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January 4, 2016 **PUBLIC DOCUMENT**

Daniel P. Wolf
Executive Secretary
Minnesota Public Utilities Commission
121 Seventh Place East, Suite 350
St. Paul, MN 55101-2147

RE: **PUBLIC Comments of the Minnesota Department of Commerce, Division of Energy Resources**
Docket No. E015/RP-15-690

Dear Mr. Wolf:

Attached are the **PUBLIC** Comments of the Minnesota Department of Commerce, Division of Energy Resources (the Department) in the following matter:

> Minnesota Power's Application for Approval of its 2015-2029 Integrated Resource Plan.

The Petitioner is:

> Lori Hoyum
> Policy Manager
> Minnesota Power
> 30 West Superior Street
> Duluth, MN 55802-2191

The Department recommends that the Commission approve Minnesota Power's 2015-2029 Integrated Resource Plan with modifications. The Department's team of Samir Ouanes, Susan Peirce, Stephen Rakow, Zac Ruzycki, Sachin Shah and I are available to answer any questions the Commission may have.

Sincerely,

/s/ CHRISTOPHER T. DAVIS
Rates Analyst

CTD/lt
Attachment

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MINNESOTA DEPARTMENT OF COMMERCE

PUBLIC DOCUMENT

BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION

PUBLIC COMMENTS OF THE MINNESOTA DEPARTMENT OF COMMERCE DIVISION OF ENERGY RESOURCES

MINNESOTA POWER'S 2016 RESOURCE PLAN

DOCKET NO. E015/RP-15-690

I. INTRODUCTION

A. COMMISSION ORDER

Minnesota Power (MP or the Company) submitted its last resource plan on March 1, 2013 in Docket No. E015/RP-13-53. On November 12, 2013, the Commission submitted its *Order Approving Resource Plan, Requiring Filings, and Setting Date for Next Resource Plan* with the following Order Points:

1. The Commission approves Minnesota Power's 2013 – 2027 resource plan. This approval does not extend to particular projects that are currently under review in other proceedings or will be subject to review in future proceedings, but is a general finding that the plans filed by Minnesota Power appear to be reasonable in light of the entire record.
2. The Commission finds that Minnesota Power's proposal to refuel Laskin units 1 and 2 to operate on natural gas by 2015 is reasonable.
3. The Commission finds that Minnesota Power's proposal to remove Taconite Harbor unit 3 from Minnesota Power's system by the end of 2015 is reasonable.
4. If Minnesota Power pursues refueling Laskin units 1 and 2 to operate on natural gas, or removing Taconite Harbor unit 3 from Minnesota Power's system, then, within nine months of the date of this Order, Minnesota Power shall file updated project costs and associated schedules.
5. Minnesota Power shall obtain approximately 200 MW, subject to need, of intermediate capacity (and associated energy) in the 2015 – 2017 timeframe by constructing the resource itself, by sharing in the ownership of the resource, or by procuring the resource through bilateral contracts, whichever option is most cost-effective.
6. The Commission finds that with Minnesota Power's proposed retirement of

Taconite Harbor unit 3, the current resource plan demonstrates Minnesota Power's need for an additional 50 MW of capacity in 2015, increasing up to 100 MW by 2019. Based on the modeling in the record, adding intermediate resources most appropriately reflects the nature of Minnesota Power's system needs.

7. When Minnesota Power commits to a specific bilateral contract, the Company shall file pertinent details of the contract, such as the duration, price, and amount of capacity and associated energy to be procured.
8. Minnesota Power shall file with the Commission all relevant MISO Attachment Y requests and the results of each, including whether Minnesota Power has requested MISO to evaluate any Minnesota Power unit as a System Support Resource.
9. On or before September 1, 2015, Minnesota Power shall make its next resource plan filing.
10. Thirty days prior to its next resource plan filing date, Minnesota Power shall file its energy and demand forecast and Strategist commands.
11. The Commission approves an energy savings goal of 1.87 percent of Minnesota Power's retail sales by its next resource plan filing.
12. For its next resource plan, Minnesota Power shall:
    a. Identify the amount of energy savings embedded in each year of its load forecast, in terms of total savings (kWh) and as a percentage of non-CIP-exempt retail sales;
    b. Identify the amount of system-wide energy savings, including aggregate data for CIP-exempt customers, embedded in each year of its load forecast;
    c. Evaluate additional conservation scenarios for its CIP-exempt and non-CIP-exempt customers, that would achieve greater energy savings beyond those in the base case; and
    d. Provide cost assumptions for achieving every 0.1 percent of savings above 1.5 percent of non-CIP-exempt retail sales.
13. In its next resource plan filing, Minnesota Power shall include the midpoint of the Commission's approved CO_2 range in its base case assumptions.
14. In its next resource plan filing, Minnesota Power shall include a full analysis of the effects of retiring or repowering the Taconite 1 and 2 plants, including transmission and distribution effects.
15. In its next resource plan filing, Minnesota Power shall provide a summary of its compliance with new statutory measures and how the legislative changes impact its resource plan.

In compliance with Order Point 10, MP filed its energy and demand forecasts and Strategist commands on July 31, 2015. Further, in compliance with Order Point 9, MP submitted the instant resource plan on September 1, 2015. On November 4, 2015 MP supplemented its initial filing with additional information in response to Order Point 12 above. On November 9, 2015, the Department submitted a letter concluding that, with the supplemental information, MP's 2015 resource plan should be considered complete.

II. MP'S 2015 IRP

A. MP'S RESOURCE NEEDS DURING PLANNING PERIOD

Table 1 below shows MP's resource needs over its 2015 IRP planning period. Negative numbers indicate that MP needs to add resources. For example, in 2017, MP is expected to have a capacity deficit of 48.6 MW, growing to 54.2 MW in 2018.

Table 1: MP's Capacity Resource Needs[1]

Year	Surplus/ (Deficit) in MW
2015	40.6
2016	97.6
2017	(48.6)
2018	(54.2)
2019	(12.8)
2020	125.3
2021	119.2
2022	93.7
2023	67.6
2024	41.1
2025	(113.5)
2026	(140.2)
2027	(285.8)
2028	(293.5)
2029	(302.1)
2030	(310.0)

[1] The Department's calculation is based on the following assumptions:

- Future resources under contract come on-line as scheduled (Power Purchase Agreement from the Manitoba Hydro Electric Board, MHEB);
- MP achieves demand savings embedded in econometric forecast;
- Taconite Harbor 1 & 2 shut down in 2026;
- Boswell 1 & 2 shut down in 2024; and
- No resources for the Solar Standard are acquired.

B. MP'S ANALYSIS APPROACH

MP stated that it used a four step planning approach for evaluating how to proceed given concerns with environmental regulations and the need to add capacity to its system. MP used the first two steps to define the Company's Preferred Coal Plan. The four steps are as follows:

1. Screen Remission Options for Small Coal & Alternatives. MP evaluated whether a remission alternative is most cost-effective for each remaining small coal-fired generation facility and screens which new resource alternatives and DSM programs are most cost-effective at augmenting the power supply. By "remission alternative" MP means repowering the generation facility with a different fuel.

2. Detailed Coal Analysis. MP determined if a small coal-fired generation facility should be closed/shutdown prior to the accounting end of life rather than move forward with the cost effective option from Step 1. This step included a series of over 35 sensitivities that stress generation cost drivers such as delivered fuel, CO_2 penalties, capital and additional customer load outlooks.

3. Detailed Coal Analysis. MP identified a resource expansion plan that will augment the preferred Small Coal Strategy identified in Steps 1 and 2 that it believes will best meet its customer requirements.

4. Comparative Analysis. MP compared its Preferred Plan to the following three alternative resource expansion plans[2]:

    a. Continue small coal operations through the mid-2020s.

    b. Refuel Boswell 1&2 with natural gas.

    c. Early shutdown of remaining small coal-fired generation.

C. MP'S PROPOSED RESOURCE PLAN

Based on its analysis, MP proposes the following plan:

1. Idle Taconite Harbor 1&2 (150 MW) in 2016, use for reliability when market conditions are favorable[3].

[2] The comparison included over 50 sensitivities such as delivered fuel cost, CO_2 regulation costs, capital costs and additional customer load forecasts.

[3] Minnesota Power's definition of "idling" Taconite Harbor 1&2 was clarified in the Company's response to Information Request 12 from the Clean Energy Organizations (CEO):

> Minnesota Power will offer Taconite Harbor Energy Center ("THEC") into the annual Midcontinent Independent System Operator ("MISO") Capacity Auction for the 2016/2017 planning year in March 2016. Minnesota Power will then continue to offer THEC into each subsequent Annual Capacity Auction for planning years 2017/2018, 2018/2019 and 2019/2020. If

2. Upgrade environmental performance of Boswell 1&2 (130 MW) by 2018.

3. Procure 200 MW bilateral market purchases to bridge needs between 2016 and 2019.

4. Procure 33 MW of solar energy by 2025, beginning with the 10 MW Camp Ridley project in 2016.

5. Submit a request for proposals (RFP) for 200 MW-300 MW of combined cycle resources for implementation by 2024[4].

6. Procure average annual energy savings of 57.3 GWh (1.87 percent) during the planning period.

7. Begin procurement of 250 MW of energy and 133 MW of capacity from Manitoba Hydro beginning in 2020.

8. Reduce MP's offtake from the Young 2 coal generating station from 100 MW to 0 MW by 2026.

9. Propose an 8-10 MW customer backup generation pilot program in 2016.

MP's Preferred Plan is presented graphically in Table 2 below.

THEC is selected as economical in the capacity auction, Minnesota Power will offer THEC into the energy and ancillary services market if the units clear MISO's Annual Capacity Auction for that planning year.

[4] MP actually submitted an RFP for 200-400 MW. See http://www.duluthnewstribune.com/news/3897552-minnesota-power-seeks-bids-first-big-gas-plant

Table 2: MP's Preferred Plan

Year	THEC 1&2	BEC 1&2	DSM	Backup Generation Pilot Program	Natural Gas CC	Solar Resources	Manitoba Hydro PPA	Young 2
2015								95 MW
2016	Idle			8 MW Proxy		10 MW Camp Ripley		95 MW
2017			Consider additional investment (+11 GWh as proxy)					95 MW
2018		SO_2 Reduction						95 MW
2019								95 MW
2020	Cease Coal					12 MW Proxy	383 MW	95 MW
2021								95 MW
2022								75 MW
2023								57 MW
2024		closely assess for retirement			200-300 MW			38 MW
2025						10 MW Proxy		19 MW
2026								0 MW
2027								0 MW
2028								0 MW
2029								0 MW
2030								0 MW

III. DEPARTMENT ANALYSIS

A. REVIEW OF MP's ENERGY AND DEMAND FORECASTS

1. Overview of MP's Forecasts

The Department evaluated MP's energy and peak demand forecasts by:

- reviewing the Company's output data to examine the reasonableness of Minnesota Power's forecast period growth rates and adjustments to forecast outputs, and
- comparing the Company's current forecast, based on its Advance Forecast Report (AFR) 2014, with the Company's previous forecasts to see whether there were any unusual changes in forecast outcomes compared to MP's AFR 2012.

Changes in forecast methodology or other factors outside of the forecasting model--such as unusual weather, economic changes, or changes in consumption by large customers--may lead to significant, but reasonable, differences between a current forecast and previous forecasts. However, generally speaking, a review of how well a forecast predicts usage over a prior period is a good indicator of the quality of the overall forecasting process.

For example, in Appendix A of the Petition, MP provided detailed information on its forecast used in the IRP. In figures 12 through 14, MP provided information on its past forecast accuracy.[5] For example, for 2013 MP states that the difference between the forecast produced in 2013 (AFR 2013) and the 2013 year-end actual was 0.2 percent. In other words, the forecast was lower than the year-end actual by 0.2 percent.

For this IRP, the Company used a modeling approach for each of its rate class models and its peak demand model that was similar to the model the Company used in its previous IRP filing. The Company used various economic variables, monthly determinants, weather conditions, and trend variables to estimate monthly sales. Minnesota Power developed separate energy sales forecasts for each customer class. The Company developed its total system sales forecast by summing all of its class-specific forecasts. Minnesota Power arrived at its total retail energy requirement (including generation necessary to offset losses) by applying a monthly loss factor to its energy sales forecasts.

On page 1 of its Appendix A, MP stated the following:

> Per Order Point 10 of the 2013 Integrated Resource Plan's November 12, 2013 Order,[1] Minnesota Power is required to file its energy and demand forecast and Strategist commands thirty days prior to its next resource plan filing date, which is September 1, 2015. Therefore, the Company used the AFR2014 as the basis for the 2015 Integrated Resource Plan ("2015 Plan") due to the inability to conduct the extensive analysis required for the 2015 Plan between the July 1 submittal of Minnesota Power's 2015 Annual Electric Utility Forecast Report ("AFR2015") and August 1 when the forecasts and commands were required to be submitted. A sensitivity case using data from the AFR2015 was performed in July and the results are discussed in Appendix K beginning on page 30.

1 Docket No. E015/RP-13-53.

On page 39 of its Petition, MP stated the following:

[5] See Pages 41-43, Appendix A of MP's Petition.

8. Minnesota Power's energy demand outlook was updated with AFR2014, its July 1, 2014 submittal to the Department of Commerce – Division of Energy Resources ("Department").[28]

28 As Minnesota Power needed to begin its resource planning analysis in early 2015, the AFR2014 was the latest load outlook available for use. The AFR2015 filing was made to the Department on July 1, 2015, and was incorporated into the analysis as a sensitivity to ensure the short and long-term action plans were not impacted by the update in projection (See Appendix K).

Thus, MP forecasts its energy requirements and peak demands from 2014 through 2028.

2. Energy and Demand Forecasts

a. Forecast of Energy Requirements

Table 3 below presents MP's forecasted energy requirements at the 50th percentile of probability.

Table 3: MP Total Delivered Energy (MWh)

	Median 50% Probability
2014	11,705,702
2015	11,953,998
2016	12,330,905
2017	12,909,749
2018	13,002,284
2019	13,062,008
2020	13,158,395
2021	13,169,713
2022	13,217,452
2023	13,275,706
2024	13,363,068
2025	13,386,634
2026	13,448,376
2027	13,512,349
2028	13,614,472
Average Annual Growth 2014 - 2028	1.1%

Table 3 above shows that at the 50th percentile forecast MP projects that its delivered energy requirement will grow by 1.1% annually.

b. Forecast of Peak Demand

Table 4 below presents MP's forecasted delivered summer and winter peak demand at the 50th percentile of probability. On page 25 of its Petition, MP stated the following:

> Minnesota Power is historically a winter peaking utility, and based on monthly trends in load behavior is expected to remain winter peaking for the AFR2014 period of 2014 to 2028.

MP's summer and winter delivered peak demand is projected to grow by 1.2 and 1.1%, respectively, during the forecast periods. The delivered peak demand is forecasted monthly using weather variables.

Table 4: MP's Peak Demand Forecast

	MP Delivered Peak Demand Median (50%) Summer Peak (MW)	Winter Peak (MW)
2014	1,555	1,599
2015	1,606	1,629
2016	1,641	1,755
2017	1,740	1,770
2018	1,752	1,777
2019	1,760	1,786
2020	1,769	1,794
2021	1,775	1,801
2022	1,781	1,807
2023	1,788	1,817
2024	1,795	1,825
2025	1,802	1,833
2026	1,810	1,842
2027	1,818	1,851
2028	1,825	1,860
Average Annual Growth 2014 - 2028	1.2%	1.1%

The Department's modeling section and comments below discuss MP's reserve margin. In its Petition, MP stated the following:[6]

> In the 2015 Plan analysis, Minnesota Power used the summer peak demand forecast coincident with MISO's peak ("MISO coincident peak") for determining the capacity requirements. The MISO coincident peak is where Minnesota Power demand is projected to be at the time MISO's entire system peaks in the summer period. Traditionally, Minnesota Power has planned its capacity requirements for its own system peak, which occurs in the winter.

