697 | 197 |
| 2010 | 893 | 11 | 904 | 608 | 103 | 711 | 173 |
| 2011 | 893 | 11 | 904 | 621 | 106 | 727 | 158 |
| 2012 | 823 | 11 | 834 | 633 | 108 | 741 | 94 |
| 2013 | 823 | 11 | 834 | 645 | 110 | 755 | 80 |
| 2014 | 823 | 11 | 834 | 658 | 112 | 770 | 65 |
| 2015 | 823 | 11 | 834 | 670 | 114 | 784 | 51 |
| 2016 | 809 | 11 | 820 | 681 | 116 | 797 | 24 |
| 2017 | 731 | 0 | 731 | 692 | 118 | 810 | (79) |
| 2018 | 705 | 0 | 705 | 703 | 120 | 823 | (118) |
| 2019 | 705 | 0 | 705 | 714 | 121 | 835 | (130) |
| 2020 | 705 | 0 | 705 | 726 | 123 | 849 | (144) |
| 2021 | 705 | 0 | 705 | 736 | 125 | 861 | (156) |
| 2022 | 705 | 0 | 705 | 747 | 127 | 874 | (169) |
| 2023 | 705 | 0 | 705 | 758 | 129 | 887 | (182) |
| 2024 | 705 | 0 | 705 | 768 | 131 | 899 | (194) |
| 2025 | 705 | 0 | 705 | 779 | 132 | 911 | (206) |

[1]Owned capacity reflects all unit retirements presented in Section E.2.0, as well as the combined cycle repowering of Hopkins Unit 2 in May 2008.
[2]Peak demand forecast includes expected reductions associated with the City's existing conservation and DSM programs.

# E.5.0 The City's Economic Analysis

A detailed economic analysis was performed to evaluate the cost-effectiveness of the City's participation in TEC and to determine the least-cost capacity expansion plan to meet the City's forecast capacity requirements during the planning horizon, as presented in Section E.4.0. This section presents the assumptions and methodology used in the economic analysis, as well as the results of the base case analysis.

The economic analysis described herein compares the economics of the least-cost capacity expansion plan utilizing conventional supply-side alternatives, including the City's share of capacity and energy from TEC, versus the economics of the least-cost expansion plan for the City's system utilizing conventional supply-side alternatives, which does not include participation in TEC. The capacity associated with the City's share of TEC, as well as construction of any of the supply-side alternatives presented in Section A.6.0, is only sufficient to satisfy the City's forecast capacity requirements for a portion of the expansion planning horizon. To meet the forecast capacity requirements, multiple unit additions were selected from the City's supply-side alternatives considered for individual participation that passed the supply-side screening described in Section A.6.7. Analyses of the City's joint participation in supply-side alternatives other than TEC are presented as sensitivity cases in Section E.6.0.

## E.5.1 Expansion Planning and Production Costing Methodology

The supply-side evaluations of generating unit alternatives were performed using POWROPT, an optimal generation expansion model that Black & Veatch developed as an alternative to other optimization programs. POWROPT has been benchmarked against other optimization programs and has proven to be an effective modeling program. Both POWROPT and its detailed chronological production costing module, POWRPRO, have been used in numerous Need for Power Applications approved by the FPSC, including FMPA's Treasure Coast Energy Center (TCEC) Unit 1 Need for Power Application approved in July 2005, and the Orlando Utilities Commission (OUC) Stanton B Need for Power Application approved in May 2006.

POWROPT operates on an hourly chronological basis and is used to determine a set of optimal capacity expansion plans to satisfy forecast capacity requirements, simulate the operation of each of these plans, and select the most desirable plan based on cumulative present worth revenue requirements. POWROPT evaluates all combinations of generating unit alternatives and purchase power options, in conjunction with existing capacity resources, while maintaining user-defined reliability criteria. All capacity expansion plans were analyzed over a 30 year period from 2006 through 2035.

After the optimal generation expansion plan was selected using POWROPT, Black & Veatch's POWRPRO was used to obtain the annual production cost for the expansion plan. POWRPRO is a computer-based chronological production costing model developed for use in power supply systems planning. POWRPRO simulates the hour-by-hour operation of a power supply system over a specified planning period. Required inputs are carried forward from those used in POWROPT and include the performance characteristics of generating units, fuel costs, and the system hourly load profile for each year.

POWRPRO summarizes each unit's operating characteristics for every year of the planning horizon. These characteristics include, among others, each unit's annual generation, fuel consumption, fuel cost, average net operating heat rate, the number of hours the unit was on line, the capacity factor, variable operations and maintenance (O&M) costs, and the number of starts and associated costs. Fixed O&M costs were included only for new unit additions, since fixed O&M costs for existing units are generally considered sunk costs that will not vary from one expansion plan to another. Similarly, the annual capacity charges for the existing PEF purchase were not included, since they also represent sunk costs. In addition, fixed costs for firm natural gas transportation capacity from the Florida Gas Transmission Company (FGT) for existing units are considered sunk costs and were not included. The operating costs of each unit were aggregated to determine the annual operating costs for each year of the expansion plan. Capital costs, fixed O&M costs, and incremental costs for natural gas transportation (for combined cycle capacity addition alternatives) were then added for each capacity addition selected, at which point the cumulative present worth cost (CPWC) of each expansion plan was calculated.

The CPWC calculation accounts for annual system costs (fuel and energy, fixed O&M for capacity additions, nonfuel variable O&M, startup, and levelized capital) for each year of the expansion planning period and discounts each back to 2006 at the present worth discount rate of 5.0 percent. These annual present worth costs were then summed over the 2006 through 2035 period to calculate the total CPWC of the expansion plan being considered. Such analysis allows for a comparison of CPWC between various capacity expansion plans, and the plan with the lowest CPWC is considered the least-cost capacity expansion plan.

## E.5.2 Least-Cost Capacity Expansion Analysis

The economic analysis consisted of comparing the economics of the optimal capacity expansion plan, including the City's participation in TEC, with the optimal capacity expansion plan not including participation in TEC. As described previously in this section, Black & Veatch first used its optimum generation expansion program, POWROPT, to select unit additions from the City's supply-side alternatives considered for individual participation, which was presented in Section A.6.0. Once the least-cost expansion plan for each case was determined, POWRPRO was used to determine the annual total system costs and to develop a comparison of CPWCs associated with each expansion plan.

### *E.5.2.1 Peak Demand and Energy Growth*

As presented in Section E.3.0, a forecast of peak demand and NEL was provided for the City's system through 2025. For evaluation purposes (as discussed in Section A.8.0), loads have been held constant beyond 2025.

### *E.5.2.2 Supply-Side Candidate Unit Additions*

As described in Section E.4.0, the City's forecast capacity requirements are dictated by projected capacity shortfalls in the summer season of each year of the planning period. On a weather-normalized basis, the City's summer peak typically occurs in August of a given calendar year; however, the City's actual summer peak could occur as early as June. To ensure that new capacity additions are available to meet forecast summer reserve margin requirements, all unit additions considered for the City's individual ownership (as presented in Section A.6.0) are assumed to be installed by May 1.

Section A.6.0 presented capital and O&M costs for the units considered for individual ownership by the City. As described in more detail in Section A.6.0, absent additional investment, the City's existing Purdom and Hopkins generating stations do not have sufficient infrastructure or site space to accommodate the number of unit additions required to meet the City's forecast capacity requirements. Therefore, the capital costs for all individual ownership alternatives were developed on a greenfield basis, since the all-in costs of constructing additional generating units at either Purdom or Hopkins (after considering the costs required for the necessary site improvements) would likely be equivalent to construction at greenfield locations.

### *E.5.2.3 Fuel Prices and Natural Gas Transportation*

As described in Section A.4.0 of this Application, projections of delivered fuel prices were developed by the TEC Fuels Committee. The base case fuel price projections presented in Section A.4.0 have been used for the evaluations presented in this section.

For all capacity expansion plan evaluations, it was necessary to account for natural gas transportation capacity associated with the new combined cycle unit alternatives. The City currently has a contract in place with FGT for firm natural gas transportation to fuel its existing natural gas fired units. For the 1x1 7FA combined cycle option included in Section A.6.0, it was assumed that the City would purchase firm transportation in accordance with FGT's tariff so that 6.0 percent of the daily natural gas transportation allocation would be adequate to operate the unit at full load for an hour, based on the performance at average ambient conditions. This would require 37,323 MBtu of firm natural gas per day. Using the Firm Transportation Service reservation charge of $0.769 per MBtu (pursuant to FGT's April 2006, effective rates for incremental Firm Market Area Transportation), firm transportation costs of $2.92 per kW-month were added to the fixed O&M costs of the 1x1 7FA combined cycle alternative. It has been assumed that the City will not purchase firm natural gas transportation capacity from FGT for simple cycle CTs but, instead, will utilize an interruptible service rate assumed to be $0.37 per MBtu, which was added to the annual commodity price forecasts for natural gas presented in Section A.4.0. Any natural gas required for the City's system in excess of the firm natural gas transportation for the existing and new units is priced at the interruptible service rate.

### *E.5.2.4 Emissions Cost Considerations*

To reflect the economic effects of the Clean Air Interstate Rule (CAIR) and the Clean Air Mercury Rule (CAMR) (as described in Section A.5.0), the forecast prices of emissions allowances were incorporated into the fuel costs for each unit, including existing units that will be regulated under CAIR and CAMR, beginning with the first phases of CAIR and CAMR. The allowance price forecasts presented in Section A.5.0 provide emissions costs on a dollar per ton (dollar per pound for mercury [Hg]) basis. These costs were used to calculate a fuel cost adder for both existing units and candidate units based on the emissions rates of each individual unit. As a result, each generating unit was modeled using different prices for fuel because of differences in emissions rates. The forecast market value of the allowances allocated to the City's existing units was not included in the economic analysis, since it represents the same credit for each capacity expansion plan.

Emissions rates for some of the City's existing units may be modified through fuel switching or retrofits for emissions control to help meet the $NO_x$ and sulfur dioxide ($SO_2$) reductions mandated by CAIR. Since complete emissions control strategies, the resulting reductions in emissions rates, and the generating unit output and performance impacts from potential emissions control measures are not entirely known, no changes in emissions rates or unit output and performance were considered for the existing units in this analysis, with the exception of the repowered Hopkins Unit 2 combined cycle.

Table E.5-1 presents the emissions cost adders for the City's existing units. In years when units are no longer available to the City because of retirement, "N/A" is used to indicate that the adders are no longer applicable, since the resources are not included in the City's dispatch model. Table E.5-2 presents the emissions cost adders for the City's candidate units, which were presented in Section A.6.0. The City's existing generating system does not include any Hg emitting units and, therefore, no adders for Hg emissions allowance costs are included for the City's existing units.

### *E.5.2.5 Dispatch Assumptions*

Nonfuel variable O&M and forecast emissions allowance costs were included in the unit dispatch modeling in POWROPT and POWRPRO, along with the fuel costs. These costs were included in the dispatch modeling to ensure the most cost-effective dispatch of both the existing and new generating units.

### *E.5.2.6 Analysis of the City's Participation in TEC*

The evaluation of the City's participation in TEC was performed by modeling a capacity expansion plan that included a seasonal purchase of 22 MW in the summer of 2011, and TEC as a committed resource beginning May 1, 2012. The seasonal purchase was modeled with an assumed energy cost of $160.09 per MWh and a capacity cost of $7.50 per kW-month in 2011 dollars.

POWROPT was used to determine the optimum set of capacity additions after the construction of TEC from the conventional technologies considered for individual ownership by the City, as presented in Section A.6.0. Taking into account the seasonal purchase in 2011 and the capacity from TEC beginning May 1, 2012, additional capacity for the City's system is projected to be required during the summer of 2016. All of the generating alternatives, except the integrated gasification combined cycle (IGCC) option, were assumed to be available to meet capacity requirements in 2016. Given its current developmental status, it has been assumed that the IGCC option would not be available before 2018. This would allow for 3 years of successful commercial operation of the next generation of IGCC units, such as OUC's Stanton B IGCC, which is scheduled to begin operation on June 1, 2010, followed by an assumed 2 year engineering, permitting, and licensing process and 3 year construction schedule.

Table E.5-1
Combined $SO_2$ and $NO_x$, Emissions Cost Adders for the City's Existing Units
(Nominal $/MBtu)

| Calendar Year | Hopkins 1 | Hopkins CT 1 | Hopkins CT 2 | Purdom 8 | Purdom 7 | Hopkins LM6000s | Hopkins 2 1x1 CC |
|---|---|---|---|---|---|---|---|
| 2009 | $0.24 | $0.37 | $0.37 | $0.03 | $0.25 | $0.02 | $0.01 |
| 2010 | $0.33 | $0.51 | $0.51 | $0.05 | $0.35 | $0.03 | $0.01 |
| 2011 | $0.35 | $0.54 | $0.54 | $0.05 | $0.36 | $0.03 | $0.01 |
| 2012 | $0.36 | $0.56 | $0.56 | $0.05 | N/A | $0.03 | $0.01 |
| 2013 | $0.37 | $0.57 | $0.57 | $0.05 | N/A | $0.04 | $0.01 |
| 2014 | $0.40 | $0.62 | $0.62 | $0.06 | N/A | $0.04 | $0.01 |
| 2015 | $0.64 | $0.99 | $0.99 | $0.09 | N/A | $0.06 | $0.02 |
| 2016 | $0.69 | N/A | $1.07 | $0.10 | N/A | $0.07 | $0.02 |
| 2017 | N/A | N/A | $0.92 | $0.09 | N/A | $0.06 | $0.02 |
| 2018 | N/A | N/A | N/A | $0.09 | N/A | $0.06 | $0.02 |
| 2019 | N/A | N/A | N/A | $0.12 | N/A | $0.08 | $0.03 |
| 2020 | N/A | N/A | N/A | $0.14 | N/A | $0.09 | $0.03 |
| 2021 | N/A | N/A | N/A | $0.14 | N/A | $0.09 | $0.03 |
| 2022 | N/A | N/A | N/A | $0.13 | N/A | $0.09 | $0.03 |
| 2023 | N/A | N/A | N/A | $0.17 | N/A | $0.11 | $0.04 |
| 2024 | N/A | N/A | N/A | $0.25 | N/A | $0.16 | $0.06 |
| 2025 | N/A | N/A | N/A | $0.27 | N/A | $0.18 | $0.06 |
| 2026 | N/A | N/A | N/A | $0.29 | N/A | $0.19 | $0.07 |
| 2027 | N/A | N/A | N/A | $0.32 | N/A | $0.21 | $0.08 |
| 2028 | N/A | N/A | N/A | $0.34 | N/A | $0.22 | $0.08 |
| 2029 | N/A | N/A | N/A | $0.37 | N/A | $0.24 | $0.09 |
| 2030 | N/A | N/A | N/A | $0.39 | N/A | $0.26 | $0.09 |
| 2031 | N/A | N/A | N/A | $0.42 | N/A | $0.28 | $0.10 |
| 2032 | N/A | N/A | N/A | $0.45 | N/A | $0.30 | $0.11 |
| 2033 | N/A | N/A | N/A | $0.48 | N/A | $0.32 | $0.11 |
| 2034 | N/A | N/A | N/A | $0.52 | N/A | $0.34 | $0.12 |
| 2035 | N/A | N/A | N/A | $0.55 | N/A | $0.36 | $0.13 |

Table E.5-2
Combined $SO_2$, $NO_x$, and Hg Emissions Cost Adders for the City's Candidate Units
(Nominal $/MBtu)

| Calendar Year | LM6000 CT | 7EA CT | 7FA CT | 1x1 7FA CC | TEC | CFB (100 percent coal) | 1x1 IGCC (100 percent coal) | LMS100 CT | LM6000 1x1 CC |
|---|---|---|---|---|---|---|---|---|---|
| 2009 | $0.01 | $0.01 | $0.01 | $0.01 | $0.08 | $0.10 | $0.07 | $0.01 | $0.01 |
| 2010 | $0.01 | $0.01 | $0.01 | $0.01 | $0.15 | $0.19 | $0.10 | $0.01 | $0.01 |
| 2011 | $0.01 | $0.01 | $0.01 | $0.01 | $0.16 | $0.20 | $0.11 | $0.01 | $0.01 |
| 2012 | $0.01 | $0.01 | $0.01 | $0.01 | $0.16 | $0.20 | $0.11 | $0.01 | $0.01 |
| 2013 | $0.01 | $0.01 | $0.01 | $0.01 | $0.17 | $0.21 | $0.11 | $0.01 | $0.01 |
| 2014 | $0.01 | $0.01 | $0.01 | $0.01 | $0.18 | $0.22 | $0.12 | $0.01 | $0.01 |
| 2015 | $0.02 | $0.02 | $0.02 | $0.02 | $0.28 | $0.36 | $0.20 | $0.02 | $0.02 |
| 2016 | $0.02 | $0.02 | $0.02 | $0.02 | $0.30 | $0.38 | $0.21 | $0.02 | $0.02 |
| 2017 | $0.02 | $0.02 | $0.02 | $0.02 | $0.27 | $0.34 | $0.18 | $0.02 | $0.02 |
| 2018 | $0.02 | $0.02 | $0.02 | $0.02 | $0.30 | $0.37 | $0.19 | $0.02 | $0.02 |
| 2019 | $0.03 | $0.03 | $0.03 | $0.03 | $0.36 | $0.46 | $0.25 | $0.03 | $0.03 |
| 2020 | $0.03 | $0.03 | $0.03 | $0.03 | $0.42 | $0.53 | $0.30 | $0.03 | $0.03 |
| 2021 | $0.03 | $0.03 | $0.03 | $0.03 | $0.42 | $0.52 | $0.28 | $0.03 | $0.03 |
| 2022 | $0.03 | $0.03 | $0.03 | $0.03 | $0.41 | $0.51 | $0.27 | $0.03 | $0.03 |
| 2023 | $0.04 | $0.04 | $0.04 | $0.04 | $0.54 | $0.67 | $0.35 | $0.04 | $0.04 |
| 2024 | $0.06 | $0.06 | $0.06 | $0.06 | $0.74 | $0.93 | $0.52 | $0.06 | $0.06 |
| 2025 | $0.06 | $0.06 | $0.06 | $0.06 | $0.84 | $1.05 | $0.57 | $0.06 | $0.06 |
| 2026 | $0.07 | $0.07 | $0.07 | $0.07 | $0.91 | $1.13 | $0.61 | $0.07 | $0.07 |
| 2027 | $0.08 | $0.08 | $0.08 | $0.08 | $0.98 | $1.22 | $0.66 | $0.08 | $0.08 |
| 2028 | $0.08 | $0.08 | $0.08 | $0.08 | $1.05 | $1.31 | $0.71 | $0.08 | $0.08 |
| 2029 | $0.09 | $0.09 | $0.09 | $0.09 | $1.13 | $1.41 | $0.76 | $0.09 | $0.09 |
| 2030 | $0.09 | $0.09 | $0.09 | $0.09 | $1.21 | $1.51 | $0.82 | $0.09 | $0.09 |
| 2031 | $0.10 | $0.10 | $0.10 | $0.10 | $1.29 | $1.62 | $0.88 | $0.10 | $0.10 |
| 2032 | $0.11 | $0.11 | $0.11 | $0.11 | $1.39 | $1.73 | $0.94 | $0.11 | $0.11 |
| 2033 | $0.11 | $0.11 | $0.11 | $0.11 | $1.49 | $1.86 | $1.01 | $0.11 | $0.11 |
| 2034 | $0.12 | $0.12 | $0.12 | $0.12 | $1.59 | $1.99 | $1.08 | $0.12 | $0.12 |
| 2035 | $0.13 | $0.13 | $0.13 | $0.13 | $1.71 | $2.13 | $1.15 | $0.13 | $0.13 |

CFB = Circulating Fluidized Bed.

***E.5.2.6.1 TEC Capital Cost.*** As described in Sections A.3.0 and A.8.0, the installed capital cost for TEC would be $1,752.4 million in 2012 dollars, inclusive of escalation and interest during construction. It was assumed that the City would be responsible for a percentage of the capital costs equal to the City's ownership share of 20.3 percent. The City's total share of TEC's installed cost is $355.7 million in 2012 dollars, which includes the costs for engineering, procurement, and construction (EPC); allowance for funds used during construction (AFUDC); land; community contribution; initial coal inventory; and owner's costs for TEC. Table E.5-3 presents a summary of the City's share of the capital costs for TEC.

Table E.5-3
TEC Capital Cost – The City's Share
(All Costs in 2012 Dollars)

| Description | Entire Unit ($1,000s) | The City's Share[(1)] ($1,000s) |
|---|---|---|
| EPC Cost | $1,420,892 | $288,441 |
| AFUDC | $135,413 | $27,489 |
| Owner's Cost | $116,994 | $23,750 |
| Initial Coal Inventory | $39,010 | $7,919 |
| Community Contribution | $20,000 | $4,060 |
| Land Cost | $20,100 | $4,080 |
| **Total** | **$1,752,409** | **$355,739** |

[(1)]Reflects the City's 20.3 percent ownership share of TEC.

***E.5.2.6.2 Transmission Considerations.*** As described in Section A.3.0, the City will be utilizing the transmission system of PEF for delivery from the Perry Substation to the City's transmission system. The City will be required to pay a transmission tariff to PEF. The transmission tariff assumed for the City's use of the PEF transmission system is $1,193.00 per MW-month. It is assumed that the City will purchase firm transmission for 155.4 MW, which will ensure that enough firm transmission is available for the City to receive its full entitlement of capacity and energy from TEC in both the winter and summer seasons. The annual transmission tariff that the City will pay to PEF is $2,224,578. This cost is included as an additional cost to the City starting on May 1, 2012.

The line loss for the PEF transmission system is 2.10 percent. This loss was considered when modeling the City's participation in TEC, and the resulting net output and net plant heat rates for the City are summarized in Table E.5-4.

Table E.5-4
The City's Share of TEC (Ambient Average Conditions)
Output and Performance Considering Transmission Losses

| Without Transmission Losses | | Including Transmission Losses[1] | |
|---|---|---|---|
| Output (MW) | Net Plant Heat Rate (Btu/kWh) | Output (MW) | Net Plant Heat Rate (Btu/kWh) |
| 155.4 | 9,238 | 152.1 | 9,436 |
| 151.8 | 9,238 | 148.6 | 9,436 |
| 120.3 | 9,428 | 117.8 | 9,630 |
| 79.7 | 9,933 | 78.1 | 10,146 |
| 55.3 | 10,535 | 54.2 | 10,761 |

[1]Assumes loss of 2.10 percent.

***E.5.2.6.3 Operations and Maintenance Costs.*** Section A.3.0 presented the fixed and nonfuel variable O&M costs for TEC. It was assumed that the City would be responsible for a share of the O&M costs for TEC equal to the City's ownership share of 20.3 percent. Total fixed O&M costs for TEC include an adder for ongoing capital expenditures of $2.97 per kW-year in 2012 dollars, which escalates 2.0 percent higher than the general inflation rate. Excluding the adder for ongoing capital expenditures, the total annual cost for TEC's fixed O&M is $17.7 million in 2005 dollars. The City's share of the fixed O&M cost for TEC is $3.60 million or about $23.63 per kW-year (net after considering transmission losses) in 2005 dollars. Section A.3.0 presented the nonfuel variable O&M cost for TEC before transmission losses as $1.36 per MWh. With transmission losses considered, the City's net nonfuel variable O&M cost is $1.39 per MWh in 2005 dollars.

***E.5.2.6.4 TEC Scheduled Maintenance and Forced Outages.*** As presented in Section A.3.0, TEC is expected to have an average of 16 scheduled maintenance days per year. Scheduled maintenance is assumed to begin on October 1st of every year after 2012. The scheduled maintenance period is consistent for all of the economic evaluations presented in this Application. TEC is assumed to have an equivalent forced outage rate of 5.23 percent.

***E.5.2.6.5 Community Contribution.*** For the purposes of this analysis, the TEC Participants are assumed to pay a community contribution of $2.5 million per year, in addition to an initial contribution of $20.0 million (included in the capital cost) previously described in this section. Similar to the other fixed costs for TEC, it was assumed that the City would be responsible for a percentage of the annual community contribution proportionate to its ownership share of TEC. The City's share of the annual community contribution is approximately $507,500 in 2012 dollars. The community contribution is included as an additional annual cost to the City, escalated at the general inflation rate of 2.5 percent per year after May 1, 2012.

### *E.5.2.7 Analysis of Alternative Expansion Plans to Participation in TEC*

The base case capacity expansion plan presented in Subsection E.5.2.6 indicates a seasonal purchase during the summer of 2011, followed by participation in TEC in 2012. However, for this alternative expansion plan analysis, it was assumed that the City would neither purchase seasonal capacity nor participate in TEC. Instead, Black & Veatch's POWROPT was utilized to determine the least-cost capacity expansion plan for the City's system, beginning with the initial forecast need for capacity in the summer of 2011. To determine this plan, POWROPT selected generating unit alternatives from among the City's individual ownership supply-side alternatives identified in Section A.6.0. All supply-side alternatives were assumed to be available to meet the City's need for capacity in the summer of 2011, except for the CFB and the IGCC options. Considering the time likely required to permit, license, and construct a solid-fuel unit in Tallahassee (including the conducting of a referendum consistent with the City's charter), it has been assumed that the CFB option would first be available in 2015 and, as previously described in Subsection E.5.2.6, the IGCC option was first assumed to be available in 2018.

## E.5.3 Cumulative Present Worth Cost Analysis

The previous sections described the assumptions and methodology that were used in POWROPT to select least-cost capacity expansion plans for a scenario that included the City's participation in TEC and another scenario in which it was assumed that TEC would not be constructed. Once these least-cost capacity expansion plans were identified, POWRPRO was used to determine the total annual system costs and to develop a comparison of CPWCs associated with each expansion plan.

### *E.5.3.1 Analysis of the Capacity Expansion Plan with TEC*

The least-cost capacity expansion plan, assuming that the City participates in TEC in May 2012, includes a seasonal purchase in the summer of 2011, followed by an LMS100 CT unit in 2016, and a second LMS100 CT unit in 2021.

### *E.5.3.2 Analysis of Alternative Capacity Expansion Plan*

The least-cost capacity expansion plan without the City's participation in TEC includes an LMS100 CT unit in 2011, followed by a CFB unit in 2016.

### *E.5.3.3 Comparison of Cumulative Present Worth Costs*

As shown in Table E.5-5, the CPWC of the least-cost capacity expansion plan that includes the City's participation in TEC is approximately $4,320.0 million. Table E.5-6 indicates that the CPWC of the least-cost capacity expansion plan without TEC is $4,472.6 million. A comparison of the CPWCs for the two plans demonstrates that the expansion plan that includes participation in TEC is the least-cost plan by $152.6 million over the planning period.

## Table E.5-5 Expansion Plan Economic Summary - With Taylor Energy Center in 2012

| Case Description | |
|---|---|
| Fuel Forecast: | Base Case |
| Load Forecast | Base Case |

| Economic Parameters | |
|---|---|
| CPW Discount Rate: | 5.0% |
| Final Capital Escalation Rate: | 2.5% |
| Base Year for CPW $ | 2006 |

| Financial Parameters | |
|---|---|
| Interest During Construction: | 5.00% |
| Fixed Charge Rate CT: (20 year) | 8.97% |
| Fixed Charge Rate CC: (25 year) | 7.92% |
| Fixed Charge Rate Coal: (30 year) | 7.25% |

| Generation Additions | | | | | |
|---|---|---|---|---|---|
| Unit Addition | 2006 Capital Cost ($1,000) | Construction and Development Period (months) | Month/Day/Year Installed (mm/dd/yy) | Installed Cost ($1,000) | Levelized Cost ($1,000) |
| TEC | NA | NA | 05/01/12 | 355,739 | 25,805 |
| GE LMS100 SC | 66,300 | 17 | 05/01/16 | 87,038 | 7,809 |
| GE LMS100 SC | 66,300 | 17 | 05/01/21 | 98,471 | 8,835 |

| | Production Cost | | | | Capital Cost and Other Project Costs | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fuel and Energy | O&M | | *Total Production* | | | | | Ongoing | *Total* | Total | Cumulative Present |
| Year | Cost ($1,000) | Variable ($1,000) | Fixed ($1,000) | *Cost ($1,000)* | Unit Capital Cost ($1,000) | Community Contribution ($1,000) | Transmission Charge ($1,000) | Seasonal Purchase ($1,000) | Capex Cost ($1,000) | *Capital Cost ($1,000)* | System Cost ($1,000) | Worth Cost ($1,000) |
| 2006 | $232,683 | $5,346 | $0 | $238,029 | $0 | $0 | $0 | $0 | $0 | $0 | $238,029 | $238,029 |
| 2007 | $232,226 | $5,739 | $0 | $237,965 | $0 | $0 | $0 | $0 | $0 | $0 | $237,965 | $464,662 |
| 2008 | $193,920 | $6,872 | $0 | $200,791 | $0 | $0 | $0 | $0 | $0 | $0 | $200,791 | $646,785 |
| 2009 | $168,573 | $7,694 | $0 | $176,267 | $0 | $0 | $0 | $0 | $0 | $0 | $176,267 | $799,051 |
| 2010 | $154,375 | $8,148 | $0 | $162,523 | $0 | $0 | $0 | $0 | $0 | $0 | $162,523 | $932,760 |
| 2011 | $152,718 | $8,496 | $0 | $161,213 | $0 | $0 | $0 | $990 | $0 | $990 | $162,203 | $1,059,850 |
| 2012 | $145,934 | $7,789 | $2,869 | $156,592 | $17,274 | $508 | $1,483 | $0 | $309 | $19,574 | $176,166 | $1,191,308 |
| 2013 | $143,713 | $7,710 | $4,380 | $155,803 | $25,805 | $520 | $2,225 | $0 | $482 | $29,032 | $184,835 | $1,322,667 |
| 2014 | $152,920 | $8,073 | $4,490 | $165,483 | $25,805 | $533 | $2,225 | $0 | $504 | $29,067 | $194,550 | $1,454,345 |
| 2015 | $164,843 | $8,450 | $4,602 | $177,896 | $25,805 | $547 | $2,225 | $0 | $527 | $29,103 | $206,999 | $1,587,779 |
| 2016 | $172,087 | $8,869 | $5,684 | $186,640 | $31,033 | $560 | $2,225 | $0 | $550 | $34,368 | $221,007 | $1,723,458 |
| 2017 | $180,981 | $9,389 | $6,311 | $196,682 | $33,614 | $574 | $2,225 | $0 | $575 | $36,988 | $233,670 | $1,860,080 |
| 2018 | $190,652 | $9,874 | $6,469 | $206,995 | $33,614 | $589 | $2,225 | $0 | $601 | $37,029 | $244,024 | $1,995,962 |
| 2019 | $203,439 | $10,295 | $6,631 | $220,365 | $33,614 | $603 | $2,225 | $0 | $628 | $37,070 | $257,435 | $2,132,485 |
| 2020 | $217,137 | $10,798 | $6,797 | $234,731 | $33,614 | $618 | $2,225 | $0 | $656 | $37,114 | $271,845 | $2,269,785 |
| 2021 | $229,196 | $11,357 | $8,060 | $248,613 | $39,545 | $634 | $2,225 | $0 | $686 | $43,089 | $291,702 | $2,410,098 |
| 2022 | $241,174 | $11,853 | $8,811 | $261,838 | $42,449 | $650 | $2,225 | $0 | $717 | $46,040 | $307,878 | $2,551,141 |
| 2023 | $256,364 | $12,425 | $9,031 | $277,820 | $42,449 | $666 | $2,225 | $0 | $749 | $46,089 | $323,908 | $2,692,461 |
| 2024 | $274,592 | $13,482 | $9,257 | $297,331 | $42,449 | $683 | $2,225 | $0 | $783 | $46,139 | $343,471 | $2,835,180 |
| 2025 | $293,263 | $13,987 | $9,488 | $316,739 | $42,449 | $700 | $2,225 | $0 | $818 | $46,191 | $362,930 | $2,978,804 |
| 2026 | $305,250 | $14,356 | $9,726 | $329,332 | $42,449 | $717 | $2,225 | $0 | $855 | $46,246 | $375,577 | $3,120,355 |
| 2027 | $317,317 | $14,715 | $9,969 | $342,001 | $42,449 | $735 | $2,225 | $0 | $893 | $46,302 | $388,303 | $3,259,733 |
| 2028 | $331,211 | $15,150 | $10,218 | $356,579 | $42,449 | $753 | $2,225 | $0 | $933 | $46,361 | $402,939 | $3,397,478 |
| 2029 | $345,753 | $15,530 | $10,473 | $371,756 | $42,449 | $772 | $2,225 | $0 | $975 | $46,421 | $418,178 | $3,533,625 |
| 2030 | $361,004 | $15,919 | $10,735 | $387,659 | $42,449 | $792 | $2,225 | $0 | $1,019 | $46,485 | $434,143 | $3,668,238 |
| 2031 | $376,941 | $16,318 | $11,004 | $404,262 | $42,449 | $811 | $2,225 | $0 | $1,065 | $46,550 | $450,812 | $3,801,365 |
| 2032 | $393,639 | $16,727 | $11,279 | $421,645 | $42,449 | $832 | $2,225 | $0 | $1,113 | $46,618 | $468,264 | $3,933,059 |
| 2033 | $411,129 | $17,146 | $11,561 | $439,836 | $42,449 | $852 | $2,225 | $0 | $1,163 | $46,689 | $486,525 | $4,063,374 |
| 2034 | $429,426 | $17,575 | $11,850 | $458,851 | $42,449 | $874 | $2,225 | $0 | $1,215 | $46,763 | $505,614 | $4,192,353 |
| 2035 | $448,589 | $18,016 | $12,146 | $478,750 | $42,449 | $896 | $2,225 | $0 | $1,270 | $46,840 | $525,590 | $4,320,044 |

## Table E.5-6 Expansion Plan Economic Summary - Without Taylor Energy Center

| Case Description | |
|---|---|
| Fuel Forecast: | Base Case |
| Load Forecast | Base Case |

| Economic Parameters | |
|---|---|
| CPW Discount Rate: | 5.0% |
| Final Capital Escalation Rate: | 2.5% |
| Base Year for CPW $ | 2006 |

| Financial Parameters | |
|---|---|
| Interest During Construction: | 5.00% |
| Fixed Charge Rate CT: (20 year) | 8.97% |
| Fixed Charge Rate CC: (25 year) | 7.92% |
| Fixed Charge Rate Coal: (30 yeai | 7.25% |

| Generation Additions | | | | | |
|---|---|---|---|---|---|
| Unit Addition | 2006 Capital Cost ($1,000) | Construction and Development Period (months) | Month/Day/Year Installed (mm/dd/yy) | Installed Cost ($1,000) | Levelized Cost ($1,000) |
| GE LMS100 SC | 66,300 | 17 | 05/01/11 | 76,926 | 6,902 |
| CFB | 566,000 | 44 | 05/01/16 | 763,461 | 55,381 |

| Year | Production Cost | | | | Capital Cost and Other Project Costs | | | | | | Total System Cost ($1,000) | Cumulative Present Worth Cost ($1,000) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fuel and Energy Cost ($1,000) | O&M Variable ($1,000) | O&M Fixed ($1,000) | *Total Production Cost ($1,000)* | Unit Capital Cost ($1,000) | Community Contribution ($1,000) | Transmission Charge ($1,000) | Seasonal Purchase ($1,000) | Ongoing Capex Cost ($1,000) | *Total Capital Cost ($1,000)* | | |
| 2006 | $232,683 | $5,346 | $0 | $238,029 | $0 | $0 | $0 | $0 | $0 | $0 | $238,029 | $238,029 |
| 2007 | $232,226 | $5,739 | $0 | $237,965 | $0 | $0 | $0 | $0 | $0 | $0 | $237,965 | $464,662 |
| 2008 | $193,920 | $6,872 | $0 | $200,791 | $0 | $0 | $0 | $0 | $0 | $0 | $200,791 | $646,785 |
| 2009 | $168,573 | $7,694 | $0 | $176,267 | $0 | $0 | $0 | $0 | $0 | $0 | $176,267 | $799,051 |
| 2010 | $154,375 | $8,148 | $0 | $162,523 | $0 | $0 | $0 | $0 | $0 | $0 | $162,523 | $932,760 |
| 2011 | $152,448 | $8,614 | $854 | $161,916 | $4,633 | $0 | $0 | $0 | $0 | $4,633 | $166,549 | $1,063,255 |
| 2012 | $161,186 | $9,007 | $1,305 | $171,498 | $6,902 | $0 | $0 | $0 | $0 | $6,902 | $178,400 | $1,196,380 |
| 2013 | $172,037 | $9,465 | $1,337 | $182,839 | $6,902 | $0 | $0 | $0 | $0 | $6,902 | $189,740 | $1,331,225 |
| 2014 | $183,161 | $9,888 | $1,371 | $194,419 | $6,902 | $0 | $0 | $0 | $0 | $6,902 | $201,321 | $1,467,487 |
| 2015 | $195,653 | $10,304 | $1,405 | $207,362 | $6,902 | $0 | $0 | $0 | $0 | $6,902 | $214,264 | $1,605,604 |
| 2016 | $172,425 | $12,699 | $9,655 | $194,778 | $43,974 | $0 | $0 | $0 | $0 | $43,974 | $238,753 | $1,752,177 |
| 2017 | $168,241 | $14,088 | $14,020 | $196,349 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $258,632 | $1,903,394 |
| 2018 | $178,224 | $14,645 | $14,371 | $207,240 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $269,523 | $2,053,475 |
| 2019 | $190,470 | $15,204 | $14,730 | $220,404 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $282,687 | $2,203,390 |
| 2020 | $201,422 | $15,784 | $15,098 | $232,305 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $294,588 | $2,352,177 |
| 2021 | $212,467 | $16,389 | $15,476 | $244,332 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $306,615 | $2,499,664 |
| 2022 | $223,463 | $17,015 | $15,863 | $256,341 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $318,624 | $2,645,629 |
| 2023 | $240,540 | $17,658 | $16,259 | $274,457 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $336,740 | $2,792,548 |
| 2024 | $264,140 | $18,726 | $16,666 | $299,532 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $361,816 | $2,942,890 |
| 2025 | $280,737 | $19,463 | $17,083 | $317,283 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $379,566 | $3,093,097 |
| 2026 | $292,160 | $19,949 | $17,510 | $329,618 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $391,901 | $3,240,800 |
| 2027 | $305,127 | $20,449 | $17,947 | $343,524 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $405,807 | $3,386,462 |
| 2028 | $318,217 | $20,961 | $18,396 | $357,574 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $419,857 | $3,529,990 |
| 2029 | $331,774 | $21,484 | $18,856 | $372,114 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $434,397 | $3,671,417 |
| 2030 | $346,166 | $22,023 | $19,327 | $387,516 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $449,799 | $3,810,885 |
| 2031 | $361,208 | $22,574 | $19,810 | $403,592 | $57,651 | $0 | $0 | $0 | $0 | $57,651 | $461,243 | $3,947,092 |
| 2032 | $376,952 | $23,139 | $20,306 | $420,397 | $55,381 | $0 | $0 | $0 | $0 | $55,381 | $475,779 | $4,080,900 |
| 2033 | $393,492 | $23,717 | $20,813 | $438,022 | $55,381 | $0 | $0 | $0 | $0 | $55,381 | $493,404 | $4,213,057 |
| 2034 | $410,766 | $24,312 | $21,334 | $456,412 | $55,381 | $0 | $0 | $0 | $0 | $55,381 | $511,793 | $4,343,612 |
| 2035 | $428,884 | $24,919 | $21,867 | $475,670 | $55,381 | $0 | $0 | $0 | $0 | $55,381 | $531,051 | $4,472,629 |

# E.6.0 The City's Sensitivity Analyses

Several sensitivity analyses were performed to supplement the City's base case economic analysis and to demonstrate the robustness of the capacity expansion plans, including the City's participation in TEC. These analyses measured the impact of varying the key assumptions used in the base case economic analysis, as well as the effects of considerations not included in the base case.

As described in Section E.5.0, the base case economic analysis compared the CPWC of the optimal capacity expansion plan, including the City's participation in TEC, to the optimal capacity expansion plan without participation in TEC. For the base case analysis that included participation in TEC, the proposed TEC was treated as a committed unit starting May 1, 2012, while in the base case analysis without TEC, no candidate units were committed. POWROPT, Black & Veatch's optimal generation and capacity expansion model, was used to select the least-cost expansion plan to meet the City's capacity needs. Once the optimal capacity expansion plan was developed for each case, POWRPRO (Black & Veatch's production costing model) was used to determine each plan's production costs, which were used to develop an overall CPWC for each plan.

The general methodology used in the sensitivity analyses is similar to the methodology used in the base case analysis. POWROPT was used to determine the optimal capacity expansion plan for all cases considered under the various assumptions described in this section. POWRPRO was then utilized to calculate production costs of each plan, to compare each plan's CPWC and to determine the least-cost expansion plan. The remainder of this section presents the methodology and results of the sensitivity analyses.

## E.6.1 Input Parameter Sensitivities

The sensitivities described in this section reflect changes to the base case input assumptions including fuel prices, load forecast, emissions allowance prices, capital costs, and potential environmental regulations related to carbon dioxide ($CO_2$) emissions.

### *E.6.1.1 High Fuel Price Forecast*

The high fuel price sensitivity analysis is based on Hill & Associates' high fuel price forecasts and the corresponding emissions allowance price forecasts. The high fuel price forecasts are presented in Section A.4.0, while the emissions allowance price forecasts corresponding to the high fuel price forecast are presented in Section A.5.0.

As in the base case analysis described in Section E.5.0, the costs of emissions allowances were added to the fuel prices for both the existing and candidate units in the high fuel price sensitivity. Table E.6-1 presents the emissions cost adders for the City's existing units, and Table E.6-2 presents the emissions adders for the candidate units under the high fuel price sensitivity. The City's existing generating system does not include any mercury emitting units, and therefore no adders for Hg emissions allowance costs are included for the City's system. In years when existing units are no longer available to the City due to retirement, "N/A" is used to indicate that the adders are no longer applicable, since the resources are not included in the City's dispatch model.

Under the high fuel price forecast scenario, the optimal capacity expansion plan for the case with TEC in 2012 consists of a CFB unit in 2016. The optimal capacity expansion plan for the case without participation in TEC consists of an LMS100 CT unit in 2011, followed by a CFB unit in 2016.

The CPWCs for the expansion plan with TEC and the plan without participation in TEC are $4,817.0 million and $4,996.6 million, respectively. A comparison of these CPWCs shows that the expansion plan with TEC is the least-cost plan by $179.6 million over the evaluation period.

### *E.6.1.2 Low Fuel Price Forecast*

The low fuel price sensitivity analysis is based on Hill & Associates' low fuel price forecasts and the corresponding emissions allowance price forecasts. The low fuel price forecasts are presented in Section A.4.0, while the emissions allowance price forecasts corresponding to the low fuel price forecast are presented in Section A.5.0.

As in the base case analysis described in Section E.5.0, the costs of emissions allowances were added to the fuel prices for both the existing and candidate units in the low fuel price sensitivity. Table E.6-3 presents the emissions cost adders for the City's existing system, and Table E.6-4 presents the emissions cost adders for the candidate units under the low fuel price sensitivity. The City's existing generating system does not include any mercury emitting units, and therefore no adders for Hg emissions allowance costs are included for the City's system. In years when existing units are no longer available to the City due to retirement, "N/A" is used to indicate that the adders are no longer applicable, since the resources are not included in the City's dispatch model.

Under the low fuel price forecast scenario, the optimal capacity expansion plan for the case with TEC in 2012 consists of a 7FA CT unit in 2016. The optimal capacity expansion plan for the case without participation in TEC consists of an LMS100 CT unit in 2011, followed by a 7FA CT unit in 2016, and a second LMS100 CT unit in 2021.