[6] See Page 42 of Appendix K: Detailed Analysis Section.

The coincidence factor (CF) referenced above is first calculated by dividing MP's demand at the time of MISO peak (coincident demand) to the overall peak on MP's system, regardless of whether it coincides with MISO's peak (non-coincident demand peak). If the coincidence factor is 100 percent, then MP's peak fully coincides with MISO's peak and there is no diversity between MP's system and MISO's system. If the coincidence factor is less than one, then MP's peak occurs at a different time than MISO's peak and MP can use some of that diversity in the system to serve its customers' needs.[7] MISO provides its monthly peak data by month and year (for the particular month; only June, July, August and September data are currently published by MISO).[8]

The diversity factor (DF) is then calculated by subtracting the coincidence factor from 1 (1 – CF = DF). For illustrative purposes, a difference of 1 percent DF on MP's system (assuming a 2,000 MW peak) translates into a change of approximately 20 MW. Thus, another reason the Department modeled forecast bands around the peak demand is to address potential changes in the diversity factor and reserve margin as explained in the modeling section of these comments.

3. Input Data

Minnesota Power's forecast models used historical monthly energy sales, historical monthly peak demand data, economic variables, demographic variables, trend variables, and weather variables. The Company's economic and demographic variables are derived from various sources, including Regional Economic Models, Inc.; IHS Global Insight; and the Federal Reserve Board. Minnesota Power's weather data is taken from the National Oceanic and Atmospheric Administration's Duluth monitoring station and from Weather Underground.[9]

In its Appendix A, MP provided detailed information on its forecast methodology, assumptions and inputs for the 2014 AFR. For example, on page 11 of its Appendix A, MP provided a discussion on methodological adjustments to its 2014 AFR. On page 19 of its Appendix A, MP stated the following:

[7] A coincidence factor closer to zero (which is not the case with MP) would indicate a great deal of diversity between MISO's peak and a utility's peak.
[8] Please see MP's electronic file titled, "2005-2013 Historical Peak Dates and Times.pdf"
[9] See Page 15 of Appendix A.

> Minnesota Power made a number of adjustments to internally developed data for the 2014 AFR, which fall into four general categories:
>
> 1. Revisions of count, sales, and peak demand data
>
> 2. Adjustments to raw customer count data for billing anomalies
>
> 3. Adjustments to raw sales and peak demand data for large load additions and losses
>
> 4. Revision of customer appliance saturation rate estimates

In its *June 3, 2013 Comments* in MP's last IRP in Docket No. E015/RP-13-53 (Docket 13-53), the Department pointed out inconsistencies in MP's data at the time:[10]

> The Department appreciates MP's reconciliation and explanation of the data discrepancies as mentioned above and described in detail in its response to Department IR no. 23. However, rather than requiring discovery by the Department to flesh out basic information about the Company's forecast data, MP should provide detailed explanation(s) and documentation upfront, similar to its response to Department IR no. 23, in any filing relying on forecasts, including resource plans, certificates of need and rate cases. This upfront transparency and reconciliation in any data would not only enable MP to keep track of all changes in its data and forecasts from period to period but also enable third party reviewers to readily know what changes may have transpired in MP's data and forecasts. Thus, the Department recommends that the Commission require MP to provide detailed explanation(s) and documentation upfront, in a manner similar to its response to Department IR no. 23, whenever MP submits data and forecasts or uses data and forecasts in any regulatory filing requiring forecasts.

The Department appreciates MP's inclusion of the explanation and reconciliation of the data in its *Petition*. The Department also appreciates all the detailed information provided by MP in its Appendix A regarding its energy and peak demand forecasts.

[10] See page 11 of the Department's *June 3, 2013 Comments* in Docket 13-53.

4. Output Data

Minnesota Power is unique among Minnesota utilities given the size of large industrial load on its system relative to the rest of its retail load. The electric load associated with these large industrial customers accounts, on average, for approximately 54 percent[11] of Minnesota Power's total system load; in addition, some of these large customers have their own on-site generation. These unique operational characteristics require Minnesota Power to adjust its energy and peak demand forecasts accordingly.

The Company's official peak forecast is based on the sum of its econometric forecast, Coincident Customer's Net Load (CCNL), Customer Generation, and Dual Fuel load. Minnesota Power's official energy forecast is the sum of its econometric forecasts, as described earlier in this section, the CCNL, and Customer Generation.

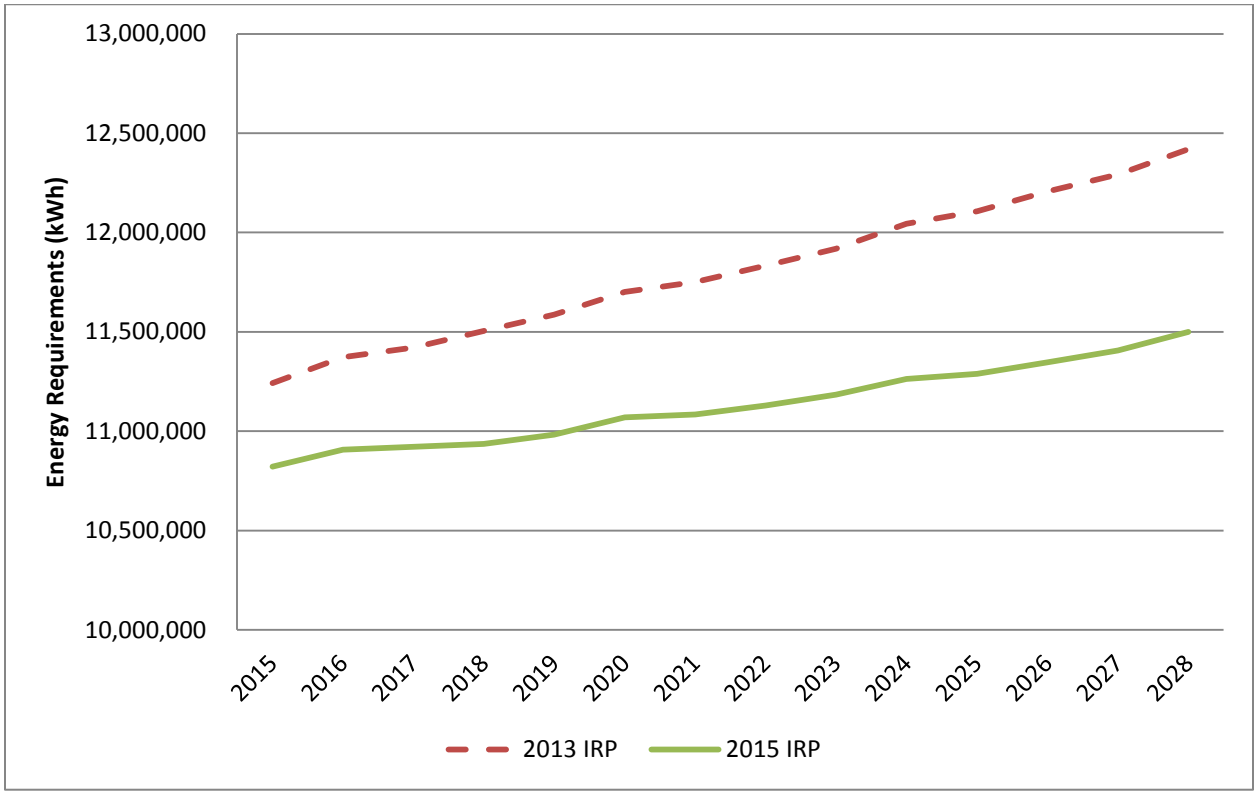
5. Consistency with Previous IRP Forecasts

As noted earlier, the forecasts used in the current IRP are constructed using Minnesota Power's 2014 AFR and the forecasts in its previous IRP filing were constructed using its 2012 AFR. Minnesota Power's AFR represents its long-run forecasting and planning approach that is updated on an annual basis. MP also uses the AFR and other information when estimating test year sales in its rate case filings.

The total energy forecasts and peak demand forecasts, on an annual basis, are similar between the current IRP filing (based on the 2014 AFR) and its previous IRP (based on the 2012 AFR). Minnesota Power projects lower energy (kWh) consumption in the current IRP compared to the previous IRP filing. In Figure 1 below, the Department compares the two forecasts graphically.

[11] See Page 1 of *Section 1: About Minnesota Power* of the Company's Petition.

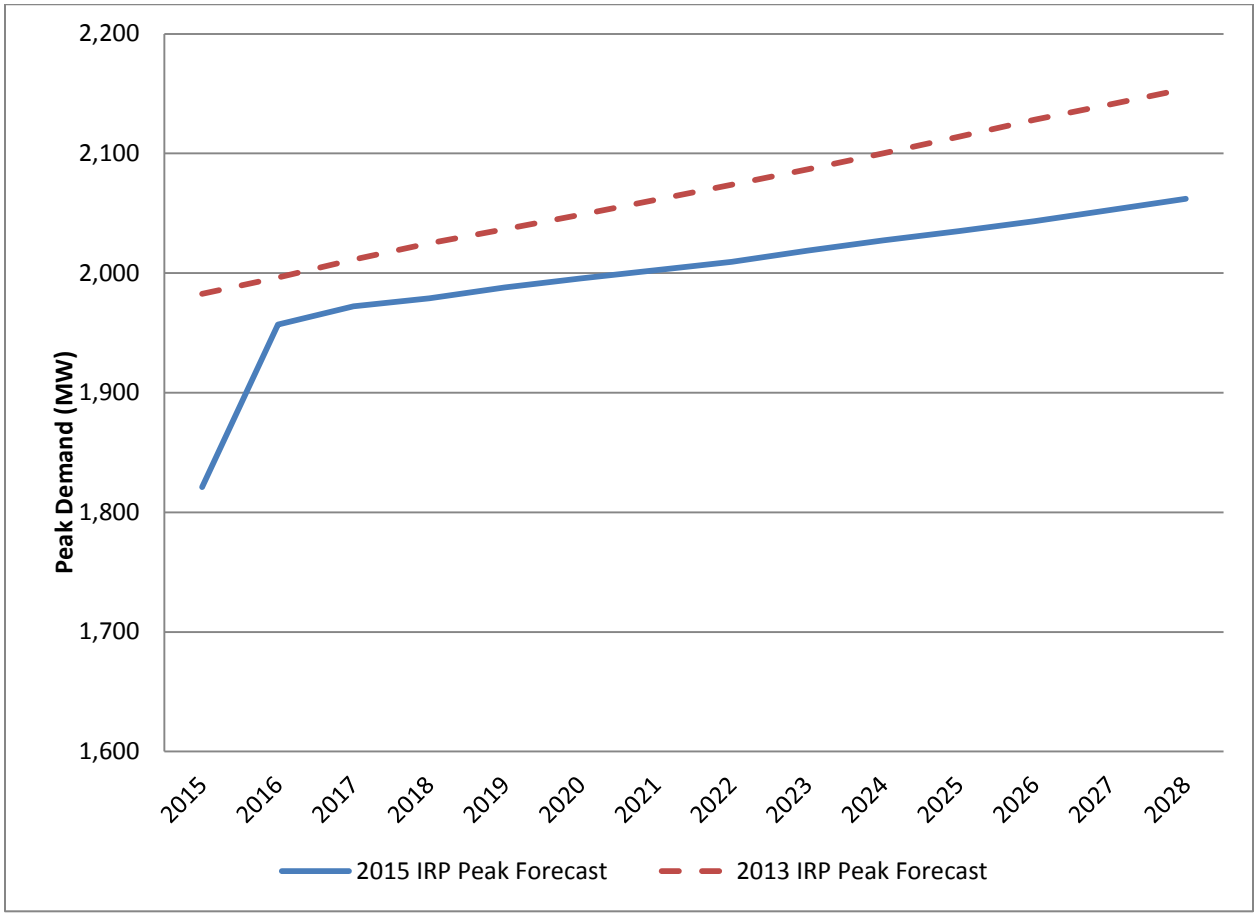
Figure 1: Comparison of Energy Forecasts



Based on its graphical review, other than the lower forecast (approximately four percent lower in 2016, estimated to grow to approximately six percent lower in 2028), the Department does not observe material differences in the forecasting patterns between the forecasts. However, as explained before, factors outside of the forecasting model, such as unusual weather, economic changes, or changes in consumption by large customers, may lead to significant, but rational, differences between a current forecast and previous forecasts.

The Company projects lower peak demand (MW) in the current IRP filing compared to the previous IRP. In the same manner as the energy forecasts, the Department also compared the peak demand forecasts graphically, as shown in Figure 2 below.

Figure 2: Comparison of Peak Demand Forecasts



Overall, the Department did not observe any differences in the forecasting pattern between the two forecasts except in the period from 2015 to 2016.

On page 3 of its Appendix A, MP stated the following:

> **Moderate Growth Scenario with Deferred Resale:** includes additional loads served by Minnesota Power and its wholesale customers that are likely but not yet certain. This scenario's assumptions are identical to those in the Moderate Growth scenario except the start of a new mining customer's facility in Nashwauk is delayed by one year. This scenario demonstrates the sensitivity of Minnesota Power's demand and energy outlook to the timing of this prospective customer's start-up.

In its 2013 IRP, MP assumed incremental load additions and demand growth of approximately 125 MW beginning in winter 2013 compared to the current IRP, which assumes incremental load additions and demand growth of 183 MW in 2016. The Department concludes that, with the reconciliation of the new customer load, the peak demand forecast results are sufficiently similar for IRP purposes.

6. DOC's Recommendations

Minnesota Power has continued to work on improving its sales and peak demand forecasts since its previous IRP filing. In the resource plan, the Department's analytical approach is typically geared more towards range estimates and risk analysis as opposed to point estimates, which is the primary tool in a proceeding such as a general rate case. As a result, the Department concludes that MP's forecasts are satisfactory for IRP planning purposes and recommends their approval.

B. MODELING REVIEW

1. Introduction

The Department used Strategist to review MP's modeling efforts. The general process followed by the Department when reviewing Strategist modeling is as follows:

1. obtain from the applicant a base case file, and the commands necessary to re-create the various scenarios explored by the Company;
2. re-run the applicant's base case file to make sure that the outputs match and the Department is working with the correct file;
3. review the base case's inputs and outputs for reasonableness;
4. create a new base case, which includes any changes deemed necessary to the Company's base case;
5. run scenarios of interest on the new base case to explore various risks and alternative futures;
6. assess the results of the scenarios and establish a new preferred case; and
7. run scenarios of interest on the new preferred case to test the robustness of the preferred case.

The Department's overall goal in reviewing utility modeling efforts is to determine if the Company's proposed plan results in a reliable, low cost, low environmental impact system that manages risk, and to recommend modifications if needed.

2. Verifying MP's Strategist Results

The first step in the Department's modeling was to obtain from MP the Company's reference case and the commands necessary to re-create certain contingencies and scenarios explored by the Company in the Petition.[12] The Department re-ran the reference case provided by MP through Strategist. The Department's outputs matched the results included in the file provided by MP, confirming that the Department was working with the inputs that created MP's outputs and that modeling could proceed.
For the second step, the Department attempted to match the results from the reference case file provided by MP to the reference case results reported in the Petition. However, the cost results for the full study period did not match the costs reported by MP. The Department ultimately determined that MP appeared to be providing results from 2032 even though MP actually ran Strategist through 2034 with a subsequent end effects period.

[12] This Strategist data was provided by MP on July 31, 2015—one month prior to filing the Petition.

Having verified how MP reported its results in the Petition, the Department concluded that it would be preferable for the cost results reported in our comments to be for the full study period. The Department also determined that it would be preferable to use a 15-year planning period (2016-2030) since that is the duration specified in the resource planning rules.[13]

3. Changes to MP's Reference Case

The Department made several changes to MP's reference case file with the spot market turned on. There were no significant issues with MP's wind expansion unit and solar expansion unit. However, the Department concluded that a different wind modeling approach would enable greater flexibility in sizing of the wind units. MP has an up-front energy need; larger wind and solar units could potentially supply that need in the early years of the plan. However, once that initial need is filled smaller units provide a better match for MP's forecasted energy growth rate.

The Department allowed Strategist to choose generic wind units in even numbered years for 2018 to 2030; the size of the units was 300 MW for 2018 and 100 MW in the subsequent years. The units were labeled superfluous (which means Strategist can choose them if they provide cost-effective energy even when there is no capacity need) in years 2018 to 2022. The Department included estimates of integration and cycling costs in the generic wind costs.[14] The 2018 wind unit was modeled with a flat cost of $50 per MWh for 20 years. The cost of subsequent wind units was escalated at two percent per year to determine the flat cost.[15] For energy production the Department assumed a 42.5 percent capacity factor. As with MP's modeling of generic wind units, the Department also assumed that the generic wind units would not provide any accredited capacity.[16]

The Department made 100 MW generic solar units available in odd numbered years for 2019 and 2021. The Department made 50 MW generic solar units available in odd numbered years for 2023 to 2029. The generic solar units were labeled superfluous (to address energy needs when there is no capacity need) in years 2019 to 2025. The Department assumed the units had a price of $100 per MWh for 20 years in 2019. The price was assumed to not change for units available in subsequent years, thus making solar expansion units progressively cheaper relative to the other alternatives available to Strategist in subsequent years of the planning period. For energy production the

[13] A 15-year end effects period was also included in each Strategist run.
[14] The Department used the cost rates estimated by Xcel Energy; see Xcel Energy's petition at page 18 of Appendix J in Docket No. E002/RP-15-21. The Department acknowledges the Petition's statement that MP "has not identified any direct impacts to its ancillary services requirements that are due to renewable implementation as part of the RES requirements." However, the Department added these costs because they are relatively small, enable more consistent modeling across utilities, and recognize that MP may run into small integration costs in the future.
[15] For example, the 2024 unit costs a flat $56.31 per MWh, and the 2028 unit costs $60.95 per MWh.
[16] The Department concluded that MP's assumption of no accredited wind capacity was reasonable given MP's difficulty in obtaining accredited capacity prior to major transmission lines coming in-service connecting Minnesota with load centers further east (expected around 2020) and also considering that significant transmission costs may not be justified to obtain the small quantity of accredited capacity wind offers. Lastly, note that lack of transmission for accreditation may also lead to wind energy being curtailed—another factor that led the Department to reduce the overall wind capacity factor.

Department used a 20 percent capacity factor.[17] The Department's generic solar units have a capacity accreditation factor of about 52 percent.

MP adjusted the demand forecast inputs to its Strategist database to account for the fact that the reserve ratio is applied to the Company's demand at the time of MISO's peak rather than MP's own (non-coincident) peak. This adjustment means that Strategist uses a lower peak demand than the forecast predicts, with the reduction designed to mimic the coincident peak rather than the non-coincident peak. The Department was concerned that, while perhaps unlikely, MP's approach might impact the model results negatively, either now or in the future if it were continued to be used.[18] Therefore, the Department adjusted these inputs to use the approach used by Xcel and the Department in Xcel's most recent resource plan.[19] The Department entered MP's non-coincident peak demand forecast and then adjusted the required reserve ratio to account for MISO's coincidence factor. The reserve margin at the time of MISO's peak is 7.1 percent. Using MP's 2014 Advanced Forecast Report the coincidence factor between MP's system and MISO system peak is **[TRADE SECRET DATA HAS BEEN EXCISED]**.[20] Therefore, the effective reserve margin is:

[TRADE SECRET DATA HAS BEEN EXCISED]

Another change was to reduce the size of the spot market that MP could access by 50 percent. The Department made this modification to reduce the Company's reliance on the spot market to about five percent of total energy needs after MP's purchase from Manitoba Hydro comes on-line in 2021. Unlike Xcel, MP has an overall energy short position (i.e. needs energy) early in the planning period. Therefore, MP's Strategist model requires availability of spot market purchases. However, the Department concluded that MP's reliance on the spot market was rather high after the first few years and a reduction was advisable. The Department ran each contingency through a version of the Strategist database with the wholesale market available and with the wholesale market turned off. The results are available in the Attachments to these comments.

Lastly, to improve the efficiency of the Strategist modeling, the Department made two adjustments to eliminate redundant expansion alternatives by limiting the number of potential plans or "states" considered by Strategist. The first change was to eliminate the availability of distributed generation (DG) units because MP already had peaking units available. The second change was to defer the availability of the combustion turbine (CT) and combined cycle (CC) expansion units by one year (to 2021 and 2022 respectively) and make the one-year bridge purchase available for an additional year.[21]

4. Scenarios Analyzed by the Department

The Department focused its Strategist analysis on the potential shutdown dates for the Company's Taconite Harbor 1 and 2 and Boswell 1 and 2 units. In order to limit the number

[17] This solar capacity factor is consistent with the assumption of both MP and Xcel in their recent resource plans.
[18] Changing the capacity in this manner will impact, for example, the load factor.
[19] Reflected in Department's July 2, 2015 comments in Docket No. E002/RP-15-21.
[20] Taken from the file CP-AFR_2014_(Mod_Deferred)_Strategist.xlsx
[21] This change also ensured that MP had sufficient time to plan, permit, and construct a new power plant.

of scenarios, MP performed a screening analysis to limit the options run through Strategist to a reasonable number. Overall, because natural gas is not a viable option, the Department agrees with MP's screening analysis that determined continued coal use is more economic than gas conversion at Taconite Harbor at any capacity factor.[22] Therefore, the Department did not further analyze a Taconite Harbor gas conversion option.

In addition to the four scenarios analyzed by MP in detail, the Department created two additional scenarios to provide a more complete picture of potential options (and not because it was thought the two additional scenarios might be economic). The six scenarios studied in detail are:

1. Taconite Harbor early shut down, Boswell early shut down (TEBE);
2. Taconite Harbor early shut down, Boswell gas conversion (TEBG);
3. Taconite Harbor early shut down, Boswell late shut down (TEBL);
4. Taconite Harbor late shut down, Boswell early shut down (TLBE);
5. Taconite Harbor late shut down, Boswell gas conversion (TLBG); and
6. Taconite Harbor late shut down, Boswell late shut down (TLBL).

Note that each shut down scenario was modeled under three different levels of energy savings:

- 57.3 GWh average annual energy savings (46.5 GWh approved in MP's last CIP[23]+11 GWh annual energy savings);[24]
- 61.2 GWh average annual energy savings (46.5 GWh approved in MP's last CIP+15 GWh);and
- 76.5 GWh average annual energy savings (46.5 GWh approved in MP's last CIP +30 GWh).

See the DSM section of the comments for further details and analysis of MP's DSM scenarios.
Lastly, note that each shut down scenario was run under four different modeling approaches:

- CO_2 and externality costs applied, utility discount rate (8.2%), spot market on;
- No CO_2 and externality costs, utility discount rate (8.2%), spot market on;
- CO_2 and externality costs applied, social discount rate (2.5%), spot market on; and
- CO_2 and externality costs applied, utility discount rate (8.2%), spot market off.

5. Contingencies Analyzed

[22] See Figures 15 and 16 of the Petition and discussion on pages 49-50.
[23] Docket No. E015/CIP-13-409.
[24] The 57.3 GWh energy savings level approximates the 1.85 percent of energy savings required by the Commission's Order in MP's previous IRP, Docket No. E015/RP-13-53. Note that, in the low to middle levels of DSM, the total amount of DSM is less than the sum of the two figures because the existing level of DSM is assumed to decrease slightly over time.

For each scenario, the Department ran the following contingencies:

a. externalities: two contingencies, high externalities/CO_2 internal cost and low externalities/CO_2 internal cost;
b. solar prices: four contingencies, higher and lower in $10 per MWh increments (+$20, +$10, -$10, -$20).
c. wind prices: four contingencies, higher and lower in $10 per MWh increments (+$20, +$10, -$10, -$20).
d. coal prices: two contingencies, 30 percent higher and lower costs;
e. natural gas prices: four contingencies, higher and lower in 25 percent increments (+50%, +25%, -25%, -50%);
f. capital costs: two contingencies, higher and lower by 30 percent;
g. energy and demand forecast: four contingencies, higher and lower in 2.5% increments applied to both (+5%, +2.5%, -2.5%, and -5%); and
h. spot market prices: two contingencies, higher and lower by 25 percent.

As with the Xcel resource plan, the Department considered running contingencies regarding the diversity factor and required reserve ratio assumptions since these are likely to change in the future. However, the demand forecast band simulates such changes. For example, assuming a higher diversity factor is similar to assuming a lower demand forecast. Assuming a higher reserve ratio is similar to assuming a higher demand forecast. In this case:

- The mid-high forecast with a 7.17 percent diversity factor results in the same capacity requirement as the base forecast and a 4.70 percent reserve ratio;
- The mid-low forecast with a 2.40 percent diversity factor results in the same capacity requirement as the base forecast and a 4.70 percent reserve ratio;
  - The range of diversity factors implicit in the mid-high to mid-low forecast band is 2.40 to 7.17 percent;
- The mid-high forecast with a 4.64 percent reserve ratio results in the same capacity requirement as the base forecast and a 7.10 percent reserve ratio;
- The mid-low forecast with a 10.04 percent reserve ratio results in the same capacity requirement as the base forecast and a 7.10 percent reserve ratio;
- The range of reserve ratios implicit in the mid-high to mid-low forecast band is 4.64 to 10.04 percent.

Note that the forecast contingencies impact both energy and demand. However, the Department determined that the added time and complexity of the analysis would outweigh the benefit of additional information from more contingencies to address the diversity factor and the reserve ratio. Consequently, the Department did not run contingencies on the diversity factor and the reserve ratio.

Thus, the Department ran each of the six scenarios regarding the Taconite Harbor and Boswell facilities a total of 25 times, the base case plus 24 contingencies. The following charts illustrate some of the contingency bands analyzed.

Figures 3 and 4 below show the base demand and energy forecasts and contingencies used by the Department. The Department used two high and two low forecast bands. The mid-high and mid-low forecast bands represent the normal band in between which MP's requirements will fluctuate. The highest/lowest forecast bands represent significant additions or subtractions of energy and demand requirements.