Table E.6-1
Combined $SO_2$ and $NO_x$ Emissions Cost Adders for the City's Existing Units – High Fuel Forecast
(Nominal $/MBtu)

| Calendar Year | Hopkins 1 | Hopkins CT 1 | Hopkins CT 2 | Purdom 8 | Purdom 7 | Hopkins LM6000s | Hopkins 2 1x1 CC |
|---|---|---|---|---|---|---|---|
| 2009 | $0.25 | $0.38 | $0.38 | $0.04 | $0.26 | $0.02 | $0.01 |
| 2010 | $0.34 | $0.52 | $0.52 | $0.05 | $0.36 | $0.03 | $0.01 |
| 2011 | $0.35 | $0.55 | $0.55 | $0.05 | $0.37 | $0.03 | $0.01 |
| 2012 | $0.38 | $0.58 | $0.58 | $0.06 | N/A | $0.04 | $0.01 |
| 2013 | $0.40 | $0.63 | $0.63 | $0.06 | N/A | $0.04 | $0.01 |
| 2014 | $0.44 | $0.69 | $0.69 | $0.07 | N/A | $0.04 | $0.02 |
| 2015 | $0.78 | $1.20 | $1.20 | $0.11 | N/A | $0.08 | $0.03 |
| 2016 | $0.71 | N/A | $1.09 | $0.10 | N/A | $0.07 | $0.02 |
| 2017 | N/A | N/A | $1.14 | $0.11 | N/A | $0.07 | $0.03 |
| 2018 | N/A | N/A | N/A | $0.14 | N/A | $0.09 | $0.03 |
| 2019 | N/A | N/A | N/A | $0.14 | N/A | $0.09 | $0.03 |
| 2020 | N/A | N/A | N/A | $0.18 | N/A | $0.12 | $0.04 |
| 2021 | N/A | N/A | N/A | $0.21 | N/A | $0.14 | $0.05 |
| 2022 | N/A | N/A | N/A | $0.23 | N/A | $0.15 | $0.06 |
| 2023 | N/A | N/A | N/A | $0.21 | N/A | $0.14 | $0.05 |
| 2024 | N/A | N/A | N/A | $0.28 | N/A | $0.18 | $0.07 |
| 2025 | N/A | N/A | N/A | $0.30 | N/A | $0.20 | $0.07 |
| 2026 | N/A | N/A | N/A | $0.33 | N/A | $0.22 | $0.08 |
| 2027 | N/A | N/A | N/A | $0.36 | N/A | $0.24 | $0.09 |
| 2028 | N/A | N/A | N/A | $0.39 | N/A | $0.26 | $0.09 |
| 2029 | N/A | N/A | N/A | $0.43 | N/A | $0.28 | $0.10 |
| 2030 | N/A | N/A | N/A | $0.46 | N/A | $0.30 | $0.11 |
| 2031 | N/A | N/A | N/A | $0.50 | N/A | $0.33 | $0.12 |
| 2032 | N/A | N/A | N/A | $0.54 | N/A | $0.35 | $0.13 |
| 2033 | N/A | N/A | N/A | $0.58 | N/A | $0.38 | $0.14 |
| 2034 | N/A | N/A | N/A | $0.63 | N/A | $0.41 | $0.15 |
| 2035 | N/A | N/A | N/A | $0.68 | N/A | $0.45 | $0.16 |

Table E.6-2
Combined $SO_2$ $NO_x$, and Hg Emissions Cost Adders for the City's Candidate Units – High Fuel Forecast
(Nominal $/MBtu)

| Calendar Year | LM6000 CT | 7EA CT | 7FA CT | 1x1 7FA CC | TEC | CFB (100 percent coal) | 1x1 IGCC (100 percent coal) | LMS100 CT | LM6000 1x1 CC |
|---|---|---|---|---|---|---|---|---|---|
| 2009 | $0.01 | $0.01 | $0.01 | $0.01 | $0.08 | $0.11 | $0.07 | $0.01 | $0.01 |
| 2010 | $0.01 | $0.01 | $0.01 | $0.01 | $0.16 | $0.20 | $0.10 | $0.01 | $0.01 |
| 2011 | $0.01 | $0.01 | $0.01 | $0.01 | $0.16 | $0.20 | $0.11 | $0.01 | $0.01 |
| 2012 | $0.01 | $0.01 | $0.01 | $0.01 | $0.17 | $0.22 | $0.12 | $0.01 | $0.01 |
| 2013 | $0.01 | $0.01 | $0.01 | $0.01 | $0.18 | $0.23 | $0.12 | $0.01 | $0.01 |
| 2014 | $0.02 | $0.02 | $0.02 | $0.02 | $0.20 | $0.25 | $0.14 | $0.02 | $0.02 |
| 2015 | $0.03 | $0.03 | $0.03 | $0.03 | $0.33 | $0.42 | $0.24 | $0.03 | $0.03 |
| 2016 | $0.02 | $0.02 | $0.02 | $0.02 | $0.31 | $0.39 | $0.22 | $0.02 | $0.02 |
| 2017 | $0.03 | $0.03 | $0.03 | $0.03 | $0.32 | $0.40 | $0.23 | $0.03 | $0.03 |
| 2018 | $0.03 | $0.03 | $0.03 | $0.03 | $0.40 | $0.51 | $0.28 | $0.03 | $0.03 |
| 2019 | $0.03 | $0.03 | $0.03 | $0.03 | $0.42 | $0.53 | $0.29 | $0.03 | $0.03 |
| 2020 | $0.04 | $0.04 | $0.04 | $0.04 | $0.52 | $0.65 | $0.37 | $0.04 | $0.04 |
| 2021 | $0.05 | $0.05 | $0.05 | $0.05 | $0.59 | $0.75 | $0.43 | $0.05 | $0.05 |
| 2022 | $0.06 | $0.06 | $0.06 | $0.06 | $0.66 | $0.84 | $0.48 | $0.06 | $0.06 |
| 2023 | $0.05 | $0.05 | $0.05 | $0.05 | $0.65 | $0.82 | $0.45 | $0.05 | $0.05 |
| 2024 | $0.07 | $0.07 | $0.07 | $0.07 | $0.80 | $1.01 | $0.57 | $0.07 | $0.07 |
| 2025 | $0.07 | $0.07 | $0.07 | $0.07 | $0.92 | $1.15 | $0.63 | $0.07 | $0.07 |
| 2026 | $0.08 | $0.08 | $0.08 | $0.08 | $1.00 | $1.26 | $0.69 | $0.08 | $0.08 |
| 2027 | $0.09 | $0.09 | $0.09 | $0.09 | $1.09 | $1.37 | $0.75 | $0.09 | $0.09 |
| 2028 | $0.09 | $0.09 | $0.09 | $0.09 | $1.18 | $1.49 | $0.82 | $0.09 | $0.09 |
| 2029 | $0.10 | $0.10 | $0.10 | $0.10 | $1.28 | $1.61 | $0.89 | $0.10 | $0.10 |
| 2030 | $0.11 | $0.11 | $0.11 | $0.11 | $1.39 | $1.74 | $0.96 | $0.11 | $0.11 |
| 2031 | $0.12 | $0.12 | $0.12 | $0.12 | $1.50 | $1.88 | $1.03 | $0.12 | $0.12 |
| 2032 | $0.13 | $0.13 | $0.13 | $0.13 | $1.62 | $2.03 | $1.12 | $0.13 | $0.13 |
| 2033 | $0.14 | $0.14 | $0.14 | $0.14 | $1.75 | $2.19 | $1.21 | $0.14 | $0.14 |
| 2034 | $0.15 | $0.15 | $0.15 | $0.15 | $1.89 | $2.37 | $1.30 | $0.15 | $0.15 |
| 2035 | $0.16 | $0.16 | $0.16 | $0.16 | $2.05 | $2.56 | $1.41 | $0.16 | $0.16 |

Table E.6-3
Combined $SO_2$ and $NO_x$ Emissions Cost Adders for the City's Existing Units – Low Fuel Forecast
(Nominal $/MBtu)

| Calendar Year | Hopkins 1 | Hopkins CT 1 | Hopkins CT 2 | Purdom 8 | Purdom 7 | Hopkins LM6000s | Hopkins 2 1x1 CC |
|---|---|---|---|---|---|---|---|
| 2009 | $0.23 | $0.36 | $0.36 | $0.03 | $0.24 | $0.02 | $0.01 |
| 2010 | $0.31 | $0.48 | $0.48 | $0.05 | $0.33 | $0.03 | $0.01 |
| 2011 | $0.32 | $0.50 | $0.50 | $0.05 | $0.34 | $0.03 | $0.01 |
| 2012 | $0.35 | $0.54 | $0.54 | $0.05 | N/A | $0.03 | $0.01 |
| 2013 | $0.36 | $0.56 | $0.56 | $0.05 | N/A | $0.03 | $0.01 |
| 2014 | $0.38 | $0.59 | $0.59 | $0.06 | N/A | $0.04 | $0.01 |
| 2015 | $0.58 | $0.90 | $0.90 | $0.09 | N/A | $0.06 | $0.02 |
| 2016 | $0.38 | N/A | $0.59 | $0.06 | N/A | $0.04 | $0.01 |
| 2017 | N/A | N/A | $0.68 | $0.07 | N/A | $0.04 | $0.02 |
| 2018 | N/A | N/A | N/A | $0.09 | N/A | $0.06 | $0.02 |
| 2019 | N/A | N/A | N/A | $0.09 | N/A | $0.06 | $0.02 |
| 2020 | N/A | N/A | N/A | $0.10 | N/A | $0.06 | $0.02 |
| 2021 | N/A | N/A | N/A | $0.11 | N/A | $0.07 | $0.03 |
| 2022 | N/A | N/A | N/A | $0.11 | N/A | $0.07 | $0.03 |
| 2023 | N/A | N/A | N/A | $0.12 | N/A | $0.08 | $0.03 |
| 2024 | N/A | N/A | N/A | $0.13 | N/A | $0.08 | $0.03 |
| 2025 | N/A | N/A | N/A | $0.14 | N/A | $0.09 | $0.03 |
| 2026 | N/A | N/A | N/A | $0.15 | N/A | $0.10 | $0.04 |
| 2027 | N/A | N/A | N/A | $0.16 | N/A | $0.10 | $0.04 |
| 2028 | N/A | N/A | N/A | $0.17 | N/A | $0.11 | $0.04 |
| 2029 | N/A | N/A | N/A | $0.18 | N/A | $0.12 | $0.04 |
| 2030 | N/A | N/A | N/A | $0.19 | N/A | $0.12 | $0.04 |
| 2031 | N/A | N/A | N/A | $0.20 | N/A | $0.13 | $0.05 |
| 2032 | N/A | N/A | N/A | $0.21 | N/A | $0.14 | $0.05 |
| 2033 | N/A | N/A | N/A | $0.22 | N/A | $0.15 | $0.05 |
| 2034 | N/A | N/A | N/A | $0.24 | N/A | $0.15 | $0.06 |
| 2035 | N/A | N/A | N/A | $0.25 | N/A | $0.16 | $0.06 |

Table E.6-4
Combined $SO_2$, $NO_x$, and Hg Emissions Cost Adders for the City's Candidate Units – Low Fuel Forecast
(Nominal $/MBtu)

| Calendar Year | LM6000 CT | 7EA CT | 7FA CT | 1x1 7FA CC | TEC | CFB (100 percent coal) | 1x1 IGCC (100 percent coal) | LMS100 CT | LM6000 1x1 CC |
|---|---|---|---|---|---|---|---|---|---|
| 2009 | $0.01 | $0.01 | $0.01 | $0.01 | $0.08 | $0.10 | $0.07 | $0.01 | $0.01 |
| 2010 | $0.01 | $0.01 | $0.01 | $0.01 | $0.14 | $0.18 | $0.10 | $0.01 | $0.01 |
| 2011 | $0.01 | $0.01 | $0.01 | $0.01 | $0.15 | $0.19 | $0.10 | $0.01 | $0.01 |
| 2012 | $0.01 | $0.01 | $0.01 | $0.01 | $0.16 | $0.20 | $0.11 | $0.01 | $0.01 |
| 2013 | $0.01 | $0.01 | $0.01 | $0.01 | $0.17 | $0.21 | $0.11 | $0.01 | $0.01 |
| 2014 | $0.01 | $0.01 | $0.01 | $0.01 | $0.17 | $0.21 | $0.12 | $0.01 | $0.01 |
| 2015 | $0.02 | $0.02 | $0.02 | $0.02 | $0.26 | $0.33 | $0.18 | $0.02 | $0.02 |
| 2016 | $0.01 | $0.01 | $0.01 | $0.01 | $0.19 | $0.24 | $0.12 | $0.01 | $0.01 |
| 2017 | $0.02 | $0.02 | $0.02 | $0.02 | $0.21 | $0.27 | $0.14 | $0.02 | $0.02 |
| 2018 | $0.02 | $0.02 | $0.02 | $0.02 | $0.27 | $0.34 | $0.18 | $0.02 | $0.02 |
| 2019 | $0.02 | $0.02 | $0.02 | $0.02 | $0.30 | $0.38 | $0.20 | $0.02 | $0.02 |
| 2020 | $0.02 | $0.02 | $0.02 | $0.02 | $0.30 | $0.38 | $0.21 | $0.02 | $0.02 |
| 2021 | $0.03 | $0.03 | $0.03 | $0.03 | $0.33 | $0.41 | $0.22 | $0.03 | $0.03 |
| 2022 | $0.03 | $0.03 | $0.03 | $0.03 | $0.34 | $0.43 | $0.23 | $0.03 | $0.03 |
| 2023 | $0.03 | $0.03 | $0.03 | $0.03 | $0.40 | $0.50 | $0.26 | $0.03 | $0.03 |
| 2024 | $0.03 | $0.03 | $0.03 | $0.03 | $0.43 | $0.54 | $0.28 | $0.03 | $0.03 |
| 2025 | $0.03 | $0.03 | $0.03 | $0.03 | $0.51 | $0.63 | $0.31 | $0.03 | $0.03 |
| 2026 | $0.04 | $0.04 | $0.04 | $0.04 | $0.53 | $0.65 | $0.32 | $0.04 | $0.04 |
| 2027 | $0.04 | $0.04 | $0.04 | $0.04 | $0.56 | $0.69 | $0.34 | $0.04 | $0.04 |
| 2028 | $0.04 | $0.04 | $0.04 | $0.04 | $0.60 | $0.74 | $0.36 | $0.04 | $0.04 |
| 2029 | $0.04 | $0.04 | $0.04 | $0.04 | $0.63 | $0.78 | $0.38 | $0.04 | $0.04 |
| 2030 | $0.04 | $0.04 | $0.04 | $0.04 | $0.67 | $0.83 | $0.40 | $0.04 | $0.04 |
| 2031 | $0.05 | $0.05 | $0.05 | $0.05 | $0.72 | $0.88 | $0.43 | $0.05 | $0.05 |
| 2032 | $0.05 | $0.05 | $0.05 | $0.05 | $0.76 | $0.94 | $0.45 | $0.05 | $0.05 |
| 2033 | $0.05 | $0.05 | $0.05 | $0.05 | $0.81 | $1.00 | $0.48 | $0.05 | $0.05 |
| 2034 | $0.06 | $0.06 | $0.06 | $0.06 | $0.86 | $1.06 | $0.51 | $0.06 | $0.06 |
| 2035 | $0.06 | $0.06 | $0.06 | $0.06 | $0.91 | $1.13 | $0.54 | $0.06 | $0.06 |

The CPWCs for the expansion plan with TEC and the plan without participation in TEC are $3,502.7 million and $3,648.6 million, respectively. A comparison of these CPWCs shows that the expansion plan with TEC is the least-cost plan by $145.9 million over the evaluation period.

### *E.6.1.3 High Load and Energy Growth*

Load and energy growth sensitivities are important analyses that help to demonstrate the robustness of future capacity additions, since load growth is a fundamental variable in determining an optimal capacity expansion plan. The high load and energy growth sensitivity demonstrates the effects of planning to meet capacity and energy requirements in a case where both load and energy grow at a rate that is higher than the expected rate used in the base case economic evaluation presented in Section E.5.0. This scenario requires the addition of more generation to meet reserve margin requirements and, therefore, results in increased CPWCs compared to the base case capacity expansion plan. The high load and energy growth scenario is based upon the high load and energy growth forecast presented in Section E.3.0. Tables E.6-5 and E.6-6 present the City's projected reliability levels under the high load and energy growth scenario for the winter and summer seasons, respectively.

In the base case economic evaluation, the capacity expansion plan with the City's participation in TEC included a seasonal purchase in the summer of 2011. Since the City would need to add additional capacity in the high load and energy growth scenario prior to 2011, the seasonal purchase was not included in this sensitivity.

Under the high load and energy growth sensitivity analysis, the optimal capacity expansion plan with TEC in 2012 consists of a 7FA CT unit in 2007, followed by an LM6000 CT unit in 2023. The optimal capacity expansion plan without participation in TEC consists of an LM6000 CT unit in 2007, followed by a second LM6000 CT unit in 2011, and a CFB unit in 2015.

The CPWCs for the expansion plan with TEC and the plan without participation in TEC are $4,670.3 and $4,793.1 million, respectively. A comparison of the CPWCs shows that the case with TEC is the least-cost plan by $122.8 million over the evaluation period.

Table E.6-5
City's Summer Capacity Balance – High Load and Energy Growth

| Year | Generating Resources (MW) | | | Capacity Requirements (MW) | | | Excess/(Deficit) Capacity to Maintain 17 Percent Reserves |
|---|---|---|---|---|---|---|---|
| | Owned[1] | Purchased Power | Total | Peak Demand[2] | 17 Percent Reserves | Total | |
| 2006 | 746 | 11 | 757 | 636 | 108 | 744 | 13 |
| 2007 | 746 | 11 | 757 | 654 | 111 | 765 | (8) |
| 2008 | 814 | 11 | 825 | 665 | 113 | 778 | 47 |
| 2009 | 814 | 11 | 825 | 674 | 115 | 789 | 36 |
| 2010 | 814 | 11 | 825 | 684 | 116 | 800 | 25 |
| 2011 | 746 | 11 | 757 | 695 | 118 | 813 | (56) |
| 2012 | 746 | 11 | 757 | 705 | 120 | 825 | (68) |
| 2013 | 746 | 11 | 757 | 715 | 122 | 837 | (80) |
| 2014 | 746 | 11 | 757 | 725 | 123 | 848 | (91) |
| 2015 | 734 | 11 | 745 | 735 | 125 | 860 | (115) |
| 2016 | 658 | 11 | 669 | 744 | 126 | 870 | (201) |
| 2017 | 634 | 0 | 634 | 753 | 128 | 881 | (247) |
| 2018 | 634 | 0 | 634 | 762 | 130 | 892 | (258) |
| 2019 | 634 | 0 | 634 | 771 | 131 | 902 | (268) |
| 2020 | 634 | 0 | 634 | 780 | 133 | 913 | (279) |
| 2021 | 634 | 0 | 634 | 789 | 134 | 923 | (289) |
| 2022 | 634 | 0 | 634 | 798 | 136 | 934 | (300) |
| 2023 | 634 | 0 | 634 | 807 | 137 | 944 | (310) |
| 2024 | 634 | 0 | 634 | 816 | 139 | 955 | (321) |
| 2025 | 634 | 0 | 634 | 824 | 140 | 964 | (330) |

(1)Owned capacity reflects all unit retirements presented in Section E.2.0, as well as the combined cycle repowering of Hopkins Unit 2 in May 2008.
(2)Peak demand forecast includes expected reductions associated with the City's existing conservation and DSM programs.

Table E.6-6
City's Winter Capacity Balance – High Load and Energy Growth

| Year | Generating Resources (MW) | | | Capacity Requirements (MW) | | | Excess/(Deficit) Capacity to Maintain 17 Percent Reserves |
|---|---|---|---|---|---|---|---|
| | Owned[(1)] | Purchased Power | Total | Peak Demand[(2)] | 17 Percent Reserves | Total | |
| 2006 | 797 | 11 | 808 | 596 | 101 | 697 | 111 |
| 2007 | 797 | 11 | 808 | 620 | 105 | 725 | 83 |
| 2008 | 797 | 11 | 808 | 635 | 108 | 743 | 65 |
| 2009 | 893 | 11 | 904 | 647 | 110 | 757 | 147 |
| 2010 | 893 | 11 | 904 | 660 | 112 | 772 | 132 |
| 2011 | 893 | 11 | 904 | 672 | 114 | 786 | 118 |
| 2012 | 823 | 11 | 834 | 685 | 116 | 801 | 33 |
| 2013 | 823 | 11 | 834 | 697 | 118 | 815 | 19 |
| 2014 | 823 | 11 | 834 | 710 | 121 | 831 | 3 |
| 2015 | 823 | 11 | 834 | 723 | 123 | 846 | (12) |
| 2016 | 809 | 11 | 820 | 734 | 125 | 859 | (39) |
| 2017 | 731 | 0 | 731 | 746 | 127 | 873 | (142) |
| 2018 | 705 | 0 | 705 | 757 | 129 | 886 | (181) |
| 2019 | 705 | 0 | 705 | 768 | 131 | 899 | (194) |
| 2020 | 705 | 0 | 705 | 780 | 133 | 913 | (208) |
| 2021 | 705 | 0 | 705 | 791 | 134 | 925 | (220) |
| 2022 | 705 | 0 | 705 | 802 | 136 | 938 | (233) |
| 2023 | 705 | 0 | 705 | 813 | 138 | 951 | (246) |
| 2024 | 705 | 0 | 705 | 824 | 140 | 964 | (259) |
| 2025 | 705 | 0 | 705 | 835 | 142 | 977 | (272) |

(1)Owned capacity reflects all unit retirements presented in Section E.2.0, as well as the combined cycle repowering of Hopkins Unit 2 in May 2008.
(2)Peak demand forecast includes expected reductions associated with the City's existing conservation and DSM programs.

### *E.6.1.4 Low Load and Energy Growth*

The low load and energy growth sensitivity demonstrates the effects of planning to meet capacity and energy requirements in a case where both load and energy grow at a rate that is lower than the expected rate used in the base case economic evaluation. This scenario requires the addition of less generation to meet reserve margin requirements and, therefore, results in decreased CPWCs over the planning period compared to the base case capacity expansion plan. The low load and energy growth scenario is based upon the low load and energy growth forecast presented in Section E.3.0. Tables E.6-7 and E.6-8 present the City's projected reliability levels under the low load and energy growth scenario for the winter and summer seasons, respectively. The seasonal purchase described in Section E.5.0 was not considered in this sensitivity, since no capacity would be needed during the summer of 2011.

Under the low load and energy growth sensitivity analysis, the optimal capacity expansion plan with TEC in 2012 consists of an LMS100 CT unit in 2017, followed by an LM6000 CT unit in 2024. The optimal capacity expansion plan without participation in TEC consists of an LM6000 CT unit in 2012, followed by a CFB unit in 2015.

The CPWCs for the expansion plan with TEC and the plan without participation in TEC are $4,058.0 and $4,234.9 million, respectively. A comparison of the CPWCs shows that the case with TEC is the least-cost plan by $176.9 million over the evaluation period.

### *E.6.1.5 High Capital Costs*

In the high capital cost sensitivity, the capital costs for the candidate units and the proposed TEC are increased by 20 percent. Considering an increase in capital costs helps capture uncertainty related to the future costs of material, labor, and equipment. Increasing capital costs can change the emphasis on the timing of capital intensive units and may result in the selection of units with relatively lower capital costs but higher operating and production costs earlier than units with relatively higher capital costs but lower operating and production costs.

Under the high capital cost scenario, the optimal capacity expansion plan for the case with TEC in 2012 consists of a 7FA CT unit in 2016. The optimal capacity expansion plan without participation in TEC consists of an LMS100 CT unit in 2011, followed by a CFB unit in 2016.

The CPWCs for the expansion plan with TEC and the plan without participation in TEC are $4,388.6 and $4,573.3 million, respectively. A comparison of the CPWCs shows that the case with TEC is the least-cost plan by $184.7 million over the evaluation period.

Table E.6-7
City's Summer Capacity Balance – Low Load and Energy Growth

| Year | Generating Resources (MW) | | | Capacity Requirements (MW) | | | Excess/(Deficit) Capacity to Maintain 17 Percent Reserves |
|---|---|---|---|---|---|---|---|
| | Owned(1) | Purchased Power | Total | Peak Demand(2) | 17 Percent Reserves | Total | |
| 2006 | 746 | 11 | 757 | 588 | 100 | 688 | 69 |
| 2007 | 746 | 11 | 757 | 605 | 103 | 708 | 49 |
| 2008 | 814 | 11 | 825 | 616 | 105 | 721 | 104 |
| 2009 | 814 | 11 | 825 | 625 | 106 | 731 | 94 |
| 2010 | 814 | 11 | 825 | 635 | 108 | 743 | 82 |
| 2011 | 746 | 11 | 757 | 644 | 109 | 753 | 4 |
| 2012 | 746 | 11 | 757 | 654 | 111 | 765 | (8) |
| 2013 | 746 | 11 | 757 | 664 | 113 | 777 | (20) |
| 2014 | 746 | 11 | 757 | 673 | 114 | 787 | (30) |
| 2015 | 734 | 11 | 745 | 683 | 116 | 799 | (54) |
| 2016 | 658 | 11 | 669 | 691 | 117 | 808 | (139) |
| 2017 | 634 | 0 | 634 | 700 | 119 | 819 | (185) |
| 2018 | 634 | 0 | 634 | 709 | 121 | 830 | (196) |
| 2019 | 634 | 0 | 634 | 718 | 122 | 840 | (206) |
| 2020 | 634 | 0 | 634 | 726 | 123 | 849 | (215) |
| 2021 | 634 | 0 | 634 | 735 | 125 | 860 | (226) |
| 2022 | 634 | 0 | 634 | 743 | 126 | 869 | (235) |
| 2023 | 634 | 0 | 634 | 752 | 128 | 880 | (246) |
| 2024 | 634 | 0 | 634 | 760 | 129 | 889 | (255) |
| 2025 | 634 | 0 | 634 | 769 | 131 | 900 | (266) |

(1)Owned capacity reflects all unit retirements presented in Section E.2.0, as well as the combined cycle repowering of Hopkins Unit 2 in May 2008.
(2)Peak demand forecast includes expected reductions associated with the City's existing conservation and DSM programs.

Table E.6-8
City's Winter Capacity Balance – Low Load and Energy Growth

| Year | Generating Resources (MW) | | | Capacity Requirements (MW) | | | Excess/(Deficit) Capacity to Maintain 17 Percent Reserves |
|---|---|---|---|---|---|---|---|
| | Owned[1] | Purchased Power | Total | Peak Demand[2] | 17 Percent Reserves | Total | |
| 2006 | 797 | 11.4 | 808 | 496 | 84 | 580 | 228 |
| 2007 | 797 | 11.4 | 808 | 519 | 88 | 607 | 201 |
| 2008 | 797 | 11.4 | 808 | 533 | 91 | 624 | 185 |
| 2009 | 893 | 11.4 | 904 | 545 | 93 | 638 | 267 |
| 2010 | 893 | 11.4 | 904 | 557 | 95 | 652 | 253 |
| 2011 | 893 | 11.4 | 904 | 569 | 97 | 666 | 239 |
| 2012 | 823 | 11.4 | 834 | 581 | 99 | 680 | 155 |
| 2013 | 823 | 11.4 | 834 | 593 | 101 | 694 | 141 |
| 2014 | 823 | 11.4 | 834 | 606 | 103 | 709 | 125 |
| 2015 | 823 | 11.4 | 834 | 618 | 105 | 723 | 111 |
| 2016 | 809 | 11.4 | 820 | 629 | 107 | 736 | 84 |
| 2017 | 731 | 0 | 731 | 640 | 109 | 749 | (18) |
| 2018 | 705 | 0 | 705 | 651 | 111 | 762 | (57) |
| 2019 | 705 | 0 | 705 | 661 | 112 | 773 | (68) |
| 2020 | 705 | 0 | 705 | 672 | 114 | 786 | (81) |
| 2021 | 705 | 0 | 705 | 683 | 116 | 799 | (94) |
| 2022 | 705 | 0 | 705 | 693 | 118 | 811 | (106) |
| 2023 | 705 | 0 | 705 | 704 | 120 | 824 | (119) |
| 2024 | 705 | 0 | 705 | 714 | 121 | 835 | (130) |
| 2025 | 705 | 0 | 705 | 725 | 123 | 848 | (143) |

[1]Owned capacity reflects all unit retirements presented in Section E.2.0, as well as the combined cycle repowering of Hopkins Unit 2 in May 2008.
[2]Peak demand forecast includes expected reductions associated with the City's existing conservation and DSM programs.

### *E.6.1.6 Low Capital Costs*

In the low capital cost sensitivity, the capital costs for the candidate units and the proposed TEC are decreased by 20 percent. Considering a decrease in capital costs helps capture uncertainty about the future costs of material, labor, and equipment. Decreasing capital costs can change the emphasis on the timing of capital intensive units and may result in the selection of units with relatively higher capital costs but lower operating and production costs earlier than units with relatively lower capital costs but higher operating and production costs.

Under the low capital cost scenario, the optimal capacity expansion plan for the case with TEC in 2012 consists of a CFB unit in 2016. The optimal capacity expansion plan without participation in TEC consists of an LMS100 CT unit in 2011, followed by a CFB unit in 2016.

The CPWCs for the expansion plan with TEC and the plan without participation in TEC are $4,187.9 and $4,372.0 million, respectively. A comparison of the CPWCs shows that the case with TEC is the least-cost plan by $184.1 million over the evaluation period.

### *E.6.1.7 High Emissions Allowance Prices*

The base economic analysis presented in Section E.5.0 utilizes the base fuel and corresponding emissions allowance price forecasts provided by Hill & Associates. Historically, prices for emissions allowances have been volatile, and this sensitivity demonstrates the effects of higher allowance prices than the forecasts provided by Hill & Associates.

In the high emissions allowance price sensitivity case, the base case allowance price forecasts provided by Hill & Associates were increased by 25 percent on an annual basis, while the fuel price forecasts were left unchanged from those provided by Hill & Associates in the base case. Increasing the allowance prices results in a higher fuel cost adder for the fuels being burned in existing and candidate generating units. The increase in allowance prices results in a greater economic incentive to operate units with lower emissions rates for electric generation, and also results in higher CPWCs relative to the base case economic analysis. Table E.6-9 presents the emissions allowance prices used in the high emissions allowance price sensitivity analysis. Tables E.6-10 and E.6-11 present the emissions cost adders included for the City's existing and candidate units, respectively, for the high emissions allowance price sensitivity. The City's existing generating system does not include any mercury emitting units, and therefore no adders for Hg emissions allowance costs are included for the City's system. In years when existing units are no longer available to the City due to retirement, "N/A" is used to indicate that the adders are no longer applicable, since the resources are not included in the City's dispatch model.

Table E.6-9
High and Low Emissions Allowance Prices
(Nominal Dollars)

| Calendar Year | High Sensitivity | | | Low Sensitivity | | |
|---|---|---|---|---|---|---|
| | $SO_2$ ($/ton) | $NO_x$ ($/ton) | Hg ($/lb) | $SO_2$ ($/ton) | $NO_x$ ($/ton) | Hg ($/lb) |
| 2009 | - | $2,864 | - | - | $1,718 | - |
| 2010 | $480 | $3,994 | $21,103 | $288 | $2,397 | $12,662 |
| 2011 | $490 | $4,189 | $21,491 | $294 | $2,513 | $12,894 |
| 2012 | $566 | $4,358 | $17,393 | $340 | $2,615 | $10,436 |
| 2013 | $581 | $4,463 | $22,743 | $ 348 | $2,678 | $13,646 |
| 2014 | $754 | $4,834 | $13,549 | $452 | $2,900 | $8,129 |
| 2015 | $1,075 | $7,721 | $26,165 | $645 | $4,632 | $15,699 |
| 2016 | $1,247 | $8,346 | $17,456 | $748 | $5,008 | $10,473 |
| 2017 | $1,398 | $7,163 | $16,616 | $839 | $4,298 | $9,970 |
| 2018 | $1,465 | $7,413 | $33,133 | $879 | $4,448 | $19,880 |
| 2019 | $1,493 | $9,725 | $32,251 | $896 | $5,835 | $19,351 |
| 2020 | $1,629 | $11,726 | $33,057 | $978 | $7,036 | $19,834 |
| 2021 | $1,778 | $11,146 | $36,152 | $1,067 | $6,688 | $21,691 |
| 2022 | $1,913 | $10,650 | $38,114 | $1,148 | $6,390 | $22,869 |
| 2023 | $2,076 | $13,676 | $69,280 | $1,246 | $8,206 | $41,568 |
| 2024 | $2,379 | $20,578 | $71,286 | $1,427 | $12,347 | $42,771 |
| 2025 | $2,437 | $22,318 | $113,955 | $1,462 | $13,391 | $68,373 |
| 2026 | $2,479 | $24,131 | $125,244 | $1,487 | $14,479 | $75,146 |
| 2027 | $2,621 | $26,022 | $137,025 | $1,573 | $15,613 | $82,215 |
| 2028 | $2,769 | $27,991 | $149,318 | $1,661 | $16,795 | $89,591 |
| 2029 | $2,923 | $30,043 | $162,139 | $1,754 | $18,026 | $97,284 |
| 2030 | $3,082 | $32,180 | $175,509 | $1,849 | $19,308 | $105,305 |
| 2031 | $3,250 | $34,469 | $189,980 | $1,950 | $20,681 | $113,988 |
| 2032 | $3,428 | $36,921 | $205,645 | $2,057 | $22,153 | $123,387 |
| 2033 | $3,615 | $39,547 | $222,602 | $2,169 | $23,728 | $133,561 |
| 2034 | $3,812 | $42,360 | $240,956 | $2,287 | $25,416 | $144,574 |
| 2035 | $4,021 | $45,373 | $260,824 | $2,412 | $27,224 | $156,495 |

Table E.6-10
Combined $SO_2$ and $NO_x$ Emissions Cost Adders for the City's Existing Units – High Allowance Prices
(Nominal $/MBtu)

| Calendar Year | Hopkins 1 | Hopkins CT 1 | Hopkins CT 2 | Purdom 8 | Purdom 7 | Hopkins LM6000s | Hopkins 2 1x1 CC |
|---|---|---|---|---|---|---|---|
| 2009 | $0.30 | $0.46 | $0.46 | $0.04 | $0.31 | $0.03 | $0.01 |
| 2010 | $0.41 | $0.64 | $0.64 | $0.06 | $0.43 | $0.04 | $0.01 |
| 2011 | $0.43 | $0.67 | $0.67 | $0.06 | $0.45 | $0.04 | $0.02 |
| 2012 | $0.45 | $0.70 | $0.70 | $0.07 | N/A | $0.04 | $0.02 |
| 2013 | $0.46 | $0.71 | $0.71 | $0.07 | N/A | $0.04 | $0.02 |
| 2014 | $0.50 | $0.77 | $0.77 | $0.07 | N/A | $0.05 | $0.02 |
| 2015 | $0.80 | $1.24 | $1.24 | $0.12 | N/A | $0.08 | $0.03 |
| 2016 | $0.86 | N/A | $1.34 | $0.13 | N/A | $0.08 | $0.03 |
| 2017 | N/A | N/A | $1.15 | $0.11 | N/A | $0.07 | $0.03 |
| 2018 | N/A | N/A | N/A | $0.11 | N/A | $0.07 | $0.03 |
| 2019 | N/A | N/A | N/A | $0.15 | N/A | $0.10 | $0.04 |
| 2020 | N/A | N/A | N/A | $0.18 | N/A | $0.12 | $0.04 |
| 2021 | N/A | N/A | N/A | $0.17 | N/A | $0.11 | $0.04 |
| 2022 | N/A | N/A | N/A | $0.16 | N/A | $0.11 | $0.04 |
| 2023 | N/A | N/A | N/A | $0.21 | N/A | $0.14 | $0.05 |
| 2024 | N/A | N/A | N/A | $0.31 | N/A | $0.21 | $0.07 |
| 2025 | N/A | N/A | N/A | $0.34 | N/A | $0.22 | $0.08 |
| 2026 | N/A | N/A | N/A | $0.37 | N/A | $0.24 | $0.09 |
| 2027 | N/A | N/A | N/A | $0.40 | N/A | $0.26 | $0.09 |
| 2028 | N/A | N/A | N/A | $0.43 | N/A | $0.28 | $0.10 |
| 2029 | N/A | N/A | N/A | $0.46 | N/A | $0.30 | $0.11 |
| 2030 | N/A | N/A | N/A | $0.49 | N/A | $0.32 | $0.12 |
| 2031 | N/A | N/A | N/A | $0.53 | N/A | $0.35 | $0.12 |
| 2032 | N/A | N/A | N/A | $0.56 | N/A | $0.37 | $0.13 |
| 2033 | N/A | N/A | N/A | $0.60 | N/A | $0.40 | $0.14 |
| 2034 | N/A | N/A | N/A | $0.65 | N/A | $0.42 | $0.15 |
| 2035 | N/A | N/A | N/A | $0.69 | N/A | $0.45 | $0.16 |

Table E.6-11
Combined $SO_2$, $NO_x$, and Hg Emissions Cost Adders for the City's Candidate Units – High Allowance Prices
(Nominal $/MBtu)

| Calendar Year | LM6000 CT | 7EA CT | 7FA CT | 1x1 7FA CC | TEC | CFB (100 percent coal) | 1x1 IGCC (100 percent coal) | LMS100 CT | LM6000 1x1 CC |
|---|---|---|---|---|---|---|---|---|---|
| 2009 | $0.01 | $0.01 | $0.01 | $0.01 | $0.10 | $0.13 | $0.09 | $0.01 | $0.01 |
| 2010 | $0.01 | $0.01 | $0.01 | $0.01 | $0.19 | $0.24 | $0.13 | $0.01 | $0.01 |
| 2011 | $0.02 | $0.02 | $0.02 | $0.02 | $0.20 | $0.25 | $0.13 | $0.02 | $0.02 |
| 2012 | $0.02 | $0.02 | $0.02 | $0.02 | $0.20 | $0.25 | $0.14 | $0.02 | $0.02 |
| 2013 | $0.02 | $0.02 | $0.02 | $0.02 | $0.21 | $0.27 | $0.14 | $0.02 | $0.02 |
| 2014 | $0.02 | $0.02 | $0.02 | $0.02 | $0.22 | $0.28 | $0.15 | $0.02 | $0.02 |
| 2015 | $0.03 | $0.03 | $0.03 | $0.03 | $0.36 | $0.45 | $0.24 | $0.03 | $0.03 |
| 2016 | $0.03 | $0.03 | $0.03 | $0.03 | $0.37 | $0.47 | $0.26 | $0.03 | $0.03 |
| 2017 | $0.03 | $0.03 | $0.03 | $0.03 | $0.34 | $0.42 | $0.23 | $0.03 | $0.03 |
| 2018 | $0.03 | $0.03 | $0.03 | $0.03 | $0.37 | $0.47 | $0.24 | $0.03 | $0.03 |
| 2019 | $0.04 | $0.04 | $0.04 | $0.04 | $0.45 | $0.57 | $0.31 | $0.04 | $0.04 |
| 2020 | $0.04 | $0.04 | $0.04 | $0.04 | $0.53 | $0.67 | $0.37 | $0.04 | $0.04 |
| 2021 | $0.04 | $0.04 | $0.04 | $0.04 | $0.52 | $0.66 | $0.35 | $0.04 | $0.04 |
| 2022 | $0.04 | $0.04 | $0.04 | $0.04 | $0.51 | $0.64 | $0.34 | $0.04 | $0.04 |
| 2023 | $0.05 | $0.05 | $0.05 | $0.05 | $0.67 | $0.84 | $0.44 | $0.05 | $0.05 |
| 2024 | $0.07 | $0.07 | $0.07 | $0.07 | $0.93 | $1.17 | $0.65 | $0.07 | $0.07 |
| 2025 | $0.08 | $0.08 | $0.08 | $0.08 | $1.05 | $1.31 | $0.71 | $0.08 | $0.08 |
| 2026 | $0.09 | $0.09 | $0.09 | $0.09 | $1.13 | $1.42 | $0.77 | $0.09 | $0.09 |
| 2027 | $0.09 | $0.09 | $0.09 | $0.09 | $1.22 | $1.53 | $0.83 | $0.09 | $0.09 |
| 2028 | $0.10 | $0.10 | $0.10 | $0.10 | $1.31 | $1.64 | $0.89 | $0.10 | $0.10 |
| 2029 | $0.11 | $0.11 | $0.11 | $0.11 | $1.41 | $1.76 | $0.96 | $0.11 | $0.11 |
| 2030 | $0.12 | $0.12 | $0.12 | $0.12 | $1.51 | $1.89 | $1.02 | $0.12 | $0.12 |
| 2031 | $0.12 | $0.12 | $0.12 | $0.12 | $1.62 | $2.02 | $1.10 | $0.12 | $0.12 |
| 2032 | $0.13 | $0.13 | $0.13 | $0.13 | $1.73 | $2.17 | $1.17 | $0.13 | $0.13 |
| 2033 | $0.14 | $0.14 | $0.14 | $0.14 | $1.86 | $2.32 | $1.26 | $0.14 | $0.14 |
| 2034 | $0.15 | $0.15 | $0.15 | $0.15 | $1.99 | $2.49 | $1.35 | $0.15 | $0.15 |
| 2035 | $0.16 | $0.16 | $0.16 | $0.16 | $2.13 | $2.67 | $1.44 | $0.16 | $0.16 |

In the high emissions allowance price scenario, the optimal capacity expansion plan for the case with TEC in 2012 consists of an LMS100 unit in 2016, followed by a second LMS100 unit in 2021. The optimal capacity expansion plan without participation in TEC consists of an LMS100 unit in 2011, followed by a CFB unit in 2016.

The CPWCs for the expansion plan with TEC and the plan without participation in TEC are $4,344.5 and $4,516.3 million, respectively. A comparison of the CPWCs shows that the case with TEC is the least-cost plan by $171.8 million over the evaluation period.

### *E.6.1.8 Low Emissions Allowance Prices*

In the low emissions allowance price sensitivity case, the base case allowance price forecasts provided by Hill & Associates were decreased by 25 percent on an annual basis, while the fuel price forecasts were left unchanged from those provided by Hill & Associates in the base case. Decreasing the allowance prices results in a lower fuel cost adder for the fuels being burned in existing and candidate generating units. The decrease in allowance prices reduces the economic incentive to operate units with lower emissions rates for electric generation, and also results in lower CPWCs relative to the base case economic analysis. Table E.6-9 presents the emissions allowance prices used in the low emissions allowance price sensitivity analysis. Tables E.6-12 and E.6-13 present the emissions cost adders included for the City's existing and candidate units, respectively, for the low emissions allowance price sensitivity. The City's existing generating system does not include any mercury emitting units, and therefore no adders for Hg emissions allowance costs are included for the City's system. In years when existing units are no longer available to the City due to retirement, "N/A" is used to indicate that the adders are no longer applicable, since the resources are not included in the City's dispatch model.

In the low emissions allowance price scenario, the optimal capacity expansion plan for the case with TEC in 2012 consists of a CFB unit in 2016. The optimal capacity expansion plan without participation in TEC consists of an LMS100 unit in 2011, followed by a CFB unit in 2016.

The CPWCs for the expansion plan with TEC and the plan without participation in TEC are $4,274.9 and $4,431.7 million, respectively. A comparison of the CPWCs shows that the case with TEC is the least-cost plan by $156.8 million over the evaluation period.

Table E.6-12
Combined $SO_2$ and $NO_x$, Emissions Cost Adders for the City's Existing Units – Low Allowance Prices
(Nominal $/MBtu)

| Calendar Year | Hopkins 1 | Hopkins CT 1 | Hopkins CT 2 | Purdom 8 | Purdom 7 | Hopkins LM6000s | Hopkins 2 1x1 CC |
|---|---|---|---|---|---|---|---|
| 2009 | $0.18 | $0.27 | $0.27 | $0.03 | $0.19 | $0.02 | $0.01 |
| 2010 | $0.25 | $0.38 | $0.38 | $0.04 | $0.26 | $0.02 | $0.01 |
| 2011 | $0.26 | $0.40 | $0.40 | $0.04 | $0.27 | $0.03 | $0.01 |
| 2012 | $0.27 | $0.42 | $0.42 | $0.04 | N/A | $0.03 | $0.01 |
| 2013 | $0.28 | $0.43 | $0.43 | $0.04 | N/A | $0.03 | $0.01 |
| 2014 | $0.30 | $0.46 | $0.46 | $0.04 | N/A | $0.03 | $0.01 |
| 2015 | $0.48 | $0.74 | $0.74 | $0.07 | N/A | $0.05 | $0.02 |
| 2016 | $0.52 | N/A | $0.80 | $0.08 | N/A | $0.05 | $0.02 |
| 2017 | N/A | N/A | $0.69 | $0.07 | N/A | $0.04 | $0.02 |
| 2018 | N/A | N/A | N/A | $0.07 | N/A | $0.04 | $0.02 |
| 2019 | N/A | N/A | N/A | $0.09 | N/A | $0.06 | $0.02 |
| 2020 | N/A | N/A | N/A | $0.11 | N/A | $0.07 | $0.03 |
| 2021 | N/A | N/A | N/A | $0.10 | N/A | $0.07 | $0.02 |
| 2022 | N/A | N/A | N/A | $0.10 | N/A | $0.06 | $0.02 |
| 2023 | N/A | N/A | N/A | $0.13 | N/A | $0.08 | $0.03 |
| 2024 | N/A | N/A | N/A | $0.19 | N/A | $0.12 | $0.04 |
| 2025 | N/A | N/A | N/A | $0.20 | N/A | $0.13 | $0.05 |
| 2026 | N/A | N/A | N/A | $0.22 | N/A | $0.14 | $0.05 |
| 2027 | N/A | N/A | N/A | $0.24 | N/A | $0.16 | $0.06 |
| 2028 | N/A | N/A | N/A | $0.26 | N/A | $0.17 | $0.06 |
| 2029 | N/A | N/A | N/A | $0.28 | N/A | $0.18 | $0.07 |
| 2030 | N/A | N/A | N/A | $0.30 | N/A | $0.19 | $0.07 |
| 2031 | N/A | N/A | N/A | $0.32 | N/A | $0.21 | $0.07 |
| 2032 | N/A | N/A | N/A | $0.34 | N/A | $0.22 | $0.08 |
| 2033 | N/A | N/A | N/A | $0.36 | N/A | $0.24 | $0.09 |
| 2034 | N/A | N/A | N/A | $0.39 | N/A | $0.25 | $0.09 |
| 2035 | N/A | N/A | N/A | $0.42 | N/A | $0.27 | $0.10 |

Table E.6-13
Combined $SO_2$, $NO_x$, and Hg Emissions Cost Adders for the City's Candidate Units – Low Allowance Prices
(Nominal $/MBtu)

| Calendar Year | LM6000 CT | 7EA CT | 7FA CT | 1x1 7FA CC | TEC | CFB (100 percent coal) | 1x1 IGCC (100 percent coal) | LMS100 CT | LM6000 1x1 CC |
|---|---|---|---|---|---|---|---|---|---|
| 2009 | $0.01 | $0.01 | $0.01 | $0.01 | $0.06 | $0.08 | $0.05 | $0.01 | $0.01 |
| 2010 | $0.01 | $0.01 | $0.01 | $0.01 | $0.11 | $0.14 | $0.08 | $0.01 | $0.01 |
| 2011 | $0.01 | $0.01 | $0.01 | $0.01 | $0.12 | $0.15 | $0.08 | $0.01 | $0.01 |
| 2012 | $0.01 | $0.01 | $0.01 | $0.01 | $0.12 | $0.15 | $0.08 | $0.01 | $0.01 |
| 2013 | $0.01 | $0.01 | $0.01 | $0.01 | $0.13 | $0.16 | $0.09 | $0.01 | $0.01 |
| 2014 | $0.01 | $0.01 | $0.01 | $0.01 | $0.13 | $0.17 | $0.09 | $0.01 | $0.01 |
| 2015 | $0.02 | $0.02 | $0.02 | $0.02 | $0.21 | $0.27 | $0.15 | $0.02 | $0.02 |
| 2016 | $0.02 | $0.02 | $0.02 | $0.02 | $0.22 | $0.28 | $0.16 | $0.02 | $0.02 |
| 2017 | $0.02 | $0.02 | $0.02 | $0.02 | $0.20 | $0.25 | $0.14 | $0.02 | $0.02 |
| 2018 | $0.02 | $0.02 | $0.02 | $0.02 | $0.22 | $0.28 | $0.14 | $0.02 | $0.02 |
| 2019 | $0.02 | $0.02 | $0.02 | $0.02 | $0.27 | $0.34 | $0.19 | $0.02 | $0.02 |
| 2020 | $0.03 | $0.03 | $0.03 | $0.03 | $0.32 | $0.40 | $0.22 | $0.03 | $0.03 |
| 2021 | $0.02 | $0.02 | $0.02 | $0.02 | $0.31 | $0.39 | $0.21 | $0.02 | $0.02 |
| 2022 | $0.02 | $0.02 | $0.02 | $0.02 | $0.31 | $0.39 | $0.20 | $0.02 | $0.02 |
| 2023 | $0.03 | $0.03 | $0.03 | $0.03 | $0.40 | $0.50 | $0.26 | $0.03 | $0.03 |
| 2024 | $0.04 | $0.04 | $0.04 | $0.04 | $0.56 | $0.70 | $0.39 | $0.04 | $0.04 |
| 2025 | $0.05 | $0.05 | $0.05 | $0.05 | $0.63 | $0.79 | $0.43 | $0.05 | $0.05 |
| 2026 | $0.05 | $0.05 | $0.05 | $0.05 | $0.68 | $0.85 | $0.46 | $0.05 | $0.05 |
| 2027 | $0.06 | $0.06 | $0.06 | $0.06 | $0.73 | $0.92 | $0.50 | $0.06 | $0.06 |
| 2028 | $0.06 | $0.06 | $0.06 | $0.06 | $0.79 | $0.99 | $0.53 | $0.06 | $0.06 |
| 2029 | $0.07 | $0.07 | $0.07 | $0.07 | $0.85 | $1.06 | $0.57 | $0.07 | $0.07 |
| 2030 | $0.07 | $0.07 | $0.07 | $0.07 | $0.91 | $1.13 | $0.61 | $0.07 | $0.07 |
| 2031 | $0.07 | $0.07 | $0.07 | $0.07 | $0.97 | $1.21 | $0.66 | $0.07 | $0.07 |
| 2032 | $0.08 | $0.08 | $0.08 | $0.08 | $1.04 | $1.30 | $0.70 | $0.08 | $0.08 |
| 2033 | $0.09 | $0.09 | $0.09 | $0.09 | $1.12 | $1.39 | $0.75 | $0.09 | $0.09 |
| 2034 | $0.09 | $0.09 | $0.09 | $0.09 | $1.19 | $1.49 | $0.81 | $0.09 | $0.09 |
| 2035 | $0.10 | $0.10 | $0.10 | $0.10 | $1.28 | $1.60 | $0.87 | $0.10 | $0.10 |

### *E.6.1.9 Carbon Dioxide Regulation Sensitivity*

This sensitivity, presented for information purposes only, considers the potential economic impact associated with a regulatory environment in which emissions of $CO_2$ would be subject to a cap-and-trade program, similar to that contemplated under CAIR and CAMR. To date, the United States has not mandated any reductions in $CO_2$ emissions through nationwide environmental regulations. However, in the last few years, legislation has been proposed suggesting various approaches to regulating $CO_2$ emissions in the United States. Section A.4.0 presented a description of Hill & Associates' assumptions utilized in developing the fuel price forecast and corresponding emissions allowance price forecasts for a scenario in which $CO_2$ emissions are regulated and a cap-and-trade market evolves for $CO_2$ allowances. As described in Section A.4.0 and discussed further in Section A.5.0, the assumptions supporting Hill & Associates' regulated-$CO_2$ sensitivity case for fuel and emissions allowance price forecasts are based on the utility industry complying with the proposed McCain-Lieberman *Climate Stewardship Act of 2005* (S. 342, introduced to the 109th Congress).