Figure 3: Energy Forecast Contingencies

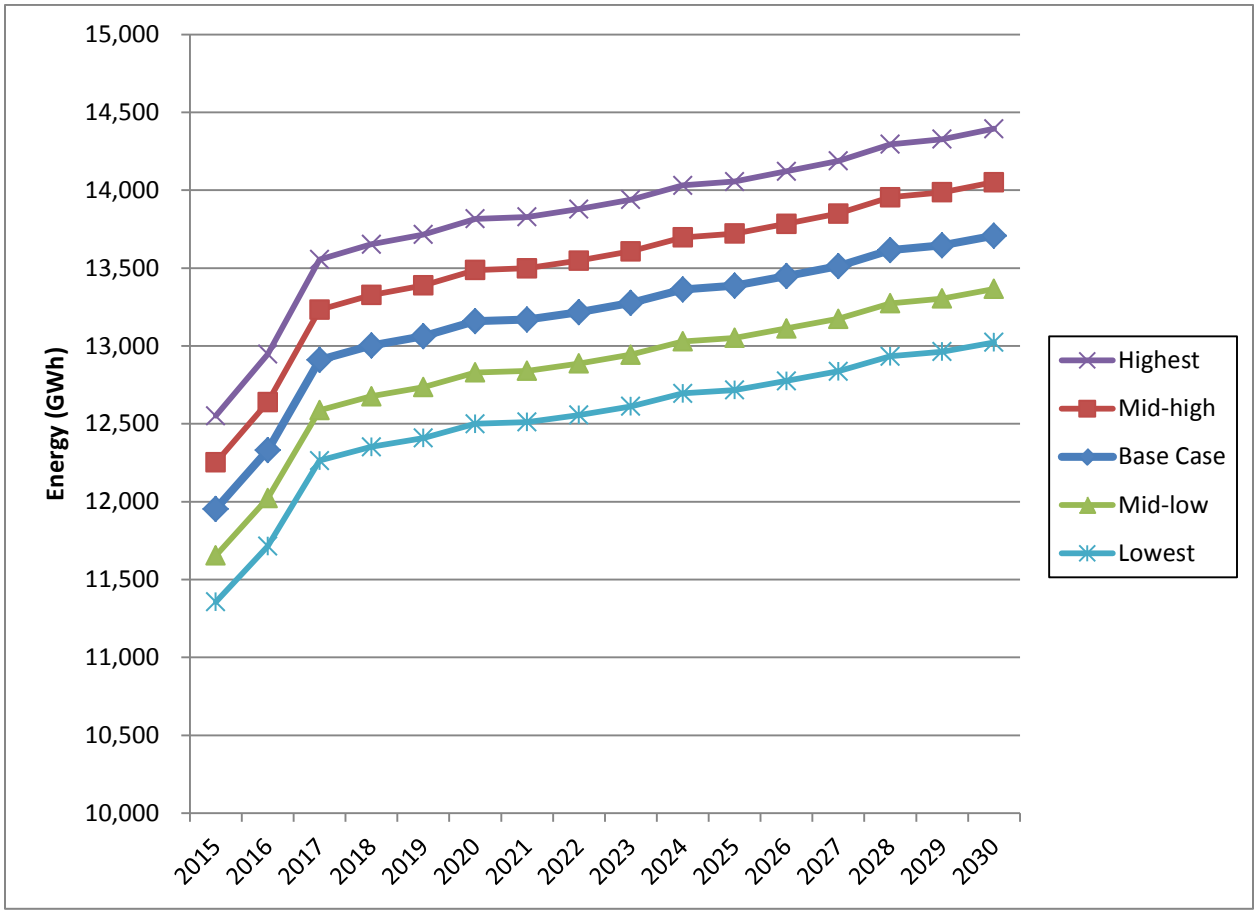


Figure 4: Demand Forecast Contingencies

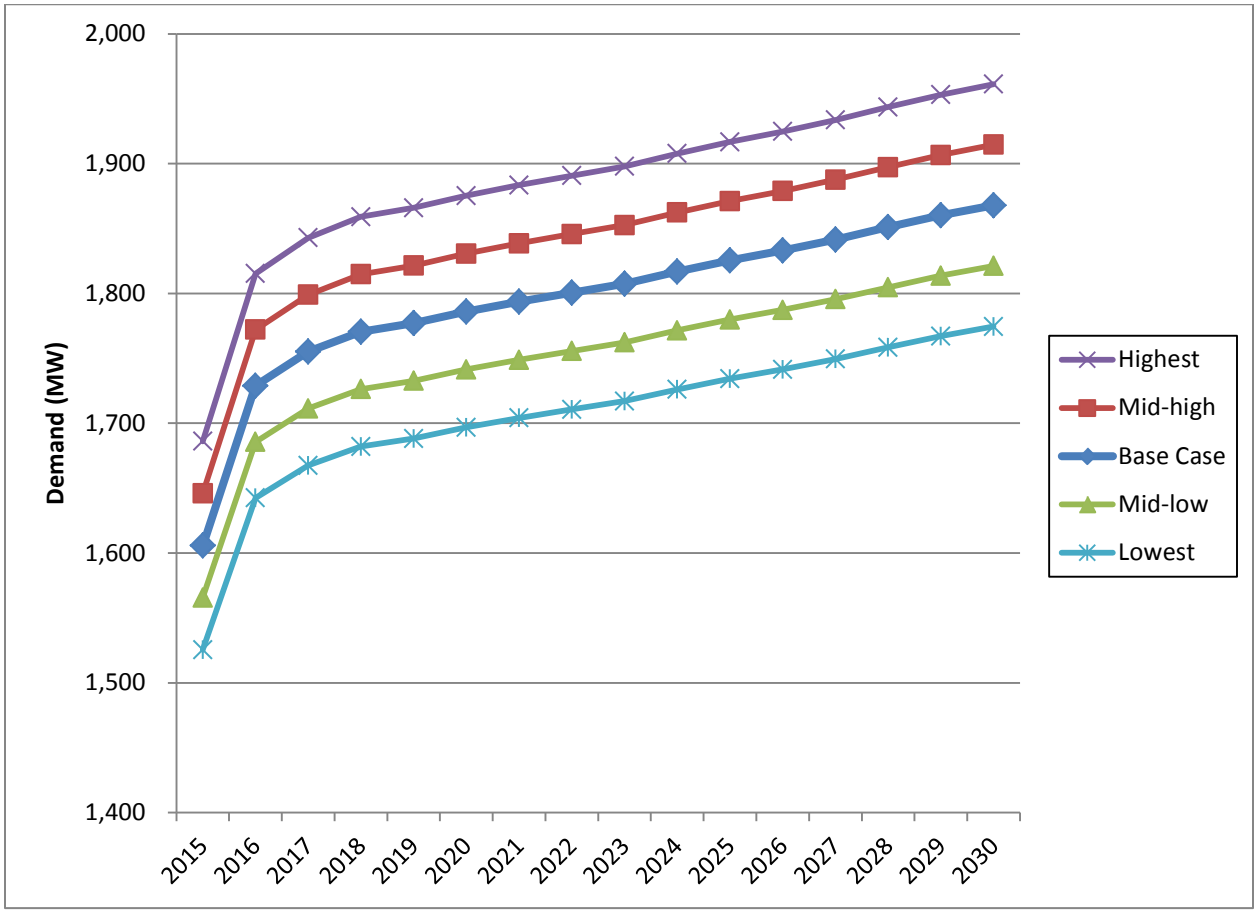


Figure 5 below shows the base natural gas price forecast and the contingencies modeled by the Department.[25] The Department used two high and two low natural gas bands in an attempt to determine how much natural gas prices have to change before they significantly impact the overall expansion plan.

[25] MP modeled natural gas prices varying by month. The prices shown are for December and/or January.

[TRADE SECRET DATA HAS BEEN EXCISED]

Figures 6 and 7 below show the base coal price forecast and the contingencies used by the Department in its analysis of Boswell 1 and 2 and Taconite Harbor 1 and 2.

[TRADE SECRET DATA HAS BEEN EXCISED]

5. Modeling Approaches

The Department analyzed each scenario under four different overall modeling approaches. Again the goal was to determine if the expansion plan would be significantly impacted by a different approach. The Department's first modeling approach, as described above, employed MP's cost of capital as the discount rate, the Commission's median externality and CO_2 cost values, and the spot market turned on.

The Department's second modeling approach continued to use the utility's cost of capital as the discount rate and left the spot market turned on but excluded externality and CO_2 cost values. In essence, this approach has no planning for future environmental regulation—that is it assumes that the Company can continue to impose the cost of pollution on others and does not attempt to plan for meeting future environmental regulations.

The third approach used a societal discount rate based on 20-year U.S. Treasury yields,[26] the Commission's median externality and CO_2 cost values, and the spot market turned on. This was an attempt to use a societal discount rate to create a better societal cost approach than has been used in past dockets. Note that for simplicity the discount rate was applied to all costs.

In the Department's fourth approach we used the utility's cost of capital as the discount rate, the Commission's median externality and CO_2 cost values, but turned the spot market off.

6. Model Outputs

a. Base Case Modeling Results

The Department ran MP's preferred case—Taconite Harbor 1 and 2 close early, Boswell 1 and 2 close late—with all of the Department's changes under the first modeling approach discussed above. The resulting expansion plan, assuming 11 GWh of added annual energy savings, is shown in Table 5 below.

[26] The values are available at http://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/TextView.aspx?data=yield At the time of the Department's analysis the rate was 2.51 percent. Note that the 20-year treasury rate is used by the Department's Conservation Improvement Program unit for the societal benefit/cost test.

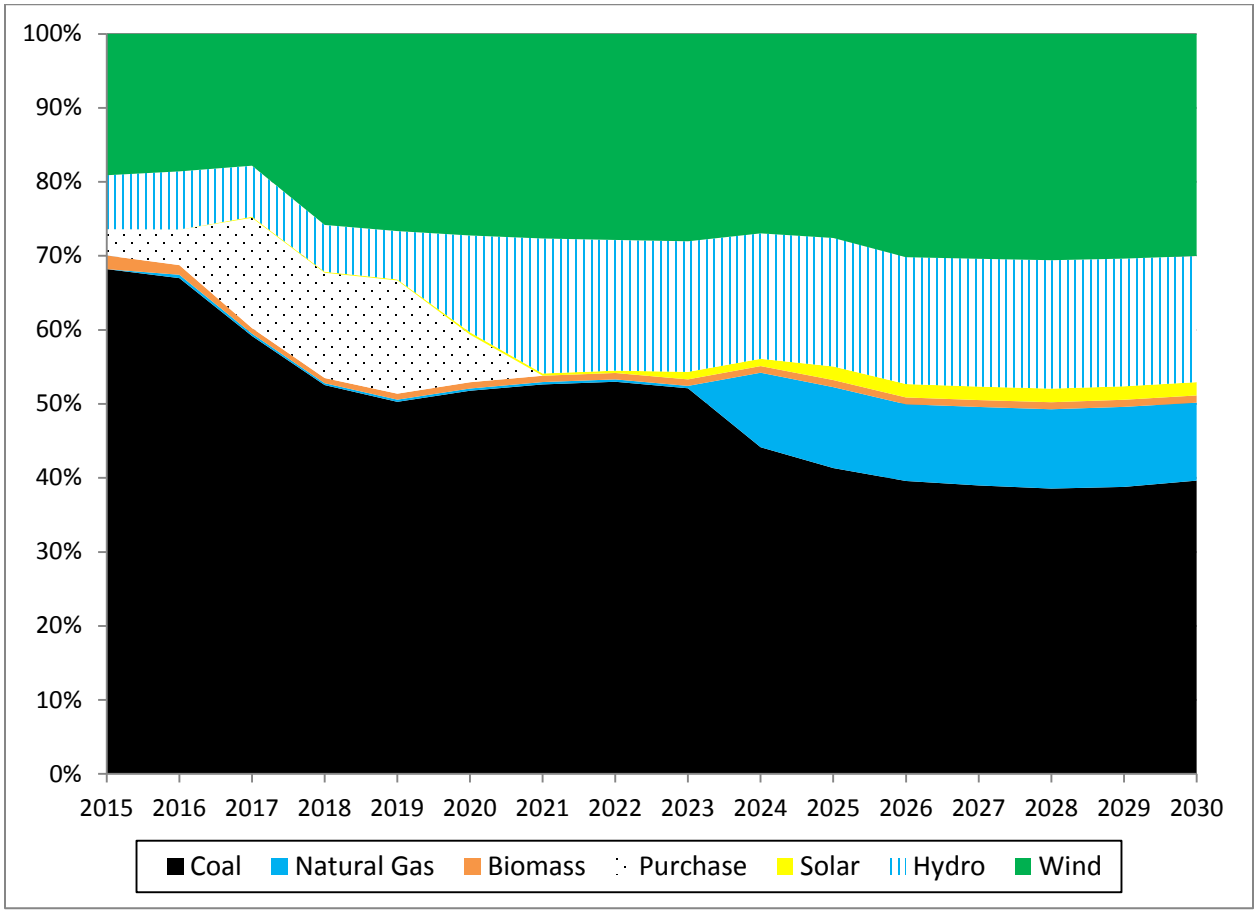
Table 5: Base Case Expansion Plan (units)[27]

Year	Wind (100 MW)	Solar (50 MW)	CC units (192 MW)	CT units (202 MW)
2015	0	0	0	0
2016	0	0	0	0
2017	0	0	0	0
2018	3	0	0	0
2019	0	0	0	0
2020	1	0	0	0
2021	0	0	0	0
2022	0	0	0	0
2023	0	1	0	0
2024	0	0	1	0
2025	0	1	0	0
2026	0	0	0	0
2027	0	0	0	0
2028	0	0	0	0
2029	0	0	0	0
2030	0	0	0	0

Additional information for the base case is shown in Figures 8 to 10 below.

[27] Capacity is nameplate for the wind and solar and accredited for the CC and CT units.

Figure 8: Energy Mix (2015-2030)



As shown in Figure 8 above, MP's fuel mix is projected to become much more diversified. The largest energy sources are projected to be coal, natural gas, hydro, and wind; each of which provides more than 10 percent of the Company's energy by the end of the planning period (2030). The portion of the Company's energy mix that is from low emission resources (wind, solar and hydro) grows from about 25 percent in 2015 to about 50 percent by 2030.

Figure 9: Internal Cost per MWh[28]

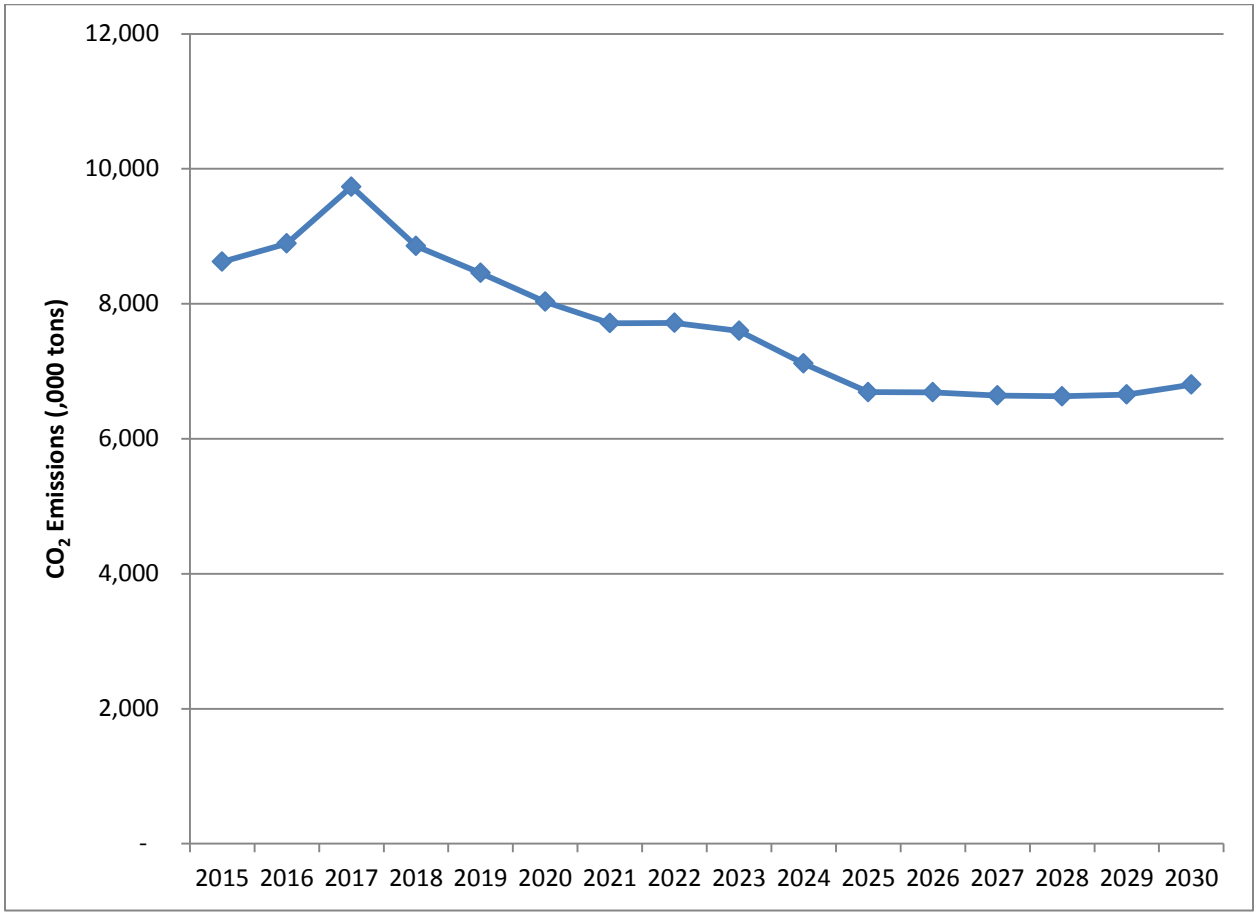
[TRADE SECRET DATA HAS BEEN EXCISED]

In Figure 9 above the dashed lines (Total Cost – Effluent Expense) show the cost per MWh without the Commission's estimate of the cost of future CO_2 regulation ($21/MWh). The solid lines show the cost per MWh with the Commission's estimate of the cost of future CO_2 regulation. As shown in Figure 9, in the base case the cost per MWh (in nominal dollars) will [TRADE SECRET DATA HAS BEEN EXCISED] during the planning period (2015-2030). When converted to real dollars using a two percent inflation rate [TRADE SECRET DATA HAS BEEN EXCISED]. When emissions costs are removed, MP's cost per MWh (in nominal dollars) will [TRADE SECRET DATA HAS BEEN EXCISED] When converted to real dollars using a two percent inflation rate [TRADE SECRET DATA HAS BEEN EXCISED]

This analysis demonstates that the majority of the cost increase shown in Figure 9 is due to the assumed cost of future CO_2 regulation and general inflation, not due to the internal costs of future resources.

[28] Externality costs are excluded.

Figure 10: MP System CO_2 Emissions[29]



As shown in Figure 10 above, MP's CO_2 emissions under the base case are projected to slowly decrease starting in 2017 and continuing for the duration of the planning period. The decrease between 2017 and 2030 is approximately 21 percent under base case conditions.

b. Base Case Contingency Analysis

The cost of the base case and the contingencies under the first modeling approach discussed above are shown in Table 6 below.

[29] Note that CO_2 emissions are based upon MP's CO2-E information. See page 6 of Appendix J of the Petition for a description of MP's CO_2 inputs.

Table 6: Base Case Cost (PVSC[30] $ Million)

Contingency	PVSC	Difference from Base	% Change from Base
Base	$ 11,764		
CO_2/externalities High	$ 12,665	$ 902	7.7%
CO_2/externalities Low	$ 10,821	$ (942)	-8.0%
Solar -$20	$ 11,744	$ (20)	-0.2%
Solar - $10	$ 11,754	$ (10)	-0.1%
Solar + $10	$ 11,774	$ 10	0.1%
Solar +$20	$ 11,784	$ 20	0.2%
Wind -$20	$ 11,441	$ (322)	-2.7%
Wind - $10	$ 11,607	$ (157)	-1.3%
Wind + $10	$ 11,875	$ 111	0.9%
Wind +$20	$ 11,885	$ 121	1.0%
Coal Low	$ 11,170	$ (594)	-5.0%
Coal High	$ 12,339	$ 576	4.9%
Capital Cost Low	$ 11,667	$ (97)	-0.8%
Capital Cost High	$ 11,830	$ 66	0.6%
Natural Gas - 50%	$ 11,430	$ (334)	-2.8%
Natural Gas - 25%	$ 11,605	$ (159)	-1.3%
Natural Gas + 25%	$ 11,890	$ 126	1.1%
Natural Gas + 50%	$ 11,994	$ 230	2.0%
Forecast Low	$ 11,227	$ (536)	-4.6%
Forecast Mid-low	$ 11,484	$ (280)	-2.4%
Forecast Mid-high	$ 12,050	$ 286	2.4%
Forecast High	$ 12,363	$ 600	5.1%
Market Low	$ 11,614	$ (149)	-1.3%
Market High	$ 11,944	$ 181	1.5%

Table 6 shows the top contingencies, in terms of the absolute value of the percent change in costs, including CO_2 costs, coal costs, natural gas costs, and forecasting. However, only the CO_2, coal, and high/low forecast contingencies created an impact of more than three percent. When assembling a preferred case the Department considered ways to mitigate MP's exposure to these three more significant risks.

Total carbon emissions for the planning period are shown below in Table 7.

[30] Present Value of Societal Costs.

Table 7: Base Case CO_2 (tons, 2015-'30)

Contingency	CO_2 Emissions (,000 tons)	Difference from Base	% Change from Base
Base	122,839		
CO_2/externalities High	118,924	(3,916)	-3.2%
CO_2/externalities Low	127,992	5,153	4.2%
Solar -$20	122,839	-	0.0%
Solar - $10	122,839	-	0.0%
Solar + $10	122,839	-	0.0%
Solar +$20	124,369	1,530	1.2%
Wind -$20	120,728	(2,112)	-1.7%
Wind - $10	120,728	(2,112)	-1.7%
Wind + $10	131,734	8,895	7.2%
Wind +$20	134,655	11,815	9.6%
Coal Low	128,044	5,205	4.2%
Coal High	120,618	(2,221)	-1.8%
Capital Cost Low	124,369	1,530	1.2%
Capital Cost High	122,839	-	0.0%
Gas - 50%	123,263	424	0.3%
Gas - 25%	123,327	488	0.4%
Gas + 25%	123,484	645	0.5%
Gas + 50%	125,253	2,413	2.0%
Forecast Low	119,580	(3,260)	-2.7%
Forecast Mid-low	120,955	(1,884)	-1.5%
Forecast Mid-high	126,902	4,062	3.3%
Forecast High	126,520	3,680	3.0%
Market Low	123,183	343	0.3%
Market High	122,462	(378)	-0.3%

1. Small Coal Scenarios

Attachments 1 to 13 provide selected summary data from the outputs for the scenarios and contingencies assuming various shut down dates and conversion for Taconite Harbor units 1 and 2 and Boswell units 1 and 2. The Department's integrated resource plan (IRP) team reviewed information similar to that provided in Attachments 1 to 13 when analyzing the Department's modeling results.

Regarding the small coal shut down scenarios, generally shutting down Taconite Harbor units 1 and 2 early is more cost effective than a later shut down date. Based upon review of the modeling results, the Department concluded that the overall best plan clearly involves shutting down Taconite Harbor units 1 and 2 early. As discussed elsewhere in these comments, the Department also concluded that the overall best plan involves an additional

annual 30 GWh of energy efficiency, or annual energy savings of 76.5 GWh. The final question for the Department was the action plan to recommend regarding Boswell units 1 and 2. In most circumstances the gas conversion option was the highest cost of the three alternatives for Boswell units 1 and 2.[31] The cost of the remaining two alternatives (early and late shut down) were typically very close in cost. In addition, the number of wind, solar, CT, and CC units in the expansion plan did not vary significantly with the shutdown date. The main difference was that an early shut down required MP to rely upon substantial short term base load capacity for an additional three years.[32] The short term capacity is necessary to meet the Company's load and capability requirements. From this information the Department concluded that MP should coincide its shut down of Boswell units 1 and 2 with the addition of natural gas capacity. This approach will allow the Boswell units 1 and 2 to be shut down without the necessity of relying upon the availability of capacity and energy in the short term market. An earlier shut down might only result in shutting down MP-owned coal units and forcing the Company to purchase energy from other coal units.[33]

At this point in the Department's analysis, our preferred action plan included:

- shutting down Taconite Harbor units 1 and 2 early;
- shutting down Boswell units 1 and 2 as soon as replacement capacity is available; and
- 76.5 GWh of energy savings.

The remaining question was what supply-side units should be included in the small coal replacement package? Tables 8a and 8b below summarize the number of times that various amounts of least cost fossil fuel unit additions (CT and CC) were selected by Strategist under different modeling contingencies.

Table 8a: Fossil Fuel Additions under TEBE Contingencies[34]

	0 CT	1 CT	2 CT
0 CC	-	20	-
1 CC	47	4	-
2 CC	29	-	-

[31] The three alternatives are an early shut down, a conversion to a natural gas boiler, and a late shut down.
[32] Here the unit added is a one year purchase of 150 MW of capacity with energy produced 24 hours a day, seven days a week. The unit is typically added three years in a row.
[33] In the MISO real-time market coal is a marginal fuel over 80 percent of the hours in most months.
[34] There are 100 contingencies since each scenario contains 25 contingencies and these tables address one scenario (TEBE or TEBL each with 76.5 GWh of energy efficiency) under four different conditions.

Table 8b: Fossil Fuel Additions under TEBL Contingencies

	0 CT	1 CT	2 CT
0 CC	-	7	-
1 CC	61	4	-
2 CC	28	-	-

Regarding fossil fuel units, in both the TEBE and TEBL scenarios approximately two-thirds of all contingencies resulted in adding either one CT unit or one CC unit; the most common addition being a single CC unit, especially in the TEBL scenario. Two CC units are often added when the wholesale market is turned off.[35] One CC unit and one CT unit also was chosen when the wholesale market is turned off. Since the risks related to exposure to the spot market would be mitigated by deferring the shutdown of Boswell 1 and 2 until replacement capacity is available, it is less likely that a second CC unit would be needed. Thus, the Department concludes that the addition of a single CC unit is preferable.

With a single CC unit and 30 GWh of added energy efficiency in the small coal replacement package, the remaining question is the least cost additions of renewable energy. Regarding solar units, under TEBL conditions over 80 percent of contingencies that add 1 CC unit also add 1 solar unit; under TEBE conditions the ratio is still high, but falls to 61 percent. Therefore, the Department concludes that Strategist shows a strong preference for a single, 50 MW solar unit in the least cost, small coal replacement package.

Regarding wind units, the data demonstrate a preference for no wind or a single wind unit (100 MW).[36] Under TEBL conditions about 66 percent of contingencies that add 1 CC unit also add 0 or 1 wind units; under TEBE conditions the ratio is 64 percent. Therefore, the Department concludes that Strategist shows a strong preference for up to 100 MW of wind in the least cost, small coal replacement package.

With the small coal shut down and small coal replacement packages determined, the final step in the Department's analysis was to determine what actions should be taken in the five-year action plan (2016 to 2020) to support the overall small coal recommendation. First, all of the Strategist runs had forced solar additions in order to meet the Company's obligation under Minnesota's solar energy standard (SES). The forced solar units during the five-year action plan are 11 MW in 2016, and 12 MW in 2020.[37] Second, under the Department's overall small coal recommendation, Strategist typically selected 300 MW of wind in 2018. Therefore, the Department recommends that the five-year action plan include:

- 11 MW of solar in 2016 and 12 MW of solar in 2020; and
- 300 MW of wind in 2018.

[35] Under TEBE, 20 of 29 contingencies selecting two CC units assumed the wholesale market was off. Under TEBL, 19 of 28 contingencies selecting two CC units assumed the wholesale market was off.
[36] This wind is in addition to the approximately 300 MW of wind acquired as part of MP-s five-year action plan, discussed elsewhere in this section.
[37] Note that an additional 10 MW of solar is forced later in the planning period (2025) for SES compliance purposes.

Table 9 below shows the Department's preferred expansion plan. For purposes of preparing this table, the Department assumed that MP could procure the small coal replacement package in 2022.

Table 9: Department's Preferred Expansion Plan (2016-2030, nameplate capacity)

Year	CC	CT	Solar Options	Solar Standard Compliance	Wind Options
2016	-	-	-	11	-
2017	-	-	-	-	-
2018	-	-	-	-	300
2019	-	-	-	-	-
2020	-	-	-	12	-
2021	-	-	-	-	-
2022	200 to 400	-	Up to 50	-	Up to 200
2023	-	-	-	-	-
2024	-	-	-	-	-
2025	-	-	-	10	-
2026	-	-	-	-	-
2027	-	-	-	-	-
2028	-	-	-	-	-
2029	-	-	-	-	-
2030	-	-	-	-	-

1. *Department Recommended Plan and Potential Compliance with the Clean Power Plan*

After selecting a recommended plan for MP, the Department determined that it might be helpful to see how the Department's recommendation regarding MP's resource plan might fit into a potential, overall Clean Power Plan (CPP) compliance strategy for Minnesota as a whole. Necessarily, this analysis is preliminary, but the Department provides it here as one of many analyses being done to assess what may be necessary in Minnesota to comply with the CPP.

To start, the Department briefly reviewed the U.S. Environmental Protection Agency's (EPA) rate and mass goals for Minnesota. It has not yet been decided whether Minnesota will pursue a rate-based or mass-based goal. However, given that the mass goal is easier to calculate at this time, the Department used the mass-based approach for this overview.[38] To determine the affected generating units located in Minnesota, the Department consulted EPA's website and found a list of potentially affected units as of August 2015.[39] The

[38] Minnesota's goals are available on EPA's website at: http://www3.epa.gov/airquality/cpptoolbox/minnesota.pdf.
[39] See http://www2.epa.gov/sites/production/files/2015-11/documents/tsd-fp-affected-egu.pdf.

Department then reviewed the status of the units and the availability of modeling outputs for the utility owning the units.

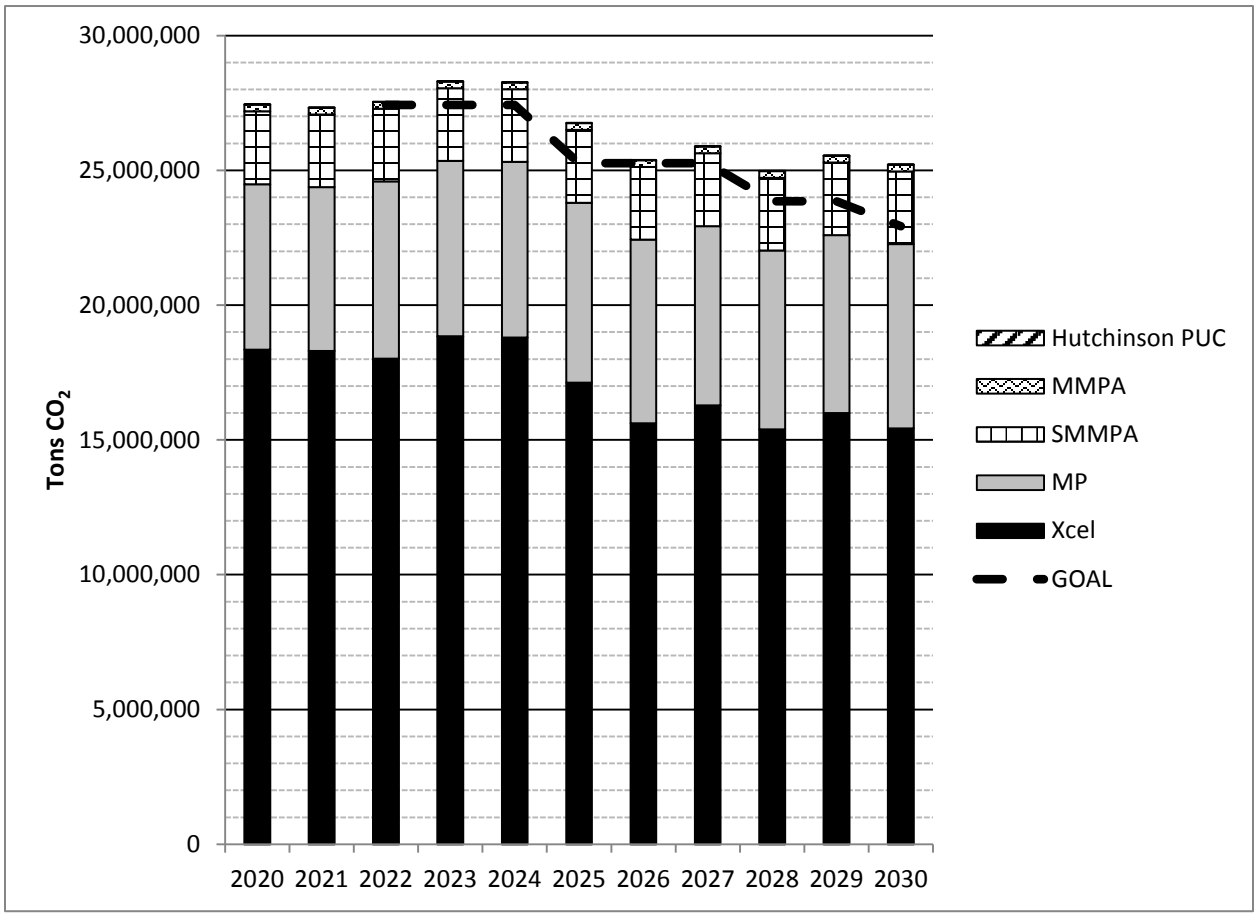
The following affected units are not included in a Strategist database:

- Fox Lake 3—owned by Interstate Power and Light, to be retired prior to 2022;
- Austin Northeast—owned by Austin Municipal Utility, to be retired prior to 2022;
- Silver Lake—owned by Rochester Public Utilities, to be retired prior to 2022;
- Faribault Energy Park (MMPA)—owned by Minnesota Municipal Power Agency;
- Hutchinson Plant #2 (HUC)—owned by Hutchinson Municipal Utility; and
- Sherburne County #3 (SMMPA)—partially owned by Southern Minnesota Municipal Power Agency.

The Department calculated the expected CO_2 annual emissions for SMMPA by multiplying the emissions factor from Xcel's Strategist database by the median generation for 2007-2010 and 2014 as reported in SMMPA's annual filing under Minnesota Rules 7610.[40] Emissions for HUC and MMPA were the 2012 levels reported by EPA. The remaining affected units were in the Strategist databases of Xcel, MP, and Otter Tail Power Company. However, OTP's affected units (Hoot Lake 2 and 3) are scheduled to be retired in 2020. Therefore, OTP was excluded from further consideration. Data for Xcel's affected units[41] was taken from the Department's recommended plan under base case conditions in Docket No. E002/RP-15-21. Data for MP's affected units[42] was taken from the scenario that assumes Boswell 1 and 2 retire early, as being reasonably representative of the impact of the Department's recommendation in this resource plan. (As discussed above, the Department recommends that Minnesota Power retire Boswell 1 and 2 once replacement power from a CC unit is acquired.) The results of this analysis, shown below in Figure 11,indicates that, other than potentially in the last years (2029-2030), significant actions beyond those already ordered by the Commission or recommended by the Department may not be required.[43]

[40] The years 2011-2013 were excluded due to the impact of an extended forced outage.
[41] Xcel's affected units are assumed to include: King; Black Dog 2/5, 3, and 4; Sherco 1, 2, and 3 (including the gas boiler conversion); High Bridge, Riverside, LS Power Cottage Grove; Calpine Mankato (including the recently approved expansion). Some of these units (at Black Dog) retire prior to 2020.
[42] MP's affected units are assumed to include: Boswell 1, 2, 3, and 4; Hibbard 3 and 4; Laskin 1 and 2; and Taconite Harbor 1, 2, and 3. Some of these units (at Taconite Harbor) retire prior to 2020.
[43] The Department notes that, given a particular scenario, CO_2 emissions can vary significantly depending upon the contingency under consideration. For example, MP's emissions in any one year might decrease by 300,000 to 400,000 tons and might increase by 1,100,000 tons or more.