Similar to the methodology described throughout this Application for consideration of the $SO_2$, $NO_x$, and Hg emissions allowance price forecasts, adders for the regulated-$CO_2$ emissions allowance price forecasts were developed for each existing and candidate unit being considered. Tables E.6-14 and E.6-15 present the $CO_2$ cost adders for the City's existing and candidate units, respectively, for the $CO_2$ regulation sensitivity. Tables E.6-16 and E.6-17 present the combined adders for $CO_2$, $SO_2$, $NO_x$, and Hg for the City's existing and candidate units, respectively, for the $CO_2$ regulation sensitivity. Tables E.6-14 through E.6-17 were developed utilizing the emissions allowance prices developed by Hill & Associates for the $CO_2$ regulation sensitivity, which are included in Section A.5.0. The City's existing generating system does not include any mercury emitting units, and therefore no adders for Hg emissions allowance costs are included for the City's system. In years when existing units are no longer available to the City due to retirement, "N/A" is used to indicate that the adders are no longer applicable, since the resources are not included in the City's dispatch model.

In this sensitivity case, the optimal capacity expansion plan for the case with TEC in 2012 consists of a 7FA CT unit in 2016. The optimal capacity expansion plan without participation in TEC consists of an LMS100 unit in 2011, followed by a CFB unit in 2016.

The CPWCs for the expansion plan with TEC and the plan without participation in TEC are \$4,392.8 and \$4,508.4 million, respectively. A comparison of the CPWCs shows that the case with TEC is the least-cost plan by \$115.6 million over the evaluation period.

Table E.6-14
$CO_2$ Emissions Adders for the City's Existing Units – Regulated-$CO_2$ Sensitivity Case
(Nominal $/MBtu)

| Calendar Year | Hopkins 1 | Hopkins CT 1 | Hopkins CT 2 | Purdom 8 | Purdom 7 | Hopkins LM6000s | Hopkins 2 1x1 CC |
|---|---|---|---|---|---|---|---|
| 2009 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 |
| 2010 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 |
| 2011 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 |
| 2012 | $0.29 | $0.28 | $0.28 | $0.28 | N/A | $0.28 | $0.29 |
| 2013 | $0.59 | $0.57 | $0.57 | $0.57 | N/A | $0.57 | $0.59 |
| 2014 | $0.78 | $0.75 | $0.75 | $0.75 | N/A | $0.75 | $0.78 |
| 2015 | $0.74 | $0.70 | $0.70 | $0.70 | N/A | $0.70 | $0.74 |
| 2016 | $0.78 | N/A | $0.74 | $0.74 | N/A | $0.74 | $0.77 |
| 2017 | N/A | N/A | $0.66 | $0.66 | N/A | $0.66 | $0.69 |
| 2018 | N/A | N/A | N/A | $0.18 | N/A | $0.18 | $0.19 |
| 2019 | N/A | N/A | N/A | $0.27 | N/A | $0.27 | $0.28 |
| 2020 | N/A | N/A | N/A | $0.20 | N/A | $0.20 | $0.21 |
| 2021 | N/A | N/A | N/A | $0.24 | N/A | $0.24 | $0.25 |
| 2022 | N/A | N/A | N/A | $0.52 | N/A | $0.52 | $0.55 |
| 2023 | N/A | N/A | N/A | $0.68 | N/A | $0.68 | $0.71 |
| 2024 | N/A | N/A | N/A | $0.54 | N/A | $0.54 | $0.56 |
| 2025 | N/A | N/A | N/A | $0.63 | N/A | $0.63 | $0.65 |
| 2026 | N/A | N/A | N/A | $0.67 | N/A | $0.67 | $0.70 |
| 2027 | N/A | N/A | N/A | $0.74 | N/A | $0.74 | $0.77 |
| 2028 | N/A | N/A | N/A | $0.81 | N/A | $0.81 | $0.85 |
| 2029 | N/A | N/A | N/A | $0.89 | N/A | $0.89 | $0.93 |
| 2030 | N/A | N/A | N/A | $0.97 | N/A | $0.97 | $1.01 |
| 2031 | N/A | N/A | N/A | $1.06 | N/A | $1.06 | $1.10 |
| 2032 | N/A | N/A | N/A | $1.15 | N/A | $1.15 | $1.20 |
| 2033 | N/A | N/A | N/A | $1.26 | N/A | $1.26 | $1.31 |
| 2034 | N/A | N/A | N/A | $1.37 | N/A | $1.37 | $1.43 |
| 2035 | N/A | N/A | N/A | $1.50 | N/A | $1.50 | $1.56 |

Table E.6-15
$CO_2$ Emissions Adders for the City's Candidate Units – Regulated-$CO_2$ Sensitivity Case
(Nominal $/MBtu)

| Calendar Year | LM6000 CT | 7EA CT | 7FA CT | 1x1 7FA CC | TEC | CFB (100 percent coal) | 1x1 IGCC (100 percent coal) | LMS100 CT | LM6000 1x1 CC |
|---|---|---|---|---|---|---|---|---|---|
| 2009 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 |
| 2010 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 |
| 2011 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 |
| 2012 | $0.29 | $0.29 | $0.29 | $0.29 | $0.53 | $0.52 | $0.52 | $0.29 | $0.29 |
| 2013 | $0.59 | $0.59 | $0.59 | $0.59 | $1.09 | $1.07 | $1.07 | $0.59 | $0.59 |
| 2014 | $0.78 | $0.78 | $0.78 | $0.78 | $1.43 | $1.41 | $1.40 | $0.78 | $0.78 |
| 2015 | $0.74 | $0.74 | $0.74 | $0.74 | $1.35 | $1.33 | $1.33 | $0.74 | $0.74 |
| 2016 | $0.77 | $0.77 | $0.77 | $0.77 | $1.42 | $1.40 | $1.40 | $0.77 | $0.77 |
| 2017 | $0.69 | $0.69 | $0.69 | $0.69 | $1.26 | $1.24 | $1.24 | $0.69 | $0.69 |
| 2018 | $0.19 | $0.19 | $0.19 | $0.19 | $0.35 | $0.35 | $0.35 | $0.19 | $0.19 |
| 2019 | $0.28 | $0.28 | $0.28 | $0.28 | $0.52 | $0.51 | $0.51 | $0.28 | $0.28 |
| 2020 | $0.21 | $0.21 | $0.21 | $0.21 | $0.39 | $0.39 | $0.38 | $0.21 | $0.21 |
| 2021 | $0.25 | $0.25 | $0.25 | $0.25 | $0.47 | $0.46 | $0.46 | $0.25 | $0.25 |
| 2022 | $0.55 | $0.55 | $0.55 | $0.55 | $1.00 | $0.99 | $0.99 | $0.55 | $0.55 |
| 2023 | $0.71 | $0.71 | $0.71 | $0.71 | $1.30 | $1.28 | $1.28 | $0.71 | $0.71 |
| 2024 | $0.56 | $0.56 | $0.56 | $0.56 | $1.04 | $1.02 | $1.02 | $0.56 | $0.56 |
| 2025 | $0.65 | $0.65 | $0.65 | $0.65 | $1.20 | $1.18 | $1.18 | $0.65 | $0.65 |
| 2026 | $0.70 | $0.70 | $0.70 | $0.70 | $1.28 | $1.26 | $1.26 | $0.70 | $0.70 |
| 2027 | $0.77 | $0.77 | $0.77 | $0.77 | $1.42 | $1.40 | $1.39 | $0.77 | $0.77 |
| 2028 | $0.85 | $0.85 | $0.85 | $0.85 | $1.56 | $1.54 | $1.53 | $0.85 | $0.85 |
| 2029 | $0.93 | $0.93 | $0.93 | $0.93 | $1.71 | $1.68 | $1.68 | $0.93 | $0.93 |
| 2030 | $1.01 | $1.01 | $1.01 | $1.01 | $1.86 | $1.83 | $1.83 | $1.01 | $1.01 |
| 2031 | $1.10 | $1.10 | $1.10 | $1.10 | $2.03 | $2.00 | $1.99 | $1.10 | $1.10 |
| 2032 | $1.20 | $1.20 | $1.20 | $1.20 | $2.21 | $2.18 | $2.17 | $1.20 | $1.20 |
| 2033 | $1.31 | $1.31 | $1.31 | $1.31 | $2.41 | $2.38 | $2.37 | $1.31 | $1.31 |
| 2034 | $1.43 | $1.43 | $1.43 | $1.43 | $2.63 | $2.59 | $2.58 | $1.43 | $1.43 |
| 2035 | $1.56 | $1.56 | $1.56 | $1.56 | $2.87 | $2.82 | $2.81 | $1.56 | $1.56 |

Table E.6-16
Combined $CO_2$, $SO_2$, and $NO_x$ Emissions Cost Adders for the City's Existing Units – Regulated-$CO_2$ Sensitivity Case
(Nominal $/MBtu)

| Calendar Year | Hopkins 1 | Hopkins CT 1 | Hopkins CT 2 | Purdom 8 | Purdom 7 | Hopkins LM6000s | Hopkins 2 1x1 CC |
|---|---|---|---|---|---|---|---|
| 2009 | $0.19 | $0.29 | $0.29 | $0.03 | $0.20 | $0.02 | $0.01 |
| 2010 | $0.24 | $0.38 | $0.38 | $0.04 | $0.25 | $0.02 | $0.01 |
| 2011 | $0.25 | $0.39 | $0.39 | $0.04 | $0.27 | $0.02 | $0.01 |
| 2012 | $0.51 | $0.62 | $0.62 | $0.31 | N/A | $0.30 | $0.30 |
| 2013 | $0.82 | $0.92 | $0.92 | $0.60 | N/A | $0.59 | $0.60 |
| 2014 | $0.98 | $1.06 | $1.06 | $0.78 | N/A | $0.76 | $0.79 |
| 2015 | $1.18 | $1.39 | $1.39 | $0.77 | N/A | $0.75 | $0.75 |
| 2016 | $1.25 | N/A | $1.47 | $0.81 | N/A | $0.79 | $0.79 |
| 2017 | N/A | N/A | $1.45 | $0.73 | N/A | $0.71 | $0.70 |
| 2018 | N/A | N/A | N/A | $0.25 | N/A | $0.23 | $0.21 |
| 2019 | N/A | N/A | N/A | $0.34 | N/A | $0.31 | $0.30 |
| 2020 | N/A | N/A | N/A | $0.28 | N/A | $0.25 | $0.23 |
| 2021 | N/A | N/A | N/A | $0.31 | N/A | $0.29 | $0.27 |
| 2022 | N/A | N/A | N/A | $0.59 | N/A | $0.57 | $0.56 |
| 2023 | N/A | N/A | N/A | $0.76 | N/A | $0.73 | $0.73 |
| 2024 | N/A | N/A | N/A | $0.69 | N/A | $0.64 | $0.60 |
| 2025 | N/A | N/A | N/A | $0.78 | N/A | $0.73 | $0.69 |
| 2026 | N/A | N/A | N/A | $0.84 | N/A | $0.78 | $0.74 |
| 2027 | N/A | N/A | N/A | $0.92 | N/A | $0.86 | $0.82 |
| 2028 | N/A | N/A | N/A | $1.01 | N/A | $0.94 | $0.90 |
| 2029 | N/A | N/A | N/A | $1.10 | N/A | $1.03 | $0.98 |
| 2030 | N/A | N/A | N/A | $1.20 | N/A | $1.12 | $1.07 |
| 2031 | N/A | N/A | N/A | $1.30 | N/A | $1.22 | $1.16 |
| 2032 | N/A | N/A | N/A | $1.42 | N/A | $1.33 | $1.27 |
| 2033 | N/A | N/A | N/A | $1.54 | N/A | $1.44 | $1.38 |
| 2034 | N/A | N/A | N/A | $1.67 | N/A | $1.57 | $1.50 |
| 2035 | N/A | N/A | N/A | $1.82 | N/A | $1.71 | $1.64 |

Table E.6-17
Combined $CO_2$, $SO_2$, $NO_x$, and Hg Emissions Cost Adders for the City's Candidate Units – Regulated-$CO_2$ Sensitivity Case
(Nominal $/MBtu)

| Calendar Year | LM6000 CT | 7EA CT | 7FA CT | 1x1 7FA CC | TEC | CFB (100 percent coal) | 1x1 IGCC (100 percent coal) | LMS100 CT | LM6000 1x1 CC |
|---|---|---|---|---|---|---|---|---|---|
| 2009 | $0.01 | $0.01 | $0.01 | $0.01 | $0.06 | $0.08 | $0.06 | $0.01 | $0.01 |
| 2010 | $0.01 | $0.01 | $0.01 | $0.01 | $0.12 | $0.15 | $0.08 | $0.01 | $0.01 |
| 2011 | $0.01 | $0.01 | $0.01 | $0.01 | $0.12 | $0.15 | $0.08 | $0.01 | $0.01 |
| 2012 | $0.30 | $0.30 | $0.30 | $0.30 | $0.63 | $0.65 | $0.59 | $0.30 | $0.30 |
| 2013 | $0.60 | $0.60 | $0.60 | $0.60 | $1.20 | $1.21 | $1.14 | $0.60 | $0.60 |
| 2014 | $0.79 | $0.79 | $0.79 | $0.79 | $1.53 | $1.53 | $1.47 | $0.79 | $0.79 |
| 2015 | $0.75 | $0.75 | $0.75 | $0.75 | $1.55 | $1.58 | $1.46 | $0.75 | $0.75 |
| 2016 | $0.79 | $0.79 | $0.79 | $0.79 | $1.62 | $1.65 | $1.54 | $0.79 | $0.79 |
| 2017 | $0.70 | $0.70 | $0.70 | $0.70 | $1.48 | $1.51 | $1.39 | $0.70 | $0.70 |
| 2018 | $0.21 | $0.21 | $0.21 | $0.21 | $0.56 | $0.61 | $0.48 | $0.21 | $0.21 |
| 2019 | $0.30 | $0.30 | $0.30 | $0.30 | $0.73 | $0.78 | $0.65 | $0.30 | $0.30 |
| 2020 | $0.23 | $0.23 | $0.23 | $0.23 | $0.63 | $0.68 | $0.54 | $0.23 | $0.23 |
| 2021 | $0.27 | $0.27 | $0.27 | $0.27 | $0.69 | $0.74 | $0.60 | $0.27 | $0.27 |
| 2022 | $0.56 | $0.56 | $0.56 | $0.56 | $1.24 | $1.28 | $1.13 | $0.56 | $0.56 |
| 2023 | $0.73 | $0.73 | $0.73 | $0.73 | $1.57 | $1.62 | $1.45 | $0.73 | $0.73 |
| 2024 | $0.60 | $0.60 | $0.60 | $0.60 | $1.47 | $1.56 | $1.32 | $0.60 | $0.60 |
| 2025 | $0.69 | $0.69 | $0.69 | $0.69 | $1.69 | $1.80 | $1.51 | $0.69 | $0.69 |
| 2026 | $0.74 | $0.74 | $0.74 | $0.74 | $1.81 | $1.93 | $1.62 | $0.74 | $0.74 |
| 2027 | $0.82 | $0.82 | $0.82 | $0.82 | $1.99 | $2.11 | $1.78 | $0.82 | $0.82 |
| 2028 | $0.90 | $0.90 | $0.90 | $0.90 | $2.18 | $2.31 | $1.95 | $0.90 | $0.90 |
| 2029 | $0.98 | $0.98 | $0.98 | $0.98 | $2.37 | $2.51 | $2.12 | $0.98 | $0.98 |
| 2030 | $1.07 | $1.07 | $1.07 | $1.07 | $2.57 | $2.72 | $2.30 | $1.07 | $1.07 |
| 2031 | $1.16 | $1.16 | $1.16 | $1.16 | $2.79 | $2.95 | $2.50 | $1.16 | $1.16 |
| 2032 | $1.27 | $1.27 | $1.27 | $1.27 | $3.03 | $3.20 | $2.72 | $1.27 | $1.27 |
| 2033 | $1.38 | $1.38 | $1.38 | $1.38 | $3.29 | $3.47 | $2.95 | $1.38 | $1.38 |
| 2034 | $1.50 | $1.50 | $1.50 | $1.50 | $3.57 | $3.76 | $3.21 | $1.50 | $1.50 |
| 2035 | $1.64 | $1.64 | $1.64 | $1.64 | $3.87 | $4.08 | $3.49 | $1.64 | $1.64 |

### *E.6.1.10 Summary of the Sensitivity Cases for Input Parameters*

Table E.6-18 summarizes the results of the sensitivity analyses described in this section. Appendix E.1 presents the CPWC summary sheets for all the cases presented in Table E.6-18. The optimal capacity expansion plan with participation in TEC in 2012 was the least-cost plan in each of the scenarios. Overall, these results demonstrate the robustness and flexibility of the expansion plan with TEC to overcome variations and deviations from the base case assumptions.

Table E.6-18
Summary of Sensitivity Analyses
*(Varying Base Case Input Parameters)*

| Sensitivity Case | Expansion Plan CPWC Cost ($ million) With TEC | Without TEC | Differential CPWC Savings with TEC |
|---|---|---|---|
| Base Case | $4,320.0 | $4,472.6 | $152.6 |
| High Fuel Prices | $4,817.0 | $4,996.6 | $179.6 |
| Low Fuel Prices | $3,502.7 | $3,648.6 | $145.9 |
| High Load and Energy Growth | $4,670.3 | $4,793.1 | $122.8 |
| Low Load and Energy Growth | $4,058.0 | $4,234.9 | $176.9 |
| High Capital Cost | $4,388.6 | $4,573.3 | $184.7 |
| Low Capital Cost | $4,187.9 | $4,372.0 | $184.1 |
| High Emissions Allowance Costs | $4,344.5 | $4,516.3 | $171.8 |
| Low Emissions Allowance Costs | $4,274.9 | $4,431.7 | $156.8 |
| Regulated $CO_2$ | $4,392.8 | $4,508.4 | $115.6 |

## E.6.2 External Parameter Sensitivities

The sensitivities described in this section reflect changes to the base case external parameter assumptions, including the opportunity to participate in joint development capacity additions other than TEC, consideration of different types of generating technologies to meet capacity needs, and consideration of an alternative coal source for TEC. For each of the sensitivities described in this section, the base case input parameters (fuel prices, emissions allowance prices, load forecast, and capital cost estimates) have not been altered.

### *E.6.2.1 3x1 CC Joint Development Project*

To demonstrate that participation in TEC in May 2012 is part of the least-cost capacity expansion plan for the City, sensitivities were developed assuming that the City had the option to participate in other jointly owned projects with different generating technologies. Since participation in another jointly owned generation project would provide the City with similar economies of scale to participation in TEC, this sensitivity allows a more comparable evaluation of the economics of different generating technologies than the base case analysis.

In this sensitivity, it was assumed that the City would participate in a jointly owned 3x1 7FA combined cycle unit with a commercial operation date of May 1, 2012, in lieu of participation in TEC. In this analysis, the City would retain the same expected ownership share percentage in the 3x1 7FA combined cycle unit as in the proposed TEC, which provides the City with a similarly sized amount of capacity compared to the City's share of the proposed TEC. Section A.6.0 presented cost, performance, and availability estimates for the jointly owned 3x1 7FA combined cycle unit.

The jointly owned 3x1 combined cycle unit is assumed to be located at the TEC site to make the alternative as similar as possible to TEC. All relevant costs associated with the development of a generating alternative at the TEC site were considered and included for the 3x1 combined cycle alternative, including the community contribution assumed for TEC, and the transmission tariffs and losses described in Section E.5.0.

Table E.6-19 presents the output and performance of the City's share of the jointly owned 3x1 combined cycle alternative, including transmission losses. Using the methodology described in Section E.5.0, the total annual firm transmission cost to the City for its share of the 3x1 combined cycle alternative is $2,636,782 per year. This cost is included as of May 1, 2012, and is not escalated with inflation.

The City's share of the fixed O&M cost for the 3x1 combined cycle alternative is $0.9 million or about $5.13 per kW-year (net after considering transmission losses) in 2006 dollars. An adder for firm natural gas transportation of $2.89 per kW-month was included to provide the City's system with an additional 22,752 MBtu/day of firm natural gas transportation. Section A.6.0 presented the nonfuel variable O&M cost for the 3x1 combined cycle option before transmission losses as $4.29 per MWh. With transmission losses considered, the City's net nonfuel variable O&M cost is $4.39 per MWh in 2006 dollars.

The optimal capacity expansion plan involving participation in the 3x1 combined cycle option consists of a CFB unit in 2017, with a CPWC of approximately $4,598.0 million. A comparison of the CPWCs for this case and the base case capacity expansion plan that includes participation in TEC (presented in Section E.5.0) shows that this plan is approximately $278.0 million higher in CPWC than the expansion plan that includes participation in TEC.

Table E.6-19
The City's Share of a Jointly Owned 3x1 7FA Combined Cycle Unit
Output and Performance Considering Transmission Losses
(Average Ambient Conditions)

| Without Transmission Losses | | Including Transmission Losses[1] | |
|---|---|---|---|
| Output (MW) | Net Plant Heat Rate (Btu/kWh) | Output (MW) | Net Plant Heat Rate (Btu/kWh) |
| 184.2 | 7,412 | 180.3 | 7,571 |
| 149.8 | 7,006 | 146.6 | 7,156 |
| 117.8 | 7,282 | 115.3 | 7,438 |
| 87.0 | 7,877 | 85.1 | 8,046 |
| 32.5 | 10,826 | 31.8 | 11,058 |

[1]Assumes losses of 2.10 percent.

### *E.6.2.2 Three-Train 1x1 IGCC Joint Development Project*

In this sensitivity, it was assumed that the City would participate in a jointly owned three-train 1x1 IGCC unit with a commercial operation date of May 1, 2012, in lieu of participation in TEC. Although it is unlikely that the Participants would construct an IGCC unit prior to 2018 for the reasons described in Sections A.6.0 and E.5.0, it is important to compare the emerging IGCC technology with the supercritical pulverized coal technology proposed for TEC in an economic analysis, to demonstrate that participation TEC is part of the least-cost expansion plan for the City.

In this analysis, the City would retain the same expected ownership share percentage in the three-train 1x1 IGCC unit as in the proposed TEC, which would provide the City with a similarly sized amount of capacity compared to the City's share of the proposed TEC. Section A.6.0 presented cost, performance, and availability estimates for the jointly owned three-train 1x1 IGCC.

The jointly owned three-train 1x1 IGCC unit is assumed to be located at the TEC site to make the alternative as similar as possible to TEC. All relevant costs associated with the development of a generating alternative at the TEC site were considered and included for the three-train 1x1 IGCC alternative, including the community contribution assumed for TEC, and the transmission tariffs and losses described in Section E.5.0.

Table E.6-20 presents the output and performance of the City's share of the jointly owned three-train 1x1 IGCC alternative, including transmission losses. Using the methodology described in Section E.5.0, the total annual firm transmission cost to the City for its share of the three-train 1x1 IGCC alternative is $2,528,349 per year. This cost is included as of May 1, 2012, and is not escalated with inflation.

Table E.6-20
The City's Share of a Jointly Owned Three-Train 1x1 IGCC Unit
Output and Performance Considering Transmission Losses
(Average Ambient Conditions - 100 Percent Petcoke)

| Without Transmission Losses | | Including Transmission Losses(1) | |
|---|---|---|---|
| Output (MW) | Net Plant Heat Rate (Btu/kWh) | Output (MW) | Net Plant Heat Rate (Btu/kWh) |
| 175.4 | 10,018 | 171.7 | 10,233 |
| 136.2 | 10,576 | 133.4 | 10,803 |
| 95.4 | 11,601 | 93.4 | 11,850 |

(1)Assumes losses of 2.10 percent.

The City's share of the fixed O&M cost for the three-train 1x1 IGCC alternative is $6.7 million or about $39.23 per kW-year (net after considering transmission losses) in 2006 dollars. Section A.6.0 presented the nonfuel variable O&M cost for the three-train 1x1 IGCC before transmission losses as $5.86 per MWh. With transmission losses considered, the City's net nonfuel variable O&M cost is $5.99 per MWh in 2006 dollars.

The optimal capacity expansion plan involving participation in the three-train 1x1 IGCC in 2012 consists of an LMS100 CT unit in 2016, followed by an LM6000 CT unit in 2022, with a CPWC of $4,421.8 million. A comparison of the CPWCs for this case and the base case capacity expansion plan that includes participation in TEC (presented in Section E.5.0) shows that this plan is $101.8 million higher in CPWC than the capacity expansion plan that includes participation in TEC.

### *E.6.2.3 Second Jointly Owned Pulverized Coal Unit*

Currently, there are no coal fired generation projects identified that the City could participate in before TEC. Furthermore, the City has no firm plans for participation in a large, jointly developed pulverized coal unit in the near term. As such, no additional pulverized coal units were considered as supply-side alternatives after construction of TEC in the base case analysis. This sensitivity considers the possibility of joint participation in a second pulverized coal unit located at either the TEC site or another unidentified site in Florida.

The costs and performance of a second supercritical pulverized coal unit are assumed to be identical to those presented for TEC in Section A.3.0, to reflect indicative estimates for a large coal unit. Section E.5.0 presents the City's share of the capital and O&M costs for TEC, which are assumed to be the same as those for the second pulverized coal option.

Since the TEC Participants would not likely engage in the construction of another pulverized coal unit with a construction schedule that overlaps the construction of TEC, the second pulverized coal unit was not assumed to be available until 2016, to allow for a 4 year construction schedule for the second potential unit.

In this sensitivity case, the optimal capacity expansion plan for the case with TEC in 2012 consists of the City's participation in a second jointly owned supercritical pulverized coal unit in 2016.

The CPWC for the expansion plan with TEC and a second jointly owned pulverized coal unit is $4,134.7 million, which represents a decrease in CPWC of $185.3 over the evaluation period, compared to the base case TEC CPWC.

#### *E.6.2.4 All Natural Gas Capacity Expansion Plan*

To develop a more complete understanding of the economics associated with the expansion plan (including the City's participation in TEC), a sensitivity case was developed to reflect costs associated with a capacity expansion plan that only includes natural gas fired capacity expansion alternatives.

In this scenario, POWROPT and POWRPRO were used to determine the least-cost capacity expansion plan for the cases without TEC, if the CFB and IGCC supply-side alternatives are not considered as alternatives to meet the City's capacity needs. This sensitivity analysis results in higher CPWCs relative to the base case expansion plans because of the higher costs of natural gas generation compared to solid fuel alternatives.

In this sensitivity case, the optimal capacity expansion plan (including only natural gas fired capacity additions) consists of an LMS100 CT unit in 2011, followed by a 7FA CT unit in 2016, and a second LMS100 CT unit in 2021.

The CPWC for the all natural gas capacity expansion plan is $4,619.8 million. A comparison of the CPWCs shows that the case with TEC is the least-cost plan by $299.8 million over the evaluation period.

### *E.6.2.5 Direct-Fired Biomass Supply-Side Alternative*

This sensitivity includes the 30 MW direct-fired biomass (stoker-fired) alternative presented in Section A.6.0 as a committed unit in 2011 in the cases with and without TEC, since this is the first year that the City would need capacity under the base case assumptions. The seasonal purchase for the base case with TEC (described in Section E.5.0) was not considered in this sensitivity, since no capacity would be needed during the summer of 2011, corresponding to the additional capacity provided from the direct-fired biomass alternative.

Cost and performance estimates for the direct-fired biomass alternative are presented in Section A.6.0. The unit was modeled as a "must run" unit, without consideration of emissions allowance costs, to allow for a conservative economic analysis and because biomass emissions are highly dependent on the type of biomass utilized in power generation.

In this sensitivity case, the optimal capacity expansion plan for the case with TEC in 2012 consists of an LMS100 CT unit in 2017, followed by an LM6000 CT unit in 2024. The optimal capacity expansion plan without participation in TEC consists of an LM6000 CT unit in 2012, followed by a CFB unit in 2015.

The CPWCs for the expansion plan with TEC and the plan without participation in TEC are $4,345.5 and $4,514.5 million, respectively. A comparison of the CPWCs shows that the case with TEC is the least-cost plan by approximately $169.0 million over the evaluation period. However, as compared to the base case TEC CPWC, including the 30 MW biomass resource in 2011 increases the CPWC with TEC by $25.5 million.

### *E.6.2.6 Powder River Basin Coal for TEC*

The base case economic analysis and all other sensitivity analyses performed assume that TEC will burn a blend of Latin American coal and petcoke. However, as described in Section A.3.0, TEC will be designed to be capable of burning blends of PRB coal and petcoke, as well as blends of Central Appalachian coal and petcoke. This sensitivity assumes that TEC will burn a blend of PRB coal and petcoke and is based on the corresponding operating cost and performance estimates provided by Sargent & Lundy, which were presented in Section A.3.0.

Hill & Associates' forecast of Latin American coal prices is lower than the forecasts of PRB coal prices, and the corresponding operating costs of TEC are expected to be lower when burning a blend of Latin American coal and petcoke than when burning a blend of PRB coal and petcoke. However, this sensitivity is intended to demonstrate that the additional flexibility of TEC resulting from its capability to burn multiple types of coal allows TEC to be a cost-effective alternative, if the preferred coal source is unavailable for any reason.

The optimal capacity expansion plan involving operation of TEC on a blend of PRB coal and petcoke consists of a 7FA CT unit in 2016, with a CPWC of $4,334.5 million. A comparison of the CPWCs for this case and the base case capacity expansion plan that includes participation in TEC (presented in Section E.5.0) shows that the plan with TEC's operation on a blend of PRB coal and petcoke is $14.5 million higher in CPWC than the plan with TEC's operation on a blend of Latin American coal and petcoke. However, the plan with TEC's operation on a blend of PRB coal and petcoke is still lower in CPWC than the base case capacity expansion plan without participation in TEC by $138.1 million over the evaluation period.

### *E.6.2.7 Summary of the Sensitivity Cases for External Parameters*

Appendix E.1 presents the CPWC summary sheets for all the cases presented in Table E.6-21. The optimal capacity expansion plan with TEC in 2012 was the least-cost plan in each of the scenarios, except for the second jointly owned pulverized coal unit sensitivity. Overall, these results demonstrate the robustness and flexibility of the expansion plan with TEC to overcome external variations and deviations from the base case assumptions.

Table E.6-21
Summary of Sensitivity Analyses
*(Varying External Parameters)*

| Sensitivity Case | Expansion Plan CPWC Cost ($ million) | | |
|---|---|---|---|
| | Sensitivity Scenario | Base Case TEC in 2012 | Differential CPWC Savings of Base Case |
| 3x1 Combined Cycle Joint Development | $4,598.0 | $4,320.0 | $278.0 |
| Three-Train 1x1 IGCC Joint Development | $4,421.8 | $4,320.0 | $101.8 |
| Second Jointly Owned Pulverized Coal Unit | $4,134.7 | $4,320.0 | ($185.3) |
| All Natural Gas Capacity Expansion Plan | $4,619.8 | $4,320.0 | $299.8 |
| Biomass Supply-Side Addition with TEC | $4,345.5 | $4,320.0 | $25.5 |
| Biomass Supply-Side Addition without TEC | $4,514.5 | $4,320.0 | $194.5 |
| PRB Coal for TEC | $4,334.5 | $4,320.0 | $14.5 |

## E.6.3 Analysis of RFP Responses

As described in Section A.7.0, Southern Power Company (Southern) responded to the Participants' RFP and provided bids for a pulverized coal unit and a 2x1 combined cycle unit. Southern's proposed costs and estimated performance for the units are confidential. Although both of Southern's bids were determined by R.W. Beck to not be least-cost to TEC on a levelized cost basis, each bid has been evaluated for the City's system as a sensitivity to further asses the cost-effectiveness of the City's participation in TEC. This section briefly describes the bids and the resulting optimal capacity expansion plans under each scenario.

### *E.6.3.1 Southern's Pulverized Coal Unit Bid*

Southern's pulverized coal unit bid was considered a committed unit for the City, and all costs and performance for the unit were made to be consistent with Southern's bid. The optimal expansion plan for the City's system with Southern's pulverized coal bid, which was considered a committed unit in 2012, consisted of an LMS100 CT unit in 2016, followed by an LM6000 CT unit in 2022, with a CPWC of $4,576.3 million. A comparison of CPWCs shows that the base case expansion plan with the City's participation in TEC is $256.3 million lower in CPWC than the expansion plan with Southern's pulverized coal bid over the evaluation period.

### *E.6.3.2 Southern's 2x1 Combined Cycle Bid*

Southern's 2x1 combined cycle unit bid was considered a committed unit for the City, and all costs and performance for the unit were made to be consistent with Southern's bid. The optimal expansion plan for the City's system with Southern's 2x1 combined cycle bid, which was considered a committed unit in 2012, consisted of a CFB unit in 2016, with a CPWC of $4,734.3 million. A comparison of CPWCs shows that the base case expansion plan with the City's participation in TEC is $414.3 million lower in CPWC than the expansion plan with Southern's combined cycle bid over the evaluation period.

### *E.6.3.3 Summary of the Sensitivity Cases for the City's Share of the RFP Responses*

As shown in Table E.6-22, the City's optimal capacity expansion plan with TEC in 2012 was the least-cost plan compared to the City's share of both of Southern's bids.

Table E.6-22
Summary of the City's Share of Southern's Bids

| Sensitivity Case | Expansion Plan CPWC Cost ($ million) | | |
|---|---|---|---|
| | Sensitivity Scenario | Base Case TEC in 2012 | Differential CPWC Savings of Base Case |
| Southern's Pulverized Coal Unit | $4,576.3 | $4,320.0 | $256.3 |
| Southern's 2x1 Combined Cycle Unit | $4,734.3 | $4,320.0 | $414.3 |

# E.7.0 The City's Demand-Side Management

According to Section 403.519 of the Florida Statutes, in its determination of need, the FPSC must take into consideration conservation measures that might mitigate the need for the proposed plant. To address this requirement, the City has tested potential conservation, load management, and demand response (collectively referred to as demand-side management, or DSM) measures for cost-effectiveness utilizing an integrated approach that is based on projections of total achievable capacity and energy reductions and their associated annual costs developed specifically for the City of Tallahassee.

The remainder of this section summarizes the City's existing DSM programs, presents a discussion of the methodology used to determine the potential cost-effectiveness of new DSM measures, and presents the results of the City's DSM cost-effectiveness evaluations.

## E.7.1 Existing DSM and Conservation Programs

The City is no longer subject to the requirements of the *Florida Energy Efficiency and Conservation Act* (FEECA) and, therefore, the FPSC does not set numeric conservation goals for the City. Despite this fact, the City expects to continue its commitment to conservation and the DSM programs that prove beneficial to the City's ratepayers. The City currently offers a variety of conservation and DSM programs to its residential and commercial customers as described below.

### *E.7.1.1 Residential Secured Energy Efficiency Loans*

The City offers loans to its residential customers to improve home energy efficiency. The loans, secured with a property lien, are for a maximum of $7,000 at a 5.0 percent interest rate for 5 years. Loans are issued to install natural gas heating with electric central air conditioners, energy efficient heat pumps and water heaters, natural gas ranges and ovens, natural gas firelogs, ceiling insulation, energy efficient refrigerators, solar water heaters, and other energy conserving appliances. Loans are repaid on the customer's monthly utility bill and can be repaid at any time within the 5 year period without penalty.

### *E.7.1.2 Residential Natural Gas Rebates*

The City offers rebates to homebuilders and owners of existing homes for the installation of natural gas appliances or the replacement of electric appliances with natural gas appliances. This program benefits the City by directly reducing winter peak demands through fuel switching and benefits the gas utility by increasing the system's load factor.

Rebates are offered to homebuilders (the person or company that applies for the construction permit) for installing natural gas appliances instead of electric appliances. Rebates ranging from $50 to $800 per appliance are available to eligible builders of new single-family homes or multi-family apartments. Qualifying owners of existing homes are eligible for rebates ranging from $50 to $450 per appliance. Bonus rebates for the installation of multiple gas appliances are available to both new homebuilders and, in certain cases, the contractor installing appliances in existing homes.

Installation of, or conversion to, the following natural gas appliances are included in the rebate program:

- Natural gas furnaces.
- Natural gas water heaters.
- Natural gas ranges and ovens.
- Natural gas firelogs.
- Natural gas clothes dryers.
- Natural gas barbeque grills.
- Natural gas pool and spa heaters.
- Natural gas outdoor lights.
- Hydronic (combination appliance) water/space heaters.
- Natural gas backup generators.

Only those customers who presently have or will install at least a new gas water heater, furnace, or hydronic system are eligible for rebates on the remaining appliances.

### *E.7.1.3 Residential Low-Income Ceiling Insulation Grants*

The City offers grants of up to $500 for the addition of ceiling insulation, where the existing level of insulation is less than R-24. The grants are available to City customers whose income level is at or below 80 percent of Tallahassee's median income level.

### *E.7.1.4 Residential Low-Income Energy Retrofit Grants*

The City offers grants of up to $500 for the repair of heating, ventilation, and air conditioning (HVAC) systems. The grants are available to City customers whose income level is at or below 80 percent of Tallahassee's median income level.

### *E.7.1.5 Residential Information and Audits*

This program includes a variety of activities that are intended to improve general knowledge of energy use in the community and, therefore, improve overall energy efficiency. The residential information programs described below benefit the City's customers by increasing their knowledge of energy use, which will make them better able to lower their utility bills. The programs benefit the utility by reducing demand and energy requirements through improved efficiency and better customer energy usage patterns.

***E.7.1.5.1 Energy Information.*** The City offers presentations to community groups, schools, and individuals. The City provides flyers, folders, brochures, workshops, booklets, bill stuffers, presentations, seminars, and videos. The intent is to educate the public about residential energy efficiency, energy use and conservation, rates, costs, weather, and proper operation of control devices.

***E.7.1.5.2 Energy Audits and High Bill Investigations.*** Class B energy audits are free to the City's customers and are intended to point out areas of improvement in energy efficiency. When performing an audit, auditors also take the opportunity to distribute literature on efficiency and to recommend other City incentive programs to help increase energy efficiency.

***E.7.1.5.3 HVAC Tune-Up Training.*** The City provides training in "precision HVAC tune-up" to local HVAC service vendors. This is intended to promote improved service procedures for maintaining HVAC efficiency and to introduce local HVAC service providers to improved methods for dealing with ducted air delivery systems and building pressurization effects.

***E.7.1.5.4 Energy-Efficient Construction Information.*** The City promotes the use of the Building Energy Efficiency Rating System (BEERS), which applies to energy efficiency in new construction.

### *E.7.1.6 Commercial Low Interest Energy Efficiency Loan*

Loans are offered to increase the affordability to customers of installing higher efficiency equipment, especially HVAC systems. The loans, secured with a property lien, are for a maximum of $10,000 at a 5.0 percent interest rate for 5 years. Loans are repaid on the customers' monthly utility bill and can be repaid at any time within the 5 year period without penalty.

### *E.7.1.7 Commercial Customer Loan*

This program offers loans for various energy efficiency measures to commercial customers who have had a recent energy audit. The customer benefits through lowered utility bills in the long run, and the utility benefits from reduced summer and winter peaks achieved through improved equipment efficiency and building envelope integrity. The loans, secured with a property lien, are usually issued at a 5.0 percent interest rate for a 5 year term, up to a maximum of $25,000. Loans in excess of $25,000 may be granted, pending approval by the appropriate City authority. Loans are repaid through the customer's utility bill, and the interest rate is subject to change. The measures offered through this program are expected to include, but are not limited to, the following:

- Lighting Changeouts--Loans are offered for the replacement of lighting to improve efficiency and to improve color rendering. The majority of program participation is expected to be associated with this measure.
- Fuel Switching--Loans are offered to customers who wish to convert their heating or cooling system to natural gas.
- Building Envelope--Loans are offered to customers who wish to add window treatments, ceiling insulation, and other building envelope efficiency measures.

### *E.7.1.8 Commercial Demonstrations*

This program selects specific high-profile projects that can be used to demonstrate the benefits of energy conservation, advanced technology, or customer-control of energy use. Currently, there is one major demonstration project underway:

- City Facilities--Improvements are being made to City facilities to demonstrate the impact of improved lighting, energy management systems, variable speed motor drives, and building envelope measures including window treatments.

It is intended that demonstration projects in public buildings will increase general public awareness of the opportunities that exist for energy conservation and cost reduction. Additionally, these program measures will benefit the City by reducing energy consumption in City-owned facilities and by reducing peak loads on the electric system.

### *E.7.1.9 Commercial Information and Audits*

The commercial information programs described below will benefit customers by increasing their knowledge of energy use, which will make them better able to lower their utility bills. The programs benefit the utility by reducing demand and energy requirements through improved efficiency and customer usage patterns. The City aims to improve commercial customer awareness and knowledge about energy use through the following:

- Energy Audits and High Bill Investigation--Audits of customer premises will be provided as required under the FPSC rules. During the audit, auditors will attempt to point out areas in which energy efficiency can be improved and inform customers about available incentives. Customers concerned about high or irregular bills are offered services to assist in correcting the problem.
- Key Accounts Technical Workshops and Seminars--Training will be offered to educate "key account" customers about energy efficiency, building operations, and other energy-related issues.
- Vendor Training--Energy efficiency training will be offered to local vendors.

## E.7.2 The City's DSM Analysis

As discussed previously, the City's analysis of potentially cost-effective DSM was based on projections of total achievable capacity and energy reductions and their associated annual costs developed specifically for the City. Candidate DSM measures were initially screened using a cost-effectiveness test that was based on the busbar cost of each measure (adjusted for line losses) compared to comparable (appropriate) supply-side resources, where the costs of the supply-side resources and DSM measures were computed on a levelized basis over the DSM measure life. Levelized costs for the DSM measures were lower than or the same as the relevant supply-side options for almost all of the DSM measures screened.

The measures were then combined into bundles of measures affecting similar end uses and/or having similar costs per kWh saved. Projected capacity and energy savings, and implementation costs, were developed for each bundle. Chronological hourly load shapes were then developed for each bundle and combined into an overall DSM composite bundle (portfolio) load shape, which was applied as a load shape adjustment to the base demand and energy forecast. Tables E.7-1a and E.7-1b show the mapping of DSM measures into individual residential and commercial DSM measure bundles, respectively.