Figure 11: Preliminary Estimate of Minnesota's Clean Power Plan Compliance Status



8. Department Recommended Action Plan

First, the Department recommends that the Commission approve a five-year action plan that includes MP:

- acquiring up to 300 MW of wind capacity in about 2018;
- acquiring solar units of 11 MW in 2016 and 12 MW in 2020;
- shutting down the Taconite Harbor 1 and 2 units in 2017,
- procuring annual average energy savings of 76.5 GWh.

Second, the Department recommends that the Commission require MP to pursue a small coal replacement package of approximately 100 MW of wind, 50 MW of solar, and 200 MW of CC capacity with the Boswell 1 and 2 units being shut down when the CC replacement capacity is on-line.

Third, given that MP intends to further explore distributed generation through its backup generation pilot project, the Department recommends that the Commission require MP to

conduct a distribution study to identify interconnection points on its distribution system for small-scale distributed generation resources.

C. REVIEW OF MP's DEMAND-SIDE MANAGEMENT

1. Background

One purpose of resource planning is to estimate the optimal amount of demand-side resources for meeting the Company's customers' future needs.

Minn. Stat. §216B.2401 clearly identifies energy savings as the State's preferred energy resource:

> The legislature finds that energy savings are an energy resource, and that cost-effective energy savings are preferred over all other energy resources. The legislature further finds that cost-effective energy savings should be procured systematically and aggressively in order to reduce utility costs for businesses and residents, improve the competitiveness and profitability of businesses, create more energy-related jobs, reduce the economic burden of fuel imports, and reduce pollution and emissions that cause climate change. Therefore, it is the energy policy of the state of Minnesota to achieve annual energy savings equal to at least 1.5 percent of annual retail energy sales of electricity and natural gas through cost-effective energy conservation improvement programs and rate design, energy efficiency achieved by energy consumers without direct utility involvement, energy codes and appliance standards, programs designed to transform the market or change consumer behavior, energy savings resulting from efficiency improvements to the utility infrastructure and system, and other efforts to promote energy efficiency and energy conservation.

When analyzing the appropriateness of a utility's energy savings plan within an IRP, the Department considers, along with other factors:

- Minnesota's clear preference for energy savings as a resource;
- The Company's historical energy savings achievements;
- The Company's costs of different energy savings levels; and
- The impact of different amounts of energy savings on the Company's total system costs.

Order Point 11 of MP's last IRP stated: [44]

[44] November 12, 2013 Commission Order Approving Resource Plan, Requiring Filings, and Setting Date for Next Resource Plan, Docket E015/RP-13-53

> The Commission approves an energy savings goal of 1.87 percent of Minnesota Power's retail sales by its next resource plan filing.

In Order Point 12 of the same Order, the Commission instructed that for its next resource plan, Minnesota Power shall:

> a. Identify the amount of energy savings embedded in each year of its load forecast, in terms of total savings (kWh) and as a percentage of non-CIP-exempt retail sales;
> b. Identify the amount of system-wide energy savings, including aggregate data for CIP-exempt customers, embedded in each year of its load forecast;
> c. Evaluate additional conservation scenarios for its CIP-exempt and non-CIP-exempt customers, that would achieve greater energy savings beyond those in the base case; and
> d. Provide cost assumptions for achieving every 0.1 percent of savings above 1.5 percent of non-CIP-exempt retail sales.

In its analysis, the Department visits each of these Order points and evaluates the compliance by the Company point by point.

2. MP's Proposed Energy Savings

Appendix B of MP's filing details the DSM scenarios and sensitivities that MP analyzed in this resource plan. Additionally, Section IV of MP's filing, 2015 Plan Development, provides a narrative that describes the Company's preferred DSM scenarios. MP analyzed three scenarios proposing incremental additions on top of its base scenario, which is based on the energy savings goals approved in the Company's most recent triennial CIP. [45] A summary of the Company's current approved CIP savings levels is shown in Table 10 below.

Table 10: Current Approved CIP Triennial Energy Savings

Year	Proposed Goal (kWh)	Adjusted Average Retail Sales (kWh)	Proposed Savings %	Statutory Savings Goal
2014	46,553,951	3,071,179,967	1.52%	1.50%
2015	46,539,000	3,071,179,967	1.52%	1.50%
2016	46,545,084	3,071,179,967	1.52%	1.50%

[45] Docket No. E015/CIP-15-409

Table 11 below shows the four DSM scenarios modeled by MP, including costs, incremental energy savings (as compared to approved CIP levels) and total energy savings.

Table 11: MP's Incremental Energy Savings Scenarios[46]

Scenarios			Annual Program Costs			
Annual Savings at the Generator (GWh)	*% of Sales (rounded)*	*Plan*	*Incentives*	*Admin*	*Nonimpact*	*Total Costs*
46.5	1.50%	Existing	$3,418,012	$1,243,589	$2,417,854	$7,079,455
57.3	1.87 %	+ 11 GWh	$4,809,780	$1,723,687	$3,211,156	$9,744,623
61.2	2.00%	+ 15 GWh	$5,570,768	$1,946,120	$3,626,781	$11,143,669
76.5	2.50%	+ 30 GWh	$9,432,408	$2,853,205	$5,319,279	$17,604,891

3. MP's Historical Energy Savings Costs

Historically, Minnesota Power has achieved energy savings at costs significantly below the national electric utility industry average. The Company stated that:

> Minnesota Power has met or exceeded the 1.5 percent savings goal since the Next Generation Energy Act of 2007 was implemented in 2010. Between 2010 and 2014, achieved first-year savings ranged from roughly 60,000 to roughly 78,000 MWh, with costs ranging between $5.6 million and $7.2 million. First-year savings averaged about $0.09 per kWh—about $0.15/kWh less than the 2013 industry average.[47]

MP provided its recent historical costs and achievements in Appendix B of the filing. The historical achievements indicate that MP's residential programs have provided approximately 20 percent of the Company's CIP energy savings. In 2014, MP's residential projects delivered energy savings at an average first-year energy savings cost of $0.13 per kWh ($130/MWh) while MP's commercial/industrial (C/I) programs delivered energy savings at an average annual first year energy savings cost of $0.0045 per kWh ($45 per MWh), down from $0.06/kWh in 2010. Between 2010 and 2014, MP's first year energy savings from MP's C/I customers increased by 20 million kWh. Figure 12 below illustrates MP's CIP savings and costs since 2005.

[46] The 57.3GWh energy savings is equivalent to the 1.87 percent of retail sales energy savings required by the Commission in Order Point 11 of Docket No. E015/RP-13-53.
[47] Page 2, Appendix B

Figure 12: Minnesota Power Historical CIP Achievements

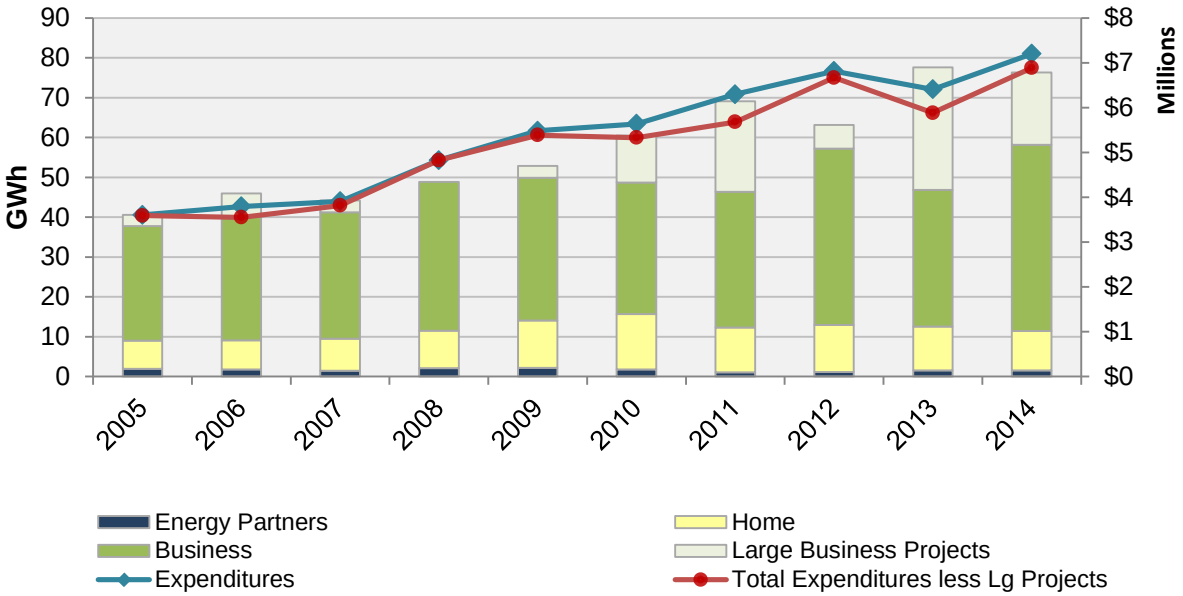
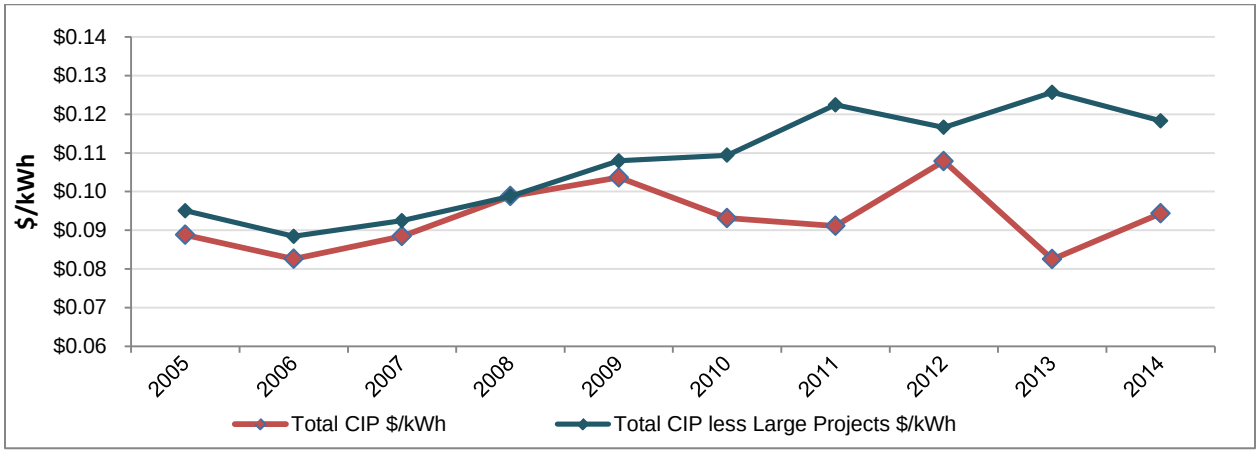


Figure 13 below illustrates the Company's total portfolio cost per first-year kWh savings, including residential and C/I programs. The figure plots two series of costs, one that includes MP's large, one-time C/I projects and one that excludes these projects. MP's large C/I projects have resulted in large amounts of energy savings at a low cost.

Figure 13: Total Portfolio Cost per First-Year kWh



MP reasons that, since these projects are difficult to predict and have large savings impacts, they should not be considered indicative of future levels and costs of MP's CIP energy savings. From 2010-2014, the Company achieved its energy savings at a total program cost of approximately $0.12/kWh or $120/MWh (MP excluded large one-time projects in its calculation).

4. Department Analysis

To analyze the appropriate level of energy savings in MP's IRP, the Department considered the following factors:

- MP's compliance with Commission Order Point 11 from Docket No. E015/MP-RP-13-53 requiring the Company to procure energy savings equivalent to 1.87 percent of retail sales;
- MP's compliance with other Commission Order Points 12 a through d; and
- Department modeling of cost-effective levels of energy savings.

The Department discusses each of these issues below.

a. Order Point 11 – 1.87 percent energy savings goal

Order Point 11 of MP's previous IRP filing stated:

> The Commission approves an energy savings goal of 1.87 percent of Minnesota Power's retail sales by its next resource plan filing.

The Department estimates that 1.87 percent translates into energy savings of approximately 57.3 GWh. MP's +11 GWh scenario would comply with this requirement. The Department's review of MP's Strategist inputs indicates that MP included the +11GWh incremental savings in its preferred plan. However, statements from MP regarding the amount of energy savings in its preferred plan are ambiguous, and are not clear from reading the Company's narrative. [48] The Department requests that the Company provide a more clear and discrete energy savings proposal in future resource plan filings. Based on the Department's review of MP's Strategist inputs, the Department concludes that the Company complied with Commission Order Point 11.

b. Order Points 12a and 12b—embedded energy savings

When MP creates its econometric forecast, the Company inputs historical customer energy and demand use that have been impacted by the historical energy and demand savings of both its CIP and CIP-exempt customers. Thus an econometric forecast already has a certain amount of energy and demand savings embedded into it. The forecast assumes that the future is a function of the past achievements. This concept is important because embedded energy savings must be accounted for when evaluating what level of future energy savings is appropriate. For example, if a forecast already has 100 MWh of energy savings embedded

[48] For example, in Appendix B, MP states:

> Minnesota Power has included additional investment in CIP as part of its short-term action plan in order to augment its already high performing energy efficiency portfolio. (See Section IV for details on energy efficiency included in the resource plan.) The Company believes that **some additional savings compared to the existing CIP may be achievable and will continue its efforts to determine that level of savings along with delivery strategies.** [Emphasis added.]

in it, and the Company wants to evaluate the impact and cost-effectiveness of a DSM scenario with average annual energy savings of 125 MWh, the utility's analysis should:

- Include the costs of the entire 125 MWh of future annual energy savings, but
- Include the impact of only the incremental 25 MWh because the 100 MWh is already assumed in the forecast.

In response to Commission Order Point 12b, MP estimated the amount of energy savings embedded in each year of its forecast. Table 12 below shows the initial data MP used for its calculations.

Table 12: Embedded Energy Savings in IRP Forecast

Year	Annual Impacts (GWh)			Total (GWh)
	CIP Customers	Adjusted CIP Customers[49]	CIP Exempt	
2006	[TRADE SECRET DATA HAS BEEN EXCISED]			
2007				
2008				
2009				
2010				
2011				
2012				
2013				
2014				
2015				
2016				
2017				
2018				
2019				
2020				
2021				
2022				
2023				
2024				
2025				
2026				
2027				
2028				

For its CIP customers, MP first subtracted the energy savings of projects larger than 1 million kWh, reasoning that these types of projects are too difficult to predict, from its reported CIP energy savings. The result is shown above in the column labeled Adjusted CIP Customers. MP's adjusted 2010-2014 CIP energy savings total 258 GWh.

For its CIP-exempt customers, MP averaged the 2007-2010 energy savings, which is **[TRADE SECRET DATA HAS BEEN EXCISED]** annually. MP then assumed that the forecast would include five years of MP's CIP-Exempt customers' **[TRADE SECRET DATA HAS BEEN EXCISED]**

[49] These figures exclude non-CIP exempt projects larger than 1 million kWh, which MP considers as unlikely to be replicable in the near future without new large customers, and savings associated with previously non-CIP exempt customers who have since opted out of Minnesota Power's CIP program.

of energy savings, or [TRADE SECRET DATA HAS BEEN EXCISED]. MP calculated total embedded energy savings by adding the 258 GWh savings from CIP customers and the [TRADE SECRET DATA HAS BEEN EXCISED] from CIP-Exempt customers, or [TRADE SECRET DATA HAS BEEN EXCISED]. For future years, MP assumed that the forecast would include energy savings based on MP's approved 2015 CIP energy savings goal, or 47 GWh. For CIP-exempt customers, MP assumed that [TRADE SECRET DATA HAS BEEN EXCISED] of energy savings would continue to be embedded annually. The results of MP's calculations are shown in Table 13 below.