Table E.7-1a
Mapping of DSM Measures to DSM Bundles

| Sector | DSM Measure | Bundle ID |
|---|---|---|
| Res | Solar PV(with Federal tax credit) - Facing West | PHOTO |
| Res | Solar PV small (with Federal tax credit) - Facing South | PHOTO |
| Res | Solar PV small (with Federal tax credit) - Facing Southwest | PHOTO |
| Res | Reflective Roofs | REX1 |
| Res | Plenum Repair & Duct Seal AC | REX1 |
| Res | Plenum Repair & Duct Seal HP | REX1 |
| Res | Low-income AC maintenance | REX1 |
| Res | Low-Income Infiltration Reduction | REX1 |
| Res | Programmable Thermostat -- Existing Heat Pump | REX1 |
| Res | HVAC Diagnostics and Servicing --Heat Pump | REX1 |
| Res | HVAC Diagnostics and Servicing --Central AC | REX1 |
| Res | Whole-House Weatherization | REX2 |
| Res | Programmable Thermostat -- Exstg Elec Strip Furnace | REX1 |
| Res | Attic Insulation, Existing | REX1 |
| Res | Heat Pump Efficiency Upgrade to SEER 15.25 HSPF 8.75, New Construction Heat Pump Home | RHVAC |
| Res | Heat Pump Efficiency Upgrade to SEER 15.25 HSPF 8.75, Existing Construction Heat Pump Home | RHVAC |
| Res | Central AC Efficiency Upgrade to SEER 15, Electric Strip Furnace New Home | RHVAC |
| Res | Central AC Efficiency Upgrade to SEER 15, Electric Strip Furnace Existing Home | RHVAC |
| Res | CFL 14 Watt (60W Incandescent) | RLGHT |
| Res | CFL 14 Watt (60W Incandescent) | RLGHT |
| Res | Res CFL 18 Watt >=1,100 Lumens (75W Incandescent) | RLGHT |
| Res | Res CFL 18 Watt >=1,100 Lumens (75W Incandescent) | RLGHT |
| Res | Programmable Thermostat -- NC (heat pump) | RNC1 |
| Res | Programmable Thermostat -- NC (electric strip heat) | RNC1 |
| Res | Perimeter Insulation in New Electric Strip Heat | RNC1 |
| Res | Duct Insulation and Seal in New Electric Strip Heat | RNC1 |
| Res | Duct Seal for New Heat Pump Home | RNC1 |
| Res | NC: 15% Savings over Code, Heat Pump (with Fed Solar WH Tax Credit) | RNC2 |
| Res | NC: 15% Savings over Code, Electric Strip (with Fed Tax Credit for Insulation) | RNC2 |
| Res | NC: 20% Savings Over Code, Heat Pump (with Fed Solar Water Heater/Insulation Tax Credits) | RNC3 |
| Res | NC: 20% Savings Over Code, Electric Strip (with Fed Solar Water Heater/Insulation Tax Credits) | RNC3 |
| Res | Radiant Barrier in New Electric Strip Heat Home | RNC1 |
| Res | Res Tree Shading | ROTHR |
| Res | Res Efficient Pool Pumps - Efficient single-speed pool pump (1.5 hp) -- new or replacement | ROTHR |
| Res | Res Efficient Pool Pumps - Efficient two-speed pool pump (1.5 hp) -- new or replacement | ROTHR |
| Res | Res Refrigerator Recycling | ROTHR |
| Res | Energy Star Freezer | ROTHR |
| Res | Energy Star Clothes Washer -- electric water heater and dryer | ROTHR |
| Res | Energy Star Clothes Washer -- gas water heater and electric dryer | ROTHR |
| Res | Energy Star Clothes Washer -- electric water heater and gas dryer | ROTHR |
| Res | Energy Star Refrigerator | ROTHR2 |
| Res | Energy Star Dishwasher, single-family | ROTHR2 |
| Res | Energy Star Dishwasher, multi-family | ROTHR2 |
| Res | Heat Pump Water Heater, single-family | RWH1 |
| Res | High-Efficiency Water Heater | RWH1 |
| Res | Heat Pump Water Heater, multi-family | RWH2 |
| Res | Res Solar Water Heater End-Use Pricing Business | SWH |
| Res | Res Solar Water Heater (ICS) -- with Federal Tax Credit | SWH |
| Res | Res Solar Water Heater, 80-Gallon tank, with Fed Tax Credit | SWH |
| Res | Res Demand Response | RDR |

Table E.7-1b
Mapping of DSM Measures to DSM Bundles

| Sector | DSM Measure | Bundle ID |
|---|---|---|
| Com | High Eff Chiller - GS - New Construction | CNC1 |
| Com | High Eff Chiller - GSD - New Construction | CNC1 |
| Com | High Eff Chiller - GSLD - New Construction | CNC1 |
| Com | High Eff DX AC - GS - New Construction | CNC1 |
| Com | High Eff DX AC - GSD - New Construction | CNC1 |
| Com | High Eff DX AC - GSLD - New Construction | CNC1 |
| Com | Window Film - GSLD - New Construction | CNC1 |
| Com | High Eff Chiller - GS - Existing Construction | CHVAC1 |
| Com | High Eff Chiller - GSD - Existing Construction | CHVAC1 |
| Com | High Eff Chiller - GSLD - Existing Construction | CHVAC1 |
| Com | High Eff DX AC - GS - Existing Construction | CHVAC1 |
| Com | High Eff DX AC - GSD - Existing Construction | CHVAC1 |
| Com | High Eff DX AC - GSLD - Existing Construction | CHVAC1 |
| Com | Roof Insulation - GS - Existing Construction | CHVAC1 |
| Com | Roof Insulation - GSD - Existing Construction | CHVAC1 |
| Com | Roof Insulation - GSLD - Existing Construction | CHVAC1 |
| Com | Window Film - GSLD - Existing Construction | CHVAC1 |
| Com | Leak Free Ducts DX AC - GS - Existing Construction | CHVAC1 |
| Com | Leak Free Ducts DX AC - GSD - Existing Construction | CHVAC1 |
| Com | Leak Free Ducts DX AC - GSLD - Existing Construction | CHVAC1 |
| Com | CIBE Reflective Roof - GS - Existing Construction | CHVAC1 |
| Com | CIBE Reflective Roof - GSD - Existing Construction | CHVAC1 |
| Com | CIBE Reflective Roof - GSLD - Existing Construction | CHVAC1 |
| Com | T8 32W Dimming El Ballast, New/Replacement | CLGHT1 |
| Com | Premium T8 El Ballast | CLGHT1 |
| Com | Nonres CFL New/Replacement - 36 W screw-in CFL (150 W incandescent) | CLGHT1 |
| Com | Nonres CFL Retrofit - 36 W screw-in CFL (150 W incandescent) | CLGHT1 |
| Com | Nonres CFL New/Replacement - 25 W CFL (100 W incandescent) | CLGHT1 |
| Com | Nonres CFL Retrofit - 25 W CFL (100 W incandescent) | CLGHT1 |
| Com | Nonres CFL New/Replacement - 14 W screw-in CFL (60 W incandescent) | CLGHT1 |
| Com | Nonres CFL Retrofit - 14 W screw-in CFL (60 W incandescent) | CLGHT1 |
| Com | Nonres CFL New/Replacement - 19 W screw-in CFL (75 W incandescent) | CLGHT1 |
| Com | Nonres CFL Retrofit - 19 W screw-in CFL (75 W incandescent) | CLGHT1 |
| Com | Nonres CFL New/Replacement - 13 W screw-in CFL (40 W incandescent) | CLGHT1 |
| Com | Nonres CFL Retrofit - 13 W screw-in CFL (40 W incandescent) | CLGHT1 |
| Com | Nonres CFL Retrofit - 55 W pin-based CFL (200 W incandescent) | CLGHT1 |
| Com | Nonres Metal Halide - 75 W (100 W mercury vapor) | CLGHT1 |
| Com | Nonres Metal Halide - 100 W (175 W mercury vapor) | CLGHT1 |
| Com | Nonres Metal Halide - 175 W (250 W mercury vapor) | CLGHT1 |
| Com | Nonres Metal Halide - 250 W (400 W mercury vapor) | CLGHT1 |
| Com | Nonres Metal Halide - 175 W (500 W mercury vapor) | CLGHT1 |
| Com | Occ-Sensor - Wall box | CLGHT1 |
| Com | Photocell | CLGHT1 |
| Com | Timeclock | CLGHT1 |
| Com | Premium Efficiency Motor - 5 HP | CHVAC1 |
| Com | Premium Efficiency Motor - 15 HP | CHVAC2 |
| Com | Premium Efficiency Motor - 50 HP | CHVAC3 |
| Com | EnergyMiser -- unconditioned environment | COTHR1 |
| Com | EnergyMiser -- conditioned environment | COTHR1 |
| Com | EnergyMiser vending machine controller -- uncooled (snack) machine | COTHR1 |
| Com | Solar photovoltaic system, small (due west) | PHOTO |
| Com | Solar photovoltaic system, small (due south) | PHOTO |
| Com | Solar photovoltaic system, small (due southwest) | PHOTO |
| Com | Heat Pump Water Heater -- GS | CWH |
| Com | Heat Pump Water Heater -- GSD | CWH |
| Com | Heat Pump Water Heater -- GSLD | CWH |
| Com | Window film, GS | CHVAC1 |
| Com | Window film, GSD | CHVAC2 |
| Com | New Construction Program | CNC2 |
| Com | Comm Demand Response | CDR |

In developing the measure bundles, care was taken to ensure that inclusion of alternative measures addressing the same end use did not result in an overstatement of potential savings. Where measures "competed" for the same end use (e.g., heat pump water heaters and high-efficiency water heaters), either one measure was selected or the market share of each competing measure was estimated so that the total market shares of all measures addressing the same end use totaled 100 percent. Likewise, care was taken to ensure that the composite DSM portfolio did not include measure bundles that competed with each other for the same end uses without creating market shares for each.

The composite portfolio of DSM measures was then analyzed as a reduction to the City's hourly loads (including seasonal peak demands and energy requirements). The resulting system load shape was evaluated using production cost modeling that was consistent with the methodology described in Section E.5.0. Production cost modeling was performed for the reduced annual load projection scenarios resulting from DSM savings for two different cases: (1) a case in which the City participates in TEC in 2012; and (2) a case in which the City does not participate in TEC. The remainder of this section provides more specific information related to the projected annual peak demand and energy savings associated with the portfolio of DSM measures, the corresponding annual costs to achieve these projected energy savings, and the resulting system economics considering the energy savings and costs for the DSM portfolio.

### *E.7.2.1 Description of the DSM Portfolio*

The non-duplicative DSM measure bundles that comprise the DSM portfolio are described below, aggregated primarily by affected end use.

***E.7.2.1.1 Commercial Space Conditioning.*** This measure bundle included individual measure bundles CHVAC1, CHVAC2, and CHVAC3 from Table E.7-1b. Among the specific measures addressed in the bundle were those affecting heating and cooling usage, such as high-efficiency air conditioning equipment, duct and roof insulation, reflective roofing, and motors used for ventilation. These measures are applied to the renovation and retrofit markets.

***E.7.2.1.2 Commercial Lighting.*** This measure bundle included individual measure bundle CLGHT1 from Table E.7-1b. Among the specific measures addressed in the bundle were various high-efficiency fluorescent bulbs, efficient ballasts, metal halide lights, occupancy sensors, and photocells and time clocks for outdoor lighting. The most common lighting fixture uses the 4-foot fluorescent tubes. There are numerous possible combinations of ballasts, reflectors, and bulbs applicable to the commercial sector. Rather than enumerating all of the various combinations (and estimating current market share for each), measures that represented the typical current practice and a high efficiency alternative were selected. The baseline (current practice for lighting in new and renovation projects) incorporates substantial energy efficiency relative to practice even 5 years ago.

***E.7.2.1.3 Commercial New Construction.*** This measure bundle included individual measure bundle CNC2 from Table E.7-1b. Among the measures addressed in the bundle were a wide range of HVAC, lighting and other measures that are applicable to improving the efficiency of new construction. Savings and cost estimates were estimated at a high level, based on the success of comprehensive new construction programs in California and New England. The comprehensive approach resulted in greater savings at lower costs of energy saved than the individual new construction measures.

***E.7.2.1.4 Commercial Water Heating and Vending Machine Controls.*** This measure bundle included individual measure bundle COTHR1 and CWH from Table E.7-1b. Among the measures addressed in the bundle were both water heating measures such as heat pump water heaters and devices that cut power usage by vending machines when they are not being used.

***E.7.2.1.5 Residential Space Conditioning.*** This measure bundle included individual measure bundles REX1 and RHVAC from Table E.7-1a. Among the specific measures addressed in the bundle were those affecting heating and cooling usage, such as high-efficiency heating and air conditioning equipment and servicing, duct and attic insulation, reflective roofing, and programmable thermostats.

***E.7.2.1.6 Residential New Construction.*** Three different strategies for residential new construction were evaluated. The first (RNC1), consists of a programmable thermostat and some shell upgrades. The second (RNC2), included shell, duct and equipment upgrades to reduces use by 15 percent relative to current code requirements. The third (RNC3), is a 20 percent improvement relative to current code requirements. Among the specific measures addressed in the bundle were those affecting heating, cooling and water heating usage, such as a variety of insulation applications, programmable thermostats and solar water heaters. This third new construction program was incorporated into the final composite bundle.

***E.7.2.1.7 Residential Appliances and Pool Pumps.*** This measure bundle included individual measure bundles ROTHR and ROTHR2 from Table E.7-1a. Among the specific measures addressed in the bundle were high-efficiency home appliances and pool pumps, as well as refrigerator recycling and tree shading.

***E.7.2.1.8 Residential Water Heating.*** This measure bundle included individual measure bundles RWH1, RWH2 and SWH from Table E.7-1a. Among the specific measures addressed in the bundle were high-efficiency water heaters, heat pump water heaters and solar water heaters.

***E.7.2.1.9 Residential and Commercial Photovoltaics.*** This measure bundle included individual measure bundle PHOTO from Tables E.7-1a and E.7-1b. Among the specific measures addressed in the bundle were PV systems at various solar orientations, for both residential and commercial buildings.

***E.7.2.1.10 Residential and Commercial Demand Response.*** This measure bundle included individual measure bundles CDR and RDR from Tables E.7-1a and E.7-1b. In light of the rapid technological advancements in the area of demand response, individual technologies were not modeled. Instead, the experience of other utilities with successful demand response programs were used to generate high-level estimates of total demand-response impacts achievable for the residential and commercial sectors. It was assumed that the same level of impact could be obtained in winter as in summer.

### E.7.2.2 Projected Annual Peak Demand and Energy Savings

Table E.7-2 presents the projected annual peak demand and energy savings resulting from implementation of the DSM measures being evaluated by the City. The reductions include projected savings associated with energy efficiency (EE) measures as well as demand response/load control (DR) measures. Projections were developed for calendar year 2007 through calendar year 2025 and were held constant thereafter, similar to the evaluation methodology used for the City's forecast load.

It should be noted that the peak seasonal demand reductions shown in Table E.7-2 take into account the coincidence of the load profiles developed for each bundle. That is, the peak savings for each DSM bundle may not occur at the same hour for all DSM bundles. The impact of considering only coincident peak demand reductions is very minimal and is, in fact, negligible until the summer of 2025 (at which time, there is a 1 MW differential due to noncoincidence) and until the winter of 2024 (at which time, there is a 1 MW differential due to noncoincidence, which increases to 2 MW during the winter of 2025).

The relative contribution of each DSM bundle comprising the composite DSM portfolio is presented in Table E.7-3.

Table E.7-2
Projected Seasonal Coincident Peak Demand and Annual Energy Savings

| Year | EE DSM Bundles | | | DR DSM Bundles | | Total (EE and DR DSM Bundles) | | |
|---|---|---|---|---|---|---|---|---|
| | Summer Coincident Peak Demand Reduction (MW) | Winter Coincident Peak Demand Reduction (MW) | Annual Energy Reduction (MWh) | Summer Coincident Peak Demand Reduction (MW) | Winter Coincident Peak Demand Reduction (MW) | Summer Coincident Peak Demand Reduction (MW) | Winter Coincident Peak Demand Reduction (MW) | Annual Energy Reduction (MWh) |
| 2007 | 3 | 2 | 11,200 | 4 | 4 | 7 | 7 | 11,200 |
| 2008 | 7 | 6 | 27,999 | 9 | 9 | 15 | 15 | 27,999 |
| 2009 | 12 | 11 | 50,398 | 13 | 13 | 25 | 24 | 50,398 |
| 2010 | 18 | 17 | 78,397 | 18 | 18 | 37 | 35 | 78,397 |
| 2011 | 26 | 24 | 111,996 | 23 | 23 | 49 | 47 | 111,996 |
| 2012 | 34 | 31 | 145,594 | 25 | 25 | 59 | 55 | 145,594 |
| 2013 | 44 | 39 | 184,793 | 26 | 26 | 70 | 65 | 184,793 |
| 2014 | 53 | 47 | 223,991 | 28 | 28 | 81 | 76 | 223,991 |
| 2015 | 62 | 56 | 263,190 | 30 | 30 | 92 | 86 | 263,190 |
| 2016 | 70 | 63 | 296,789 | 32 | 32 | 102 | 94 | 296,789 |
| 2017 | 78 | 70 | 330,387 | 32 | 32 | 110 | 102 | 330,387 |
| 2018 | 86 | 77 | 363,986 | 32 | 32 | 118 | 109 | 363,986 |
| 2019 | 92 | 83 | 391,985 | 33 | 33 | 125 | 116 | 391,985 |
| 2020 | 99 | 89 | 419,984 | 33 | 33 | 132 | 122 | 419,984 |
| 2021 | 106 | 95 | 447,983 | 34 | 34 | 139 | 128 | 447,983 |
| 2022 | 111 | 99 | 470,382 | 34 | 34 | 145 | 133 | 470,382 |
| 2023 | 116 | 104 | 492,781 | 34 | 34 | 151 | 138 | 492,781 |
| 2024 | 121 | 108 | 515,180 | 35 | 35 | 156 | 143 | 515,180 |
| 2025 | 126 | 112 | 537,579 | 35 | 35 | 161 | 147 | 537,579 |

Table E.7-3
Individual Bundle Contributions to DSM Portfolio Reductions[(1)]

| Bundle | Percent of Summer Peak Demand Reduction (2025) | Percent of Winter Peak Demand Reduction (2025) | Percent of Annual Energy Reduction (2025) |
|---|---|---|---|
| Commercial Space Conditioning (CHVAC1, CHVAC2, CHVAC3) | 22% | 20% | 24% |
| Residential and Commercial Demand Response (RDR, CDR) | 22% | 24% | 0% |
| Residential Space Conditioning (REX1, RHVAC) | 20% | 18% | 22% |
| Commercial Lighting (CLGHT1) | 14% | 13% | 16% |
| Commercial New Construction (CNC2) | 7% | 7% | 8% |
| Residential New Construction (RNC3) | 6% | 6% | 7% |
| Residential Appliances and Pool Pumps (ROTHR, ROTHR2) | 3% | 3% | 7% |
| Residential Water Heating (RWH1, RWH2, SWH) | 2% | 3% | 4% |
| Residential Lighting (RLGHT) | 2% | 4% | 7% |
| Commercial Water Heating & Vending Machine Controls (CWH, COTHR1) | 2% | 3% | 4% |
| Residential and Commercial Photovoltaics (PHOTO) | 1% | <1% | 1% |

(1). Percentages may not total 100 due to rounding.

### *E.7.2.3 Projected Annual Costs for DSM Measures*

Table E.7-4 presents the projected annual costs associated with the DSM savings shown in Table E.7-2. The projected annual costs are the costs for which the City would be responsible for in order to allow the participating customers to realize a 2 year payback on any necessary investments associated with the DSM measures. The annual costs are presented in nominal dollars through 2025, and beyond 2025 are assumed to escalate at the assumed 2.5 percent general inflation rate presented in Section A.4.0.

Table E.7-4
Projected Annual Costs Associated with DSM Savings

| Year | Annual Costs (Nominal $000s) |
|---|---|
| 2007 | $4,523 |
| 2008 | $6,680 |
| 2009 | $8,968 |
| 2010 | $11,367 |
| 2011 | $13,913 |
| 2012 | $13,696 |
| 2013 | $16,242 |
| 2014 | $16,806 |
| 2015 | $17,622 |
| 2016 | $16,157 |
| 2017 | $16,725 |
| 2018 | $17,620 |
| 2019 | $16,411 |
| 2020 | $17,221 |
| 2021 | $18,372 |
| 2022 | $17,620 |
| 2023 | $19,258 |
| 2024 | $20,471 |
| 2025 | $22,212 |

### E.7.2.4 System Economics Considering Projected DSM Savings and Costs

The cumulative present worth cost (CPWC) results of the production cost models for the City's base case analysis and the scenario in which load projections were reduced to account for DSM savings were compared to one another. Such an analysis can be used to determine whether implementation of DSM measures beyond what the City currently offers may be more beneficial than participating in TEC, or whether a combination of the implementation of the DSM measures along with participation in TEC will offer the City an economic advantage.

The methodology utilized in developing the CPWC results for the DSM portfolio was similar to the approach outlined in Section A.8.0 and Section E.5.0. However, the demand and energy savings projected to be realized through implementation of the DSM portfolio (presented in Table E.7-3) were considered when developing the optimum capacity expansion plan and performing the production cost modeling to calculate the CPWC. A chronological load shape was developed for each year corresponding to the reductions projected for the DSM portfolio. Accounting for the peak demand and energy savings projected to be realized through implementation of the DSM portfolio resulted in lower annual system costs and reduced need for additional capacity. The projected annual costs shown in Table E.7-4 were accounted for, allowing for a comparison of CPWCs between the City's base case least-cost capacity expansion plan and the capacity expansion plan, reflecting energy savings associated with the DSM portfolio under consideration.

As presented in Section E.5.0, the CPWC for the City's least-cost capacity expansion plan that includes participation in the TEC beginning May 1, 2012, is approximately \$4,320.0 million. The CPWC for the City's least-cost capacity expansion plan including TEC and reflecting the energy reductions and corresponding costs associated with the DSM portfolio is \$4,100.1 million. A comparison of the CPWCs indicates that participation in TEC in conjunction with the DSM portfolio under analysis would result in savings of \$219.9 million as compared to participation in TEC without DSM.

Also presented in Section E.5.0 is the base case least-cost capacity expansion plan that does not include participation in TEC, which has a CPWC of \$4,472.6 million. The CPWC for the City's least-cost capacity expansion plan not including TEC, but reflecting the energy reductions and corresponding costs associated with the DSM portfolio, is \$4,307.4 million. A comparison of the CPWCs indicates that the City's least-cost capacity expansion plan not including TEC, but including the DSM portfolio under analysis, results in savings of \$165.2 million, compared to the least-cost capacity expansion plan without TEC and DSM.

Based on the results of the City's DSM analysis, it can be concluded that incorporation of the DSM portfolio under consideration would result in CPWC savings for the least-cost capacity expansion plan involving TEC in 2012 of $207.3 million, compared to the case in which the City does not participate in TEC.

Based on the analysis conducted, the peak demand savings projected for the DSM portfolio would defer the City's initial capacity requirement from 2011 to 2016. Despite the potential deferral of the need for capacity, the results of the DSM analysis indicate that the City's participation in TEC in 2012 would nevertheless provide significant additional CPWC savings because of the low cost, baseload coal fired generation that TEC would provide to diversify the City's existing all natural gas fired generation portfolio. This is illustrated by comparing the CPWC savings of $207.3 million after inclusion of the DSM portfolio to the CPWC differential of approximately $152.6 million without the DSM impacts presented in Section E.5.0. As discussed in Section E.5.0, the City's least-cost, base case capacity expansion plan not involving participation in TEC includes an LMS100 simple cycle CT in 2011, followed by a CFB in 2016. The City's least-cost capacity expansion plan that does not involve participation in TEC and incorporates the DSM portfolio includes only a CFB in 2016. The relative increase in CPWC savings from the base case to the cases including the DSM portfolio can be primarily attributed to the relative size of the City's ownership share of TEC, which provides for a more optimum utilization of baseload capacity when incorporating the demand and energy reductions associated with the DSM portfolio compared to sole ownership of a larger CFB option.

# E.8.0 The City's Strategic Considerations

In addition to cost-effectively meeting the City's capacity needs, there were several strategic considerations and advantages associated with the TEC project, which led the City to consider participation in the TEC project as its next baseload generating unit. These strategic considerations include both economic and non-economic attributes and are discussed in the remainder of this section.

## E.8.1 The City's Fuel Diversity

Participation in TEC will provide the City with an opportunity to increase fuel diversity for the City's system, which is currently comprised of only natural gas, fuel oil, and hydroelectric generating units. In addition to providing the City with fuel diversity, TEC will provide an increase in fuel diversity for the State of Florida as a whole. The project will have the ability to source solid fuels from both domestic and international coal producing regions, including the PRB, Central Appalachia, and Latin American regions, as well as petcoke from the Gulf Coast region and the Caribbean. Historically, coals from these regions and petcoke have experienced significantly less fluctuation in price and generally have less volatile commodity prices than oil and natural gas on an annual basis. As a result, TEC will not only provide additional solid fuel capacity for the City and Florida, but it will also provide further fuel diversification through the capability to source coal and petcoke from numerous different regions via different transportation modes and routes. This additional choice in fuel for the City's generating fleet will provide more flexibility to respond to fuel price fluctuations that exist within all fuel markets due to extenuating events that occur from time to time.

Additionally, the low cost baseload energy from TEC will help the City and Florida reduce their dependence on volatile, higher cost energy from natural gas and oil. Figures E.8-1 and E.8-2 show the City's projected capacity resources by fuel type in 2006 and 2013, respectively. Figures E.8-3 and E.8-4 show the City's projected energy resources by fuel type in 2006 and 2013, respectively.

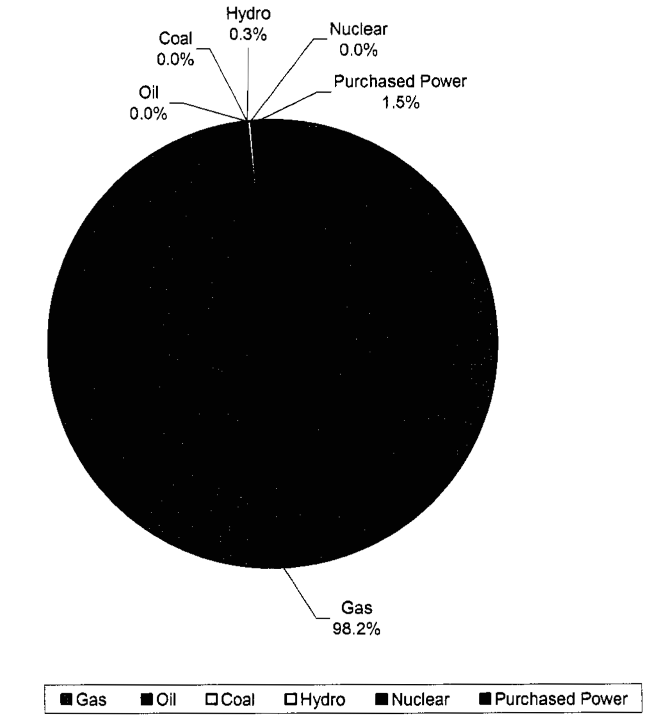


Figure E.8-1
The City's 2006 Capacity Resources by Fuel Type

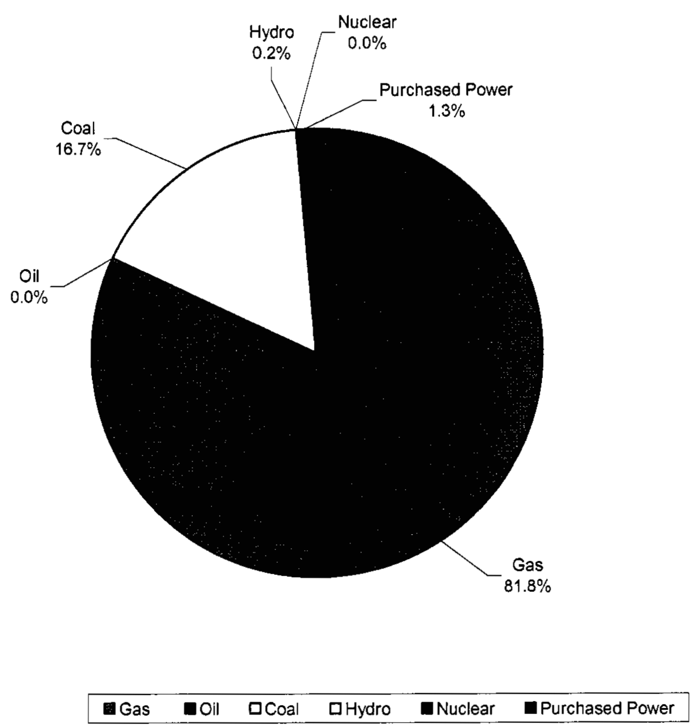


Figure E.8-2
The City's 2013 Capacity Resources by Fuel Type

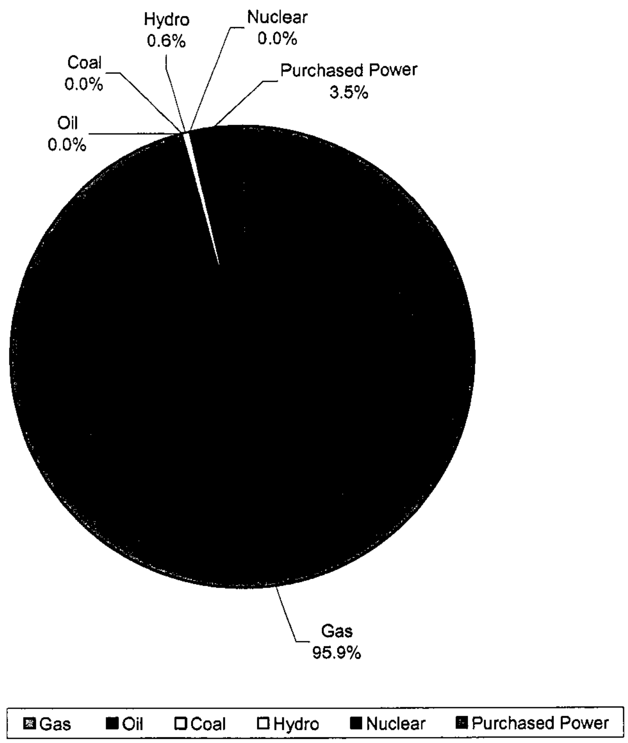


Figure E.8-3
The City's 2006 Energy Resources by Fuel Type

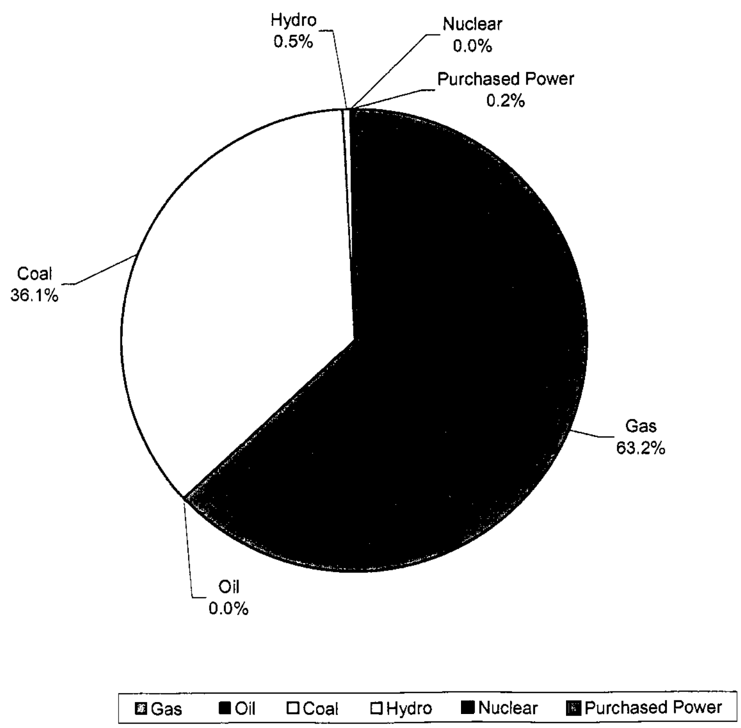


Figure E.8-4
The City's 2013 Energy Resources by Fuel Type

## E.8.2 Reliability of the City's Fuel Supply

The addition of solid-fueled generation increases the reliability of the City's fuel supply. The plant design will allow for up to at least 90 days of coal and petcoke inventory, minimizing the short-term supply disruptions that occurred with natural gas as a result of hurricanes affecting the Gulf Coast supply region. Furthermore, onsite fuel storage minimizes the short-term disruptions of fuel transportation systems.

## E.8.3 Stability of The City's Electric Rates

TEC will help to satisfy the need for low cost, baseload energy within the City's service territory and the State of Florida as a whole. Additional low cost, baseload energy from TEC will help stabilize electric rates for consumers and businesses. Electric rate stability will be beneficial for long-term planning and should also help facilitate more stable growth within the economy.

## E.8.4 Long Service Life

Although economic evaluations have been conducted through 2035 for this Application, TEC will be designed for, and is expected to have, a service life significantly greater than the 23 years of operation captured by the analysis period. The benefits of TEC's expected actual service life of 35 to 50 or more years have not been captured in the economic analysis, but are expected to be realized by the City and the other Participants. Therefore, the total cost savings and benefits of TEC are understated in the economic analysis.

## E.8.5 Supercritical Coal Technology

By using supercritical pulverized coal boiler technology (which operates at a higher steam pressure than subcritical pulverized coal boilers) with Best Available Control Technology (BACT) pollution control systems, TEC will be among the most efficient and cleanest coal plants within the State of Florida. Supercritical clean coal technology is proven, has been in commercial service for decades, and provides at least a 2 percent lower heat rate in comparison to subcritical pulverized coal technology. This improvement in heat rate means that more energy can be generated with the same fuel input. The lower heat rate also translates into lower emissions from fuel combustion, because less fuel is needed for the same quantity of kilowatt-hours of energy output.

In addition, TEC will include BACT pollution control equipment to further reduce emissions per unit of fuel input. Combustion and post-combustion pollution controls will include low $NO_x$ burners, SCR, wet flue gas desulfurization (FGD), wet electrostatic precipitator (WESP), baghouse, and a zero liquid discharge. As a result, TEC will have very low emissions rates.

## E.8.6 Demonstrated Technology

Supercritical pulverized coal technology is a demonstrated technology that has been in commercial use for decades and has proven to be a reliable, baseload technology. Selection of a demonstrated technology is important to minimize risk to the City's customers. The use of supercritical pulverized coal, as a demonstrated technology, allows the Participants to achieve economies of scale inherent in larger generating units. Moreover, demonstrated technology is generally more favored by financing institutions and bond investors.

## E.8.7 Environmental Considerations

As described in Section A.5.0, CAIR and CAMR will require much of the United States, including the State of Florida, to make significant reductions in the emissions of $NO_x$, $SO_2$, and Hg. With high natural gas prices, coal fired facilities will likely be the most economical type of generation to meet capacity requirements for utilities throughout the CAIR region. Generally, conventional coal fired generation produces higher emissions of $NO_x$, $SO_2$, and Hg than natural gas or fuel oil generation. As a result of the planned pollution control measures to be implemented on TEC as listed above and described in more detail in Section A.3.0, the proposed TEC project is designed to have lower emissions of $NO_x$, $SO_2$, and Hg than other coal fired power plants currently in operation.

## E.8.8 Geographic Diversity

For the City, the other Participants, and the State of Florida as a whole, TEC will provide geographic diversity, because it will be constructed on a greenfield site. The greenfield site provides the City with additional baseload generation without increasing the concentration of its generation resources at one location. This diversity should increase the reliability and availability of generating resources, particularly if a hurricane or other extreme condition causes forced outages in a localized area.

# E.9.0 The City's Consequences of Delay

The proposed TEC is unique compared to the other supply-side alternatives considered in this analysis, because the project is significantly further along in the development process than the other options presented in Section A.6.0 and considered to meet the City's capacity and energy needs. As a result, the consequences of delaying the commercial operation of TEC are significant from an economic and reliability standpoint for the City. This section describes the negative consequences of delaying the TEC project.

## E.9.1 Economic Consequences

If the commercial operation of TEC is delayed by 1 year to May 1, 2013, the City will not be able to realize the economic benefit of the low cost, baseload energy from TEC and will need to secure capacity for an additional year to maintain its target 17 percent reserve margin. As a result, the City will need to continue to satisfy its demand and energy requirements with higher cost energy from natural gas and additional seasonal purchases. The capacity expansion plan, including TEC delayed 1 year until May 1, 2013, includes a seasonal purchases of 22 MW in 2011, a second seasonal purchase of 34 MW in 2012, and TEC as a committed resource beginning May 1, 2013. The summer seasonal purchases were modeled with an assumed energy cost of $160.09 per MWh (escalating at 2.5 percent annually) and a capacity cost of $7.50 per kW-month (with no escalation) in 2011 dollars. Following operation of TEC in May 2013, the remainder of the capacity expansion plan includes an LMS100 CT unit in 2016, and a second LMS100 CT unit in 2021. The CPWC of this plan is $4,324.4 million, which is about $4.4 million higher in CPWC over the planning period than the base case plan with TEC in 2012, presented in Section E.5.0. The CPWC of the plan with TEC delayed 1 year is still $148.2 million lower in cost than the lowest cost plan without TEC, presented in Section E.5.0.

## E.9.2 Reliability Consequences

If TEC is delayed and no additional seasonal purchase is made to meet the City's forecast capacity requirements in 2012, the City's reserve margin will fall to 13.7 percent. This will be 3.3 percent below the City's reserve criterion of 17 percent. Operation of the City's system below its reserve margin criteria will increase the probability that the City will not be able to serve its retail customers and will expose the customers to potentially high energy costs from capacity purchases. Additionally, the generating resources owned by the City will consist entirely of natural gas and hydroelectric generating units, with natural gas fired units comprising 98.5 percent of the capacity owned by the City in 2012. Continuing to rely so heavily on natural gas fired generating units will increase the probability that the City will not be able to satisfy its demand and energy requirements in the event of a natural gas supply disruption, which would have negative consequences from both an economic as well as a reliability standpoint.

## E.9.3 Consideration of the City's DSM Portfolio

Section E.7.0 discusses the DSM portfolio evaluated by the City and indicates that the peak demand savings associated with the DSM portfolio would defer the City's capacity requirements to 2016. The economic analysis of the DSM portfolio also indicates that although the need for capacity may be deferred, the addition of TEC in 2012 remains cost-effective because of its low cost baseload energy. If TEC is delayed 1 year until May 2013, the CPWC of the capacity expansion plan that includes both TEC and the DSM portfolio increases by approximately $3.8 million when compared to the capacity expansion plan that includes TEC in May 2012 and the DSM portfolio. These results further demonstrate that the addition of TEC in 2012 is economic for the City, and delaying its addition will have adverse consequences.

# E.10.0 The City's Financial Analysis

The City has multiple funding source options available that may be used to finance its share of the development and construction of the TEC. Given its 20.3 percent ownership stake in the project, the City will be responsible for financing an estimated $355.7 million of the total cost. These total costs include interest during construction, owner's costs, land acquisition, initial coal inventory, and a community contribution.

The City typically finances its capital projects using two funding sources. During preliminary design, engineering, and permitting, the City may draw on its working capital within the electric services fund. As the initial development concludes and construction commences, the City will need to initiate an electric system revenue bond issuance for long-term project funding. For large projects, such as a coal fired power plant, the City could expect to issue either fixed or a combination of fixed and floating rate revenue bonds, with terms of up to 30 years.

The City's electric system has credit ratings of A1 from Moody's Investors Service, AA- from Standard and Poor's, and AA- from Fitch. With its excellent credit rating, the City should expect that it will have no difficulties in obtaining bond financing for its construction share of TEC. As of September 30, 2005, the City's electric system had $179.1 million in outstanding long-term bonds. In addition, in early fiscal year 2006, the City's electric system issued $128.9 million of energy system revenue bonds.

The detailed financing for TEC is expected to result in debt service requirements less than the assumed debt service presented in the economic parameters in Section A.4.0.

# Appendix E.1 – The City's CPWC Summary Sheets

## Table E.1-1 Expansion Plan Economic Summary - With Taylor Energy Center in 2012 - High Fuel Prices

| Case Description | |
|---|---|
| Fuel Forecast: | Base Case |
| Load Forecast | Base Case |

| Economic Parameters | |
|---|---|
| CPW Discount Rate: | 5.0% |
| Final Capital Escalation Rate: | 2.5% |
| Base Year for CPW $ | 2006 |

| Financial Parameters | |
|---|---|
| Interest During Construction: | 5.00% |
| Fixed Charge Rate CT: (20 year) | 8.97% |
| Fixed Charge Rate CC: (25 year) | 7.92% |
| Fixed Charge Rate Coal: (30 year) | 7.25% |

| Generation Additions | | | | | |
|---|---|---|---|---|---|
| Unit Addition | 2006 Capital Cost ($1,000) | *Construction and* Development Period (months) | *Month/Day/Year* Installed (mm/dd/yy) | Installed Cost ($1,000) | Levelized Cost ($1,000) |
| TEC | NA | NA | 05/01/12 | 355,928 | 25,819 |
| 250 MW CFB | 566,000 | 44 | 05/01/16 | 763,461 | 55,381 |

| | Production Cost | | | | Capital Cost and Other Project Costs | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fuel and Energy | O&M | | *Total Production* | | | | | | | | Cumulative |
| Year | Cost ($1,000) | Variable ($1,000) | Fixed ($1,000) | *Cost ($1,000)* | Unit Capital Cost ($1,000) | Community Contribution ($1,000) | Transmission Charge ($1,000) | Seasonal Purchase ($1,000) | Ongoing Capex Cost ($1,000) | *Total Capital Cost ($1,000)* | Total System Cost ($1,000) | Present Worth Cost ($1,000) |
| 2006 | $269,078 | $5,352 | $0 | $274,430 | $0 | $0 | $0 | $0 | $0 | $0 | $274,430 | $274,430 |
| 2007 | $245,385 | $5,738 | $0 | $251,123 | $0 | $0 | $0 | $0 | $0 | $0 | $251,123 | $513,594 |
| 2008 | $223,520 | $6,867 | $0 | $230,387 | $0 | $0 | $0 | $0 | $0 | $0 | $230,387 | $722,562 |
| 2009 | $193,967 | $7,582 | $0 | $201,549 | $0 | $0 | $0 | $0 | $0 | $0 | $201,549 | $896,668 |
| 2010 | $177,270 | $8,041 | $0 | $185,311 | $0 | $0 | $0 | $0 | $0 | $0 | $185,311 | $1,049,124 |
| 2011 | $175,725 | $8,424 | $0 | $184,149 | $0 | $0 | $0 | $990 | $0 | $990 | $185,139 | $1,194,185 |
| 2012 | $165,389 | $7,732 | $2,869 | $175,989 | $17,283 | $508 | $1,483 | $0 | $309 | $19,583 | $195,572 | $1,340,124 |
| 2013 | $161,950 | $7,618 | $4,380 | $173,949 | $25,819 | $520 | $2,225 | $0 | $482 | $29,046 | $202,995 | $1,484,389 |
| 2014 | $172,739 | $7,957 | $4,490 | $185,187 | $25,819 | $533 | $2,225 | $0 | $504 | $29,081 | $214,268 | $1,629,413 |
| 2015 | $187,467 | $8,312 | $4,602 | $200,381 | $25,819 | $547 | $2,225 | $0 | $527 | $29,117 | $229,498 | $1,777,350 |
| 2016 | $164,634 | $10,692 | $12,932 | $188,257 | $62,891 | $560 | $2,225 | $0 | $550 | $66,226 | $254,484 | $1,933,581 |
| 2017 | $163,124 | $12,032 | $17,379 | $192,536 | $81,200 | $574 | $2,225 | $0 | $575 | $84,574 | $277,110 | $2,095,601 |
| 2018 | $174,129 | $12,532 | $17,814 | $204,475 | $81,200 | $589 | $2,225 | $0 | $601 | $84,615 | $289,090 | $2,256,577 |
| 2019 | $183,903 | $13,058 | $18,259 | $215,220 | $81,200 | $603 | $2,225 | $0 | $628 | $84,656 | $299.876 | $2.415.608 |
| 2020 | $199,721 | $13,736 | $18,716 | $232,172 | $81,200 | $618 | $2,225 | $0 | $656 | $84,700 | $316,872 | $2,575,650 |
| 2021 | $217,519 | $14,286 | $19,184 | $250,989 | $81,200 | $634 | $2,225 | $0 | $686 | $84,745 | $335,734 | $2,737,144 |
| 2022 | $229,249 | $14,886 | $19,663 | $263,798 | $81,200 | $650 | $2,225 | $0 | $717 | $84,791 | $348,590 | $2,896,837 |
| 2023 | $239,856 | $15,488 | $20,155 | $275,498 | $81,200 | $666 | $2,225 | $0 | $749 | $84,840 | $360,338 | $3,054,051 |
| 2024 | $258,448 | $16,124 | $20,659 | $295,231 | $81,200 | $683 | $2,225 | $0 | $783 | $84,890 | $380,121 | $3,211,999 |
| 2025 | $275,689 | $16,783 | $21,175 | $313,647 | $81,200 | $700 | $2,225 | $0 | $818 | $84,943 | $398,589 | $3,369,734 |
| 2026 | $287,239 | $17,203 | $21,704 | $326,146 | $81,200 | $717 | $2,225 | $0 | $855 | $84,997 | $411,143 | $3,524,690 |
| 2027 | $298,656 | $17,634 | $22,247 | $338,537 | $81,200 | $735 | $2,225 | $0 | $893 | $85,053 | $423,590 | $3,676,734 |
| 2028 | $312,425 | $18,075 | $22,803 | $353,303 | $81,200 | $753 | $2,225 | $0 | $933 | $85,112 | $438,415 | $3,826,607 |
| 2029 | $326,244 | $18,527 | $23,373 | $368,145 | $81,200 | $772 | $2,225 | $0 | $975 | $85,173 | $453,317 | $3,974,194 |
| 2030 | $340,611 | $18,991 | $23,958 | $383,559 | $81,200 | $792 | $2,225 | $0 | $1,019 | $85,236 | $468,795 | $4,119,552 |
| 2031 | $355,994 | $19,492 | $24,557 | $400,043 | $81,200 | $811 | $2,225 | $0 | $1,065 | $85,301 | $485,345 | $4,262,876 |
| 2032 | $371,872 | $19,981 | $25,171 | $417,023 | $81,200 | $832 | $2,225 | $0 | $1,113 | $85,370 | $502,392 | $4,404,169 |
| 2033 | $388,555 | $20,479 | $25,800 | $434,834 | $81,200 | $852 | $2,225 | $0 | $1,163 | $85,441 | $520,274 | $4,543,523 |
| 2034 | $406,541 | $20,993 | $26,445 | $453,978 | $81,200 | $874 | $2,225 | $0 | $1,215 | $85,514 | $539,493 | $4,681,145 |
| 2035 | $425,018 | $21,517 | $27,106 | $473,641 | $81,200 | $896 | $2,225 | $0 | $1,270 | $85,591 | $559,232 | $4,817,008 |

## Table E.1-2 Expansion Plan Economic Summary - Without Taylor Energy Center - High Fuel Prices

| Case Description | |
|---|---|
| Fuel Forecast: | Base Case |
| Load Forecast | Base Case |

| Economic Parameters | |
|---|---|
| CPW Discount Rate: | 5.0% |
| Final Capital Escalation Rate: | 2.5% |
| Base Year for CPW $ | 2006 |

| Financial Parameters | |
|---|---|
| Interest During Construction: | 5.00% |
| Fixed Charge Rate CT: (20 year) | 8.97% |
| Fixed Charge Rate CC: (25 year) | 7.92% |
| Fixed Charge Rate Coal: (30 year | 7.25% |

Generation Additions

| Unit Addition | 2006 Capital Cost ($1,000) | Construction and Development Period (months) | Month/Day/Year Installed (mm/dd/yy) | Installed Cost ($1,000) | Levelized Cost ($1,000) |
|---|---|---|---|---|---|
| GE LMS100 SC | 66,300 | 17 | 05/01/11 | 76,926 | 6,902 |
| 250 MW CFB | 566,000 | 44 | 05/01/16 | 763,461 | 55,381 |

| Year | Production Cost | | | | Capital Cost and Other Project Costs | | | | | | Total System Cost ($1,000) | Cumulative Present Worth Cost ($1,000) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fuel and Energy Cost ($1,000) | O&M Variable ($1,000) | O&M Fixed ($1,000) | *Total Production Cost ($1,000)* | Unit Capital Cost ($1,000) | Community Contribution ($1,000) | Transmission Charge ($1,000) | Seasonal Purchase ($1,000) | Ongoing Capex Cost ($1,000) | *Total Capital Cost ($1,000)* | | |
| 2006 | $269,078 | $5,352 | $0 | $274,430 | $0 | $0 | $0 | $0 | $0 | $0 | $274,430 | $274,430 |
| 2007 | $245,385 | $5,738 | $0 | $251,123 | $0 | $0 | $0 | $0 | $0 | $0 | $251,123 | $513,594 |
| 2008 | $223,520 | $6,867 | $0 | $230,387 | $0 | $0 | $0 | $0 | $0 | $0 | $230,387 | $722,562 |
| 2009 | $193,967 | $7,582 | $0 | $201,549 | $0 | $0 | $0 | $0 | $0 | $0 | $201,549 | $896,668 |
| 2010 | $177,270 | $8,041 | $0 | $185,311 | $0 | $0 | $0 | $0 | $0 | $0 | $185,311 | $1,049,124 |
| 2011 | $175,404 | $8,535 | $854 | $184,794 | $4,633 | $0 | $0 | $0 | $0 | $4,633 | $189,426 | $1,197,544 |
| 2012 | $185,583 | $8,906 | $1,305 | $195,794 | $6,902 | $0 | $0 | $0 | $0 | $6,902 | $202,696 | $1,348,799 |
| 2013 | $197,881 | $9,336 | $1,337 | $208,554 | $6,902 | $0 | $0 | $0 | $0 | $6,902 | $215,456 | $1,501,919 |
| 2014 | $210,933 | $9,732 | $1,371 | $222,036 | $6,902 | $0 | $0 | $0 | $0 | $6,902 | $228,937 | $1,656,873 |
| 2015 | $225,498 | $10,134 | $1,405 | $237,037 | $6,902 | $0 | $0 | $0 | $0 | $6,902 | $243,939 | $1,814,118 |
| 2016 | $195,121 | $12,573 | $9,655 | $217,348 | $43,974 | $0 | $0 | $0 | $0 | $43,974 | $261,322 | $1,974,547 |
| 2017 | $190,184 | $14,088 | $14,020 | $218,293 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $280,576 | $2,138,594 |
| 2018 | $203,074 | $14,646 | $14,371 | $232,091 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $294,374 | $2,302,513 |
| 2019 | $214,902 | $15,204 | $14,730 | $244,836 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $307,120 | $2,465,385 |
| 2020 | $235,513 | $16,168 | $15,098 | $266,780 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $329,063 | $2,631,584 |
| 2021 | $251,040 | $16,790 | $15,476 | $283,306 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $345,589 | $2,797,819 |
| 2022 | $265,906 | $17,434 | $15,863 | $299,202 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $361,486 | $2,963,419 |
| 2023 | $281,131 | $18,022 | $16,259 | $315,412 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $377,695 | $3,128,207 |
| 2024 | $300,086 | $18,727 | $16,666 | $335,479 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $397,762 | $3,293,485 |
| 2025 | $319,278 | $19,464 | $17,083 | $355,824 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $418,108 | $3,458,944 |
| 2026 | $333,348 | $19,950 | $17,510 | $370,808 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $433,091 | $3,622,172 |
| 2027 | $348,262 | $20,450 | $17,947 | $386,659 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $448,942 | $3,783,316 |
| 2028 | $363,758 | $20,962 | $18,396 | $403,116 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $465,399 | $3,942,413 |
| 2029 | $379,827 | $21,485 | $18,856 | $420,168 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $482,451 | $4,099,485 |
| 2030 | $396,882 | $22,024 | $19,327 | $438,233 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $500,516 | $4,254,679 |
| 2031 | $414,777 | $22,576 | $19,810 | $457,163 | $57,651 | $0 | $0 | $0 | $0 | $57,651 | $514,814 | $4,406,705 |
| 2032 | $433,542 | $23,141 | $20,306 | $476,988 | $55,381 | $0 | $0 | $0 | $0 | $55,381 | $532,370 | $4,556,429 |
| 2033 | $453,243 | $23,718 | $20,813 | $497,774 | $55,381 | $0 | $0 | $0 | $0 | $55,381 | $553,156 | $4,704,591 |
| 2034 | $474,027 | $24,331 | $21,334 | $519,692 | $55,381 | $0 | $0 | $0 | $0 | $55,381 | $575,073 | $4,851,288 |
| 2035 | $495,774 | $24,977 | $21,867 | $542,618 | $55,381 | $0 | $0 | $0 | $0 | $55,381 | $597,999 | $4,996,570 |

## Table E.1-3 Expansion Plan Economic Summary - With Taylor Energy Center in 2012 - Low Fuel Prices

| Case Description | |
|---|---|
| Fuel Forecast: | Base Case |
| Load Forecast | Base Case |

| Economic Parameters | |
|---|---|
| CPW Discount Rate: | 5.0% |
| Final Capital Escalation Rate: | 2.5% |
| Base Year for CPW $ | 2006 |

| Financial Parameters | |
|---|---|
| Interest During Construction: | 5.00% |
| Fixed Charge Rate CT: (20 year) | 8.97% |
| Fixed Charge Rate CC: (25 year) | 7.92% |
| Fixed Charge Rate Coal: (30 year) | 7.25% |

| Generation Additions | | | | | |
|---|---|---|---|---|---|
| Unit Addition | 2006 Capital Cost ($1,000) | Construction and Development Period (months) | Month/Day/Year Installed (mm/dd/yy) | Installed Cost ($1,000) | Levelized Cost ($1,000) |
| TEC | NA | NA | 05/01/12 | 354,487 | 25,714 |
| GE 7FA SC | 75,700 | 14 | 05/01/16 | 99,080 | 8,889 |

| | Production Cost | | | | Capital Cost and Other Project Costs | | | | | | | Cumulative |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fuel and | O&M | | *Total* | | | | | Ongoing | *Total* | Total | Present |
| | Energy | | | *Production* | Unit Capital | Community | Transmission | Seasonal | Capex | *Capital* | System | Worth |
| Year | Cost | Variable | Fixed | *Cost* | Cost | Contribution | Charge | Purchase | Cost | *Cost* | Cost | Cost |
| | ($1,000) | ($1,000) | ($1,000) | *($1,000)* | ($1,000) | ($1,000) | ($1,000) | ($1,000) | ($1,000) | *($1,000)* | ($1,000) | ($1,000) |
| 2006 | $180,688 | $5,356 | $0 | $186,044 | $0 | $0 | $0 | $0 | $0 | $0 | $186,044 | $186,044 |
| 2007 | $165,055 | $5,773 | $0 | $170,829 | $0 | $0 | $0 | $0 | $0 | $0 | $170,829 | $348,738 |
| 2008 | $150,843 | $6,979 | $0 | $157,822 | $0 | $0 | $0 | $0 | $0 | $0 | $157,822 | $491,887 |
| 2009 | $130,081 | $7,805 | $0 | $137,886 | $0 | $0 | $0 | $0 | $0 | $0 | $137,886 | $610,998 |
| 2010 | $119,127 | $8,184 | $0 | $127,312 | $0 | $0 | $0 | $0 | $0 | $0 | $127,312 | $715,738 |
| 2011 | $117,623 | $8,528 | $0 | $126,151 | $0 | $0 | $0 | $990 | $0 | $990 | $127,141 | $815,356 |
| 2012 | $114,565 | $7,828 | $2,869 | $125,262 | $17,213 | $508 | $1,483 | $0 | $309 | $19,513 | $144,774 | $923,389 |
| 2013 | $115,002 | $7,736 | $4,380 | $127,118 | $25,714 | $520 | $2,225 | $0 | $482 | $28,941 | $156,060 | $1,034,297 |
| 2014 | $122,911 | $8,103 | $4,490 | $135,504 | $25,714 | $533 | $2,225 | $0 | $504 | $28,976 | $164,481 | $1,145,624 |
| 2015 | $132,727 | $8,499 | $4,602 | $145,829 | $25,714 | $547 | $2,225 | $0 | $527 | $29,012 | $174,841 | $1,258,328 |
| 2016 | $137,869 | $9,179 | $5,749 | $152,796 | $31,665 | $560 | $2,225 | $0 | $550 | $35,000 | $187,796 | $1,373,619 |
| 2017 | $146,244 | $9,993 | $6,410 | $162,647 | $34,604 | $574 | $2,225 | $0 | $575 | $37,978 | $200,624 | $1,490,920 |
| 2018 | $154,319 | $10,480 | $6,571 | $171,370 | $34,604 | $589 | $2,225 | $0 | $601 | $38,018 | $209,388 | $1,607,515 |
| 2019 | $164,030 | $11,024 | $6,735 | $181,788 | $34,604 | $603 | $2,225 | $0 | $628 | $38,060 | $219,848 | $1,724,105 |
| 2020 | $174,059 | $11,577 | $6,903 | $192,540 | $34,604 | $618 | $2,225 | $0 | $656 | $38,103 | $230,643 | $1,840,596 |
| 2021 | $184,869 | $12,158 | $7,076 | $204,102 | $34,604 | $634 | $2,225 | $0 | $686 | $38,148 | $242,251 | $1,957,122 |
| 2022 | $194,761 | $12,708 | $7,253 | $214,721 | $34,604 | $650 | $2,225 | $0 | $717 | $38,195 | $252,916 | $2,072,986 |
| 2023 | $206,244 | $13,316 | $7,434 | $226,994 | $34,604 | $666 | $2,225 | $0 | $749 | $38,243 | $265,238 | $2,188,708 |
| 2024 | $219,704 | $13,952 | $7,620 | $241,275 | $34,604 | $683 | $2,225 | $0 | $783 | $38,294 | $279,569 | $2,304,875 |
| 2025 | $233,454 | $14,662 | $7,810 | $255,927 | $34,604 | $700 | $2,225 | $0 | $818 | $38,346 | $294,273 | $2,421,329 |
| 2026 | $242,933 | $15,029 | $8,006 | $265,968 | $34,604 | $717 | $2,225 | $0 | $855 | $38,400 | $304,369 | $2,536,042 |
| 2027 | $251,921 | $15,412 | $8,206 | $275,538 | $34,604 | $735 | $2,225 | $0 | $893 | $38,457 | $313,995 | $2,648,748 |
| 2028 | $263,250 | $15,797 | $8,411 | $287,458 | $34,604 | $753 | $2,225 | $0 | $933 | $38,515 | $325,974 | $2,760,182 |
| 2029 | $274,513 | $16,186 | $8,621 | $299,321 | $34,604 | $772 | $2,225 | $0 | $975 | $38,576 | $337,897 | $2,870,192 |
| 2030 | $286,261 | $16,586 | $8,837 | $311,683 | $34,604 | $792 | $2,225 | $0 | $1,019 | $38,639 | $350,323 | $2,978,815 |
| 2031 | $298,540 | $16,995 | $9,058 | $324,593 | $34,604 | $811 | $2,225 | $0 | $1,065 | $38,705 | $363,297 | $3,086,098 |
| 2032 | $311,400 | $17,414 | $9,284 | $338,098 | $34,604 | $832 | $2,225 | $0 | $1,113 | $38,773 | $376,871 | $3,192,089 |
| 2033 | $324,801 | $17,836 | $9,516 | $352,153 | $34,604 | $852 | $2,225 | $0 | $1,163 | $38,844 | $390,997 | $3,296,817 |
| 2034 | $338,846 | $18,275 | $9,754 | $366,875 | $34,604 | $874 | $2,225 | $0 | $1,215 | $38,918 | $405,793 | $3,400,332 |
| 2035 | $353,535 | $18,732 | $9,998 | $382,265 | $34,604 | $896 | $2,225 | $0 | $1,270 | $38,994 | $421,259 | $3,502,676 |

# Table E.1-4 Expansion Plan Economic Summary - Without Taylor Energy Center - Low Fuel Prices

| Case Description | |
|---|---|
| Fuel Forecast: | Base Case |
| Load Forecast | Base Case |

| Economic Parameters | |
|---|---|
| CPW Discount Rate: | 5.0% |
| Final Capital Escalation Rate: | 2.5% |
| Base Year for CPW $ | 2006 |

| Financial Parameters | |
|---|---|
| Interest During Construction: | 5.00% |
| Fixed Charge Rate CT: (20 year) | 8.97% |
| Fixed Charge Rate CC: (25 year) | 7.92% |
| Fixed Charge Rate Coal: (30 yeaı | 7.25% |

| Generation Additions | | | | | |
|---|---|---|---|---|---|
| Unit Addition | 2006 Capital Cost ($1,000) | Construction and Development Period (months) | Month/Day/Year Installed (mm/dd/yy) | Installed Cost ($1,000) | Levelized Cost ($1,000) |
| GE LMS100 SC | 66,300 | 17 | 05/01/11 | 76,926 | 6,902 |
| GE 7FA SC | 75,700 | 14 | 05/01/16 | 99,080 | 8,889 |
| GE LMS100 SC | 66,300 | 17 | 05/01/21 | 98,471 | 8,835 |

| | Production Cost | | | | Capital Cost and Other Project Costs | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fuel and Energy | O&M | | *Total* | | | | | Ongoing | *Total* | Total | Cumulative Present |
| | | | | *Production* | Unit Capital | Community | Transmission | Seasonal | Capex | *Capital* | System | Worth |
| Year | Cost ($1,000) | Variable ($1,000) | Fixed ($1,000) | *Cost ($1,000)* | Cost ($1,000) | Contribution ($1,000) | Charge ($1,000) | Purchase ($1,000) | Cost ($1,000) | *Cost ($1,000)* | Cost ($1,000) | Cost ($1,000) |
| 2006 | $180,688 | $5,356 | $0 | $186,044 | $0 | $0 | $0 | $0 | $0 | $0 | $186,044 | $186,044 |
| 2007 | $165,055 | $5,773 | $0 | $170,829 | $0 | $0 | $0 | $0 | $0 | $0 | $170,829 | $348,738 |
| 2008 | $150,843 | $6,979 | $0 | $157,822 | $0 | $0 | $0 | $0 | $0 | $0 | $157,822 | $491,887 |
| 2009 | $130,081 | $7,805 | $0 | $137,886 | $0 | $0 | $0 | $0 | $0 | $0 | $137,886 | $610,998 |
| 2010 | $119,127 | $8,184 | $0 | $127,312 | $0 | $0 | $0 | $0 | $0 | $0 | $127,312 | $715,738 |
| 2011 | $117,583 | $8,654 | $854 | $127,091 | $4,633 | $0 | $0 | $0 | $0 | $4,633 | $131,723 | $818,947 |
| 2012 | $124,194 | $9,040 | $1,305 | $134,539 | $6,902 | $0 | $0 | $0 | $0 | $6,902 | $141,440 | $924,492 |
| 2013 | $132,574 | $9,517 | $1,337 | $143,428 | $6,902 | $0 | $0 | $0 | $0 | $6,902 | $150,330 | $1,031,329 |
| 2014 | $141,187 | $9,951 | $1,371 | $152,508 | $6,902 | $0 | $0 | $0 | $0 | $6,902 | $159,410 | $1,139,224 |
| 2015 | $150,894 | $10,387 | $1,405 | $162,686 | $6,902 | $0 | $0 | $0 | $0 | $6,902 | $169,588 | $1,248,541 |
| 2016 | $157,639 | $11,304 | $2,472 | $171,415 | $12,852 | $0 | $0 | $0 | $0 | $12,852 | $184,268 | $1,361,666 |
| 2017 | $168,316 | $12,154 | $3,051 | $183,521 | $15,791 | $0 | $0 | $0 | $0 | $15,791 | $199,312 | $1,478,199 |
| 2018 | $179,266 | $12,764 | $3,128 | $195,158 | $15,791 | $0 | $0 | $0 | $0 | $15,791 | $210,949 | $1,595,664 |
| 2019 | $190,687 | $13,413 | $3,206 | $207,306 | $15,791 | $0 | $0 | $0 | $0 | $15,791 | $223,097 | $1,713,977 |
| 2020 | $202,311 | $14,071 | $3,286 | $219,668 | $15,791 | $0 | $0 | $0 | $0 | $15,791 | $235,459 | $1,832,900 |
| 2021 | $213,544 | $14,185 | $4,462 | $232,191 | $21,721 | $0 | $0 | $0 | $0 | $21,721 | $253,912 | $1,955,036 |
| 2022 | $226,124 | $14,589 | $5,122 | $245,835 | $24,626 | $0 | $0 | $0 | $0 | $24,626 | $270,461 | $2,078,937 |
| 2023 | $240,400 | $15,256 | $5,251 | $260,907 | $24,626 | $0 | $0 | $0 | $0 | $24,626 | $285,533 | $2,203,514 |
| 2024 | $255,426 | $15,957 | $5,382 | $276,764 | $24,626 | $0 | $0 | $0 | $0 | $24,626 | $301,390 | $2,328,748 |
| 2025 | $271,462 | $16,695 | $5,516 | $293,674 | $24,626 | $0 | $0 | $0 | $0 | $24,626 | $318,300 | $2,454,710 |
| 2026 | $283,551 | $17,113 | $5,654 | $306,318 | $24,626 | $0 | $0 | $0 | $0 | $24,626 | $330,944 | $2,579,440 |
| 2027 | $296,588 | $17,542 | $5,796 | $319,926 | $24,626 | $0 | $0 | $0 | $0 | $24,626 | $344,552 | $2,703,114 |
| 2028 | $310,121 | $17,982 | $5,940 | $334,043 | $24,626 | $0 | $0 | $0 | $0 | $24,626 | $358,669 | $2,825,725 |
| 2029 | $324,132 | $18,433 | $6,089 | $348,654 | $24,626 | $0 | $0 | $0 | $0 | $24,626 | $373,280 | $2,947,254 |
| 2030 | $339,104 | $18,895 | $6,241 | $364,240 | $24,626 | $0 | $0 | $0 | $0 | $24,626 | $388,866 | $3,067,829 |
| 2031 | $354,769 | $19,368 | $6,397 | $380,534 | $19,993 | $0 | $0 | $0 | $0 | $19,993 | $400,528 | $3,186,106 |
| 2032 | $371,164 | $19,854 | $6,557 | $397,575 | $17,724 | $0 | $0 | $0 | $0 | $17,724 | $415,299 | $3,302,905 |
| 2033 | $388,317 | $20,351 | $6,721 | $415,389 | $17,724 | $0 | $0 | $0 | $0 | $17,724 | $433,114 | $3,418,914 |
| 2034 | $406,251 | $20,861 | $6,889 | $434,002 | $17,724 | $0 | $0 | $0 | $0 | $17,724 | $451,726 | $3,534,146 |
| 2035 | $425,014 | $21,384 | $7,061 | $453,460 | $17,724 | $0 | $0 | $0 | $0 | $17,724 | $471,184 | $3,648,619 |

## Table E.1-5 Expansion Plan Economic Summary - With Taylor Energy Center in 2012 - High Load and Energy Growth

| Case Description | |
|---|---|
| Fuel Forecast: | Base Case |
| Load Forecast | Base Case |

| Economic Parameters | |
|---|---|
| CPW Discount Rate: | 5.0% |
| Final Capital Escalation Rate: | 2.5% |
| Base Year for CPW $ | 2006 |

| Financial Parameters | |
|---|---|
| Interest During Construction: | 5.00% |
| Fixed Charge Rate CT: (20 year) | 8.97% |
| Fixed Charge Rate CC: (25 year) | 7.92% |
| Fixed Charge Rate Coal: (30 year) | 7.25% |

| Generation Additions | | | | | |
|---|---|---|---|---|---|
| Unit Addition | 2006 Capital Cost ($1,000) | Construction and Development Period (months) | Month/Day/Year Installed (mm/dd/yy) | Installed Cost ($1,000) | Levelized Cost ($1,000) |
| GE 7FA SC | 75,700 | 14 | 05/01/07 | 79,332 | 7,118 |
| TEC | NA | NA | 05/01/12 | 355,739 | 25,805 |
| GE LM6000 SC | 40,500 | 12 | 05/01/23 | 62,881 | 5,642 |

| | Production Cost | | | | Capital Cost and Other Project Costs | | | | | | | Cumulative |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fuel and Energy | O&M | | *Total* | | | | | Ongoing | *Total* | Total | Present |
| Year | Cost ($1,000) | Variable ($1,000) | Fixed ($1,000) | *Production Cost ($1,000)* | Unit Capital Cost ($1,000) | Community Contribution ($1,000) | Transmission Charge ($1,000) | Seasonal Purchase ($1,000) | Capex Cost ($1,000) | *Capital Cost ($1,000)* | System Cost ($1,000) | Worth Cost ($1,000) |
| 2006 | $251,122 | $5,733 | $0 | $256,855 | $0 | $0 | $0 | $0 | $0 | $0 | $256,855 | $256,855 |
| 2007 | $249,537 | $7,668 | $826 | $258,031 | $4,778 | $0 | $0 | $0 | $0 | $4,778 | $262,808 | $507,149 |
| 2008 | $206,672 | $8,008 | $1,261 | $215,942 | $7,118 | $0 | $0 | $0 | $0 | $7,118 | $223,059 | $709,470 |
| 2009 | $178,171 | $9,031 | $1,293 | $188,494 | $7,118 | $0 | $0 | $0 | $0 | $7,118 | $195,612 | $878,447 |
| 2010 | $164,128 | $9,347 | $1,325 | $174,800 | $7,118 | $0 | $0 | $0 | $0 | $7,118 | $181,918 | $1,028,111 |
| 2011 | $162,309 | $9,921 | $1,358 | $173,588 | $7,118 | $0 | $0 | $0 | $0 | $7,118 | $180,705 | $1,169,699 |
| 2012 | $155,730 | $9,016 | $4,261 | $169,006 | $24,392 | $508 | $1,483 | $0 | $309 | $26,691 | $195,697 | $1,315,731 |
| 2013 | $154,397 | $8,715 | $5,807 | $168,919 | $32,923 | $520 | $2,225 | $0 | $482 | $36,150 | $205,069 | $1,461,470 |
| 2014 | $164,304 | $9,171 | $5,953 | $179,427 | $32,923 | $533 | $2,225 | $0 | $504 | $36,185 | $215,612 | $1,607,405 |
| 2015 | $177,006 | $9,585 | $6,101 | $192,693 | $32,923 | $547 | $2,225 | $0 | $527 | $36,221 | $228,914 | $1,754,965 |
| 2016 | $185,702 | $10,101 | $6,254 | $202,056 | $32,923 | $560 | $2,225 | $0 | $550 | $36,258 | $238,314 | $1,901,269 |
| 2017 | $196,357 | $11,048 | $6,410 | $213,815 | $32,923 | $574 | $2,225 | $0 | $575 | $36,297 | $250,112 | $2,047,504 |
| 2018 | $206,889 | $11,550 | $6,571 | $225,010 | $32,923 | $589 | $2,225 | $0 | $601 | $36,337 | $261,347 | $2,193,032 |
| 2019 | $220,727 | $12,129 | $6,735 | $239,590 | $32,923 | $603 | $2,225 | $0 | $628 | $36,379 | $275,969 | $2,339,384 |
| 2020 | $235,034 | $12,705 | $6,903 | $254,642 | $32,923 | $618 | $2,225 | $0 | $656 | $36,422 | $291,064 | $2,486,391 |
| 2021 | $248,951 | $13,345 | $7,076 | $269,371 | $32,923 | $634 | $2,225 | $0 | $686 | $36,467 | $305,838 | $2,633,505 |
| 2022 | $262,468 | $14,023 | $7,253 | $283,744 | $32,923 | $650 | $2,225 | $0 | $717 | $36,514 | $320,258 | $2,780,218 |
| 2023 | $277,949 | $14,292 | $8,529 | $300,770 | $36,710 | $666 | $2,225 | $0 | $749 | $40,349 | $341,119 | $2,929,048 |
| 2024 | $299,683 | $15,152 | $9,292 | $324,127 | $38,565 | $683 | $2,225 | $0 | $783 | $42,254 | $366,382 | $3,081,287 |
| 2025 | $318,196 | $15,844 | $9,524 | $343,564 | $38,565 | $700 | $2,225 | $0 | $818 | $42,307 | $385,871 | $3,233,989 |
| 2026 | $331,905 | $16,236 | $9,762 | $357,903 | $38,565 | $717 | $2,225 | $0 | $855 | $42,361 | $400,264 | $3,384,845 |
| 2027 | $345,213 | $16,642 | $10,006 | $371,862 | $38,565 | $735 | $2,225 | $0 | $893 | $42,417 | $414,279 | $3,533,547 |
| 2028 | $361,004 | $17,059 | $10,256 | $388,319 | $38,565 | $753 | $2,225 | $0 | $933 | $42,476 | $430,795 | $3,680,814 |
| 2029 | $376,910 | $17,486 | $10,513 | $404,909 | $38,565 | $772 | $2,225 | $0 | $975 | $42,537 | $447,446 | $3,826,490 |
| 2030 | $393,617 | $17,925 | $10,776 | $422,318 | $38,565 | $792 | $2,225 | $0 | $1,019 | $42,600 | $464,918 | $3,970,646 |
| 2031 | $411,071 | $18,374 | $11,045 | $440,490 | $38,565 | $811 | $2,225 | $0 | $1,065 | $42,666 | $483,156 | $4,113,323 |
| 2032 | $429,362 | $18,835 | $11,321 | $459,518 | $38,565 | $832 | $2,225 | $0 | $1,113 | $42,734 | $502,251 | $4,254,577 |
| 2033 | $448,524 | $19,307 | $11,604 | $479,435 | $38,565 | $852 | $2,225 | $0 | $1,163 | $42,805 | $522,240 | $4,394,458 |
| 2034 | $468,563 | $19,791 | $11,894 | $500,247 | $38,565 | $874 | $2,225 | $0 | $1,215 | $42,878 | $543,126 | $4,533,006 |
| 2035 | $489,556 | $20,287 | $12,192 | $522,034 | $38,565 | $896 | $2,225 | $0 | $1,270 | $42,955 | $564,989 | $4,670,268 |

# Table E.1-6 Expansion Plan Economic Summary - Without Taylor Energy Center - High Load and Energy Growth

| Case Description | |
|---|---|
| Fuel Forecast: | Base Case |
| Load Forecast | Base Case |

| Economic Parameters | |
|---|---|
| CPW Discount Rate: | 5.0% |
| Final Capital Escalation Rate: | 2.5% |
| Base Year for CPW $ | 2006 |

| Financial Parameters | |
|---|---|
| Interest During Construction: | 5.00% |
| Fixed Charge Rate CT: (20 year) | 8.97% |
| Fixed Charge Rate CC: (25 year) | 7.92% |
| Fixed Charge Rate Coal: (30 year | 7.25% |

| Generation Additions | | | | | |
|---|---|---|---|---|---|
| Unit Addition | 2006 Capital Cost ($1,000) | Construction and Development Period (months) | Month/Day/Year Installed (mm/dd/yy) | Installed Cost ($1,000) | Levelized Cost ($1,000) |
| GE LM6000 SC | 40,500 | 12 | 05/01/07 | 42,358 | 3,800 |
| GE LM6000 SC | 40,500 | 12 | 05/01/11 | 46,756 | 4,195 |
| 250 MW CFB | 566,000 | 44 | 05/01/15 | 744,807 | 54,028 |

| | Production Cost | | | | Capital Cost and Other Project Costs | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fuel and Energy Cost | O&M | | *Total Production Cost* | Unit Capital Cost | Community Contribution | Transmission Charge | Seasonal Purchase | Ongoing Capex Cost | *Total Capital Cost* | Total System Cost | Cumulative Present Worth Cost |
| Year | ($1,000) | Variable ($1,000) | Fixed ($1,000) | *($1,000)* | ($1,000) | ($1,000) | ($1,000) | ($1,000) | ($1,000) | *($1,000)* | ($1,000) | ($1,000) |
| 2006 | $251,122 | $5,733 | $0 | $256,855 | $0 | $0 | $0 | $0 | $0 | $0 | $256,855 | $256,855 |
| 2007 | $249,989 | $6,263 | $738 | $256,989 | $2,551 | $0 | $0 | $0 | $0 | $2,551 | $259,540 | $504,036 |
| 2008 | $207,286 | $7,456 | $1,126 | $215,869 | $3,800 | $0 | $0 | $0 | $0 | $3,800 | $219,669 | $703,282 |
| 2009 | $179,205 | $8,280 | $1,154 | $188,639 | $3,800 | $0 | $0 | $0 | $0 | $3,800 | $192,439 | $869,518 |
| 2010 | $163,957 | $8,782 | $1,183 | $173,922 | $3,800 | $0 | $0 | $0 | $0 | $3,800 | $177,722 | $1,015,730 |
| 2011 | $162,928 | $9,179 | $2,027 | $174,134 | $6,616 | $0 | $0 | $0 | $0 | $6,616 | $180,750 | $1,157,353 |
| 2012 | $173,235 | $9,558 | $2,486 | $185,279 | $7,995 | $0 | $0 | $0 | $0 | $7,995 | $193,275 | $1,301,578 |
| 2013 | $185,040 | $9,992 | $2,548 | $197,581 | $7,995 | $0 | $0 | $0 | $0 | $7,995 | $205,576 | $1,447,677 |
| 2014 | $196,630 | $10,422 | $2,612 | $209,663 | $7,995 | $0 | $0 | $0 | $0 | $7,995 | $217,659 | $1,594,997 |
| 2015 | $174,947 | $12,814 | $10,692 | $198,452 | $44,261 | $0 | $0 | $0 | $0 | $44,261 | $242,713 | $1,751,452 |
| 2016 | $171,336 | $14,132 | $14,983 | $200,451 | $62,024 | $0 | $0 | $0 | $0 | $62,024 | $262,475 | $1,912,588 |
| 2017 | $181,140 | $14,728 | $15,357 | $211,225 | $62,024 | $0 | $0 | $0 | $0 | $62,024 | $273,249 | $2,072,351 |
| 2018 | $191,846 | $15,295 | $15,741 | $222,881 | $62,024 | $0 | $0 | $0 | $0 | $62,024 | $284,905 | $2,230,997 |
| 2019 | $204,897 | $15,880 | $16,135 | $236,911 | $62,024 | $0 | $0 | $0 | $0 | $62,024 | $298,935 | $2,389,528 |
| 2020 | $216,862 | $16,489 | $16,538 | $249,888 | $62,024 | $0 | $0 | $0 | $0 | $62,024 | $311,912 | $2,547,065 |
| 2021 | $228,966 | $17,114 | $16,952 | $263,031 | $62,024 | $0 | $0 | $0 | $0 | $62,024 | $325,055 | $2,703,422 |
| 2022 | $240,923 | $17,764 | $17,375 | $276,062 | $62,024 | $0 | $0 | $0 | $0 | $62,024 | $338,086 | $2,858,303 |
| 2023 | $258,973 | $18,442 | $17,810 | $295,225 | $62,024 | $0 | $0 | $0 | $0 | $62,024 | $357,249 | $3,014,169 |
| 2024 | $283,379 | $19,630 | $18,255 | $321,264 | $62,024 | $0 | $0 | $0 | $0 | $62,024 | $383,287 | $3,173,433 |
| 2025 | $301,285 | $20,323 | $18,711 | $340,320 | $62,024 | $0 | $0 | $0 | $0 | $62,024 | $402,343 | $3,332,654 |
| 2026 | $313,634 | $20,832 | $19,179 | $353,645 | $62,024 | $0 | $0 | $0 | $0 | $62,024 | $415,668 | $3,489,315 |
| 2027 | $327,592 | $21,355 | $19,659 | $368,606 | $59,473 | $0 | $0 | $0 | $0 | $59,473 | $428,078 | $3,642,971 |
| 2028 | $341,702 | $21,889 | $20,150 | $383,741 | $58,223 | $0 | $0 | $0 | $0 | $58,223 | $441,964 | $3,794,056 |
| 2029 | $356,317 | $22,436 | $20,654 | $399,406 | $58,223 | $0 | $0 | $0 | $0 | $58,223 | $457,629 | $3,943,047 |
| 2030 | $371,834 | $22,998 | $21,170 | $416,002 | $58,223 | $0 | $0 | $0 | $0 | $58,223 | $474,225 | $4,090,089 |
| 2031 | $388,053 | $23,574 | $21,699 | $433,327 | $55,407 | $0 | $0 | $0 | $0 | $55,407 | $488,734 | $4,234,414 |
| 2032 | $405,032 | $24,164 | $22,242 | $451,438 | $54,028 | $0 | $0 | $0 | $0 | $54,028 | $505,466 | $4,376,571 |
| 2033 | $422,855 | $24,768 | $22,798 | $470,421 | $54,028 | $0 | $0 | $0 | $0 | $54,028 | $524,449 | $4,517,044 |
| 2034 | $441,527 | $25,395 | $23,368 | $490,290 | $54,028 | $0 | $0 | $0 | $0 | $54,028 | $544,318 | $4,655,896 |
| 2035 | $460,731 | $26,095 | $23,952 | $510,779 | $54,028 | $0 | $0 | $0 | $0 | $54,028 | $564,807 | $4,793,114 |

# Table E.1-7 Expansion Plan Economic Summary - With Taylor Energy Center in 2012 - Low Load and Energy Growth

| Case Description | |
|---|---|
| Fuel Forecast: | Base Case |
| Load Forecast | Base Case |

| Economic Parameters | |
|---|---|
| CPW Discount Rate: | 5.0% |
| Final Capital Escalation Rate: | 2.5% |
| Base Year for CPW $ | 2006 |

| Financial Parameters | |
|---|---|
| Interest During Construction: | 5.00% |
| Fixed Charge Rate CT: (20 year) | 8.97% |
| Fixed Charge Rate CC: (25 year) | 7.92% |
| Fixed Charge Rate Coal: (30 year) | 7.25% |

| Generation Additions | | | | | |
|---|---|---|---|---|---|
| Unit Addition | 2006 Capital Cost ($1,000) | Construction and Development Period (months) | Month/Day/Year Installed (mm/dd/yy) | Installed Cost ($1,000) | Levelized Cost ($1,000) |
| TEC | NA | NA | 05/01/12 | 355,739 | 25,805 |
| GE LMS100 SC | 66,300 | 17 | 05/01/17 | 89,210 | 8,004 |
| GE LM6000 SC | 40,500 | 12 | 05/01/24 | 64,456 | 5,783 |

| Year | Production Cost | | | | Capital Cost and Other Project Costs | | | | | | Total System Cost ($1,000) | Cumulative Present Worth Cost ($1,000) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fuel and Energy Cost ($1,000) | O&M Variable ($1,000) | O&M Fixed ($1,000) | *Total Production Cost ($1,000)* | Unit Capital Cost ($1,000) | Community Contribution ($1,000) | Transmission Charge ($1,000) | Seasonal Purchase ($1,000) | Ongoing Capex Cost ($1,000) | *Total Capital Cost ($1,000)* | | |
| 2006 | $218,340 | $5,031 | $0 | $223,370 | $0 | $0 | $0 | $0 | $0 | $0 | $223,370 | $223,370 |
| 2007 | $216,682 | $5,401 | $0 | $222,084 | $0 | $0 | $0 | $0 | $0 | $0 | $222,084 | $434,879 |
| 2008 | $182,925 | $6,454 | $0 | $189,379 | $0 | $0 | $0 | $0 | $0 | $0 | $189,379 | $606,651 |
| 2009 | $159,312 | $7,221 | $0 | $166,533 | $0 | $0 | $0 | $0 | $0 | $0 | $166,533 | $750,509 |
| 2010 | $145,738 | $7,657 | $0 | $153,395 | $0 | $0 | $0 | $0 | $0 | $0 | $153,395 | $876,708 |
| 2011 | $144,853 | $7,989 | $0 | $152,842 | $0 | $0 | $0 | $0 | $0 | $0 | $152,842 | $996,464 |
| 2012 | $136,746 | $7,250 | $2,869 | $146,865 | $17,274 | $508 | $1,483 | $0 | $309 | $19,574 | $166,438 | $1,120,663 |
| 2013 | $134,309 | $7,163 | $4,380 | $145,852 | $25,805 | $520 | $2,225 | $0 | $482 | $29,032 | $174,884 | $1,244,950 |
| 2014 | $142,852 | $7,507 | $4,490 | $154,849 | $25,805 | $533 | $2,225 | $0 | $504 | $29,067 | $183,916 | $1,369,431 |
| 2015 | $154,676 | $7,859 | $4,602 | $167,138 | $25,805 | $547 | $2,225 | $0 | $527 | $29,103 | $196,241 | $1,495,930 |
| 2016 | $162,361 | $8,197 | $4,717 | $175,275 | $25,805 | $560 | $2,225 | $0 | $550 | $29,140 | $204,415 | $1,621,423 |
| 2017 | $169,859 | $8,726 | $5,826 | $184,411 | $31,178 | $574 | $2,225 | $0 | $575 | $34,552 | $218,962 | $1,749,446 |
| 2018 | $178,279 | $9,151 | $6,469 | $193,899 | $33,809 | $589 | $2,225 | $0 | $601 | $37,223 | $231,123 | $1,878,143 |
| 2019 | $190,982 | $9,591 | $6,631 | $207,204 | $33,809 | $603 | $2,225 | $0 | $628 | $37,265 | $244,470 | $2,007,791 |
| 2020 | $203,145 | $10,064 | $6,797 | $220,005 | $33,809 | $618 | $2,225 | $0 | $656 | $37,308 | $257,313 | $2,137,752 |
| 2021 | $215,143 | $10,496 | $6,967 | $232,605 | $33,809 | $634 | $2,225 | $0 | $686 | $37,353 | $269,959 | $2,267,606 |
| 2022 | $226,616 | $10,984 | $7,141 | $244,741 | $33,809 | $650 | $2,225 | $0 | $717 | $37,400 | $282,141 | $2,396,858 |
| 2023 | $241,166 | $11,477 | $7,319 | $259,962 | $33,809 | $666 | $2,225 | $0 | $749 | $37,449 | $297,411 | $2,526,618 |
| 2024 | $259,489 | $12,556 | $8,624 | $280,669 | $37,680 | $683 | $2,225 | $0 | $783 | $41,370 | $322,039 | $2,660,432 |
| 2025 | $275,143 | $13,117 | $9,404 | $297,664 | $39,592 | $700 | $2,225 | $0 | $818 | $43,334 | $340,998 | $2,795,376 |
| 2026 | $286,913 | $13,447 | $9,639 | $309,998 | $39,592 | $717 | $2,225 | $0 | $855 | $43,389 | $353,387 | $2,928,564 |
| 2027 | $298,157 | $13,784 | $9,880 | $321,820 | $39,592 | $735 | $2,225 | $0 | $893 | $43,445 | $365,265 | $3,059,673 |
| 2028 | $311,803 | $14,130 | $10,127 | $336,060 | $39,592 | $753 | $2,225 | $0 | $933 | $43,504 | $379,563 | $3,189,427 |
| 2029 | $325,475 | $14,483 | $10,380 | $350,338 | $39,592 | $772 | $2,225 | $0 | $975 | $43,564 | $393,902 | $3,317,670 |
| 2030 | $339,801 | $14,847 | $10,639 | $365,287 | $39,592 | $792 | $2,225 | $0 | $1,019 | $43,628 | $408,915 | $3,444,461 |
| 2031 | $354,767 | $15,219 | $10,905 | $380,890 | $39,592 | $811 | $2,225 | $0 | $1,065 | $43,693 | $424,584 | $3,569,842 |
| 2032 | $370,452 | $15,600 | $11,178 | $397,230 | $39,592 | $832 | $2,225 | $0 | $1,113 | $43,761 | $440,991 | $3,693,867 |
| 2033 | $386,887 | $15,990 | $11,457 | $414,334 | $39,592 | $852 | $2,225 | $0 | $1,163 | $43,832 | $458,167 | $3,816,586 |
| 2034 | $404,072 | $16,391 | $11,744 | $432,207 | $39,592 | $874 | $2,225 | $0 | $1,215 | $43,906 | $476,113 | $3,938,039 |
| 2035 | $421,031 | $16,847 | $12,037 | $449,915 | $39,592 | $896 | $2,225 | $0 | $1,270 | $43,983 | $493,898 | $4,058,030 |

## Table E.1-8 Expansion Plan Economic Summary - Without Taylor Energy Center - Low Load and Energy Growth

| Case Description | |
|---|---|
| Fuel Forecast: | Base Case |
| Load Forecast | Base Case |

| Economic Parameters | |
|---|---|
| CPW Discount Rate: | 5.0% |
| Final Capital Escalation Rate: | 2.5% |
| Base Year for CPW $ | 2006 |

| Financial Parameters | |
|---|---|
| Interest During Construction: | 5.00% |
| Fixed Charge Rate CT: (20 year) | 8.97% |
| Fixed Charge Rate CC: (25 year) | 7.92% |
| Fixed Charge Rate Coal: (30 year | 7.25% |

| Generation Additions | | | | | |
|---|---|---|---|---|---|
| Unit Addition | 2006 Capital Cost ($1,000) | Construction and Development Period (months) | Month/Day/Year Installed (mm/dd/yy) | Installed Cost ($1,000) | Levelized Cost ($1,000) |
| GE LM6000 SC | 40,500 | 12 | 05/01/12 | 47,927 | 4,300 |
| 250 MW CFB | 566,000 | 44 | 05/01/15 | 744,807 | 54,028 |

| | Production Cost | | | | Capital Cost and Other Project Costs | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fuel and Energy | O&M | | *Total Production* | | | | | Ongoing | *Total* | Total | Cumulative Present |
| Year | Cost ($1,000) | Variable ($1,000) | Fixed ($1,000) | *Cost ($1,000)* | Unit Capital Cost ($1,000) | Community Contribution ($1,000) | Transmission Charge ($1,000) | Seasonal Purchase ($1,000) | Capex Cost ($1,000) | *Capital Cost ($1,000)* | System Cost ($1,000) | Worth Cost ($1,000) |
| 2006 | $218,340 | $5,031 | $0 | $223,370 | $0 | $0 | $0 | $0 | $0 | $0 | $223,370 | $223,370 |
| 2007 | $216,682 | $5,401 | $0 | $222,084 | $0 | $0 | $0 | $0 | $0 | $0 | $222,084 | $434,879 |
| 2008 | $182,925 | $6,454 | $0 | $189,379 | $0 | $0 | $0 | $0 | $0 | $0 | $189,379 | $606,651 |
| 2009 | $159,312 | $7,221 | $0 | $166,533 | $0 | $0 | $0 | $0 | $0 | $0 | $166,533 | $750,509 |
| 2010 | $145,738 | $7,657 | $0 | $153,395 | $0 | $0 | $0 | $0 | $0 | $0 | $153,395 | $876,708 |
| 2011 | $144,853 | $7,989 | $0 | $152,842 | $0 | $0 | $0 | $0 | $0 | $0 | $152,842 | $996,464 |
| 2012 | $154,588 | $8,353 | $834 | $163,776 | $2,878 | $0 | $0 | $0 | $0 | $2,878 | $166,654 | $1,120,824 |
| 2013 | $163,631 | $8,730 | $1,274 | $173,635 | $4,300 | $0 | $0 | $0 | $0 | $4,300 | $177,935 | $1,247,279 |
| 2014 | $173,800 | $9,108 | $1,306 | $184,214 | $4,300 | $0 | $0 | $0 | $0 | $4,300 | $188,514 | $1,374,872 |
| 2015 | $153,807 | $11,490 | $9,353 | $174,650 | $40,566 | $0 | $0 | $0 | $0 | $40,566 | $215,215 | $1,513,602 |
| 2016 | $149,862 | $12,787 | $13,610 | $176,260 | $58,328 | $0 | $0 | $0 | $0 | $58,328 | $234,588 | $1,657,619 |
| 2017 | $158,067 | $13,315 | $13,951 | $185,333 | $58,328 | $0 | $0 | $0 | $0 | $58,328 | $243,661 | $1,800,083 |
| 2018 | $167,544 | $13,834 | $14,300 | $195,678 | $58,328 | $0 | $0 | $0 | $0 | $58,328 | $254,006 | $1,941,523 |
| 2019 | $178,954 | $14,369 | $14,657 | $207,980 | $58,328 | $0 | $0 | $0 | $0 | $58,328 | $266,308 | $2,082,752 |
| 2020 | $189,371 | $14,923 | $15,023 | $219,317 | $58,328 | $0 | $0 | $0 | $0 | $58,328 | $277,645 | $2,222,981 |
| 2021 | $199,824 | $15,493 | $15,399 | $230,717 | $58,328 | $0 | $0 | $0 | $0 | $58,328 | $289,045 | $2,362,017 |
| 2022 | $210,067 | $16,084 | $15,784 | $241,935 | $58,328 | $0 | $0 | $0 | $0 | $58,328 | $300,263 | $2,499,571 |
| 2023 | $225,813 | $16,698 | $16,179 | $258,689 | $58,328 | $0 | $0 | $0 | $0 | $58,328 | $317,018 | $2,637,885 |
| 2024 | $249,776 | $17,783 | $16,583 | $284,142 | $58,328 | $0 | $0 | $0 | $0 | $58,328 | $342,470 | $2,780,188 |
| 2025 | $267,226 | $18,462 | $16,998 | $302,686 | $58,328 | $0 | $0 | $0 | $0 | $58,328 | $361,014 | $2,923,053 |
| 2026 | $278,062 | $18,927 | $17,423 | $314,412 | $58,328 | $0 | $0 | $0 | $0 | $58,328 | $372,740 | $3,063,535 |
| 2027 | $290,395 | $19,402 | $17,858 | $327,655 | $58,328 | $0 | $0 | $0 | $0 | $58,328 | $385,983 | $3,202,081 |
| 2028 | $301,178 | $19,925 | $18,305 | $339,407 | $58,328 | $0 | $0 | $0 | $0 | $58,328 | $397,736 | $3,338,047 |
| 2029 | $313,986 | $20,422 | $18,762 | $353,170 | $58,328 | $0 | $0 | $0 | $0 | $58,328 | $411,498 | $3,472,019 |
| 2030 | $327,581 | $20,933 | $19,231 | $367,745 | $58,328 | $0 | $0 | $0 | $0 | $58,328 | $426,073 | $3,604,130 |
| 2031 | $341,781 | $21,458 | $19,712 | $382,951 | $58,328 | $0 | $0 | $0 | $0 | $58,328 | $441,279 | $3,734,441 |
| 2032 | $356,652 | $21,994 | $20,205 | $398,851 | $55,450 | $0 | $0 | $0 | $0 | $55,450 | $454,301 | $3,862,209 |
| 2033 | $372,276 | $22,543 | $20,710 | $415,529 | $54,028 | $0 | $0 | $0 | $0 | $54,028 | $469,557 | $3,987,979 |
| 2034 | $388,588 | $23,109 | $21,228 | $432,924 | $54,028 | $0 | $0 | $0 | $0 | $54,028 | $486,953 | $4,112,198 |
| 2035 | $405,708 | $23,686 | $21,758 | $451,152 | $54,028 | $0 | $0 | $0 | $0 | $54,028 | $505,180 | $4,234,929 |