Table 13: MP's Estimate of Embedded Energy Savings Over Planning Period

	Five Year Summation			Embedded Savings	Difference
Year	Non-CIP Exempt[50]	CIP Exempt	Total		
2014	[TRADE SECRET DATA HAS BEEN EXCISED]				
2015					
2016					
2017					
2018					
2019					
2020					
2021					
2022					
2023					
2024					
2025					
2026					
2027					
2028					

When reviewing MP's estimate and use of embedded energy savings, we considered whether MP's estimate of embedded energy savings reasonable and whether MP used the embedded energy savings correctly in its IRP analysis.

[50] These figures exclude non-CIP exempt projects larger than 1 million kWh which are unlikely to be replicable in the near future without new large customers, and savings associated with previously non-CIP exempt customers who have since opted out of Minnesota Power's CIP program

i. MP Estimate of Embedded Energy Savings

The Department is not aware of any industry best practices for estimating the amount of energy savings embedded in a forecast. However, the Department concludes that one way MP could improve its estimate by not excluding the savings from the large (one million kWh and greater) energy savings projects. Regardless of how unlikely that MP thinks it is that such savings will occur in the future, the savings occurred in the recent past and thus are reflected in the data points that MP used to estimate its embedded energy savings.

In addition, for years 2015-2029, MP estimated each year that its CIP Customers' contribution to embedded energy savings was equal to its approved CIP energy savings goal for 2015, approximately 47 GWh. This approach is unduly conservative since MP averaged CIP energy savings of 69 GWh from 2010-2014 (51 GWh if the large projects are excluded.) Thus, the Department concludes that MP underestimated its embedded energy savings.

The Department typically estimates that embedded energy savings are based on the last five year's energy savings. Using MP's actual CIP results for CIP Customers and MP's estimate of a contribution of **[TRADE SECRET DATA HAS BEEN EXCISED]** from CIP-Exempt customers, the Department estimates that MP's embedded energy savings are **[TRADE SECRET DATA HAS BEEN EXCISED]** (2010-2014 CIP energy savings of 347 GWh + **[TRADE SECRET DATA HAS BEEN EXCISED]** from CIP Exempt customers).

ii. Using the Embedded Energy Savings to Evaluate DSM Scenarios

Currently, Minnesota electric utilities use different methods for evaluating the impact and cost-effectiveness of future DSM investments in their IRP portfolios. When time permits, the Department proposes to convene interested parties to see whether best practices can be established.

c. Order Points 12c and 12d—additional conservation scenarios, including cost assumptions

Table 14 below shows the cost assumptions that Minnesota Power incorporated into its four energy savings scenarios. For the Existing scenario (46.5 GWh or 1.50 percent), MP assumed annual first-year energy savings costs of $0.15/kWh. This assumed cost is 65 percent higher than MP's 2010-2014 average cost of approximately $0.09/kWh (If large projects are excluded, MP's assumed average cost of $0.12/kWh is approximately 25 percent higher for the 46.5 GWh scenario are than the 2010-2014 average cost).

Further, MP's cost assumptions begin to climb in the higher-savings scenarios, reaching a total annual cost of $0.23/kWh at an incremental cost of $0.35/kWh for the 76.5 GWh savings scenario. When evaluating the additions of savings in the different proposed plans, the Company's cost projections for the incremental additions are significantly higher than the total annual cost. These cost assumptions represent as much as a threefold increase over costs per kWh of energy savings that MP experienced in recent years.

Table 14: Minnesota Power Energy Efficiency Cost Assumptions

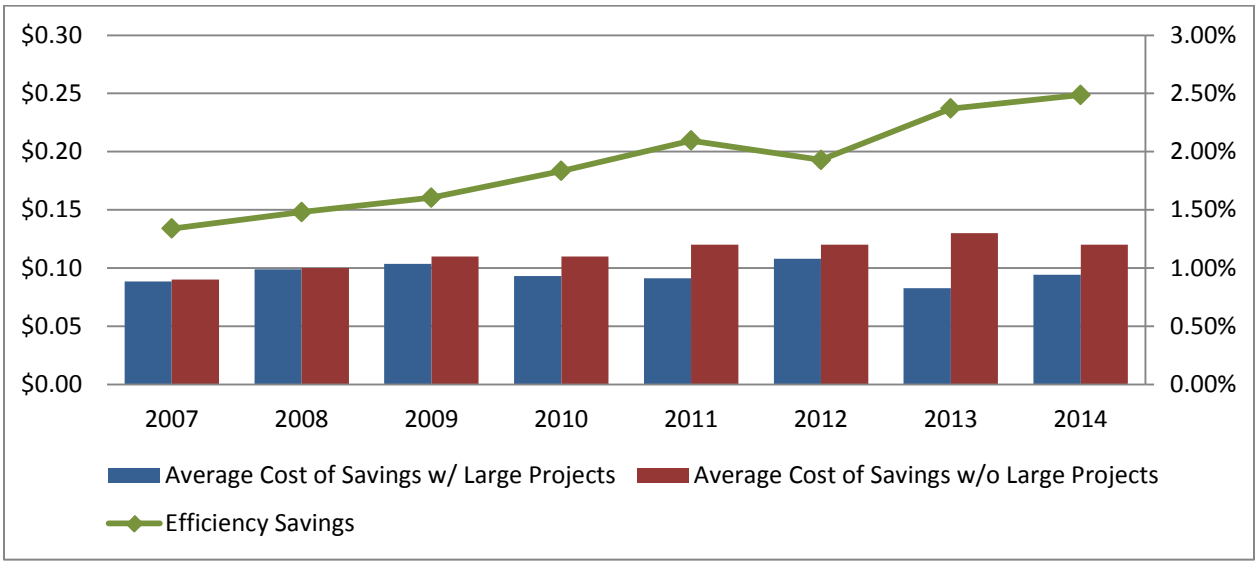
Scenarios		*Annual Program Costs (million $)*					*Company Assumed Incremental $/kWh*	*Company Assumed Total Annual Cost $/kWh*
Annual First Year GWh Savings	*Plan*	*Incentives*	*Admin*	*Nonimpact*	*Total*	*Total Incremental Costs*		
46.5	Existing	$3.4	$1.2	$2.4	$7.1	$0.0	N/A	$0.15
57.3	+ 11 GWh	$4.8	$1.7	$3.2	$9.7	$2.7	$0.24	$0.17
61.5	+ 15 GWh	$5.6	$1.9	$3.6	$11.1	$4.1	$0.27	$0.18
76.5	+ 30 GWh	$9.4	$2.9	$5.3	$17.6	$10.5	$0.35	$0.23

Table 15 and Figure 14 show Minnesota Power's last seven years of CIP energy savings and related costs. The Company has consistently exceeded the statutory 1.5 percent energy savings goal since 2009 and has met or exceeded 1.87 percent of energy savings since 2010.

Table 15: Historical Minnesota Power CIP Achievements and Costs

Year	kWh	CIP Expenditures	Net Benefits	Incentive	Savings as % of Retail Sales	$/ first year kWh	Incentive/Spending
2007	44,168,014	$3,908,223	$13,617,215	$349,334	1.34%	$0.09	9%
2008	48,845,282	$4,826,410	$18,669,840	$607,169	1.48%	$0.10	13%
2009	52,897,732	$5,483,230	$23,391,755	$878,709	1.60%	$0.10	16%
2010	60,503,220	$5,635,000	$29,675,047	$6,806,612	1.83%	$0.09	121%
2011	69,091,422	$6,295,187	$16,611,526	$7,772,785	2.09%	$0.09	123%
2012	63,159,196	$6,813,817	$16,543,789	$7,105,410	1.93%	$0.11	104%
2013	77,630,645	$6,405,828	$17,757,678	$8,733,448	2.37%	$0.08	136%
2014	76,338,363	$7,200,833	$20,792,339	$6,237,702	2.49%	$0.09	87%

Figure 14 Historical Minnesota Power CIP Achievements and Costs



As discussed above, the Company excluded certain large one-time C/I projects that produced large savings that the Company believed to be difficult to replicate and therefore didn't factor into the average MP energy savings costs for energy efficiency. MP's average cost of savings are plotted in Figure 14 with and without these large projects, and it is evident that the large projects allow MP to realize a much better cost per kWh when they are factored into the cost analysis. The Department concludes that it would be reasonable to start with a range of historical costs that both includes and excludes these large projects.

Order Point 12d directed MP to indicate the cost of 1 percent energy savings increments from 1.5 percent to 2.5 percent savings. The Company based these incremental percentage cost assumptions on the four savings scenarios that were proposed in its filing, existing 1.5 percent, 1.87 percent, 2 percent, and 2.5 percent, around which the rest of the energy savings curve from 1.5 percent to 2.5 percent in 0.1 percent increments was interpolated using a polynomial function based on the estimated program costs and savings levels identified in MPs four savings scenarios. Table 16 below presents these values.

Table 16: 0.1 Percent Savings Alternatives, 1.5 – 2.5 Percent

Percentage of Incremental Energy Savings	Total Energy Saving	GWh of Incremental Energy Savings Each Year	First Year Incremental Program Cost ($000)
0.10%	1.60%	3	$511
0.20%	1.70%	6	$1,199
0.30%	1.80%	9	$2,034
0.37%	1.87%	11	$2,665
0.40%	1.90%	12	$2,988
0.50%	2.00%	15	$4,064
0.60%	2.10%	18	$5,206
0.70%	2.20%	21	$6,438
0.80%	2.30%	24	$7,725
0.90%	2.40%	27	$9,057
1.00%	2.50%	30	$10,525

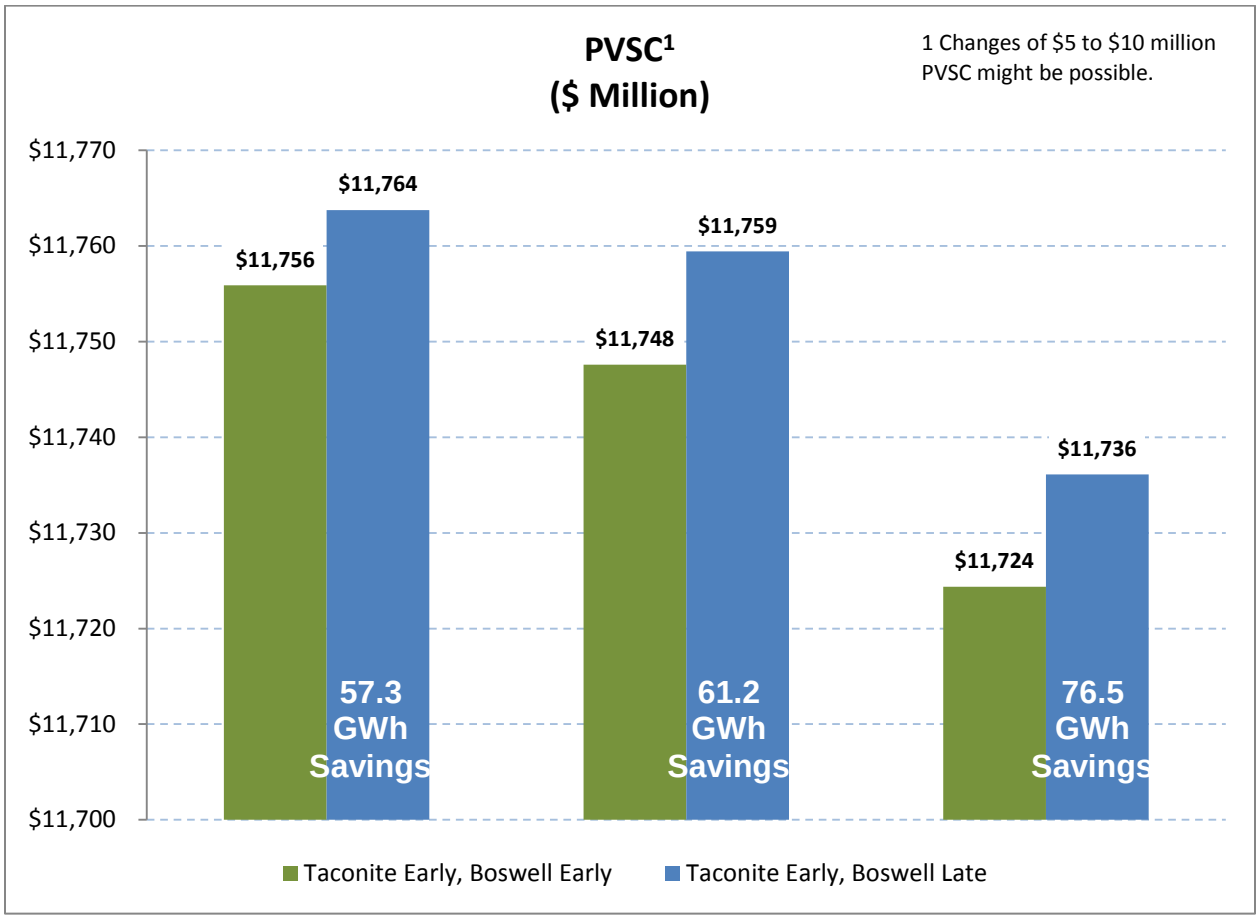
The 2017 incremental first year program cost for the 76.5 GWh savings scenario is $10.5 million, which is in addition to the existing $7.0 million 2017 first year program cost for the base plan of 46.5 GWh energy savings. With these assumptions, MP is projecting that achieving 76.5 GWh energy savings will cost the Company more than $17 million in 2017. However, in 2014 MP was able to achieve 76.3 GWh savings for a program cost of $7.2 million. Again, MP's cost assumptions appear to be high, even in the near term, almost tripling for the same level of energy savings the Company achieved in 2014.

The Department believes that the cost assumptions from MP for the incremental levels of energy efficiency are high, and represent a significant departure from historical costs per kWh for the Company. However, the Department did not conduct scenario analyses with lower cost assumptions because all of MP's energy savings scenarios, even at MP's estimated costs, were cost-effective.

d. Department Modeling

As shown in Figure 15 below, the Department's Strategist modeling of the Company's small coal scenario, based on MP's energy savings and high cost projections, indicates that cost-effectiveness increases (represented by declines in total PVSC) as MP's energy savings achievements increase, with the 76.5 GWh annual energy saving scenario delivering the plan with the lowest PVSC. Across multiple shutdown scenarios, assumptions of externality costs, market purchases on and off, and spot market price assumptions, the more energy savings that MP can procure the more beneficial it is to the overall PVSC of the Company's plan. The Department concludes that this result is reasonable given MP's large need for energy on its system.

Figure 15: Plan Costs with Increasing Energy Savings Scenarios



e. MP's Objections to Higher Energy Savings Levels

The Company concluded that the Commission should be cautious about approving higher energy savings goals. MP expressed concerns about increasing rate impacts, the ability to sustain high energy savings, and the risk that not achieving higher levels of energy savings would have on the Company's need to procure supply-side resources that take considerable time to procure[51]. The Department discusses each of these briefly below.

[51] For example, on page 5 of Appendix B, MP stated:

> Although the Company believes it may be possible to cost-effectively sustain savings levels higher than the current 1.5 percent target in the future, careful consideration of future costs should be given, and incremental savings goals should be set with caution until more experience with these changing delivery conditions can provide further insight.