# Table E.1-9 Expansion Plan Economic Summary - With Taylor Energy Center in 2012 - High Capital Costs

| Case Description | |
|---|---|
| Fuel Forecast: | Base Case |
| Load Forecast | Base Case |

| Economic Parameters | |
|---|---|
| CPW Discount Rate: | 5.0% |
| Final Capital Escalation Rate: | 2.5% |
| Base Year for CPW $ | 2006 |

| Financial Parameters | |
|---|---|
| Interest During Construction: | 5.00% |
| Fixed Charge Rate CT: (20 year) | 8.97% |
| Fixed Charge Rate CC: (25 year) | 7.92% |
| Fixed Charge Rate Coal: (30 year) | 7.25% |

| Generation Additions | | | | | |
|---|---|---|---|---|---|
| Unit Addition | 2006 Capital Cost ($1,000) | Construction and Development Period (months) | Month/Day/Year Installed (mm/dd/yy) | Installed Cost ($1,000) | Levelized Cost ($1,000) |
| TEC | NA | NA | 05/01/12 | 426,887 | 30,966 |
| GE 7FA SC | 90,840 | 14 | 05/01/16 | 118,896 | 10,667 |

| | Production Cost | | | | Capital Cost and Other Project Costs | | | | | | | Cumulative |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fuel and Energy | O&M | | *Total Production* | | | | | Ongoing | *Total* | Total | Present Worth |
| Year | Cost ($1,000) | Variable ($1,000) | Fixed ($1,000) | *Cost ($1,000)* | Unit Capital Cost ($1,000) | Community Contribution ($1,000) | Transmission Charge ($1,000) | Seasonal Purchase ($1,000) | Capex Cost ($1,000) | *Capital Cost ($1,000)* | System Cost ($1,000) | Cost ($1,000) |
| 2006 | $232,683 | $5,346 | $0 | $238,029 | $0 | $0 | $0 | $0 | $0 | $0 | $238,029 | $238,029 |
| 2007 | $232,226 | $5,739 | $0 | $237,965 | $0 | $0 | $0 | $0 | $0 | $0 | $237,965 | $464,662 |
| 2008 | $193,920 | $6,872 | $0 | $200,791 | $0 | $0 | $0 | $0 | $0 | $0 | $200,791 | $646,785 |
| 2009 | $168,573 | $7,694 | $0 | $176,267 | $0 | $0 | $0 | $0 | $0 | $0 | $176,267 | $799,051 |
| 2010 | $154,375 | $8,148 | $0 | $162,523 | $0 | $0 | $0 | $0 | $0 | $0 | $162,523 | $932,760 |
| 2011 | $152,718 | $8,496 | $0 | $161,213 | $0 | $0 | $0 | $990 | $0 | $990 | $162,203 | $1,059,850 |
| 2012 | $145,934 | $7,789 | $2,869 | $156,592 | $20,729 | $508 | $1,483 | $0 | $309 | $23,028 | $179,620 | $1,193,886 |
| 2013 | $143,713 | $7,710 | $4,380 | $155,803 | $30,966 | $520 | $2,225 | $0 | $482 | $34,193 | $189,996 | $1,328,913 |
| 2014 | $152,920 | $8,073 | $4,490 | $165,483 | $30,966 | $533 | $2,225 | $0 | $504 | $34,228 | $199,711 | $1,464,085 |
| 2015 | $164,843 | $8,450 | $4,602 | $177,896 | $30,966 | $547 | $2,225 | $0 | $527 | $34,264 | $212,160 | $1,600,845 |
| 2016 | $172,799 | $9,135 | $5,749 | $187,684 | $38,107 | $560 | $2,225 | $0 | $550 | $41,442 | $229,126 | $1,741,508 |
| 2017 | $181,929 | $10,001 | $6,410 | $198,341 | $41,634 | $574 | $2,225 | $0 | $575 | $45,008 | $243,349 | $1,883,789 |
| 2018 | $191,820 | $10,485 | $6,571 | $208,875 | $41,634 | $589 | $2,225 | $0 | $601 | $45,048 | $253,923 | $2,025,183 |
| 2019 | $204,731 | $11,032 | $6,735 | $222,497 | $41,634 | $603 | $2,225 | $0 | $628 | $45,090 | $267,587 | $2,167,090 |
| 2020 | $218,249 | $11,583 | $6,903 | $236,735 | $41,634 | $618 | $2,225 | $0 | $656 | $45,133 | $281,868 | $2,309,453 |
| 2021 | $231,430 | $12,167 | $7,076 | $250,673 | $41,634 | $634 | $2,225 | $0 | $686 | $45,178 | $295,851 | $2,451,762 |
| 2022 | $243,848 | $12,719 | $7,253 | $263,820 | $41,634 | $650 | $2,225 | $0 | $717 | $45,225 | $309,044 | $2,593,339 |
| 2023 | $259,672 | $13,322 | $7,434 | $280,428 | $41,634 | $666 | $2,225 | $0 | $749 | $45,273 | $325,701 | $2,735,441 |
| 2024 | $281,843 | $14,371 | $7,620 | $303,834 | $41,634 | $683 | $2,225 | $0 | $783 | $45,323 | $349,157 | $2,880,523 |
| 2025 | $299,095 | $15,082 | $7,810 | $321,987 | $41,634 | $700 | $2,225 | $0 | $818 | $45,376 | $367,363 | $3,025,901 |
| 2026 | $311,914 | $15,449 | $8,006 | $335,369 | $41,634 | $717 | $2,225 | $0 | $855 | $45,430 | $380,799 | $3,169,420 |
| 2027 | $324,297 | $15,830 | $8,206 | $348,332 | $41,634 | $735 | $2,225 | $0 | $893 | $45,486 | $393,819 | $3,310,778 |
| 2028 | $339,103 | $16,214 | $8,411 | $363,729 | $41,634 | $753 | $2,225 | $0 | $933 | $45,545 | $409,274 | $3,450,688 |
| 2029 | $354,014 | $16,617 | $8,621 | $379,252 | $41,634 | $772 | $2,225 | $0 | $975 | $45,606 | $424,858 | $3,589,010 |
| 2030 | $369,652 | $17,028 | $8,837 | $395,516 | $41,634 | $792 | $2,225 | $0 | $1,019 | $45,669 | $441,185 | $3,725,807 |
| 2031 | $386,012 | $17,454 | $9,058 | $412,524 | $41,634 | $811 | $2,225 | $0 | $1,065 | $45,735 | $458,258 | $3,861,132 |
| 2032 | $402,923 | $17,954 | $9,284 | $430,162 | $41,634 | $832 | $2,225 | $0 | $1,113 | $45,803 | $475,965 | $3,994,993 |
| 2033 | $420,874 | $18,404 | $9,516 | $448,794 | $41,634 | $852 | $2,225 | $0 | $1,163 | $45,874 | $494,667 | $4,127,489 |
| 2034 | $439,646 | $18,865 | $9,754 | $468,265 | $41,634 | $874 | $2,225 | $0 | $1,215 | $45,947 | $514,212 | $4,258,661 |
| 2035 | $459,315 | $19,337 | $9,998 | $488,650 | $41,634 | $896 | $2,225 | $0 | $1,270 | $46,024 | $534,674 | $4,388,558 |

## Table E.1-10 Expansion Plan Economic Summary - Without Taylor Energy Center - High Capital Costs

| Case Description | |
|---|---|
| Fuel Forecast: | Base Case |
| Load Forecast | Base Case |

| Economic Parameters | |
|---|---|
| CPW Discount Rate: | 5.0% |
| Final Capital Escalation Rate: | 2.5% |
| Base Year for CPW $ | 2006 |

| Financial Parameters | |
|---|---|
| Interest During Construction: | 5.00% |
| Fixed Charge Rate CT: (20 year) | 8.97% |
| Fixed Charge Rate CC: (25 year) | 7.92% |
| Fixed Charge Rate Coal: (30 year | 7.25% |

| Generation Additions | | | | | |
|---|---|---|---|---|---|
| Unit Addition | 2006 Capital Cost ($1,000) | Construction and Development Period (months) | Month/Day/Year Installed (mm/dd/yy) | Installed Cost ($1,000) | Levelized Cost ($1,000) |
| GE LMS100 SC | 79,560 | 17 | 05/01/11 | 92,311 | 8,282 |
| 250 MW CFB | 679,200 | 44 | 05/01/16 | 916,154 | 66,458 |

| | Production Cost | | | | Capital Cost and Other Project Costs | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fuel and Energy | O&M | | *Total Production* | | | | | Ongoing | *Total* | Total | Cumulative Present |
| Year | Cost ($1,000) | Variable ($1,000) | Fixed ($1,000) | *Cost ($1,000)* | Unit Capital Cost ($1,000) | Community Contribution ($1,000) | Transmission Charge ($1,000) | Seasonal Purchase ($1,000) | Capex Cost ($1,000) | *Capital Cost ($1,000)* | System Cost ($1,000) | Worth Cost ($1,000) |
| 2006 | $232,683 | $5,346 | $0 | $238,029 | $0 | $0 | $0 | $0 | $0 | $0 | $238,029 | $238,029 |
| 2007 | $232,226 | $5,739 | $0 | $237,965 | $0 | $0 | $0 | $0 | $0 | $0 | $237,965 | $464,662 |
| 2008 | $193,920 | $6,872 | $0 | $200,791 | $0 | $0 | $0 | $0 | $0 | $0 | $200,791 | $646,785 |
| 2009 | $168,573 | $7,694 | $0 | $176,267 | $0 | $0 | $0 | $0 | $0 | $0 | $176,267 | $799,051 |
| 2010 | $154,375 | $8,148 | $0 | $162,523 | $0 | $0 | $0 | $0 | $0 | $0 | $162,523 | $932,760 |
| 2011 | $152,448 | $8,614 | $854 | $161,916 | $5,559 | $0 | $0 | $0 | $0 | $5,559 | $167,475 | $1,063,981 |
| 2012 | $161,186 | $9,007 | $1,305 | $171,498 | $8,282 | $0 | $0 | $0 | $0 | $8,282 | $179,780 | $1,198,136 |
| 2013 | $172,037 | $9,465 | $1,337 | $182,839 | $8,282 | $0 | $0 | $0 | $0 | $8,282 | $191,121 | $1,333,962 |
| 2014 | $183,161 | $9,888 | $1,371 | $194,419 | $8,282 | $0 | $0 | $0 | $0 | $8,282 | $202,702 | $1,471,158 |
| 2015 | $195,653 | $10,304 | $1,405 | $207,362 | $8,282 | $0 | $0 | $0 | $0 | $8,282 | $215,645 | $1,610,165 |
| 2016 | $172,425 | $12,699 | $9,655 | $194,778 | $52,769 | $0 | $0 | $0 | $0 | $52,769 | $247,547 | $1,762,137 |
| 2017 | $168,241 | $14,088 | $14,020 | $196,349 | $74,740 | $0 | $0 | $0 | $0 | $74,740 | $271,089 | $1,920,638 |
| 2018 | $178,224 | $14,645 | $14,371 | $207,240 | $74,740 | $0 | $0 | $0 | $0 | $74,740 | $281,980 | $2,077,655 |
| 2019 | $190,470 | $15,204 | $14,730 | $220,404 | $74,740 | $0 | $0 | $0 | $0 | $74,740 | $295,144 | $2,234,176 |
| 2020 | $201,422 | $15,784 | $15,098 | $232,305 | $74,740 | $0 | $0 | $0 | $0 | $74,740 | $307,045 | $2,389,254 |
| 2021 | $212,467 | $16,389 | $15,476 | $244,332 | $74,740 | $0 | $0 | $0 | $0 | $74,740 | $319,072 | $2,542,733 |
| 2022 | $223,463 | $17,015 | $15,863 | $256,341 | $74,740 | $0 | $0 | $0 | $0 | $74,740 | $331,081 | $2,694,405 |
| 2023 | $240,540 | $17,658 | $16,259 | $274,457 | $74,740 | $0 | $0 | $0 | $0 | $74,740 | $349,197 | $2,846,758 |
| 2024 | $264,140 | $18,726 | $16,666 | $299,532 | $74,740 | $0 | $0 | $0 | $0 | $74,740 | $374,272 | $3,002,276 |
| 2025 | $280,737 | $19,463 | $17,083 | $317,283 | $74,740 | $0 | $0 | $0 | $0 | $74,740 | $392,023 | $3,157,413 |
| 2026 | $292,160 | $19,949 | $17,510 | $329,618 | $74,740 | $0 | $0 | $0 | $0 | $74,740 | $404,358 | $3,309,811 |
| 2027 | $305,127 | $20,449 | $17,947 | $343,524 | $74,740 | $0 | $0 | $0 | $0 | $74,740 | $418,263 | $3,459,944 |
| 2028 | $318,217 | $20,961 | $18,396 | $357,574 | $74,740 | $0 | $0 | $0 | $0 | $74,740 | $432,314 | $3,607,730 |
| 2029 | $331,774 | $21,484 | $18,856 | $372,114 | $74,740 | $0 | $0 | $0 | $0 | $74,740 | $446,854 | $3,753,213 |
| 2030 | $346,166 | $22,023 | $19,327 | $387,516 | $74,740 | $0 | $0 | $0 | $0 | $74,740 | $462,256 | $3,896,543 |
| 2031 | $361,208 | $22,574 | $19,810 | $403,592 | $69,181 | $0 | $0 | $0 | $0 | $69,181 | $472,773 | $4,036,155 |
| 2032 | $376,952 | $23,139 | $20,306 | $420,397 | $66,458 | $0 | $0 | $0 | $0 | $66,458 | $486,855 | $4,173,078 |
| 2033 | $393,492 | $23,717 | $20,813 | $438,022 | $66,458 | $0 | $0 | $0 | $0 | $66,458 | $504,480 | $4,308,202 |
| 2034 | $410,766 | $24,312 | $21,334 | $456,412 | $66,458 | $0 | $0 | $0 | $0 | $66,458 | $522,869 | $4,441,583 |
| 2035 | $428,884 | $24,919 | $21,867 | $475,670 | $66,458 | $0 | $0 | $0 | $0 | $66,458 | $542,128 | $4,573,291 |

## Table E.1-11 Expansion Plan Economic Summary - With Taylor Energy Center in 2012 - Low Capital Costs

| Case Description | |
|---|---|
| Fuel Forecast: | Base Case |
| Load Forecast | Base Case |

| Economic Parameters | |
|---|---|
| CPW Discount Rate: | 5.0% |
| Final Capital Escalation Rate: | 2.5% |
| Base Year for CPW $ | 2006 |

| Financial Parameters | |
|---|---|
| Interest During Construction: | 5.00% |
| Fixed Charge Rate CT: (20 year) | 8.97% |
| Fixed Charge Rate CC: (25 year) | 7.92% |
| Fixed Charge Rate Coal: (30 year) | 7.25% |

| | Generation Additions | | | | |
|---|---|---|---|---|---|
| Unit Addition | 2006 Capital Cost ($1,000) | Construction and Development Period (months) | Month/Day/Year Installed (mm/dd/yy) | Installed Cost ($1,000) | Levelized Cost ($1,000) |
| TEC | NA | NA | 05/01/12 | 284,591 | 20,644 |
| 250 MW CFB | 452,800 | 44 | 05/01/16 | 610,769 | 44,305 |

| | Production Cost | | | | Capital Cost and Other Project Costs | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fuel and Energy | O&M | | *Total Production* | | | | | Ongoing | *Total* | Total | Cumulative Present |
| Year | Cost ($1,000) | Variable ($1,000) | Fixed ($1,000) | *Cost ($1,000)* | Unit Capital Cost ($1,000) | Community Contribution ($1,000) | Transmission Charge ($1,000) | Seasonal Purchase ($1,000) | Capex Cost ($1,000) | *Capital Cost ($1,000)* | System Cost ($1,000) | Worth Cost ($1,000) |
| 2006 | $232,683 | $5,346 | $0 | $238,029 | $0 | $0 | $0 | $0 | $0 | $0 | $238,029 | $238,029 |
| 2007 | $232,226 | $5,739 | $0 | $237,965 | $0 | $0 | $0 | $0 | $0 | $0 | $237,965 | $464,662 |
| 2008 | $193,920 | $6,872 | $0 | $200,791 | $0 | $0 | $0 | $0 | $0 | $0 | $200,791 | $646,785 |
| 2009 | $168,573 | $7,694 | $0 | $176,267 | $0 | $0 | $0 | $0 | $0 | $0 | $176,267 | $799,051 |
| 2010 | $154,375 | $8,148 | $0 | $162,523 | $0 | $0 | $0 | $0 | $0 | $0 | $162,523 | $932,760 |
| 2011 | $152,718 | $8,496 | $0 | $161,213 | $0 | $0 | $0 | $990 | $0 | $990 | $162,203 | $1,059,850 |
| 2012 | $145,934 | $7,789 | $2,869 | $156,592 | $13,819 | $508 | $1,483 | $0 | $309 | $16,119 | $172,711 | $1,188,730 |
| 2013 | $143,713 | $7,710 | $4,380 | $155,803 | $20,644 | $520 | $2,225 | $0 | $482 | $23,871 | $179,674 | $1,316,421 |
| 2014 | $152,920 | $8,073 | $4,490 | $165,483 | $20,644 | $533 | $2,225 | $0 | $504 | $23,906 | $189,389 | $1,444,606 |
| 2015 | $164,843 | $8,450 | $4,602 | $177,896 | $20,644 | $547 | $2,225 | $0 | $527 | $23,942 | $201,838 | $1,574,713 |
| 2016 | $147,334 | $10,757 | $12,932 | $171,023 | $50,302 | $560 | $2,225 | $0 | $550 | $53,637 | $224,661 | $1,712,635 |
| 2017 | $144,812 | $12,032 | $17,379 | $174,223 | $64,949 | $574 | $2,225 | $0 | $575 | $68,323 | $242,547 | $1,854,447 |
| 2018 | $151,682 | $12,532 | $17,814 | $182,028 | $64,949 | $589 | $2,225 | $0 | $601 | $68,364 | $250,392 | $1,993,875 |
| 2019 | $161,951 | $13,058 | $18,259 | $193,268 | $64,949 | $603 | $2,225 | $0 | $628 | $68,405 | $261,673 | $2,132,645 |
| 2020 | $171,411 | $13,608 | $18,716 | $203,735 | $64,949 | $618 | $2,225 | $0 | $656 | $68,449 | $272,183 | $2,270,116 |
| 2021 | $179,800 | $14,172 | $19,184 | $213,155 | $64,949 | $634 | $2,225 | $0 | $686 | $68,494 | $281,649 | $2,405,594 |
| 2022 | $187,226 | $14,750 | $19,663 | $221,639 | $64,949 | $650 | $2,225 | $0 | $717 | $68,540 | $290,180 | $2,538,529 |
| 2023 | $201,547 | $15,356 | $20,155 | $237,058 | $64,949 | $666 | $2,225 | $0 | $749 | $68,589 | $305,647 | $2,671,882 |
| 2024 | $225,538 | $16,124 | $20,659 | $262,320 | $64,949 | $683 | $2,225 | $0 | $783 | $68,639 | $330,959 | $2,809,402 |
| 2025 | $239,294 | $16,783 | $21,175 | $277,252 | $64,949 | $700 | $2,225 | $0 | $818 | $68,691 | $345,944 | $2,946,304 |
| 2026 | $248,443 | $17,201 | $21,704 | $287,349 | $64,949 | $717 | $2,225 | $0 | $855 | $68,746 | $356,095 | $3,080,512 |
| 2027 | $257,486 | $17,633 | $22,247 | $297,366 | $64,949 | $735 | $2,225 | $0 | $893 | $68,802 | $366,168 | $3,211,945 |
| 2028 | $268,570 | $18,073 | $22,803 | $309,447 | $64,949 | $753 | $2,225 | $0 | $933 | $68,861 | $378,307 | $3,341,270 |
| 2029 | $279,423 | $18,526 | $23,373 | $321,322 | $64,949 | $772 | $2,225 | $0 | $975 | $68,922 | $390,244 | $3,468,322 |
| 2030 | $290,801 | $18,989 | $23,958 | $333,748 | $64,949 | $792 | $2,225 | $0 | $1,019 | $68,985 | $402,733 | $3,593,196 |
| 2031 | $302,610 | $19,465 | $24,557 | $346,632 | $64,949 | $811 | $2,225 | $0 | $1,065 | $69,050 | $415,682 | $3,715,948 |
| 2032 | $315,076 | $19,952 | $25,171 | $360,199 | $64,949 | $832 | $2,225 | $0 | $1,113 | $69,119 | $429,317 | $3,836,690 |
| 2033 | $328,444 | $20,479 | $25,800 | $374,723 | $64,949 | $852 | $2,225 | $0 | $1,163 | $69,190 | $443,912 | $3,955,591 |
| 2034 | $342,167 | $20,991 | $26,445 | $389,603 | $64,949 | $874 | $2,225 | $0 | $1,215 | $69,263 | $458,866 | $4,072,645 |
| 2035 | $356,565 | $21,516 | $27,106 | $405,186 | $64,949 | $896 | $2,225 | $0 | $1,270 | $69,340 | $474,526 | $4,187,929 |

## Table E.1-12 Expansion Plan Economic Summary - Without Taylor Energy Center - Low Capital Costs

| Case Description | |
|---|---|
| Fuel Forecast: | Base Case |
| Load Forecast | Base Case |

| Economic Parameters | |
|---|---|
| CPW Discount Rate: | 5.0% |
| Final Capital Escalation Rate: | 2.5% |
| Base Year for CPW $ | 2006 |

| Financial Parameters | |
|---|---|
| Interest During Construction: | 5.00% |
| Fixed Charge Rate CT: (20 year) | 8.97% |
| Fixed Charge Rate CC: (25 year) | 7.92% |
| Fixed Charge Rate Coal: (30 year | 7.25% |

| Generation Additions | | | | | |
|---|---|---|---|---|---|
| Unit Addition | 2006 Capital Cost ($1,000) | Construction and Development Period (months) | Month/Day/Year Installed (mm/dd/yy) | Installed Cost ($1,000) | Levelized Cost ($1,000) |
| GE LMS100 SC | 53,040 | 17 | 05/01/11 | 61,541 | 5,521 |
| 250 MW CFB | 452,800 | 44 | 05/01/16 | 610,769 | 44,305 |

| | Production Cost | | | | Capital Cost and Other Project Costs | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fuel and Energy | O&M | | *Total Production* | Unit Capital | Community | Transmission | Seasonal | Ongoing Capex | *Total Capital* | Total System | Cumulative Present Worth |
| Year | Cost ($1,000) | Variable ($1,000) | Fixed ($1,000) | *Cost ($1,000)* | Cost ($1,000) | Contribution ($1,000) | Charge ($1,000) | Purchase ($1,000) | Cost ($1,000) | *Cost ($1,000)* | Cost ($1,000) | Cost ($1,000) |
| 2006 | $232,683 | $5,346 | $0 | $238,029 | $0 | $0 | $0 | $0 | $0 | $0 | $238,029 | $238,029 |
| 2007 | $232,226 | $5,739 | $0 | $237,965 | $0 | $0 | $0 | $0 | $0 | $0 | $237,965 | $464,662 |
| 2008 | $193,920 | $6,872 | $0 | $200,791 | $0 | $0 | $0 | $0 | $0 | $0 | $200,791 | $646,785 |
| 2009 | $168,573 | $7,694 | $0 | $176,267 | $0 | $0 | $0 | $0 | $0 | $0 | $176,267 | $799,051 |
| 2010 | $154,375 | $8,148 | $0 | $162,523 | $0 | $0 | $0 | $0 | $0 | $0 | $162,523 | $932,760 |
| 2011 | $152,448 | $8,614 | $854 | $161,916 | $3,706 | $0 | $0 | $0 | $0 | $3,706 | $165,622 | $1,062,529 |
| 2012 | $161,186 | $9,007 | $1,305 | $171,498 | $5,521 | $0 | $0 | $0 | $0 | $5,521 | $177,020 | $1,194,624 |
| 2013 | $172,037 | $9,465 | $1,337 | $182,839 | $5,521 | $0 | $0 | $0 | $0 | $5,521 | $188,360 | $1,328,488 |
| 2014 | $183,161 | $9,888 | $1,371 | $194,419 | $5,521 | $0 | $0 | $0 | $0 | $5,521 | $199,941 | $1,463,816 |
| 2015 | $195,653 | $10,304 | $1,405 | $207,362 | $5,521 | $0 | $0 | $0 | $0 | $5,521 | $212,884 | $1,601,043 |
| 2016 | $172,425 | $12,699 | $9,655 | $194,778 | $35,179 | $0 | $0 | $0 | $0 | $35,179 | $229,958 | $1,742,217 |
| 2017 | $168,241 | $14,088 | $14,020 | $196,349 | $49,827 | $0 | $0 | $0 | $0 | $49,827 | $246,176 | $1,886,151 |
| 2018 | $178,224 | $14,645 | $14,371 | $207,240 | $49,827 | $0 | $0 | $0 | $0 | $49,827 | $257,067 | $2,029,295 |
| 2019 | $190,470 | $15,204 | $14,730 | $220,404 | $49,827 | $0 | $0 | $0 | $0 | $49,827 | $270,230 | $2,172,604 |
| 2020 | $201,422 | $15,784 | $15,098 | $232,305 | $49,827 | $0 | $0 | $0 | $0 | $49,827 | $282,131 | $2,315,099 |
| 2021 | $212,467 | $16,389 | $15,476 | $244,332 | $49,827 | $0 | $0 | $0 | $0 | $49,827 | $294,158 | $2,456,595 |
| 2022 | $223,463 | $17,015 | $15,863 | $256,341 | $49,827 | $0 | $0 | $0 | $0 | $49,827 | $306,168 | $2,596,853 |
| 2023 | $240,540 | $17,658 | $16,259 | $274,457 | $49,827 | $0 | $0 | $0 | $0 | $49,827 | $324,284 | $2,738,337 |
| 2024 | $264,140 | $18,726 | $16,666 | $299,532 | $49,827 | $0 | $0 | $0 | $0 | $49,827 | $349,359 | $2,883,503 |
| 2025 | $280,737 | $19,463 | $17,083 | $317,283 | $49,827 | $0 | $0 | $0 | $0 | $49,827 | $367,109 | $3,028,781 |
| 2026 | $292,160 | $19,949 | $17,510 | $329,618 | $49,827 | $0 | $0 | $0 | $0 | $49,827 | $379,445 | $3,171,790 |
| 2027 | $305,127 | $20,449 | $17,947 | $343,524 | $49,827 | $0 | $0 | $0 | $0 | $49,827 | $393,350 | $3,312,980 |
| 2028 | $318,217 | $20,961 | $18,396 | $357,574 | $49,827 | $0 | $0 | $0 | $0 | $49,827 | $407,401 | $3,452,249 |
| 2029 | $331,774 | $21,484 | $18,856 | $372,114 | $49,827 | $0 | $0 | $0 | $0 | $49,827 | $421,940 | $3,589,621 |
| 2030 | $346,166 | $22,023 | $19,327 | $387,516 | $49,827 | $0 | $0 | $0 | $0 | $49,827 | $437,342 | $3,725,227 |
| 2031 | $361,208 | $22,574 | $19,810 | $403,592 | $46,120 | $0 | $0 | $0 | $0 | $46,120 | $449,713 | $3,858,028 |
| 2032 | $376,952 | $23,139 | $20,306 | $420,397 | $44,305 | $0 | $0 | $0 | $0 | $44,305 | $464,703 | $3,988,722 |
| 2033 | $393,492 | $23,717 | $20,813 | $438,022 | $44,305 | $0 | $0 | $0 | $0 | $44,305 | $482,327 | $4,117,912 |
| 2034 | $410,766 | $24,312 | $21,334 | $456,412 | $44,305 | $0 | $0 | $0 | $0 | $44,305 | $500,717 | $4,245,642 |
| 2035 | $428,884 | $24,919 | $21,867 | $475,670 | $44,305 | $0 | $0 | $0 | $0 | $44,305 | $519,975 | $4,371,968 |

## Table E.1-13 Expansion Plan Economic Summary - With Taylor Energy Center in 2012 - High Allowance Prices

| Case Description | |
|---|---|
| Fuel Forecast: | Base Case |
| Load Forecast | Base Case |

| Economic Parameters | |
|---|---|
| CPW Discount Rate: | 5.0% |
| Final Capital Escalation Rate: | 2.5% |
| Base Year for CPW $ | 2006 |

| Financial Parameters | |
|---|---|
| Interest During Construction: | 5.00% |
| Fixed Charge Rate CT: (20 year) | 8.97% |
| Fixed Charge Rate CC: (25 year) | 7.92% |
| Fixed Charge Rate Coal: (30 year) | 7.25% |

| Generation Additions | | | | | |
|---|---|---|---|---|---|
| Unit Addition | 2006 Capital Cost ($1,000) | Construction and Development Period (months) | Month/Day/Year Installed (mm/dd/yy) | Installed Cost ($1,000) | Levelized Cost ($1,000) |
| TEC | NA | NA | 05/01/12 | 355,739 | 25,805 |
| GE LMS100 SC | 66,300 | 17 | 05/01/16 | 87,038 | 7,809 |
| GE LMS100 SC | 66,300 | 17 | 05/01/21 | 98,471 | 8,835 |

| | Production Cost | | | | Capital Cost and Other Project Costs | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fuel and Energy | O&M | | *Total* | | | | | Ongoing | *Total* | Total | Cumulative Present |
| Year | Cost ($1,000) | Variable ($1,000) | Fixed ($1,000) | *Production Cost ($1,000)* | Unit Capital Cost ($1,000) | Community Contribution ($1,000) | Transmission Charge ($1,000) | Seasonal Purchase ($1,000) | Capex Cost ($1,000) | *Capital Cost ($1,000)* | System Cost ($1,000) | Worth Cost ($1,000) |
| 2006 | $232,683 | $5,346 | $0 | $238,029 | $0 | $0 | $0 | $0 | $0 | $0 | $238,029 | $238,029 |
| 2007 | $232,226 | $5,739 | $0 | $237,965 | $0 | $0 | $0 | $0 | $0 | $0 | $237,965 | $464,662 |
| 2008 | $193,920 | $6,872 | $0 | $200,791 | $0 | $0 | $0 | $0 | $0 | $0 | $200,791 | $646,785 |
| 2009 | $168,718 | $7,694 | $0 | $176,413 | $0 | $0 | $0 | $0 | $0 | $0 | $176,413 | $799,177 |
| 2010 | $154,587 | $8,150 | $0 | $162,736 | $0 | $0 | $0 | $0 | $0 | $0 | $162,736 | $933,061 |
| 2011 | $152,921 | $8,497 | $0 | $161,418 | $0 | $0 | $0 | $990 | $0 | $990 | $162,408 | $1,060,312 |
| 2012 | $146,457 | $7,790 | $2,869 | $157,116 | $17,274 | $508 | $1,483 | $0 | $309 | $19,574 | $176,689 | $1,192,161 |
| 2013 | $144,446 | $7,712 | $4,380 | $156,539 | $25,805 | $520 | $2,225 | $0 | $482 | $29,032 | $185,571 | $1,324,043 |
| 2014 | $153,637 | $8,075 | $4,490 | $166,201 | $25,805 | $533 | $2,225 | $0 | $504 | $29,067 | $195,268 | $1,456,208 |
| 2015 | $165,980 | $8,450 | $4,602 | $179,033 | $25,805 | $547 | $2,225 | $0 | $527 | $29,103 | $208,136 | $1,590,374 |
| 2016 | $173,281 | $8,869 | $5,684 | $187,834 | $31,033 | $560 | $2,225 | $0 | $550 | $34,368 | $222,202 | $1,726,787 |
| 2017 | $182,116 | $9,401 | $6,311 | $197,828 | $33,614 | $574 | $2,225 | $0 | $575 | $36,988 | $234,816 | $1,864,079 |
| 2018 | $191,766 | $9,875 | $6,469 | $208,111 | $33,614 | $589 | $2,225 | $0 | $601 | $37,029 | $245,140 | $2,000,582 |
| 2019 | $204,822 | $10,297 | $6,631 | $221,750 | $33,614 | $603 | $2,225 | $0 | $628 | $37,070 | $258,820 | $2,137,840 |
| 2020 | $218,687 | $11,268 | $6,797 | $236,752 | $33,614 | $618 | $2,225 | $0 | $656 | $37,114 | $273,865 | $2,276,161 |
| 2021 | $230,784 | $11,372 | $8,060 | $250,216 | $39,545 | $634 | $2,225 | $0 | $686 | $43,089 | $293,305 | $2,417,246 |
| 2022 | $242,751 | $11,855 | $8,811 | $263,417 | $42,449 | $650 | $2,225 | $0 | $717 | $46,040 | $309,458 | $2,559,012 |
| 2023 | $257,953 | $12,864 | $9,031 | $279,848 | $42,449 | $666 | $2,225 | $0 | $749 | $46,089 | $325,937 | $2,701,217 |
| 2024 | $277,224 | $13,483 | $9,257 | $299,964 | $42,449 | $683 | $2,225 | $0 | $783 | $46,139 | $346,103 | $2,845,030 |
| 2025 | $296,327 | $13,992 | $9,488 | $319,807 | $42,449 | $700 | $2,225 | $0 | $818 | $46,191 | $365,999 | $2,989,868 |
| 2026 | $307,998 | $14,423 | $9,726 | $332,147 | $42,449 | $717 | $2,225 | $0 | $855 | $46,246 | $378,392 | $3,132,480 |
| 2027 | $320,278 | $14,785 | $9,969 | $345,032 | $42,449 | $735 | $2,225 | $0 | $893 | $46,302 | $391,334 | $3,272,946 |
| 2028 | $335,038 | $15,155 | $10,218 | $360,411 | $42,449 | $753 | $2,225 | $0 | $933 | $46,361 | $406,772 | $3,412,001 |
| 2029 | $349,844 | $15,535 | $10,473 | $375,852 | $42,449 | $772 | $2,225 | $0 | $975 | $46,421 | $422,273 | $3,549,481 |
| 2030 | $365,375 | $15,925 | $10,735 | $392,035 | $42,449 | $792 | $2,225 | $0 | $1,019 | $46,485 | $438,519 | $3,685,452 |
| 2031 | $381,644 | $16,324 | $11,004 | $408,971 | $42,449 | $811 | $2,225 | $0 | $1,065 | $46,550 | $455,522 | $3,819,969 |
| 2032 | $398,670 | $16,733 | $11,279 | $426,681 | $42,449 | $832 | $2,225 | $0 | $1,113 | $46,618 | $473,300 | $3,953,080 |
| 2033 | $416,500 | $17,152 | $11,561 | $445,212 | $42,449 | $852 | $2,225 | $0 | $1,163 | $46,689 | $491,901 | $4,084,835 |
| 2034 | $435,202 | $17,582 | $11,850 | $464,633 | $42,449 | $874 | $2,225 | $0 | $1,215 | $46,763 | $511,396 | $4,215,289 |
| 2035 | $454,765 | $18,022 | $12,146 | $484,934 | $42,449 | $896 | $2,225 | $0 | $1,270 | $46,840 | $531,773 | $4,344,481 |

## Table E.1-14 Expansion Plan Economic Summary - Without Taylor Energy Center - High Allowance Prices

| Case Description | |
|---|---|
| Fuel Forecast: | Base Case |
| Load Forecast | Base Case |

| Economic Parameters | |
|---|---|
| CPW Discount Rate: | 5.0% |
| Final Capital Escalation Rate: | 2.5% |
| Base Year for CPW $ | 2006 |

| Financial Parameters | |
|---|---|
| Interest During Construction: | 5.00% |
| Fixed Charge Rate CT: (20 year) | 8.97% |
| Fixed Charge Rate CC: (25 year) | 7.92% |
| Fixed Charge Rate Coal: (30 yeai | 7.25% |

| Generation Additions | | | | | |
|---|---|---|---|---|---|
| Unit Addition | 2006 Capital Cost ($1,000) | Construction and Development Period (months) | Month/Day/Year Installed (mm/dd/yy) | Installed Cost ($1,000) | Levelized Cost ($1,000) |
| GE LMS100 SC | 66,300 | 17 | 05/01/11 | 76,926 | 6,902 |
| 250 MW CFB | 566,000 | 44 | 05/01/16 | 763,461 | 55,381 |

| | Production Cost | | | | Capital Cost and Other Project Costs | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fuel and Energy | O&M | | *Total Production* | | | | | | | | Cumulative Present |
| Year | Cost ($1,000) | Variable ($1,000) | Fixed ($1,000) | *Cost ($1,000)* | Unit Capital Cost ($1,000) | Community Contribution ($1,000) | Transmission Charge ($1,000) | Seasonal Purchase ($1,000) | Ongoing Capex Cost ($1,000) | *Total Capital Cost ($1,000)* | Total System Cost ($1,000) | Worth Cost ($1,000) |
| 2006 | $232,683 | $5,346 | $0 | $238,029 | $0 | $0 | $0 | $0 | $0 | $0 | $238,029 | $238,029 |
| 2007 | $232,226 | $5,739 | $0 | $237,965 | $0 | $0 | $0 | $0 | $0 | $0 | $237,965 | $464,662 |
| 2008 | $193,920 | $6,872 | $0 | $200,791 | $0 | $0 | $0 | $0 | $0 | $0 | $200,791 | $646,785 |
| 2009 | $168,718 | $7,694 | $0 | $176,413 | $0 | $0 | $0 | $0 | $0 | $0 | $176,413 | $799,177 |
| 2010 | $154,587 | $8,150 | $0 | $162,736 | $0 | $0 | $0 | $0 | $0 | $0 | $162,736 | $933,061 |
| 2011 | $152,649 | $8,615 | $854 | $162,119 | $4,633 | $0 | $0 | $0 | $0 | $4,633 | $166,751 | $1,063,715 |
| 2012 | $161,402 | $9,009 | $1,305 | $171,716 | $6,902 | $0 | $0 | $0 | $0 | $6,902 | $178,617 | $1,197,002 |
| 2013 | $172,262 | $9,467 | $1,337 | $183,066 | $6,902 | $0 | $0 | $0 | $0 | $6,902 | $189,968 | $1,332,009 |
| 2014 | $183,403 | $9,890 | $1,371 | $194,664 | $6,902 | $0 | $0 | $0 | $0 | $6,902 | $201,566 | $1,468,436 |
| 2015 | $196,055 | $10,305 | $1,405 | $207,766 | $6,902 | $0 | $0 | $0 | $0 | $6,902 | $214,667 | $1,606,813 |
| 2016 | $173,988 | $12,693 | $9,655 | $196,337 | $43,974 | $0 | $0 | $0 | $0 | $43,974 | $240,311 | $1,754,343 |
| 2017 | $170,040 | $14,088 | $14,020 | $198,148 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $260,431 | $1,906,612 |
| 2018 | $180,174 | $14,646 | $14,371 | $209,191 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $271,474 | $2,057,779 |
| 2019 | $192,871 | $15,205 | $14,730 | $222,806 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $285,090 | $2,208,968 |
| 2020 | $209,365 | $16,171 | $15,098 | $240,634 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $302,917 | $2,361,962 |
| 2021 | $215,208 | $16,391 | $15,476 | $247,075 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $309,358 | $2,510,768 |
| 2022 | $226,195 | $17,016 | $15,863 | $259,074 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $321,357 | $2,657,986 |
| 2023 | $249,031 | $18,022 | $16,259 | $283,313 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $345,596 | $2,808,768 |
| 2024 | $269,273 | $18,729 | $16,666 | $304,668 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $366,951 | $2,961,244 |
| 2025 | $285,901 | $19,465 | $17,083 | $322,449 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $384,733 | $3,113,496 |
| 2026 | $297,751 | $19,951 | $17,510 | $335,212 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $397,495 | $3,263,308 |
| 2027 | $311,139 | $20,452 | $17,947 | $349,538 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $411,821 | $3,411,128 |
| 2028 | $324,695 | $20,964 | $18,396 | $364,055 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $426,338 | $3,556,871 |
| 2029 | $338,700 | $21,487 | $18,856 | $379,044 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $441,327 | $3,700,555 |
| 2030 | $353,580 | $22,026 | $19,327 | $394,932 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $457,216 | $3,842,323 |
| 2031 | $369,147 | $22,577 | $19,810 | $411,535 | $57,651 | $0 | $0 | $0 | $0 | $57,651 | $469,186 | $3,980,875 |
| 2032 | $385,471 | $23,143 | $20,306 | $428,919 | $55,381 | $0 | $0 | $0 | $0 | $55,381 | $484,300 | $4,117,080 |
| 2033 | $402,607 | $23,720 | $20,813 | $447,140 | $55,381 | $0 | $0 | $0 | $0 | $55,381 | $502,522 | $4,251,679 |
| 2034 | $420,542 | $24,315 | $21,334 | $466,191 | $55,381 | $0 | $0 | $0 | $0 | $55,381 | $521,572 | $4,384,729 |
| 2035 | $439,355 | $24,923 | $21,867 | $486,144 | $55,381 | $0 | $0 | $0 | $0 | $55,381 | $541,526 | $4,516,291 |

# Table E.1-15 Expansion Plan Economic Summary - With Taylor Energy Center in 2012 - Low Allowance Prices

| Case Description | |
|---|---|
| Fuel Forecast: | Base Case |
| Load Forecast | Base Case |

| Economic Parameters | |
|---|---|
| CPW Discount Rate: | 5.0% |
| Final Capital Escalation Rate: | 2.5% |
| Base Year for CPW $ | 2006 |

| Financial Parameters | |
|---|---|
| Interest During Construction: | 5.00% |
| Fixed Charge Rate CT: (20 year) | 8.97% |
| Fixed Charge Rate CC: (25 year) | 7.92% |
| Fixed Charge Rate Coal: (30 year) | 7.25% |

| Generation Additions | | | | | |
|---|---|---|---|---|---|
| Unit Addition | 2006 Capital Cost ($1,000) | Construction and Development Period (months) | Month/Day/Year Installed (mm/dd/yy) | Installed Cost ($1,000) | Levelized Cost ($1,000) |
| TEC | NA | NA | 05/01/12 | 355,739 | 25,805 |
| 250 MW CFB | 566,000 | 44 | 05/01/16 | 763,461 | 55,381 |

| | Production Cost | | | | Capital Cost and Other Project Costs | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fuel and Energy | O&M | | *Total Production* | Unit Capital | Community | Transmission | Seasonal | Ongoing Capex | *Total Capital* | Total System | Cumulative Present Worth |
| Year | Cost ($1,000) | Variable ($1,000) | Fixed ($1,000) | *Cost ($1,000)* | Cost ($1,000) | Contribution ($1,000) | Charge ($1,000) | Purchase ($1,000) | Cost ($1,000) | *Cost ($1,000)* | Cost ($1,000) | Cost ($1,000) |
| 2006 | $232,683 | $5,346 | $0 | $238,029 | $0 | $0 | $0 | $0 | $0 | $0 | $238,029 | $238,029 |
| 2007 | $232,226 | $5,739 | $0 | $237,965 | $0 | $0 | $0 | $0 | $0 | $0 | $237,965 | $464,662 |
| 2008 | $193,920 | $6,872 | $0 | $200,791 | $0 | $0 | $0 | $0 | $0 | $0 | $200,791 | $646,785 |
| 2009 | $168,436 | $7,694 | $0 | $176,130 | $0 | $0 | $0 | $0 | $0 | $0 | $176,130 | $798,933 |
| 2010 | $154,173 | $8,147 | $0 | $162,320 | $0 | $0 | $0 | $0 | $0 | $0 | $162,320 | $932,474 |
| 2011 | $152,494 | $8,494 | $0 | $160,988 | $0 | $0 | $0 | $990 | $0 | $990 | $161,978 | $1,059,388 |
| 2012 | $145,393 | $7,787 | $2,869 | $156,049 | $17,274 | $508 | $1,483 | $0 | $309 | $19,574 | $175,622 | $1,190,440 |
| 2013 | $143,048 | $7,709 | $4,380 | $155,137 | $25,805 | $520 | $2,225 | $0 | $482 | $29,032 | $184,170 | $1,321,326 |
| 2014 | $152,183 | $8,072 | $4,490 | $164,744 | $25,805 | $533 | $2,225 | $0 | $504 | $29,067 | $193,811 | $1,452,506 |
| 2015 | $163,683 | $8,449 | $4,602 | $176,734 | $25,805 | $547 | $2,225 | $0 | $527 | $29,103 | $205,837 | $1,585,190 |
| 2016 | $145,149 | $10,756 | $12,932 | $168,837 | $62,878 | $560 | $2,225 | $0 | $550 | $66,213 | $235,050 | $1,729,490 |
| 2017 | $142,578 | $12,032 | $17,379 | $171,989 | $81,187 | $574 | $2,225 | $0 | $575 | $84,561 | $256,550 | $1,879,489 |
| 2018 | $149,219 | $12,532 | $17,814 | $179,565 | $81,187 | $589 | $2,225 | $0 | $601 | $84,601 | $264,166 | $2,026,587 |
| 2019 | $158,903 | $13,058 | $18,259 | $190,220 | $81,187 | $603 | $2,225 | $0 | $628 | $84,643 | $274,863 | $2,172,352 |
| 2020 | $167,809 | $13,608 | $18,716 | $200,133 | $81,187 | $618 | $2,225 | $0 | $656 | $84,686 | $284,819 | $2,316,205 |
| 2021 | $176,236 | $14,172 | $19,184 | $209,591 | $81,187 | $634 | $2,225 | $0 | $686 | $84,731 | $294,322 | $2,457,779 |
| 2022 | $183,720 | $14,750 | $19,663 | $218,133 | $81,187 | $650 | $2,225 | $0 | $717 | $84,778 | $302,911 | $2,596,546 |
| 2023 | $196,915 | $15,355 | $20,155 | $232,425 | $81,187 | $666 | $2,225 | $0 | $749 | $84,826 | $317,251 | $2,734,962 |
| 2024 | $212,801 | $15,999 | $20,659 | $249,458 | $81,187 | $683 | $2,225 | $0 | $783 | $84,877 | $334,335 | $2,873,885 |
| 2025 | $232,918 | $16,793 | $21,175 | $270,887 | $81,187 | $700 | $2,225 | $0 | $818 | $84,929 | $355,815 | $3,014,693 |
| 2026 | $241,072 | $17,201 | $21,704 | $279,977 | $81,187 | $717 | $2,225 | $0 | $855 | $84,983 | $364,960 | $3,152,243 |
| 2027 | $249,525 | $17,631 | $22,247 | $289,404 | $81,187 | $735 | $2,225 | $0 | $893 | $85,040 | $374,443 | $3,286,647 |
| 2028 | $259,993 | $18,072 | $22,803 | $300,869 | $81,187 | $753 | $2,225 | $0 | $933 | $85,098 | $385,967 | $3,418,589 |
| 2029 | $270,240 | $18,524 | $23,373 | $312,138 | $81,187 | $772 | $2,225 | $0 | $975 | $85,159 | $397,297 | $3,547,938 |
| 2030 | $280,970 | $18,988 | $23,958 | $323,916 | $81,187 | $792 | $2,225 | $0 | $1,019 | $85,222 | $409,138 | $3,674,799 |
| 2031 | $292,070 | $19,464 | $24,557 | $336,091 | $81,187 | $811 | $2,225 | $0 | $1,065 | $85,288 | $421,378 | $3,799,233 |
| 2032 | $303,801 | $19,951 | $25,171 | $348,923 | $81,187 | $832 | $2,225 | $0 | $1,113 | $85,356 | $434,279 | $3,921,370 |
| 2033 | $316,063 | $20,449 | $25,800 | $362,312 | $81,187 | $852 | $2,225 | $0 | $1,163 | $85,427 | $447,739 | $4,041,296 |
| 2034 | $328,892 | $20,961 | $26,445 | $376,298 | $81,187 | $874 | $2,225 | $0 | $1,215 | $85,501 | $461,799 | $4,159,098 |
| 2035 | $342,364 | $21,485 | $27,106 | $390,955 | $81,187 | $896 | $2,225 | $0 | $1,270 | $85,577 | $476,532 | $4,274,869 |

## Table E.1-16 Expansion Plan Economic Summary - Without Taylor Energy Center - Low Allowance Prices

| Case Description | |
|---|---|
| Fuel Forecast: | Base Case |
| Load Forecast | Base Case |

| Economic Parameters | |
|---|---|
| CPW Discount Rate: | 5.0% |
| Final Capital Escalation Rate: | 2.5% |
| Base Year for CPW $ | 2006 |

| Financial Parameters | |
|---|---|
| Interest During Construction: | 5.00% |
| Fixed Charge Rate CT: (20 year) | 8.97% |
| Fixed Charge Rate CC: (25 year) | 7.92% |
| Fixed Charge Rate Coal: (30 yeai | 7.25% |

| Generation Additions | | | | | |
|---|---|---|---|---|---|
| Unit Addition | 2006 Capital Cost ($1,000) | Construction and Development Period (months) | Month/Day/Year Installed (mm/dd/yy) | Installed Cost ($1,000) | Levelized Cost ($1,000) |
| GE LMS100 SC | 66,300 | 17 | 05/01/11 | 76,926 | 6,902 |
| 250 MW CFB | 566,000 | 44 | 05/01/16 | 763,461 | 55,381 |

| | Production Cost | | | | Capital Cost and Other Project Costs | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | O&M | | | | | | | | | | |
| Year | Fuel and Energy Cost ($1,000) | Variable ($1,000) | Fixed ($1,000) | *Total Production Cost ($1,000)* | Unit Capital Cost ($1,000) | Community Contribution ($1,000) | Transmission Charge ($1,000) | Seasonal Purchase ($1,000) | Ongoing Capex Cost ($1,000) | *Total Capital Cost ($1,000)* | Total System Cost ($1,000) | Cumulative Present Worth Cost ($1,000) |
| 2006 | $232,683 | $5,346 | $0 | $238,029 | $0 | $0 | $0 | $0 | $0 | $0 | $238,029 | $238,029 |
| 2007 | $232,226 | $5,739 | $0 | $237,965 | $0 | $0 | $0 | $0 | $0 | $0 | $237,965 | $464,662 |
| 2008 | $193,920 | $6,872 | $0 | $200,791 | $0 | $0 | $0 | $0 | $0 | $0 | $200,791 | $646,785 |
| 2009 | $168,436 | $7,694 | $0 | $176,130 | $0 | $0 | $0 | $0 | $0 | $0 | $176,130 | $798,933 |
| 2010 | $154,173 | $8,147 | $0 | $162,320 | $0 | $0 | $0 | $0 | $0 | $0 | $162,320 | $932,474 |
| 2011 | $152,226 | $8,612 | $854 | $161,692 | $4,633 | $0 | $0 | $0 | $0 | $4,633 | $166,325 | $1,062,794 |
| 2012 | $160,982 | $9,005 | $1,305 | $171,292 | $6,902 | $0 | $0 | $0 | $0 | $6,902 | $178,194 | $1,195,765 |
| 2013 | $171,816 | $9,463 | $1,337 | $182,616 | $6,902 | $0 | $0 | $0 | $0 | $6,902 | $189,518 | $1,330,452 |
| 2014 | $182,910 | $9,886 | $1,371 | $194,167 | $6,902 | $0 | $0 | $0 | $0 | $6,902 | $201,068 | $1,466,543 |
| 2015 | $195,222 | $10,301 | $1,405 | $206,928 | $6,902 | $0 | $0 | $0 | $0 | $6,902 | $213,830 | $1,604,380 |
| 2016 | $170,892 | $12,698 | $9,655 | $193,244 | $43,974 | $0 | $0 | $0 | $0 | $43,974 | $237,219 | $1,750,011 |
| 2017 | $166,442 | $14,088 | $14,020 | $194,551 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $256,834 | $1,900,177 |
| 2018 | $176,221 | $14,644 | $14,371 | $205,236 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $267,519 | $2,049,141 |
| 2019 | $188,079 | $15,203 | $14,730 | $218,012 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $280,295 | $2,197,788 |
| 2020 | $198,568 | $15,783 | $15,098 | $229,449 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $291,733 | $2,345,133 |
| 2021 | $209,688 | $16,388 | $15,476 | $241,551 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $303,835 | $2,491,282 |
| 2022 | $220,710 | $17,015 | $15,863 | $253,588 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $315,871 | $2,635,987 |
| 2023 | $236,975 | $17,641 | $16,259 | $270,875 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $333,158 | $2,781,342 |
| 2024 | $254,091 | $18,353 | $16,666 | $289,110 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $351,393 | $2,927,354 |
| 2025 | $275,322 | $19,458 | $17,083 | $311,862 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $374,146 | $3,075,416 |
| 2026 | $286,612 | $19,947 | $17,510 | $324,068 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $386,351 | $3,221,027 |
| 2027 | $299,133 | $20,447 | $17,947 | $337,527 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $399,810 | $3,364,536 |
| 2028 | $311,762 | $20,958 | $18,396 | $351,117 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $413,400 | $3,505,857 |
| 2029 | $324,860 | $21,482 | $18,856 | $365,198 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $427,481 | $3,645,033 |
| 2030 | $338,743 | $22,020 | $19,327 | $380,090 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $442,373 | $3,782,198 |
| 2031 | $353,262 | $22,571 | $19,810 | $395,644 | $57,651 | $0 | $0 | $0 | $0 | $57,651 | $453,295 | $3,916,058 |
| 2032 | $368,456 | $23,136 | $20,306 | $411,898 | $55,381 | $0 | $0 | $0 | $0 | $55,381 | $467,279 | $4,047,476 |
| 2033 | $384,352 | $23,713 | $20,813 | $428,878 | $55,381 | $0 | $0 | $0 | $0 | $55,381 | $484,260 | $4,177,184 |
| 2034 | $400,979 | $24,308 | $21,334 | $446,621 | $55,381 | $0 | $0 | $0 | $0 | $55,381 | $502,002 | $4,305,241 |
| 2035 | $418,419 | $24,915 | $21,867 | $465,201 | $55,381 | $0 | $0 | $0 | $0 | $55,381 | $520,583 | $4,431,715 |

## Table E.1-17 Expansion Plan Economic Summary - With Taylor Energy Center in 2012 - Regulated - $CO_2$

| Case Description | |
|---|---|
| Fuel Forecast: | Base Case |
| Load Forecast | Base Case |

| Economic Parameters | |
|---|---|
| CPW Discount Rate: | 5.0% |
| Final Capital Escalation Rate: | 2.5% |
| Base Year for CPW $ | 2006 |

| Financial Parameters | |
|---|---|
| Interest During Construction: | 5.00% |
| Fixed Charge Rate CT: (20 year) | 8.97% |
| Fixed Charge Rate CC: (25 year) | 7.92% |
| Fixed Charge Rate Coal: (30 year) | 7.25% |

| Generation Additions | | | | | |
|---|---|---|---|---|---|
| Unit Addition | 2006 Capital Cost ($1,000) | Construction and Development Period (months) | Month/Day/Year Installed (mm/dd/yy) | Installed Cost ($1,000) | Levelized Cost ($1,000) |
| TEC | NA | NA | 05/01/12 | 355,416 | 25,782 |
| GE 7FA SC | 75,700 | 14 | 05/01/16 | 99,080 | 8,889 |

| Year | Production Cost | | | | Capital Cost and Other Project Costs | | | | | | Total System Cost ($1,000) | Cumulative Present Worth Cost ($1,000) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fuel and Energy Cost ($1,000) | O&M Variable ($1,000) | O&M Fixed ($1,000) | *Total Production Cost ($1,000)* | Unit Capital Cost ($1,000) | Community Contribution ($1,000) | Transmission Charge ($1,000) | Seasonal Purchase ($1,000) | Ongoing Capex Cost ($1,000) | *Total Capital Cost ($1,000)* | | |
| 2006 | $224,752 | $5,346 | $0 | $230,098 | $0 | $0 | $0 | $0 | $0 | $0 | $230,098 | $230,098 |
| 2007 | $205,376 | $5,737 | $0 | $211,112 | $0 | $0 | $0 | $0 | $0 | $0 | $211,112 | $431,157 |
| 2008 | $186,997 | $6,876 | $0 | $193,873 | $0 | $0 | $0 | $0 | $0 | $0 | $193,873 | $607,006 |
| 2009 | $162,141 | $7,731 | $0 | $169,872 | $0 | $0 | $0 | $0 | $0 | $0 | $169,872 | $753,749 |
| 2010 | $148,178 | $8,154 | $0 | $156,332 | $0 | $0 | $0 | $0 | $0 | $0 | $156,332 | $882,363 |
| 2011 | $146,501 | $8,504 | $0 | $155,006 | $0 | $0 | $0 | $990 | $0 | $990 | $155,996 | $1,004,590 |
| 2012 | $149,024 | $7,786 | $2,869 | $159,679 | $17,258 | $508 | $1,483 | $0 | $309 | $19,558 | $179,236 | $1,138,339 |
| 2013 | $158,688 | $7,700 | $4,380 | $170,768 | $25,782 | $520 | $2,225 | $0 | $482 | $29,009 | $199,777 | $1,280,317 |
| 2014 | $174,849 | $8,042 | $4,490 | $187,380 | $25,782 | $533 | $2,225 | $0 | $504 | $29,044 | $216,424 | $1,426,801 |
| 2015 | $184,993 | $8,407 | $4,602 | $198,002 | $25,782 | $547 | $2,225 | $0 | $527 | $29,080 | $227,082 | $1,573,180 |
| 2016 | $193,801 | $9,075 | $5,749 | $208,625 | $31,732 | $560 | $2,225 | $0 | $550 | $35,068 | $243,693 | $1,722,786 |
| 2017 | $200,513 | $9,998 | $6,410 | $216,921 | $34,671 | $574 | $2,225 | $0 | $575 | $38,045 | $254,966 | $1,871,860 |
| 2018 | $190,419 | $10,480 | $6,571 | $207,469 | $34,671 | $589 | $2,225 | $0 | $601 | $38,085 | $245,555 | $2,008,594 |
| 2019 | $205,345 | $11,022 | $6,735 | $223,103 | $34,671 | $603 | $2,225 | $0 | $628 | $38,127 | $261,230 | $2,147,129 |
| 2020 | $214,854 | $11,577 | $6,903 | $233,333 | $34,671 | $618 | $2,225 | $0 | $656 | $38,171 | $271,504 | $2,284,257 |
| 2021 | $229,458 | $12,156 | $7,076 | $248,691 | $34,671 | $634 | $2,225 | $0 | $686 | $38,216 | $286,906 | $2,422,264 |
| 2022 | $253,701 | $12,710 | $7,253 | $273,664 | $34,671 | $650 | $2,225 | $0 | $717 | $38,262 | $311,926 | $2,565,161 |
| 2023 | $274,275 | $13,319 | $7,434 | $295,028 | $34,671 | $666 | $2,225 | $0 | $749 | $38,311 | $333,338 | $2,710,595 |
| 2024 | $286,635 | $13,936 | $7,620 | $308,191 | $34,671 | $683 | $2,225 | $0 | $783 | $38,361 | $346,552 | $2,854,595 |
| 2025 | $306,067 | $14,657 | $7,810 | $328,534 | $34,671 | $700 | $2,225 | $0 | $818 | $38,413 | $366,947 | $2,999,808 |
| 2026 | $318,675 | $15,013 | $8,006 | $341,694 | $34,671 | $717 | $2,225 | $0 | $855 | $38,468 | $380,161 | $3,143,087 |
| 2027 | $333,228 | $15,377 | $8,206 | $356,810 | $34,671 | $735 | $2,225 | $0 | $893 | $38,524 | $395,334 | $3,284,990 |
| 2028 | $350,352 | $15,761 | $8,411 | $374,524 | $34,671 | $753 | $2,225 | $0 | $933 | $38,583 | $413,106 | $3,426,210 |
| 2029 | $367,635 | $16,149 | $8,621 | $392,406 | $34,671 | $772 | $2,225 | $0 | $975 | $38,643 | $431,049 | $3,566,547 |
| 2030 | $385,762 | $16,554 | $8,837 | $411,153 | $34,671 | $792 | $2,225 | $0 | $1,019 | $38,707 | $449,860 | $3,706,034 |
| 2031 | $404,877 | $16,969 | $9,058 | $430,903 | $34,671 | $811 | $2,225 | $0 | $1,065 | $38,772 | $469,675 | $3,844,731 |
| 2032 | $425,061 | $17,393 | $9,284 | $451,738 | $34,671 | $832 | $2,225 | $0 | $1,113 | $38,841 | $490,579 | $3,982,701 |
| 2033 | $446,335 | $17,829 | $9,516 | $473,680 | $34,671 | $852 | $2,225 | $0 | $1,163 | $38,911 | $512,592 | $4,119,998 |
| 2034 | $468,809 | $18,275 | $9,754 | $496,838 | $34,671 | $874 | $2,225 | $0 | $1,215 | $38,985 | $535,823 | $4,256,683 |
| 2035 | $492,543 | $18,725 | $9,998 | $521,266 | $34,671 | $896 | $2,225 | $0 | $1,270 | $39,062 | $560,327 | $4,392,813 |

## Table E.1-18 Expansion Plan Economic Summary - Without Taylor Energy Center - Regulated - $CO_2$

| Case Description | |
|---|---|
| Fuel Forecast: | Base Case |
| Load Forecast | Base Case |

| Economic Parameters | |
|---|---|
| CPW Discount Rate: | 5.0% |
| Final Capital Escalation Rate: | 2.5% |
| Base Year for CPW $ | 2006 |

| Financial Parameters | |
|---|---|
| Interest During Construction: | 5.00% |
| Fixed Charge Rate CT: (20 year) | 8.97% |
| Fixed Charge Rate CC: (25 year) | 7.92% |
| Fixed Charge Rate Coal: (30 year | 7.25% |

| | Generation Additions | | | | |
|---|---|---|---|---|---|
| Unit Addition | 2006 Capital Cost ($1,000) | Construction and Development Period (months) | Month/Day/Year Installed (mm/dd/yy) | Installed Cost ($1,000) | Levelized Cost ($1,000) |
| GE LMS100 SC | 66,300 | 17 | 05/01/11 | 76,926 | 6,902 |
| 250 MW CFB | 566,000 | 44 | 05/01/16 | 763,461 | 55,381 |

| | Production Cost | | | | Capital Cost and Other Project Costs | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fuel and Energy | O&M | | *Total* | | | | | Ongoing | *Total* | Total | Cumulative Present |
| Year | Cost ($1,000) | Variable ($1,000) | Fixed ($1,000) | *Production Cost ($1,000)* | Unit Capital Cost ($1,000) | Community Contribution ($1,000) | Transmission Charge ($1,000) | Seasonal Purchase ($1,000) | Capex Cost ($1,000) | *Capital Cost ($1,000)* | System Cost ($1,000) | Worth Cost ($1,000) |
| 2006 | $224,752 | $5,346 | $0 | $230,098 | $0 | $0 | $0 | $0 | $0 | $0 | $230,098 | $230,098 |
| 2007 | $205,376 | $5,737 | $0 | $211,112 | $0 | $0 | $0 | $0 | $0 | $0 | $211,112 | $431,157 |
| 2008 | $186,997 | $6,876 | $0 | $193,873 | $0 | $0 | $0 | $0 | $0 | $0 | $193,873 | $607,006 |
| 2009 | $162,141 | $7,731 | $0 | $169,872 | $0 | $0 | $0 | $0 | $0 | $0 | $169,872 | $753,749 |
| 2010 | $148,178 | $8,154 | $0 | $156,332 | $0 | $0 | $0 | $0 | $0 | $0 | $156,332 | $882,363 |
| 2011 | $146,234 | $8,622 | $854 | $155,710 | $4,633 | $0 | $0 | $0 | $0 | $4,633 | $160,343 | $1,007,996 |
| 2012 | $161,508 | $9,003 | $1,305 | $171,816 | $6,902 | $0 | $0 | $0 | $0 | $6,902 | $178,718 | $1,141,358 |
| 2013 | $179,553 | $9,430 | $1,337 | $190,320 | $6,902 | $0 | $0 | $0 | $0 | $6,902 | $197,222 | $1,281,520 |
| 2014 | $194,690 | $9,814 | $1,371 | $205,875 | $6,902 | $0 | $0 | $0 | $0 | $6,902 | $212,777 | $1,425,536 |
| 2015 | $206,424 | $10,237 | $1,405 | $218,065 | $6,902 | $0 | $0 | $0 | $0 | $6,902 | $224,967 | $1,570,552 |
| 2016 | $194,696 | $12,490 | $9,655 | $216,841 | $43,974 | $0 | $0 | $0 | $0 | $43,974 | $260,815 | $1,730,669 |
| 2017 | $191,755 | $13,918 | $14,020 | $219,693 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $281,976 | $1,895,535 |
| 2018 | $177,405 | $14,642 | $14,371 | $206,418 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $268,701 | $2,045,158 |
| 2019 | $191,067 | $15,171 | $14,730 | $220,968 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $283,251 | $2,195,372 |
| 2020 | $197,425 | $15,765 | $15,098 | $228,288 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $290,572 | $2,342,130 |
| 2021 | $210,374 | $16,383 | $15,476 | $242,232 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $304,516 | $2,488,608 |
| 2022 | $235,218 | $16,979 | $15,863 | $268,061 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $330,344 | $2,639,942 |
| 2023 | $256,881 | $17,620 | $16,259 | $290,760 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $353,044 | $2,793,974 |
| 2024 | $266,026 | $18,329 | $16,666 | $301,021 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $363,304 | $2,944,934 |
| 2025 | $282,510 | $19,041 | $17,083 | $318,633 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $380,916 | $3,095,675 |
| 2026 | $292,837 | $19,517 | $17,510 | $329,864 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $392,147 | $3,243,472 |
| 2027 | $308,598 | $19,996 | $17,947 | $346,541 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $408,824 | $3,390,216 |
| 2028 | $323,823 | $20,496 | $18,396 | $362,714 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $424,998 | $3,535,501 |
| 2029 | $339,643 | $21,007 | $18,856 | $379,506 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $441,790 | $3,679,335 |
| 2030 | $356,340 | $21,533 | $19,327 | $397,200 | $62,283 | $0 | $0 | $0 | $0 | $62,283 | $459,484 | $3,821,807 |
| 2031 | $374,000 | $22,073 | $19,810 | $415,883 | $57,651 | $0 | $0 | $0 | $0 | $57,651 | $473,534 | $3,961,642 |
| 2032 | $392,684 | $22,625 | $20,306 | $435,615 | $55,381 | $0 | $0 | $0 | $0 | $55,381 | $490,996 | $4,099,730 |
| 2033 | $412,427 | $23,203 | $20,813 | $456,444 | $55,381 | $0 | $0 | $0 | $0 | $55,381 | $511,825 | $4,236,822 |
| 2034 | $433,420 | $23,774 | $21,334 | $478,527 | $55,381 | $0 | $0 | $0 | $0 | $55,381 | $533,909 | $4,373,019 |
| 2035 | $455,558 | $24,367 | $21,867 | $501,792 | $55,381 | $0 | $0 | $0 | $0 | $55,381 | $557,174 | $4,508,382 |

## Table E.1-19 Expansion Plan Economic Summary - With Joint 3x1 CC in 2012

| Case Description | |
|---|---|
| Fuel Forecast: | Base Case |
| Load Forecast | Base Case |

| Economic Parameters | |
|---|---|
| CPW Discount Rate: | 5.0% |
| Final Capital Escalation Rate: | 2.5% |
| Base Year for CPW $ | 2006 |

| Financial Parameters | |
|---|---|
| Interest During Construction: | 5.00% |
| Fixed Charge Rate CT: (20 year) | 8.97% |
| Fixed Charge Rate CC: (25 year) | 7.92% |
| Fixed Charge Rate Coal: (30 year) | 7.25% |

| | Generation Additions | | | | |
|---|---|---|---|---|---|
| Unit Addition | 2006 Capital Cost ($1,000) | Construction and Development Period (months) | Month/Day/Year Installed (mm/dd/yy) | Installed Cost ($1,000) | Levelized Cost ($1,000) |
| JOINT 3x1 7FA CC | 99,247 | 36 | 05/01/12 | 120,310 | 9,523 |
| 250 MW CFB | 566,000 | 44 | 05/01/17 | 782,512 | 56,763 |

| | Production Cost | | | | Capital Cost and Other Project Costs | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | O&M | | | | | | | | | | |
| Year | Fuel and Energy Cost ($1,000) | Variable ($1,000) | Fixed ($1,000) | *Total Production Cost ($1,000)* | Unit Capital Cost ($1,000) | Community Contribution ($1,000) | Transmission Charge ($1,000) | Seasonal Purchase ($1,000) | Ongoing Capex Cost ($1,000) | *Total Capital Cost ($1,000)* | Total System Cost ($1,000) | Cumulative Present Worth Cost ($1,000) |
| 2006 | $232,683 | $5,346 | $0 | $238,029 | $0 | $0 | $0 | $0 | $0 | $0 | $238,029 | $238,029 |
| 2007 | $232,226 | $5,739 | $0 | $237,965 | $0 | $0 | $0 | $0 | $0 | $0 | $237,965 | $464,662 |
| 2008 | $193,920 | $6,872 | $0 | $200,791 | $0 | $0 | $0 | $0 | $0 | $0 | $200,791 | $646,785 |
| 2009 | $168,573 | $7,694 | $0 | $176,267 | $0 | $0 | $0 | $0 | $0 | $0 | $176,267 | $799,051 |
| 2010 | $154,375 | $8,148 | $0 | $162,523 | $0 | $0 | $0 | $0 | $0 | $0 | $162,523 | $932,760 |
| 2011 | $152,718 | $8,496 | $0 | $161,213 | $0 | $0 | $0 | $990 | $0 | $990 | $162,203 | $1,059,850 |
| 2012 | $161,315 | $9,148 | $4,917 | $175,381 | $6,374 | $508 | $1,758 | $0 | $0 | $8,640 | $184,020 | $1,197,169 |
| 2013 | $169,654 | $9,682 | $7,353 | $186,688 | $9,523 | $520 | $2,637 | $0 | $0 | $12,680 | $199,368 | $1,338,856 |
| 2014 | $180,337 | $10,100 | $7,380 | $197,817 | $9,523 | $533 | $2,637 | $0 | $0 | $12,693 | $210,510 | $1,481,337 |
| 2015 | $192,005 | $10,596 | $7,408 | $210,010 | $9,523 | $547 | $2,637 | $0 | $0 | $12,706 | $222,715 | $1,624,902 |
| 2016 | $203,177 | $11,022 | $7,437 | $221,637 | $9,523 | $560 | $2,637 | $0 | $0 | $12,720 | $234,356 | $1,768,776 |
| 2017 | $182,750 | $13,507 | $15,887 | $212,144 | $47,624 | $574 | $2,637 | $0 | $0 | $50,835 | $262,979 | $1,922,534 |
| 2018 | $179,959 | $14,917 | $20,355 | $215,231 | $66,286 | $589 | $2,637 | $0 | $0 | $69,511 | $284,742 | $2,081,089 |
| 2019 | $191,950 | $15,508 | $20,708 | $228,165 | $66,286 | $603 | $2,637 | $0 | $0 | $69,526 | $297,691 | $2,238,961 |
| 2020 | $203,288 | $16,108 | $21,069 | $240,465 | $66,286 | $618 | $2,637 | $0 | $0 | $69,541 | $310,006 | $2,395,535 |
| 2021 | $214,632 | $16,708 | $21,439 | $252,779 | $66,286 | $634 | $2,637 | $0 | $0 | $69,557 | $322,335 | $2,550,584 |
| 2022 | $226,053 | $17,362 | $21,819 | $265,234 | $66,286 | $650 | $2,637 | $0 | $0 | $69,572 | $334,806 | $2,703,963 |
| 2023 | $243,461 | $18,038 | $22,208 | $283,707 | $66,286 | $666 | $2,637 | $0 | $0 | $69,589 | $353,296 | $2,858,105 |
| 2024 | $264,922 | $18,719 | $22,607 | $306,248 | $66,286 | $683 | $2,637 | $0 | $0 | $69,605 | $375,854 | $3,014,280 |
| 2025 | $280,547 | $19,440 | $23,016 | $323,003 | $66,286 | $700 | $2,637 | $0 | $0 | $69,622 | $392,625 | $3,169,655 |
| 2026 | $291,979 | $19,925 | $23,435 | $335,340 | $66,286 | $717 | $2,637 | $0 | $0 | $69,640 | $404,980 | $3,322,287 |
| 2027 | $304,955 | $20,425 | $23,865 | $349,245 | $66,286 | $735 | $2,637 | $0 | $0 | $69,658 | $418,903 | $3,472,649 |
| 2028 | $318,056 | $20,937 | $24,305 | $363,299 | $66,286 | $753 | $2,637 | $0 | $0 | $69,676 | $432,975 | $3,620,662 |
| 2029 | $331,620 | $21,460 | $24,756 | $377,836 | $66,286 | $772 | $2,637 | $0 | $0 | $69,695 | $447,531 | $3,766,365 |
| 2030 | $346,022 | $21,998 | $25,219 | $393,239 | $66,286 | $792 | $2,637 | $0 | $0 | $69,714 | $462,953 | $3,909,912 |
| 2031 | $361,077 | $22,549 | $25,693 | $409,319 | $66,286 | $811 | $2,637 | $0 | $0 | $69,734 | $479,053 | $4,051,378 |
| 2032 | $376,833 | $23,114 | $26,179 | $426,126 | $66,286 | $832 | $2,637 | $0 | $0 | $69,754 | $495,880 | $4,190,839 |
| 2033 | $393,388 | $23,691 | $26,677 | $443,757 | $66,286 | $852 | $2,637 | $0 | $0 | $69,775 | $513,532 | $4,328,388 |
| 2034 | $410,677 | $24,286 | $27,188 | $462,151 | $66,286 | $874 | $2,637 | $0 | $0 | $69,796 | $531,947 | $4,464,084 |
| 2035 | $428,716 | $24,891 | $27,711 | $481,318 | $66,286 | $896 | $2,637 | $0 | $0 | $69,818 | $551,137 | $4,597,981 |

## Table E.1-20 Expansion Plan Economic Summary - With Joint IGCC in 2012

| Case Description | |
|---|---|
| Fuel Forecast: | Base Case |
| Load Forecast | Base Case |

| Economic Parameters | |
|---|---|
| CPW Discount Rate: | 5.0% |
| Final Capital Escalation Rate: | 2.5% |
| Base Year for CPW $ | 2006 |

| Financial Parameters | |
|---|---|
| Interest During Construction: | 5.00% |
| Fixed Charge Rate CT: (20 year) | 8.97% |
| Fixed Charge Rate CC: (25 year) | 7.92% |
| Fixed Charge Rate Coal: (30 year) | 7.25% |

| Generation Additions | | | | | |
|---|---|---|---|---|---|
| Unit Addition | 2006 Capital Cost ($1,000) | Construction and Development Period (months) | Month/Day/Year Installed (mm/dd/yy) | Installed Cost ($1,000) | Levelized Cost ($1,000) |
| JOINT IGCC | 397,636 | 53 | 05/01/12 | 490,327 | 35,568 |
| GE LMS100 SC | 66,300 | 17 | 05/01/16 | 87,038 | 7,809 |
| GE LM6000 SC | 40,500 | 12 | 05/01/22 | 61,347 | 5,504 |

| | Production Cost | | | | Capital Cost and Other Project Costs | | | | | | | Cumulative |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | Fuel and Energy Cost ($1,000) | O&M Variable ($1,000) | O&M Fixed ($1,000) | *Total Production Cost ($1,000)* | Unit Capital Cost ($1,000) | Community Contribution ($1,000) | Transmission Charge ($1,000) | Seasonal Purchase ($1,000) | Ongoing Capex Cost ($1,000) | *Total Capital Cost ($1,000)* | Total System Cost ($1,000) | Present Worth Cost ($1,000) |
| 2006 | $232,683 | $5,346 | $0 | $238,029 | $0 | $0 | $0 | $0 | $0 | $0 | $238,029 | $238,029 |
| 2007 | $232,226 | $5,739 | $0 | $237,965 | $0 | $0 | $0 | $0 | $0 | $0 | $237,965 | $464,662 |
| 2008 | $193,920 | $6,872 | $0 | $200,791 | $0 | $0 | $0 | $0 | $0 | $0 | $200,791 | $646,785 |
| 2009 | $168,573 | $7,694 | $0 | $176,267 | $0 | $0 | $0 | $0 | $0 | $0 | $176,267 | $799,051 |
| 2010 | $154,375 | $8,148 | $0 | $162,523 | $0 | $0 | $0 | $0 | $0 | $0 | $162,523 | $932,760 |
| 2011 | $152,718 | $8,496 | $0 | $161,213 | $0 | $0 | $0 | $990 | $0 | $990 | $162,203 | $1,059,850 |
| 2012 | $135,338 | $12,501 | $5,244 | $153,083 | $23,809 | $508 | $1,686 | $0 | $0 | $26,002 | $179,085 | $1,193,486 |
| 2013 | $132,339 | $14,428 | $8,007 | $154,775 | $35,568 | $520 | $2,528 | $0 | $0 | $38,617 | $193,392 | $1,330,926 |
| 2014 | $141,348 | $14,975 | $8,208 | $164,531 | $35,568 | $533 | $2,528 | $0 | $0 | $38,630 | $203,161 | $1,468,433 |
| 2015 | $153,408 | $15,501 | $8,413 | $177,322 | $35,568 | $547 | $2,528 | $0 | $0 | $38,643 | $215,965 | $1,607,646 |
| 2016 | $160,007 | $16,153 | $9,590 | $185,750 | $40,796 | $560 | $2,528 | $0 | $0 | $43,884 | $229,634 | $1,748,621 |
| 2017 | $169,354 | $16,870 | $10,315 | $196,538 | $43,377 | $574 | $2,528 | $0 | $0 | $46,480 | $243,018 | $1,890,709 |
| 2018 | $179,382 | $17,495 | $10,573 | $207,450 | $43,377 | $589 | $2,528 | $0 | $0 | $46,494 | $253,944 | $2,032,115 |
| 2019 | $193,244 | $18,154 | $10,837 | $222,234 | $43,377 | $603 | $2,528 | $0 | $0 | $46,509 | $268,743 | $2,174,635 |
| 2020 | $205,633 | $18,824 | $11,108 | $235,565 | $43,377 | $618 | $2,528 | $0 | $0 | $46,524 | $282,089 | $2,317,109 |
| 2021 | $218,289 | $19,490 | $11,386 | $249,164 | $43,377 | $634 | $2,528 | $0 | $0 | $46,540 | $295,704 | $2,459,348 |
| 2022 | $229,900 | $20,230 | $12,738 | $262,869 | $47,072 | $650 | $2,528 | $0 | $0 | $50,250 | $313,119 | $2,602,791 |
| 2023 | $244,830 | $20,964 | $13,593 | $279,387 | $48,881 | $666 | $2,528 | $0 | $0 | $52,076 | $331,463 | $2,747,407 |
| 2024 | $265,846 | $22,043 | $13,933 | $301,822 | $48,881 | $683 | $2,528 | $0 | $0 | $52,092 | $353,914 | $2,894,466 |
| 2025 | $283,669 | $22,818 | $14,281 | $320,768 | $48,881 | $700 | $2,528 | $0 | $0 | $52,109 | $372,877 | $3,042,026 |
| 2026 | $295,573 | $23,389 | $14,638 | $333,601 | $48,881 | $717 | $2,528 | $0 | $0 | $52,127 | $385,728 | $3,187,403 |
| 2027 | $307,960 | $23,974 | $15,004 | $346,939 | $48,881 | $735 | $2,528 | $0 | $0 | $52,145 | $399,084 | $3,330,651 |
| 2028 | $321,987 | $24,575 | $15,379 | $361,942 | $48,881 | $753 | $2,528 | $0 | $0 | $52,163 | $414,105 | $3,472,212 |
| 2029 | $337,089 | $25,191 | $15,764 | $378,044 | $48,881 | $772 | $2,528 | $0 | $0 | $52,182 | $430,226 | $3,612,282 |
| 2030 | $352,598 | $25,821 | $16,158 | $394,577 | $48,881 | $792 | $2,528 | $0 | $0 | $52,201 | $446,778 | $3,750,813 |
| 2031 | $368,811 | $26,466 | $16,562 | $411,839 | $48,881 | $811 | $2,528 | $0 | $0 | $52,221 | $464,060 | $3,887,852 |
| 2032 | $385,801 | $27,129 | $16,976 | $429,906 | $48,881 | $832 | $2,528 | $0 | $0 | $52,241 | $482,147 | $4,023,451 |
| 2033 | $403,596 | $27,809 | $17,400 | $448,805 | $48,881 | $852 | $2,528 | $0 | $0 | $52,262 | $501,067 | $4,157,661 |
| 2034 | $422,194 | $28,505 | $17,835 | $468,534 | $48,881 | $874 | $2,528 | $0 | $0 | $52,284 | $520,818 | $4,290,518 |
| 2035 | $440,450 | $29,290 | $18,281 | $488,021 | $48,881 | $896 | $2,528 | $0 | $0 | $52,305 | $540,327 | $4,421,789 |

# Table E.6-21 Expansion Plan Economic Summary - With Taylor Energy Center in 2012 - Second PC Unit Available

| Case Description | |
|---|---|
| Fuel Forecast: | Base Case |
| Load Forecast | Base Case |

| Economic Parameters | |
|---|---|
| CPW Discount Rate: | 5.0% |
| Final Capital Escalation Rate: | 2.5% |
| Base Year for CPW $ | 2006 |

| Financial Parameters | |
|---|---|
| Interest During Construction: | 5.00% |
| Fixed Charge Rate CT: (20 year) | 8.97% |
| Fixed Charge Rate CC: (25 year) | 7.92% |
| Fixed Charge Rate Coal: (30 year) | 7.25% |

| | Generation Additions | | | | |
|---|---|---|---|---|---|
| Unit Addition | 2006 Capital Cost ($1,000) | Construction and Development Period (months) | Month/Day/Year Installed (mm/dd/yy) | Installed Cost ($1,000) | Levelized Cost ($1,000) |
| TEC | NA | NA | 05/01/12 | 355,739 | 25,805 |
| SECOND PC | NA | NA | 05/01/16 | 392,192 | 28,450 |

| | Production Cost | | | | Capital Cost and Other Project Costs | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | O&M | | | | | | | | | | |
| Year | Fuel and Energy Cost ($1,000) | Variable ($1,000) | Fixed ($1,000) | *Total Production Cost ($1,000)* | Unit Capital Cost ($1,000) | Community Contribution ($1,000) | Transmission Charge ($1,000) | Seasonal Purchase ($1,000) | Ongoing Capex Cost ($1,000) | *Total Capital Cost ($1,000)* | Total System Cost ($1,000) | Cumulative Present Worth Cost ($1,000) |
| 2006 | $232,683 | $5,346 | $0 | $238,029 | $0 | $0 | $0 | $0 | $0 | $0 | $238,029 | $238,029 |
| 2007 | $232,226 | $5,739 | $0 | $237,965 | $0 | $0 | $0 | $0 | $0 | $0 | $237,965 | $464,662 |
| 2008 | $193,920 | $6,872 | $0 | $200,791 | $0 | $0 | $0 | $0 | $0 | $0 | $200,791 | $646,785 |
| 2009 | $168,573 | $7,694 | $0 | $176,267 | $0 | $0 | $0 | $0 | $0 | $0 | $176,267 | $799,051 |
| 2010 | $154,375 | $8,148 | $0 | $162,523 | $0 | $0 | $0 | $0 | $0 | $0 | $162,523 | $932,760 |
| 2011 | $152,718 | $8,496 | $0 | $161,213 | $0 | $0 | $0 | $990 | $0 | $990 | $162,203 | $1,059,850 |
| 2012 | $145,934 | $7,789 | $2,869 | $156,592 | $17,274 | $508 | $1,483 | $0 | $309 | $19,574 | $176,166 | $1,191,308 |
| 2013 | $143,713 | $7,710 | $4,380 | $155,803 | $25,805 | $520 | $2,225 | $0 | $482 | $29,032 | $184,835 | $1,322,667 |
| 2014 | $152,920 | $8,073 | $4,490 | $165,483 | $25,805 | $533 | $2,225 | $0 | $504 | $29,067 | $194,550 | $1,454,345 |
| 2015 | $164,843 | $8,450 | $4,602 | $177,896 | $25,805 | $547 | $2,225 | $0 | $527 | $29,103 | $206,999 | $1,587,779 |
| 2016 | $152,967 | $7,812 | $7,884 | $168,663 | $44,849 | $1,120 | $3,708 | $0 | $891 | $50,569 | $219,231 | $1,722,368 |
| 2017 | $151,477 | $7,842 | $9,670 | $168,990 | $54,255 | $1,148 | $4,449 | $0 | $1,107 | $60,960 | $229,950 | $1,856,815 |
| 2018 | $158,752 | $8,295 | $9,912 | $176,959 | $54,255 | $1,177 | $4,449 | $0 | $1,157 | $61,038 | $237,998 | $1,989,341 |
| 2019 | $169,417 | $8,679 | $10,160 | $188,256 | $54,255 | $1,207 | $4,449 | $0 | $1,209 | $61,120 | $249,376 | $2,121,590 |
| 2020 | $181,087 | $9,076 | $10,414 | $200,577 | $54,255 | $1,237 | $4,449 | $0 | $1,264 | $61,205 | $261,781 | $2,253,808 |
| 2021 | $190,444 | $9,483 | $10,674 | $210,601 | $54,255 | $1,268 | $4,449 | $0 | $1,321 | $61,292 | $271,894 | $2,384,593 |
| 2022 | $198,835 | $9,910 | $10,941 | $219,686 | $54,255 | $1,299 | $4,449 | $0 | $1,380 | $61,383 | $281,070 | $2,513,354 |
| 2023 | $211,594 | $10,359 | $11,215 | $233,167 | $54,255 | $1,332 | $4,449 | $0 | $1,442 | $61,478 | $294,646 | $2,641,907 |
| 2024 | $236,636 | $11,687 | $11,495 | $259,818 | $54,255 | $1,365 | $4,449 | $0 | $1,507 | $61,576 | $321,394 | $2,775,453 |
| 2025 | $252,558 | $12,191 | $11,782 | $276,532 | $54,255 | $1,399 | $4,449 | $0 | $1,575 | $61,678 | $338,210 | $2,909,294 |
| 2026 | $262,837 | $12,498 | $12,077 | $287,412 | $54,255 | $1,434 | $4,449 | $0 | $1,646 | $61,784 | $349,196 | $3,040,903 |
| 2027 | $271,278 | $12,810 | $12,379 | $296,467 | $54,255 | $1,470 | $4,449 | $0 | $1,720 | $61,894 | $358,361 | $3,169,533 |
| 2028 | $283,746 | $13,131 | $12,688 | $309,566 | $54,255 | $1,507 | $4,449 | $0 | $1,797 | $62,008 | $371,574 | $3,296,556 |
| 2029 | $295,770 | $13,459 | $13,006 | $322,234 | $54,255 | $1,544 | $4,449 | $0 | $1,878 | $62,127 | $384,361 | $3,421,693 |
| 2030 | $308,108 | $13,796 | $13,331 | $335,235 | $54,255 | $1,583 | $4,449 | $0 | $1,963 | $62,250 | $397,485 | $3,544,940 |
| 2031 | $321,001 | $14,141 | $13,664 | $348,807 | $54,255 | $1,623 | $4,449 | $0 | $2,051 | $62,378 | $411,184 | $3,666,364 |
| 2032 | $334,527 | $14,495 | $14,006 | $363,028 | $54,255 | $1,663 | $4,449 | $0 | $2,143 | $62,511 | $425,539 | $3,786,043 |
| 2033 | $347,832 | $14,954 | $14,356 | $377,142 | $54,255 | $1,705 | $4,449 | $0 | $2,240 | $62,649 | $439,790 | $3,903,840 |
| 2034 | $362,629 | $15,328 | $14,715 | $392,671 | $54,255 | $1,747 | $4,449 | $0 | $2,341 | $62,792 | $455,463 | $4,020,026 |
| 2035 | $378,143 | $15,711 | $15,082 | $408,937 | $54,255 | $1,791 | $4,449 | $0 | $2,446 | $62,941 | $471,878 | $4,134,666 |

## Table E.1-22 Expansion Plan Economic Summary - Without Taylor Energy Center - All Gas

| Case Description | |
|---|---|
| Fuel Forecast: | Base Case |
| Load Forecast | Base Case |

| Economic Parameters | |
|---|---|
| CPW Discount Rate: | 5.0% |
| Final Capital Escalation Rate: | 2.5% |
| Base Year for CPW $ | 2006 |

| Financial Parameters | |
|---|---|
| Interest During Construction: | 5.00% |
| Fixed Charge Rate CT: (20 year) | 8.97% |
| Fixed Charge Rate CC: (25 year) | 7.92% |
| Fixed Charge Rate Coal: (30 yeai | 7.25% |

| Generation Additions | | | | | |
|---|---|---|---|---|---|
| Unit Addition | 2006 Capital Cost ($1,000) | Construction and Development Period (months) | Month/Day/Year Installed (mm/dd/yy) | Installed Cost ($1,000) | Levelized Cost ($1,000) |
| GE LMS100 SC | 66,300 | 17 | 05/01/11 | 76,926 | 6,902 |
| GE 7FA SC | 75,700 | 14 | 05/01/16 | 99,080 | 8,889 |
| GE LMS100 SC | 66,300 | 17 | 05/01/21 | 98,471 | 8,835 |

| Year | Production Cost | | | | Capital Cost and Other Project Costs | | | | | | Total System Cost ($1,000) | Cumulative Present Worth Cost ($1,000) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fuel and Energy Cost ($1,000) | O&M Variable ($1,000) | O&M Fixed ($1,000) | *Total Production Cost ($1,000)* | Unit Capital Cost ($1,000) | Community Contribution ($1,000) | Transmission Charge ($1,000) | Seasonal Purchase ($1,000) | Ongoing Capex Cost ($1,000) | *Total Capital Cost ($1,000)* | | |
| 2006 | $232,683 | $5,346 | $0 | $238,029 | $0 | $0 | $0 | $0 | $0 | $0 | $238,029 | $238,029 |
| 2007 | $232,226 | $5,739 | $0 | $237,965 | $0 | $0 | $0 | $0 | $0 | $0 | $237,965 | $464,662 |
| 2008 | $193,920 | $6,872 | $0 | $200,791 | $0 | $0 | $0 | $0 | $0 | $0 | $200,791 | $646,785 |
| 2009 | $168,573 | $7,694 | $0 | $176,267 | $0 | $0 | $0 | $0 | $0 | $0 | $176,267 | $799,051 |
| 2010 | $154,375 | $8,148 | $0 | $162,523 | $0 | $0 | $0 | $0 | $0 | $0 | $162,523 | $932,760 |
| 2011 | $152,448 | $8,614 | $854 | $161,916 | $4,633 | $0 | $0 | $0 | $0 | $4,633 | $166,549 | $1,063,255 |
| 2012 | $161,186 | $9,007 | $1,305 | $171,498 | $6,902 | $0 | $0 | $0 | $0 | $6,902 | $178,400 | $1,196,380 |
| 2013 | $172,037 | $9,465 | $1,337 | $182,839 | $6,902 | $0 | $0 | $0 | $0 | $6,902 | $189,740 | $1,331,225 |
| 2014 | $183,161 | $9,888 | $1,371 | $194,419 | $6,902 | $0 | $0 | $0 | $0 | $6,902 | $201,321 | $1,467,487 |
| 2015 | $195,653 | $10,304 | $1,405 | $207,362 | $6,902 | $0 | $0 | $0 | $0 | $6,902 | $214,264 | $1,605,604 |
| 2016 | $205,035 | $11,208 | $2,472 | $218,715 | $12,852 | $0 | $0 | $0 | $0 | $12,852 | $231,567 | $1,747,766 |
| 2017 | $218,606 | $12,154 | $3,051 | $233,812 | $15,791 | $0 | $0 | $0 | $0 | $15,791 | $249,603 | $1,893,704 |
| 2018 | $232,389 | $12,772 | $3,128 | $248,288 | $15,791 | $0 | $0 | $0 | $0 | $15,791 | $264,080 | $2,040,753 |
| 2019 | $247,366 | $13,423 | $3,206 | $263,995 | $15,791 | $0 | $0 | $0 | $0 | $15,791 | $279,786 | $2,189,130 |
| 2020 | $262,587 | $14,075 | $3,286 | $279,948 | $15,791 | $0 | $0 | $0 | $0 | $15,791 | $295,739 | $2,338,498 |
| 2021 | $276,797 | $14,197 | $4,462 | $295,456 | $21,721 | $0 | $0 | $0 | $0 | $21,721 | $317,178 | $2,491,066 |
| 2022 | $292,732 | $14,599 | $5,122 | $312,454 | $24,626 | $0 | $0 | $0 | $0 | $24,626 | $337,080 | $2,645,486 |
| 2023 | $311,401 | $15,263 | $5,251 | $331,915 | $24,626 | $0 | $0 | $0 | $0 | $24,626 | $356,541 | $2,801,044 |
| 2024 | $331,279 | $16,000 | $5,382 | $352,660 | $24,626 | $0 | $0 | $0 | $0 | $24,626 | $377,286 | $2,957,814 |
| 2025 | $351,804 | $16,739 | $5,516 | $374,060 | $24,626 | $0 | $0 | $0 | $0 | $24,626 | $398,686 | $3,115,588 |
| 2026 | $367,529 | $17,159 | $5,654 | $390,342 | $24,626 | $0 | $0 | $0 | $0 | $24,626 | $414,968 | $3,271,985 |
| 2027 | $384,387 | $17,588 | $5,796 | $407,771 | $24,626 | $0 | $0 | $0 | $0 | $24,626 | $432,397 | $3,427,190 |
| 2028 | $401,841 | $18,029 | $5,940 | $425,810 | $24,626 | $0 | $0 | $0 | $0 | $24,626 | $450,436 | $3,581,172 |
| 2029 | $419,946 | $18,481 | $6,089 | $444,516 | $24,626 | $0 | $0 | $0 | $0 | $24,626 | $469,142 | $3,733,911 |
| 2030 | $439,289 | $18,943 | $6,241 | $464,473 | $24,626 | $0 | $0 | $0 | $0 | $24,626 | $489,099 | $3,885,565 |
| 2031 | $459,511 | $19,418 | $6,397 | $485,327 | $19,993 | $0 | $0 | $0 | $0 | $19,993 | $505,320 | $4,034,787 |
| 2032 | $480,662 | $19,904 | $6,557 | $507,123 | $17,724 | $0 | $0 | $0 | $0 | $17,724 | $524,847 | $4,182,396 |
| 2033 | $502,800 | $20,403 | $6,721 | $529,924 | $17,724 | $0 | $0 | $0 | $0 | $17,724 | $547,649 | $4,329,082 |
| 2034 | $525,960 | $20,914 | $6,889 | $553,763 | $17,724 | $0 | $0 | $0 | $0 | $17,724 | $571,487 | $4,474,865 |
| 2035 | $550,186 | $21,438 | $7,061 | $578,685 | $17,724 | $0 | $0 | $0 | $0 | $17,724 | $596,410 | $4,619,761 |

## Table E.1-23 Expansion Plan Economic Summary - With Taylor Energy Center in 2012 - Direct-Fired Biomass in 2011

| Case Description | |
|---|---|
| Fuel Forecast: | Base Case |
| Load Forecast | Base Case |

| Economic Parameters | |
|---|---|
| CPW Discount Rate: | 5.0% |
| Final Capital Escalation Rate: | 2.5% |
| Base Year for CPW $ | 2006 |

| Financial Parameters | |
|---|---|
| Interest During Construction: | 5.00% |
| Fixed Charge Rate CT: (20 year) | 8.97% |
| Fixed Charge Rate CC: (25 year) | 7.92% |
| Fixed Charge Rate Coal: (30 year) | 7.25% |

| Generation Additions | | | | | |
|---|---|---|---|---|---|
| Unit Addition | 2006 Capital Cost ($1,000) | Construction and Development Period (months) | Month/Day/Year Installed (mm/dd/yy) | Installed Cost ($1,000) | Levelized Cost ($1,000) |
| BIOMASS | 84,555 | | 05/01/11 | 96,446 | 6,996 |
| TEC | NA | NA | 05/01/12 | 355,739 | 25,805 |
| GE LMS100 SC | 66,300 | 17 | 05/01/17 | 89,210 | 8,004 |
| GE LM6000 SC | 40,500 | 12 | 05/01/24 | 64,456 | 5,783 |

| | Production Cost | | | | Capital Cost and Other Project Costs | | | | | | | Cumulative |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fuel and Energy | O&M | | *Total* | | | | Biomass Fuel, | Ongoing | *Total* | Total | Present |
| | | | | *Production* | Unit Capital | Community | Transmission | VOM, & FOM | Capex | *Capital* | System | Worth |
| Year | Cost ($1,000) | Variable ($1,000) | Fixed ($1,000) | *Cost ($1,000)* | Cost ($1,000) | Contribution ($1,000) | Charge ($1,000) | Cost ($1,000) | Cost ($1,000) | *Cost ($1,000)* | Cost ($1,000) | Cost ($1,000) |
| 2006 | $232,683 | $5,346 | $0 | $238,029 | $0 | $0 | $0 | $0 | $0 | $0 | $238,029 | $238,029 |
| 2007 | $232,226 | $5,739 | $0 | $237,965 | $0 | $0 | $0 | $0 | $0 | $0 | $237,965 | $464,662 |
| 2008 | $193,920 | $6,872 | $0 | $200,791 | $0 | $0 | $0 | $0 | $0 | $0 | $200,791 | $646,785 |
| 2009 | $168,573 | $7,694 | $0 | $176,267 | $0 | $0 | $0 | $0 | $0 | $0 | $176,267 | $799,051 |
| 2010 | $154,375 | $8,148 | $0 | $162,523 | $0 | $0 | $0 | $0 | $0 | $0 | $162,523 | $932,760 |
| 2011 | $146,321 | $8,053 | $0 | $154,374 | $4,696 | $0 | $0 | $7,881 | $0 | $12,577 | $166,950 | $1,063,570 |
| 2012 | $134,778 | $7,117 | $2,869 | $144,763 | $24,270 | $508 | $1,483 | $12,034 | $309 | $38,604 | $183,367 | $1,200,401 |
| 2013 | $132,483 | $7,040 | $4,380 | $143,903 | $32,802 | $520 | $2,225 | $12,335 | $482 | $48,364 | $192,266 | $1,337,041 |
| 2014 | $140,864 | $7,383 | $4,490 | $152,736 | $32,802 | $533 | $2,225 | $12,643 | $504 | $48,707 | $201,443 | $1,473,386 |
| 2015 | $153,061 | $7,748 | $4,602 | $165,411 | $32,802 | $547 | $2,225 | $12,960 | $527 | $49,059 | $214,470 | $1,611,635 |
| 2016 | $160,941 | $8,087 | $4,717 | $173,745 | $32,802 | $560 | $2,225 | $13,283 | $550 | $49,420 | $223,165 | $1,748,639 |
| 2017 | $167,829 | $8,630 | $5,826 | $182,285 | $38,174 | $574 | $2,225 | $13,616 | $575 | $55,163 | $237,448 | $1,887,470 |
| 2018 | $176,450 | $9,082 | $6,469 | $192,001 | $40,805 | $589 | $2,225 | $13,956 | $601 | $58,176 | $250,177 | $2,026,778 |
| 2019 | $188,915 | $9,501 | $6,631 | $205,047 | $40,805 | $603 | $2,225 | $14,305 | $628 | $58,566 | $263,613 | $2,166,578 |
| 2020 | $201,272 | $9,977 | $6,797 | $218,046 | $40,805 | $618 | $2,225 | $14,662 | $656 | $58,967 | $277,013 | $2,306,488 |
| 2021 | $213,468 | $10,427 | $6,967 | $230,862 | $40,805 | $634 | $2,225 | $15,029 | $686 | $59,379 | $290,240 | $2,446,098 |
| 2022 | $225,061 | $10,835 | $7,141 | $243,037 | $40,805 | $650 | $2,225 | $15,405 | $717 | $59,801 | $302,838 | $2,584,832 |
| 2023 | $239,764 | $11,383 | $7,319 | $258,467 | $40,805 | $666 | $2,225 | $15,790 | $749 | $60,235 | $318,701 | $2,723,880 |
| 2024 | $258,339 | $12,482 | $8,624 | $279,445 | $44,677 | $683 | $2,225 | $16,185 | $783 | $64,551 | $343,996 | $2,866,818 |
| 2025 | $273,891 | $13,049 | $9,404 | $296,344 | $46,588 | $700 | $2,225 | $16,589 | $818 | $66,920 | $363,264 | $3,010,574 |
| 2026 | $285,607 | $13,376 | $9,639 | $308,622 | $46,588 | $717 | $2,225 | $17,004 | $855 | $67,389 | $376,011 | $3,152,288 |
| 2027 | $296,802 | $13,711 | $9,880 | $320,393 | $46,588 | $735 | $2,225 | $17,429 | $893 | $67,870 | $388,263 | $3,291,652 |
| 2028 | $309,646 | $14,081 | $10,127 | $333,854 | $46,588 | $753 | $2,225 | $17,865 | $933 | $68,365 | $402,218 | $3,429,151 |
| 2029 | $323,221 | $14,433 | $10,380 | $348,034 | $46,588 | $772 | $2,225 | $18,311 | $975 | $68,872 | $416,906 | $3,564,883 |
| 2030 | $337,440 | $14,795 | $10,639 | $362,874 | $46,588 | $792 | $2,225 | $18,769 | $1,019 | $69,393 | $432,267 | $3,698,915 |
| 2031 | $352,302 | $15,166 | $10,905 | $378,373 | $46,588 | $811 | $2,225 | $19,238 | $1,065 | $69,928 | $448,301 | $3,831,300 |
| 2032 | $367,875 | $15,546 | $11,178 | $394,599 | $46,588 | $832 | $2,225 | $19,719 | $1,113 | $70,477 | $465,076 | $3,962,098 |
| 2033 | $384,190 | $15,935 | $11,457 | $411,582 | $46,588 | $852 | $2,225 | $20,212 | $1,163 | $71,041 | $482,623 | $4,091,368 |
| 2034 | $401,255 | $16,334 | $11,744 | $429,333 | $46,588 | $874 | $2,225 | $20,718 | $1,215 | $71,620 | $500,952 | $4,219,158 |
| 2035 | $419,154 | $16,745 | $12,037 | $447,935 | $46,588 | $896 | $2,225 | $21,236 | $1,270 | $72,214 | $520,150 | $4,345,526 |

# Table E.1-24 Expansion Plan Economic Summary - Without Taylor Energy Center - Direct-Fired Biomass in 2011

| Case Description | |
|---|---|
| Fuel Forecast: | Base Case |
| Load Forecast | Base Case |

| Economic Parameters | |
|---|---|
| CPW Discount Rate: | 5.0% |
| Final Capital Escalation Rate: | 2.5% |
| Base Year for CPW $ | 2006 |

| Financial Parameters | |
|---|---|
| Interest During Construction: | 5.00% |
| Fixed Charge Rate CT: (20 year) | 8.97% |
| Fixed Charge Rate CC: (25 year) | 7.92% |
| Fixed Charge Rate Coal: (30 yeai | 7.25% |

| Generation Additions | | | | | |
|---|---|---|---|---|---|
| Unit Addition | 2006 Capital Cost ($1,000) | Construction and Development Period (months) | Month/Day/Year Installed (mm/dd/yy) | Installed Cost ($1,000) | Levelized Cost ($1,000) |
| BIOMASS | 84,555 | | 05/01/11 | 96,446 | 6,996 |
| GE LM6000 SC | 40,500 | 12 | 05/01/12 | 47,927 | 4,300 |
| 250 MW CFB | 566,000 | 44 | 05/01/15 | 744,807 | 54,028 |

| | Production Cost | | | | Capital Cost and Other Project Costs | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | Fuel and Energy Cost ($1,000) | O&M Variable ($1,000) | O&M Fixed ($1,000) | *Total Production Cost ($1,000)* | Unit Capital Cost ($1,000) | Community Contribution ($1,000) | Transmission Charge ($1,000) | Biomass Fuel, VOM, & FOM Cost ($1,000) | Ongoing Capex Cost ($1,000) | *Total Capital Cost ($1,000)* | Total System Cost ($1,000) | Cumulative Present Worth Cost ($1,000) |
| 2006 | $232,683 | $5,346 | $0 | $238,029 | $0 | $0 | $0 | $0 | $0 | $0 | $238,029 | $238,029 |
| 2007 | $232,226 | $5,739 | $0 | $237,965 | $0 | $0 | $0 | $0 | $0 | $0 | $237,965 | $464,662 |
| 2008 | $193,920 | $6,872 | $0 | $200,791 | $0 | $0 | $0 | $0 | $0 | $0 | $200,791 | $646,785 |
| 2009 | $168,573 | $7,694 | $0 | $176,267 | $0 | $0 | $0 | $0 | $0 | $0 | $176,267 | $799,051 |
| 2010 | $154,375 | $8,148 | $0 | $162,523 | $0 | $0 | $0 | $0 | $0 | $0 | $162,523 | $932,760 |
| 2011 | $146,321 | $8,053 | $0 | $154,374 | $4,696 | $0 | $0 | $7,881 | $0 | $12,577 | $166,950 | $1,063,570 |
| 2012 | $152,525 | $8,208 | $834 | $161,567 | $9,875 | $0 | $0 | $12,034 | $0 | $21,909 | $183,476 | $1,200,482 |
| 2013 | $161,055 | $8,582 | $1,274 | $170,911 | $11,296 | $0 | $0 | $12,335 | $0 | $23,631 | $194,542 | $1,338,740 |
| 2014 | $171,745 | $8,968 | $1,306 | $182,019 | $11,296 | $0 | $0 | $12,643 | $0 | $23,940 | $205,959 | $1,478,141 |
| 2015 | $152,617 | $11,322 | $9,353 | $173,293 | $47,562 | $0 | $0 | $12,960 | $0 | $60,521 | $233,814 | $1,628,859 |
| 2016 | $148,547 | $12,654 | $13,610 | $174,812 | $65,324 | $0 | $0 | $13,283 | $0 | $78,608 | $253,420 | $1,784,437 |
| 2017 | $156,431 | $13,176 | $13,951 | $183,557 | $65,324 | $0 | $0 | $13,616 | $0 | $78,940 | $262,497 | $1,937,914 |
| 2018 | $165,727 | $13,692 | $14,300 | $193,718 | $65,324 | $0 | $0 | $13,956 | $0 | $79,280 | $272,999 | $2,089,930 |
| 2019 | $177,314 | $14,232 | $14,657 | $206,204 | $65,324 | $0 | $0 | $14,305 | $0 | $79,629 | $285,833 | $2,241,513 |
| 2020 | $187,820 | $14,792 | $15,023 | $217,636 | $65,324 | $0 | $0 | $14,662 | $0 | $79,987 | $297,623 | $2,391,833 |
| 2021 | $198,294 | $15,369 | $15,399 | $229,062 | $65,324 | $0 | $0 | $15,029 | $0 | $80,353 | $309,415 | $2,540,667 |
| 2022 | $208,597 | $15,968 | $15,784 | $240,349 | $65,324 | $0 | $0 | $15,405 | $0 | $80,729 | $321,078 | $2,687,756 |
| 2023 | $224,634 | $16,590 | $16,179 | $257,403 | $65,324 | $0 | $0 | $15,790 | $0 | $81,114 | $338,517 | $2,835,450 |
| 2024 | $247,436 | $17,622 | $16,583 | $281,642 | $65,324 | $0 | $0 | $16,185 | $0 | $81,509 | $363,151 | $2,986,347 |
| 2025 | $262,547 | $18,354 | $16,998 | $297,899 | $65,324 | $0 | $0 | $16,589 | $0 | $81,914 | $379,813 | $3,136,652 |
| 2026 | $273,189 | $18,813 | $17,423 | $309,425 | $65,324 | $0 | $0 | $17,004 | $0 | $82,328 | $391,754 | $3,284,300 |
| 2027 | $285,298 | $19,285 | $17,858 | $322,441 | $65,324 | $0 | $0 | $17,429 | $0 | $82,754 | $405,194 | $3,429,741 |
| 2028 | $297,512 | $19,767 | $18,305 | $335,584 | $65,324 | $0 | $0 | $17,865 | $0 | $83,189 | $418,773 | $3,572,898 |
| 2029 | $310,154 | $20,261 | $18,762 | $349,177 | $65,324 | $0 | $0 | $18,311 | $0 | $83,636 | $432,813 | $3,713,810 |
| 2030 | $323,681 | $20,771 | $19,231 | $363,683 | $65,324 | $0 | $0 | $18,769 | $0 | $84,094 | $447,776 | $3,852,651 |
| 2031 | $337,710 | $21,291 | $19,712 | $378,713 | $65,324 | $0 | $0 | $19,238 | $0 | $84,563 | $463,276 | $3,989,458 |
| 2032 | $352,437 | $21,840 | $20,205 | $394,482 | $62,446 | $0 | $0 | $19,719 | $0 | $82,165 | $476,648 | $4,123,511 |
| 2033 | $368,754 | $22,409 | $20,710 | $411,873 | $61,024 | $0 | $0 | $20,212 | $0 | $81,237 | $493,110 | $4,255,589 |
| 2034 | $384,912 | $22,971 | $21,228 | $429,111 | $61,024 | $0 | $0 | $20,718 | $0 | $81,742 | $510,853 | $4,385,904 |
| 2035 | $401,861 | $23,545 | $21,758 | $447,164 | $61,024 | $0 | $0 | $21,236 | $0 | $82,260 | $529,424 | $4,514,526 |

## Table E.1-25 Expansion Plan Economic Summary - With Taylor Energy Center in 2012 on PRB

| Case Description | |
|---|---|
| Fuel Forecast: | Base Case |
| Load Forecast | Base Case |

| Economic Parameters | |
|---|---|
| CPW Discount Rate: | 5.0% |
| Final Capital Escalation Rate: | 2.5% |
| Base Year for CPW $ | 2006 |

| Financial Parameters | |
|---|---|
| Interest During Construction: | 5.00% |
| Fixed Charge Rate CT: (20 year) | 8.97% |
| Fixed Charge Rate CC: (25 year) | 7.92% |
| Fixed Charge Rate Coal: (30 year) | 7.25% |

| Generation Additions | | | | | |
|---|---|---|---|---|---|
| Unit Addition | 2006 Capital Cost ($1,000) | Construction and Development Period (months) | Month/Day/Year Installed (mm/dd/yy) | Installed Cost ($1,000) | Levelized Cost ($1,000) |
| TEC | NA | NA | 05/01/12 | 354,683 | 25,729 |
| GE 7FA SC | 75,700 | 14 | 05/01/16 | 99,080 | 8,889 |

| | Production Cost | | | | Capital Cost and Other Project Costs | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | O&M | | | | | | | | | | |
| Year | Fuel and Energy Cost ($1,000) | Variable ($1,000) | Fixed ($1,000) | *Total Production Cost ($1,000)* | Unit Capital Cost ($1,000) | Community Contribution ($1,000) | Transmission Charge ($1,000) | Seasonal Purchase ($1,000) | Ongoing Capex Cost ($1,000) | *Total Capital Cost ($1,000)* | Total System Cost ($1,000) | Cumulative Present Worth Cost ($1,000) |
| 2006 | $232,683 | $5,346 | $0 | $238,029 | $0 | $0 | $0 | $0 | $0 | $0 | $238,029 | $238,029 |
| 2007 | $232,226 | $5,739 | $0 | $237,965 | $0 | $0 | $0 | $0 | $0 | $0 | $237,965 | $464,662 |
| 2008 | $193,920 | $6,872 | $0 | $200,791 | $0 | $0 | $0 | $0 | $0 | $0 | $200,791 | $646,785 |
| 2009 | $168,573 | $7,694 | $0 | $176,267 | $0 | $0 | $0 | $0 | $0 | $0 | $176,267 | $799,051 |
| 2010 | $154,375 | $8,148 | $0 | $162,523 | $0 | $0 | $0 | $0 | $0 | $0 | $162,523 | $932,760 |
| 2011 | $152,718 | $8,496 | $0 | $161,213 | $0 | $0 | $0 | $990 | $0 | $990 | $162,203 | $1,059,850 |
| 2012 | $143,682 | $7,804 | $2,869 | $154,355 | $17,223 | $508 | $1,480 | $0 | $308 | $19,519 | $173,874 | $1,189,598 |
| 2013 | $141,260 | $7,733 | $4,380 | $153,373 | $25,729 | $520 | $2,220 | $0 | $481 | $28,950 | $182,323 | $1,319,171 |
| 2014 | $149,655 | $8,095 | $4,490 | $162,240 | $25,729 | $533 | $2,220 | $0 | $503 | $28,985 | $191,225 | $1,448,600 |
| 2015 | $161,813 | $8,473 | $4,602 | $174,888 | $25,729 | $547 | $2,220 | $0 | $526 | $29,021 | $203,909 | $1,580,042 |
| 2016 | $170,338 | $9,160 | $5,749 | $185,247 | $31,679 | $560 | $2,220 | $0 | $549 | $35,009 | $220,256 | $1,715,260 |
| 2017 | $180,566 | $10,027 | $6,410 | $197,003 | $34,618 | $574 | $2,220 | $0 | $574 | $37,987 | $234,989 | $1,852,653 |
| 2018 | $191,604 | $10,511 | $6,571 | $208,686 | $34,618 | $589 | $2,220 | $0 | $600 | $38,027 | $246,712 | $1,990,032 |
| 2019 | $204,584 | $11,068 | $6,735 | $222,387 | $34,618 | $603 | $2,220 | $0 | $627 | $38,068 | $260,456 | $2,128,157 |
| 2020 | $217,470 | $11,611 | $6,903 | $235,983 | $34,618 | $618 | $2,220 | $0 | $655 | $38,112 | $274,095 | $2,266,594 |
| 2021 | $231,778 | $12,196 | $7,076 | $251,050 | $34,618 | $634 | $2,220 | $0 | $685 | $38,157 | $289,207 | $2,405,707 |
| 2022 | $244,823 | $12,741 | $7,253 | $264,817 | $34,618 | $650 | $2,220 | $0 | $715 | $38,203 | $303,021 | $2,544,524 |
| 2023 | $262,885 | $13,350 | $7,434 | $283,669 | $34,618 | $666 | $2,220 | $0 | $747 | $38,252 | $321,920 | $2,684,977 |
| 2024 | $284,521 | $14,409 | $7,620 | $306,550 | $34,618 | $683 | $2,220 | $0 | $781 | $38,302 | $344,852 | $2,828,270 |
| 2025 | $302,440 | $15,119 | $7,810 | $325,369 | $34,618 | $700 | $2,220 | $0 | $816 | $38,354 | $363,723 | $2,972,208 |
| 2026 | $315,093 | $15,481 | $8,006 | $338,579 | $34,618 | $717 | $2,220 | $0 | $853 | $38,408 | $376,988 | $3,114,291 |
| 2027 | $329,500 | $15,862 | $8,206 | $353,568 | $34,618 | $735 | $2,220 | $0 | $891 | $38,465 | $392,032 | $3,255,008 |
| 2028 | $344,316 | $16,247 | $8,411 | $368,974 | $34,618 | $753 | $2,220 | $0 | $932 | $38,523 | $407,497 | $3,394,311 |
| 2029 | $359,884 | $16,651 | $8,621 | $385,156 | $34,618 | $772 | $2,220 | $0 | $973 | $38,584 | $423,740 | $3,532,268 |
| 2030 | $376,268 | $17,062 | $8,837 | $402,167 | $34,618 | $792 | $2,220 | $0 | $1,017 | $38,647 | $440,814 | $3,668,951 |
| 2031 | $393,424 | $17,489 | $9,058 | $419,971 | $34,618 | $811 | $2,220 | $0 | $1,063 | $38,713 | $458,683 | $3,804,401 |
| 2032 | $411,134 | $17,983 | $9,284 | $438,402 | $34,618 | $832 | $2,220 | $0 | $1,111 | $38,781 | $477,182 | $3,938,604 |
| 2033 | $429,944 | $18,433 | $9,516 | $457,894 | $34,618 | $852 | $2,220 | $0 | $1,161 | $38,852 | $496,745 | $4,071,656 |
| 2034 | $449,633 | $18,902 | $9,754 | $478,290 | $34,618 | $874 | $2,220 | $0 | $1,213 | $38,925 | $517,215 | $4,203,595 |
| 2035 | $470,259 | $19,376 | $9,998 | $499,633 | $34,618 | $896 | $2,220 | $0 | $1,268 | $39,002 | $538,635 | $4,334,454 |

## Table E.1-26 Expansion Plan Economic Summary - With Taylor Energy Center - DSM and DLC

| Case Description | |
|---|---|
| Fuel Forecast: | Base Case |
| Load Forecast | Base Case |

| Economic Parameters | |
|---|---|
| CPW Discount Rate: | 5.0% |
| Final Capital Escalation Rate: | 2.5% |
| Base Year for CPW $ | 2006 |

| Financial Parameters | |
|---|---|
| Interest During Construction: | 5.00% |
| Fixed Charge Rate CT: (20 year) | 8.97% |
| Fixed Charge Rate CC: (25 year) | 7.92% |
| Fixed Charge Rate Coal: (30 year) | 7.25% |

| Generation Additions | | | | | |
|---|---|---|---|---|---|
| Unit Addition | 2006 Capital Cost ($1,000) | Construction and Development Period (months) | Month/Day/Year Installed (mm/dd/yy) | Installed Cost ($1,000) | Levelized Cost ($1,000) |
| TEC | NA | NA | 05/01/12 | 355,739 | 25,805 |

| | Production Cost | | | | Capital Cost and Other Project Costs | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | Fuel and Energy Cost ($1,000) | O&M Variable ($1,000) | O&M Fixed ($1,000) | *Total Production Cost ($1,000)* | Unit Capital Cost ($1,000) | Community Contribution ($1,000) | Transmission Charge ($1,000) | DSM and DLC Annual Costs ($1,000) | Ongoing Capex Cost ($1,000) | *Total Capital Cost ($1,000)* | Total System Cost ($1,000) | Cumulative Present Worth Cost ($1,000) |
| 2006 | $232,683 | $5,346 | $0 | $238,029 | $0 | $0 | $0 | $0 | $0 | $0 | $238,029 | $238,029 |
| 2007 | $231,389 | $5,714 | $0 | $237,103 | $0 | $0 | $0 | $4,523 | $0 | $4,523 | $241,626 | $468,149 |
| 2008 | $192,217 | $6,805 | $0 | $199,023 | $0 | $0 | $0 | $6,680 | $0 | $6,680 | $205,703 | $654,727 |
| 2009 | $166,021 | $7,566 | $0 | $173,586 | $0 | $0 | $0 | $8,968 | $0 | $8,968 | $182,555 | $812,425 |
| 2010 | $150,360 | $7,933 | $0 | $158,293 | $0 | $0 | $0 | $11,367 | $0 | $11,367 | $169,660 | $952,005 |
| 2011 | $147,874 | $8,192 | $0 | $156,067 | $0 | $0 | $0 | $13,913 | $0 | $13,913 | $169,979 | $1,085,188 |
| 2012 | $138,585 | $7,366 | $2,869 | $148,819 | $17,274 | $508 | $1,483 | $13,696 | $309 | $33,269 | $182,088 | $1,221,065 |
| 2013 | $134,514 | $7,182 | $4,380 | $146,076 | $25,805 | $520 | $2,225 | $16,242 | $482 | $45,274 | $191,350 | $1,357,054 |
| 2014 | $141,349 | $7,417 | $4,490 | $153,256 | $25,805 | $533 | $2,225 | $16,806 | $504 | $45,873 | $199,129 | $1,491,833 |
| 2015 | $151,045 | $7,653 | $4,602 | $163,300 | $25,805 | $547 | $2,225 | $17,622 | $527 | $46,725 | $210,025 | $1,627,216 |
| 2016 | $156,948 | $7,897 | $4,717 | $169,562 | $25,805 | $560 | $2,225 | $16,157 | $550 | $45,297 | $214,860 | $1,759,122 |
| 2017 | $163,745 | $8,208 | $4,835 | $176,788 | $25,805 | $574 | $2,225 | $16,725 | $575 | $45,904 | $222,692 | $1,889,325 |
| 2018 | $170,639 | $8,487 | $4,956 | $184,082 | $25,805 | $589 | $2,225 | $17,620 | $601 | $46,840 | $230,922 | $2,017,911 |
| 2019 | $180,524 | $8,799 | $5,080 | $194,403 | $25,805 | $603 | $2,225 | $16,411 | $628 | $45,672 | $240,075 | $2,145,228 |
| 2020 | $191,077 | $9,126 | $5,207 | $205,410 | $25,805 | $618 | $2,225 | $17,221 | $656 | $46,525 | $251,935 | $2,272,472 |
| 2021 | $200,603 | $9,454 | $5,337 | $215,394 | $25,805 | $634 | $2,225 | $18,372 | $686 | $47,722 | $263,116 | $2,399,035 |
| 2022 | $209,956 | $9,818 | $5,471 | $225,245 | $25,805 | $650 | $2,225 | $17,620 | $717 | $47,016 | $272,261 | $2,523,761 |
| 2023 | $222,288 | $10,202 | $5,607 | $238,097 | $25,805 | $666 | $2,225 | $19,258 | $749 | $48,703 | $286,801 | $2,648,891 |
| 2024 | $239,976 | $11,239 | $5,748 | $256,962 | $25,805 | $683 | $2,225 | $20,471 | $783 | $49,966 | $306,929 | $2,776,427 |
| 2025 | $253,263 | $11,660 | $5,891 | $270,815 | $25,805 | $700 | $2,225 | $22,212 | $818 | $51,759 | $322,574 | $2,904,080 |
| 2026 | $264,069 | $11,953 | $6,038 | $282,060 | $25,805 | $717 | $2,225 | $22,767 | $855 | $52,369 | $334,430 | $3,030,123 |
| 2027 | $274,311 | $12,254 | $6,189 | $292,754 | $25,805 | $735 | $2,225 | $23,337 | $893 | $52,995 | $345,749 | $3,154,227 |
| 2028 | $286,883 | $12,561 | $6,344 | $305,787 | $25,805 | $753 | $2,225 | $23,920 | $933 | $53,637 | $359,424 | $3,277,096 |
| 2029 | $299,446 | $12,875 | $6,503 | $318,824 | $25,805 | $772 | $2,225 | $24,518 | $975 | $54,295 | $373,119 | $3,398,573 |
| 2030 | $312,597 | $13,198 | $6,665 | $332,460 | $25,805 | $792 | $2,225 | $25,131 | $1,019 | $54,972 | $387,432 | $3,518,704 |
| 2031 | $326,329 | $13,531 | $6,832 | $346,692 | $25,805 | $811 | $2,225 | $25,759 | $1,065 | $55,666 | $402,357 | $3,637,521 |
| 2032 | $340,730 | $13,870 | $7,003 | $361,603 | $25,805 | $832 | $2,225 | $26,403 | $1,113 | $56,378 | $417,980 | $3,755,074 |
| 2033 | $355,818 | $14,217 | $7,178 | $377,213 | $25,805 | $852 | $2,225 | $27,063 | $1,163 | $57,109 | $434,322 | $3,871,406 |
| 2034 | $370,672 | $14,585 | $7,357 | $392,614 | $25,805 | $874 | $2,225 | $27,740 | $1,215 | $57,859 | $450,473 | $3,986,319 |
| 2035 | $387,165 | $14,950 | $7,541 | $409,656 | $25,805 | $896 | $2,225 | $28,433 | $1,270 | $58,629 | $468,285 | $4,100,087 |

## Table E.1-27 Expansion Plan Economic Summary - Without Taylor Energy Center - DSM and DLC

| Case Description | |
|---|---|
| Fuel Forecast: | Base Case |
| Load Forecast | Base Case |

| Economic Parameters | |
|---|---|
| CPW Discount Rate: | 5.0% |
| Final Capital Escalation Rate: | 2.5% |
| Base Year for CPW $ | 2006 |

| Financial Parameters | |
|---|---|
| Interest During Construction: | 5.00% |
| Fixed Charge Rate CT: (20 year) | 8.97% |
| Fixed Charge Rate CC: (25 year) | 7.92% |
| Fixed Charge Rate Coal: (30 year) | 7.25% |

| Generation Additions | | | | | |
|---|---|---|---|---|---|
| Unit Addition | 2006 Capital Cost ($1,000) | Construction and Development Period (months) | Month/Day/Year Installed (mm/dd/yy) | Installed Cost ($1,000) | Levelized Cost ($1,000) |
| CFB | 566,000 | 44 | 05/01/16 | 763,461 | 55,381 |

| | Production Cost | | | | Capital Cost and Other Project Costs | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fuel and Energy | O&M | | *Total Production* | Unit Capital | Community | Transmission | DSM and DLC Annual | Ongoing Capex | *Total Capital* | Total System | Cumulative Present Worth |
| Year | Cost ($1,000) | Variable ($1,000) | Fixed ($1,000) | *Cost ($1,000)* | Cost ($1,000) | Contribution ($1,000) | Charge ($1,000) | Costs ($1,000) | Cost ($1,000) | *Cost ($1,000)* | Cost ($1,000) | Cost ($1,000) |
| 2006 | $232,683 | $5,346 | $0 | $238,029 | $0 | $0 | $0 | $0 | $0 | $0 | $238,029 | $238,029 |
| 2007 | $231,389 | $5,714 | $0 | $237,103 | $0 | $0 | $0 | $4,523 | $0 | $4,523 | $241,626 | $468,149 |
| 2008 | $192,217 | $6,805 | $0 | $199,023 | $0 | $0 | $0 | $6,680 | $0 | $6,680 | $205,703 | $654,727 |
| 2009 | $166,021 | $7,566 | $0 | $173,586 | $0 | $0 | $0 | $8,968 | $0 | $8,968 | $182,555 | $812,425 |
| 2010 | $150,360 | $7,933 | $0 | $158,293 | $0 | $0 | $0 | $11,367 | $0 | $11,367 | $169,660 | $952,005 |
| 2011 | $147,874 | $8,192 | $0 | $156,067 | $0 | $0 | $0 | $13,913 | $0 | $13,913 | $169,979 | $1,085,188 |
| 2012 | $156,001 | $8,440 | $0 | $164,441 | $0 | $0 | $0 | $13,696 | $0 | $13,696 | $178,137 | $1,218,117 |
| 2013 | $164,762 | $8,697 | $0 | $173,458 | $0 | $0 | $0 | $16,242 | $0 | $16,242 | $189,700 | $1,352,933 |
| 2014 | $172,977 | $8,962 | $0 | $181,939 | $0 | $0 | $0 | $16,806 | $0 | $16,806 | $198,745 | $1,487,452 |
| 2015 | $181,777 | $9,235 | $0 | $191,012 | $0 | $0 | $0 | $17,622 | $0 | $17,622 | $208,634 | $1,621,939 |
| 2016 | $157,884 | $11,609 | $8,215 | $177,708 | $37,072 | $0 | $0 | $16,157 | $0 | $53,229 | $230,937 | $1,763,714 |
| 2017 | $152,321 | $12,879 | $12,544 | $177,744 | $55,381 | $0 | $0 | $16,725 | $0 | $72,106 | $249,850 | $1,909,796 |
| 2018 | $159,532 | $13,275 | $12,858 | $185,664 | $55,381 | $0 | $0 | $17,620 | $0 | $73,002 | $258,666 | $2,053,831 |
| 2019 | $169,428 | $13,711 | $13,179 | $196,318 | $55,381 | $0 | $0 | $16,411 | $0 | $71,792 | $268,110 | $2,196,016 |
| 2020 | $177,654 | $14,155 | $13,509 | $205,318 | $55,381 | $0 | $0 | $17,221 | $0 | $72,602 | $277,920 | $2,336,385 |
| 2021 | $185,750 | $14,613 | $13,846 | $214,210 | $55,381 | $0 | $0 | $18,372 | $0 | $73,754 | $287,963 | $2,474,900 |
| 2022 | $194,009 | $15,109 | $14,193 | $223,310 | $55,381 | $0 | $0 | $17,620 | $0 | $73,001 | $296,311 | $2,610,644 |
| 2023 | $207,453 | $15,621 | $14,547 | $237,621 | $55,381 | $0 | $0 | $19,258 | $0 | $74,640 | $312,261 | $2,746,882 |
| 2024 | $229,201 | $16,489 | $14,911 | $260,601 | $55,381 | $0 | $0 | $20,471 | $0 | $75,853 | $336,454 | $2,886,686 |
| 2025 | $241,970 | $17,084 | $15,284 | $274,338 | $55,381 | $0 | $0 | $22,212 | $0 | $77,594 | $351,931 | $3,025,957 |
| 2026 | $251,711 | $17,510 | $15,666 | $284,887 | $55,381 | $0 | $0 | $22,767 | $0 | $78,149 | $363,036 | $3,162,781 |
| 2027 | $262,842 | $17,949 | $16,058 | $296,848 | $55,381 | $0 | $0 | $23,337 | $0 | $78,718 | $375,566 | $3,297,588 |
| 2028 | $274,056 | $18,398 | $16,459 | $308,913 | $55,381 | $0 | $0 | $23,920 | $0 | $79,302 | $388,215 | $3,430,299 |
| 2029 | $285,667 | $18,859 | $16,871 | $321,396 | $55,381 | $0 | $0 | $24,518 | $0 | $79,900 | $401,296 | $3,560,950 |
| 2030 | $297,980 | $19,332 | $17,292 | $334,604 | $55,381 | $0 | $0 | $25,131 | $0 | $80,512 | $415,116 | $3,689,664 |
| 2031 | $310,849 | $19,815 | $17,725 | $348,390 | $55,381 | $0 | $0 | $25,759 | $0 | $81,141 | $429,530 | $3,816,505 |
| 2032 | $324,318 | $20,311 | $18,168 | $362,797 | $55,381 | $0 | $0 | $26,403 | $0 | $81,785 | $444,581 | $3,941,540 |
| 2033 | $339,589 | $20,867 | $18,622 | $379,078 | $55,381 | $0 | $0 | $27,063 | $0 | $82,445 | $461,523 | $4,065,158 |
| 2034 | $354,425 | $21,390 | $19,088 | $394,903 | $55,381 | $0 | $0 | $27,740 | $0 | $83,121 | $478,024 | $4,187,099 |
| 2035 | $369,993 | $21,924 | $19,565 | $411,482 | $55,381 | $0 | $0 | $28,433 | $0 | $83,815 | $495,297 | $4,307,429 |

## Table E.1-28 Expansion Plan Economic Summary - With Taylor Energy Center in May of 2013

| Case Description | |
|---|---|
| Fuel Forecast: | Base Case |
| Load Forecast | Base Case |

| Economic Parameters | |
|---|---|
| CPW Discount Rate: | 5.0% |
| Final Capital Escalation Rate: | 2.5% |
| Base Year for CPW $ | 2006 |

| Financial Parameters | |
|---|---|
| Interest During Construction: | 5.00% |
| Fixed Charge Rate CT: (20 year) | 8.97% |
| Fixed Charge Rate CC: (25 year) | 7.92% |
| Fixed Charge Rate Coal: (30 year) | 7.25% |

| | Generation Additions | | | | |
|---|---|---|---|---|---|
| Unit Addition | 2006 Capital Cost ($1,000) | Construction and Development Period (months) | Month/Day/Year Installed (mm/dd/yy) | Installed Cost ($1,000) | Levelized Cost ($1,000) |
| TEC | NA | NA | 05/01/13 | 364,280 | 26,425 |
| GE LMS100 SC | 66,300 | 17 | 05/01/16 | 87,038 | 7,809 |
| GE LMS100 SC | 66,300 | 17 | 05/01/21 | 98,471 | 8,835 |

| | Production Cost | | | | Capital Cost and Other Project Costs | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fuel and Energy | O&M | | *Total Production* | | | | | Ongoing | *Total* | Total | Cumulative Present |
| Year | Cost ($1,000) | Variable ($1,000) | Fixed ($1,000) | *Cost ($1,000)* | Unit Capital Cost ($1,000) | Community Contribution ($1,000) | Transmission Charge ($1,000) | Seasonal Purchase ($1,000) | Capex Cost ($1,000) | *Capital Cost ($1,000)* | System Cost ($1,000) | Worth Cost ($1,000) |
| 2006 | $232,683 | $5,346 | $0 | $238,029 | $0 | $0 | $0 | $0 | $0 | $0 | $238,029 | $238,029 |
| 2007 | $232,226 | $5,739 | $0 | $237,965 | $0 | $0 | $0 | $0 | $0 | $0 | $237,965 | $464,662 |
| 2008 | $193,920 | $6,872 | $0 | $200,791 | $0 | $0 | $0 | $0 | $0 | $0 | $200,791 | $646,785 |
| 2009 | $168,573 | $7,694 | $0 | $176,267 | $0 | $0 | $0 | $0 | $0 | $0 | $176,267 | $799,051 |
| 2010 | $154,375 | $8,148 | $0 | $162,523 | $0 | $0 | $0 | $0 | $0 | $0 | $162,523 | $932,760 |
| 2011 | $152,718 | $8,496 | $0 | $161,213 | $0 | $0 | $0 | $990 | $0 | $990 | $162,203 | $1,059,850 |
| 2012 | $162,742 | $8,847 | $0 | $171,589 | $0 | $0 | $0 | $1,530 | $0 | $1,530 | $173,119 | $1,189,034 |
| 2013 | $155,052 | $8,239 | $2,940 | $166,231 | $17,737 | $520 | $1,483 | $0 | $318 | $20,058 | $186,289 | $1,321,426 |
| 2014 | $152,920 | $8,073 | $4,490 | $165,483 | $26,425 | $533 | $2,225 | $0 | $494 | $29,677 | $195,160 | $1,453,518 |
| 2015 | $164,843 | $8,450 | $4,602 | $177,896 | $26,425 | $547 | $2,225 | $0 | $517 | $29,713 | $207,608 | $1,587,344 |
| 2016 | $172,087 | $8,869 | $5,684 | $186,640 | $31,652 | $560 | $2,225 | $0 | $540 | $34,977 | $221,617 | $1,723,397 |
| 2017 | $180,981 | $9,389 | $6,311 | $196,682 | $34,234 | $574 | $2,225 | $0 | $564 | $37,597 | $234,278 | $1,860,375 |
| 2018 | $190,652 | $9,874 | $6,469 | $206,995 | $34,234 | $589 | $2,225 | $0 | $590 | $37,637 | $244,632 | $1,996,595 |
| 2019 | $203,439 | $10,295 | $6,631 | $220,365 | $34,234 | $603 | $2,225 | $0 | $616 | $37,678 | $258,043 | $2,133,441 |
| 2020 | $217,137 | $10,798 | $6,797 | $234,731 | $34,234 | $618 | $2,225 | $0 | $644 | $37,721 | $272,452 | $2,271,047 |
| 2021 | $229,196 | $11,357 | $8,060 | $248,613 | $40,164 | $634 | $2,225 | $0 | $673 | $43,695 | $292,308 | $2,411,653 |
| 2022 | $241,174 | $11,853 | $8,811 | $261,838 | $43,069 | $650 | $2,225 | $0 | $703 | $46,646 | $308,484 | $2,552,973 |
| 2023 | $256,364 | $12,425 | $9,031 | $277,820 | $43,069 | $666 | $2,225 | $0 | $735 | $46,694 | $324,513 | $2,694,557 |
| 2024 | $274,592 | $13,482 | $9,257 | $297,331 | $43,069 | $683 | $2,225 | $0 | $768 | $46,744 | $344,075 | $2,837,527 |
| 2025 | $293,263 | $13,987 | $9,488 | $316,739 | $43,069 | $700 | $2,225 | $0 | $802 | $46,795 | $363,534 | $2,981,390 |
| 2026 | $305,236 | $14,353 | $9,726 | $329,315 | $43,069 | $717 | $2,225 | $0 | $838 | $46,849 | $376,164 | $3,123,162 |
| 2027 | $317,302 | $14,713 | $9,969 | $341,983 | $43,069 | $735 | $2,225 | $0 | $876 | $46,904 | $388,888 | $3,262,750 |
| 2028 | $331,195 | $15,147 | $10,218 | $356,561 | $43,069 | $753 | $2,225 | $0 | $915 | $46,962 | $403,523 | $3,400,694 |
| 2029 | $345,737 | $15,527 | $10,473 | $371,738 | $43,069 | $772 | $2,225 | $0 | $957 | $47,022 | $418,760 | $3,537,031 |
| 2030 | $360,987 | $15,917 | $10,735 | $387,639 | $43,069 | $792 | $2,225 | $0 | $1,000 | $47,085 | $434,724 | $3,671,825 |
| 2031 | $376,923 | $16,315 | $11,004 | $404,242 | $43,069 | $811 | $2,225 | $0 | $1,045 | $47,149 | $451,392 | $3,805,122 |
| 2032 | $393,622 | $16,724 | $11,279 | $421,625 | $43,069 | $832 | $2,225 | $0 | $1,092 | $47,217 | $468,841 | $3,936,979 |
| 2033 | $411,111 | $17,143 | $11,561 | $439,815 | $43,069 | $852 | $2,225 | $0 | $1,141 | $47,287 | $487,101 | $4,067,449 |
| 2034 | $429,407 | $17,572 | $11,850 | $458,829 | $43,069 | $874 | $2,225 | $0 | $1,192 | $47,359 | $506,189 | $4,196,574 |
| 2035 | $448,569 | $18,013 | $12,146 | $478,727 | $43,069 | $896 | $2,225 | $0 | $1,246 | $47,435 | $526,162 | $4,324,403 |