Further on page 68 of the filing, the Company states:

> Although the other scenarios contemplating even higher levels of incremental savings were also prevalent in the expansion plans, they were not included in the Preferred Plan. This was done due to a high degree of risk associated with assuming historical performance of energy efficiency programs are sustainable, and that significant new savings can be found

In Appendix B – Part 2, beginning on page ES-1, MP discussed the rate impacts that each of the different DSM scenarios would have on its customers. In general, most energy savings projects don't pass the rate impact test unless the ratio of energy savings to demand savings is low. In other words, the better a project is at energy savings, the worse it will perform in the rate impact test.

The Department notes that although MP raised the concern of rate impacts in the context of spending additional dollars on the state's preferred energy resource—energy savings—the Company has been silent on the impact that its Shared Savings DSM financial incentive mechanism has had on its customer rates. Table 17 below shows the historical Shared Savings Incentive/CIP expenditures for Minnesota's electric investor-owned utilities.

Table 17: Historical Incentive / CIP Expenditure Ratios For Minnesota's Electric IOUs

Year	Xcel Electric	Minnesota Power	Otter Tail Power	Interstate Power and Light
2010	56%	121%	70%	2%
2011	68%	123%	60%	15%
2012	62%	104%	56%	54%
2013	57%	136%	77%	12%
2014	46%	87%	57%	21%

As illustrated above, MP's Shared Savings incentive levels were higher than the Company's CIP expenditures for every year except 2014 (when the percentage was less than 100). Thus MP's incentive mechanism has doubled the cost of energy savings to customers, yet MP did not raise a concern about rate impacts due to its Shared Savings DSM financial incentive.[52]

The Department also notes that MP's rate impact analysis was based on the Company's costs, which as discussed above the Department believes will be significantly lower than projected, particularly in the next five years.

Nonetheless, the Department concedes that it is difficult to project whether MP will be able to sustain its high energy savings levels. In fact, MP has only once met the average annual savings required to meet the 76.5 GWh scenario, in 2014. However, both the Department's and MP's analyses indicate that the higher energy savings goals would result in significantly

> each year to accumulate high levels of aggregate capacity in the long term expansion plan. Relying on significant levels of energy and capacity savings to defer large long term resource decisions could put maintaining reliability and affordability for customers at risk. In the event that the energy efficiency programs do not perform as projected, additional power supply would be required, and large resource additions take years to implement.

[52] The Department notes that the Shared Savings incentives are currently undergoing revision in Docket No. E,G999/CI-08-133.

lower overall costs. Further, the high energy savings are projected to be cost-effective even with costs several times higher than historical costs.

The Department notes that the Company's five-year plan for procuring supply-side resources does not change if the Company only achieves 61.5 GWh of annual energy savings as compared to Department's recommended 76.5 GWh. Consequently, there is no risk in the Commission setting the higher energy savings goal. Further, the Commission will be re-evaluating MP's energy savings goal in its next resource plan two years from now. The Department concludes that MP's objections should be noted, but should not be a reason for the Commission not to approve higher goals.

f. Uncertainty in MP's forecast

For Minnesota Power, particularly, the opportunity to acquire more CIP energy efficiency is an attractive alternative to committing to in-the-ground generation in a time of demand uncertainty. In its filing, the Company stated:

> The Downside and Current Contract forecasts evaluate a slowdown in the key industries Minnesota Power serves, along with a continued sluggish U.S. economy that could deliver nearly 320 MW of demand destruction in northeast Minnesota. Appendix A contains additional detail on each scenario.

In its forecasting for this resource plan, the Company appears to be seriously considering scenarios that reflect significant demand reductions through the loss of customers or from impacts of international commodities markets that could affect demand in Minnesota Power's service territory. If energy savings can be procured at or below costs projected by the Company in this resource plan, it would allow Minnesota Power to increase its demand savings greatly and partially avoid investments in capital that, with possible reductions in load, could result in unnecessary generation investments.

4. Department DSM Recommendations

The Department commends MP for the high level of energy savings it has sustained over the past several years. Although the Department understands that Minnesota Power is hesitant to conclude that the Company can continue to procure its high level of energy savings in the long-term, the Department concludes that the Commission should approve the 76.5 GWh DSM scenario for the following reasons:

- The Department's analysis indicate that the 76.5 GWh would result in the lowest cost expansion plan on Minnesota Power's system;
- MP's cost assumptions provide ample opportunity for MP to spend significantly more dollars to achieve energy savings;
- The projected five year action plan does not change between different energy savings levels so not achieving the high energy savings will not adversely impact MP's ability to procure supply-side resources in a timely manner;
- Energy savings are Minnesota's preferred energy resource; and

- The Commission can and should revisit MP's energy savings goals in two years.

D. COMPLIANCE WITH THE RENEWABLE ENERGY STANDARD

1. Background

Prior to the 2007 Legislative Session, Minn. Stat. §216B.1691 required utilities to make a good faith effort to obtain 15 percent of their Minnesota retail sales from eligible energy technologies by 2015, and to obtain 0.5 percent renewable energy from biomass technologies. The 2007 Minnesota Legislature amended Minn. Stat. §216B.1691 to include a Renewable Energy Standard (RES) beginning in 2010. As amended, Minn. Stat. §216B.1691, Subd. 2 sets forth the Renewable Energy Objective in place through 2010 and requires that:

> Each electric utility shall make a good faith effort to generate or procure sufficient electricity generated by an eligible energy technology to provide its retail customers or the retail customers of a distribution utility to which the electric utility provides wholesale electric service so that commencing in 2005, at least one percent of the electric utility's total retail electric sales to retail customers in Minnesota is generated by eligible energy technologies, and seven percent of the electric utility's total retail electric sales to retail customers in Minnesota by 2010 is generated by eligible energy technologies.

Minn. Stat. §216B.1691, Subd 2a establishes the Renewable Energy Standard utilities must meet through 2025 and specifically requires that:

> … each electric utility shall generate or procure sufficient electricity generated by an eligible energy technology to provide its retail customers in Minnesota, or the retail customers of a distribution utility to which the electric utility provides wholesale electric service, so that at least the following standard percentages of the electric utility's total retail electric sales to retail customers in Minnesota is generated by eligible energy technologies by the end of the year indicated:
>
> - 2012 12 percent
> - 2016 17 percent
> - 2020 20 percent
> - 2025 25 percent

The statute no longer requires that a portion of the renewable energy generation come from biomass technologies. An eligible energy technology is defined by Minn. Stat. §216B.1691, Subd. 1 as an energy technology that:

> Generates electricity from the following energy sources: (1) solar; (2) wind; (3) hydroelectric with a capacity of less than 100 megawatts; (4) hydrogen, provided that after January 1, 2010, the hydrogen must be generated from the resources listed in this clause; or (5) biomass, which includes without limitation, landfill gas, an anaerobic digester system, and an energy recovery facility used to capture the heat value of mixed municipal solid waste or refuse-derived fuel from mixed municipal solid waste as a primary fuel.

Minn. Stat. §216B.1691, subd. 2(d) directs the Commission to "issue necessary orders detailing the criteria and standards by which it will measure an electric utility's efforts to meet the renewable energy objectives of subdivision 2 to determine whether the utility is making the required good faith effort."

The Commission set forth the criteria for determining compliance with the RES Statute after taking comments from effected parties in a number of Orders.[53] Among the resources the Commission has determined ineligible for meeting the RES are resources used for green pricing, resources that do not meet the statutory definition of eligibility, and generation assigned to compliance for other regulatory purposes such as another state's Renewable Portfolio Standard Requirements (RPS)

The 2007 amendment to Minn. Stat. §216B.1691, Subd. 4 required the Minnesota Public Utilities Commission to establish a program for tradable Renewable Energy Credits (RECs) by January 2008, and to require all electric utilities to participate in a Commission-approved REC tracking system once such a system was in operation.

The Commission subsequently adopted the use of the Midwest Renewable Energy Tracking System (M-RETS), a multi-state REC tracking system, as the REC tracking system under Minn. Stat. §216B.1691, Subd. 4(d), and required Minnesota utilities to participate.[54] Specifically, the Commission required utilities to complete the online registration process and sign the Terms of Use agreement with the M-RETS system administrator APX, Inc., and

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[53] *In the Matter of Detailing Criteria and Standards for Measuring an Electric Utility's Good Faith Efforts in Meeting the Renewable Energy Objectives Under Minn. Stat. §216B.1691,* Docket No. E999/CI-03-869, Initial Order Detailing Criteria and Standards for Determining Compliance with Minn. Stat. §216B.1691 and Requiring Customer Notification by Certain Cooperative, Municipal, and Investor-Owned Distribution Utilities. (June 1, 2004)
In the Matter of Detailing Criteria and Standards for Measuring an Electric Utility's Good Faith Efforts in Meeting the Renewable Energy Objectives Under Minn. Stat. §216B.1691, Docket No. E999/CI-03-869; *In the Matter of a Commission Investigation into a Multi-State Tracking and Trading System for Renewable Energy Credits,* Docket No. E999/CI-04-1616, Second Order Implementing Minn. Stat. §216B.1691, Opening Docket to Investigate Multi-State Program for Tracking and Trading Renewable Credits and Requesting Periodic Updates from Stakeholder Group; (October 19, 2004)
In the Matter of Detailing Criteria and Standards for Measuring an Electric Utility's Good Faith Efforts in Meeting the Renewable Energy Objectives Under Minn. Stat. §216B.1691, Docket No. E999/CI-03-869, Order After Reconsideration (August 13, 2004).

[54] *In the Matter of a Commission Investigation into a Multi-State Tracking and Trading System for Renewable Energy Credits,* Docket No. E999/CI-04-1616, Order Approving Midwest Renewable Energy Tracking System (M-RETS) Under Minn. Stat. §216B.1691, Subd. 4(d), and Requiring Utilities to Participate in M-RETS (October 9, 2007)

receive account approval from APX by January 1, 2008. In addition, the Commission directed utilities to make a substantial and good faith effort to create a system account and sub-accounts for its organization, and to register its generation units/facilities in the M-RETS system by March 1, 2008.

In its December 18, 2007 *Order Establishing Initial Protocols for Trading Renewable Energy Credits,* the Commission adopted a four-year shelf life for all renewable energy credits to be used for compliance with the Minnesota RES. A four-year shelf life allows a REC to be retired towards MN RES compliance in the year of generation and during the four years following the year of generation.

Finally, in its December 3, 2008 *Third Order Detailing Criteria and Standards for Determining Compliance under Minn. Stat. §216B.1691 and Setting Procedures for Retiring Renewable Energy Credits*, the Commission directed utilities to begin retiring RECs equivalent to one percent of their Minnesota annual retail sales for the 2008 and 2009 compliance year by May 1st of the following year. Upon retirement, RECs are transferred into a specific Minnesota RES retirement account and, once retired, are not available to meet other state or program requirements, thus addressing the statutory prohibition against double counting the RECs and promoting the environmental benefits of renewable energy. The Commission further directed the utilities to submit a compliance filing demonstrating their compliance with the RES by June 1st

In addition to amending the RES Statute, Minn. Stat. §216B.241, Subd. 1c(b) was added to establish an energy-savings goal as part of a utility's conservation improvement plan (CIP), and states:

> Each individual utility and association shall have an annual energy-savings goal equivalent to 1.5 percent of gross annual retail energy sales unless modified by the commissioner under paragraph (d). The savings goals must be calculated based on the most recent three-year weather normalized average.

The attainment of the 1.5 percent energy savings goal will reduce a utility's forecasted retail sales, and consequently lower the amount of renewable generation required to meet RES obligations.

In 2013, Minn. Stat. §216B.1691, Subd. 2(f) was amended to establish a solar energy standard (SES). Specifically, the statute requires public utilities to generate or obtain at least 1.5 percent of their electric sales to retail customers from solar energy by the end of 2020, and requires that at least 1 percent of the goal be met from distributed generation facilities with a nameplate capacity of 20 kW or less. The SES excludes retail electric sales to customers that are iron mining extraction and processing facilities, paper mills, wood products manufacturers, sawmills, or oriented strand board manufacturers.

2. RES Compliance

a. 2014 RES Compliance

In Docket No. E999/PR-15-12, MP reported that it had 10,176,245 MWh of energy sales subject to the Minnesota RES requirement for 2014[55]. The Company retired 1,221,149 RECs representing 12 percent of its Minnesota sales to comply with its RES requirement. MP complied with its 2014 RES requirement.

b. MP's Renewable Obligation

Table 18, below, summarizes MP's RES requirement in MWh's over the forecast period.

Table 18: MP's Renewable Energy Objective

Year	MN Retail Sales + Sales to MN Muni's	REO/RES Percentage	RES Requirement (MWhs)
2015	11,236,758	12%	1,348,411
2016	11,591,051	17%	1,970,479
2017	12,135,164	17%	2,062,978
2018	12,222,147	17%	2,077,765
2019	12,278,287	20%	2,087,309
2020	12,368,891	20%	2,473,778
2021	12,379,530	20%	2,475,906
2022	12,424,405	20%	2,484,881
2023	12,479,164	20%	2,495,833
2024	12,561,284	20%	2,512,257
2025	12,583,436	25%	3,145,859
2026	12,641,473	25%	3,160,368
2027	12,701,608	25%	3,175,402
2028	12,797,604	25%	3,199,401

MP's RES requirement increases from an estimated 1,348,411 MWhs in 2015 to 3,199,401 MWhs in 2028.

[55] The RES requirements set forth in Minn. Stat. §216B.1691, Subd. 2a apply to Minnesota retail sales, as well as to the wholesale sales to other Minnesota distribution companies serving Minnesota retail sales. Consequently, MP's sales to several Minnesota municipal utilities are subject to RES requirements.

c. Generation Resources

MP has registered its renewable generation facilities in M-RETS. MP generates an estimated 2,137,799 RECs annually with its existing renewable generation resources.[56] The annual estimate includes MP's Bison 4 wind generation facility, which began commercial operation at year-end 2014. The Company has additional RECs available to meet green pricing obligations, as well as, generation from renewable energy sources that are not eligible for Minnesota RES compliance as defined by Minn. Stat. §216B.1691, Subd. 1 (i.e. from hydro facilities greater than 100 MW). Table 19 summarizes MP's ability to meet its future RES obligations without the additional 300 MW of wind resources that the Company proposed in its plan.

Table 19: REO Compliance with Existing Resources

Year	RES Requirement MWh	Est. Annual Existing Renew. Generation (MWh)	Existing Generation Existing less RES Req. Surplus/ (Deficit) MWh	Cumulative RES Surplus/ (Deficit) (MWh) (Prev. Yr Bal. + Col B. –Col. A)
				Beg. Balance 5,135,860
2015	1,348,411	2,137,799	789,388	5,925,248
2016	1,970,479	2,137,799	167,231	6,092,569
2017	2,062,978	2,137,799	74,821	6,167,390
2018	2,077,765	2,137,799	60,034	6,227,425
2019	2,087,309	2,137,799	50,491	6,277,915
2020	2,473,778	2,137,799	(335,979)	5,941,937
2021	2,475,906	2,137,799	(338,107)	5,603,830
2022	2,484,881	2,137,799	(347,082)	5,256,748
2023	2,495,833	2,137,799	(358,033)	4,898,715
2024	2,512,257	2,137,799	(374,457)	4,524,257
2025	3,145,859	2,137,799	(1,008,060)	3,516,198
2026	3,160,368	2,137,799	(1,022,569)	2,493,629
2027	3,175,402	2,137,799	(1,037,603)	1,456,026
2028	3,199,401	2,137,799	(1,061,602)	394,424

The Column entitled "Existing Generation less RES Requirement" reflects the Company's ability to meet its RES requirements in a given year with that year's renewable generation. The Commission adopted a four-year shelf life for RECs which enables utilities to bank excess RECs (those not necessary to meet a particular year's RES requirement), and retire the RECs up to four years after generation towards a future year's compliance requirement. MP currently has approximately three million unretired RECs available for future compliance. The Column entitled "Cumulative RES Surplus/(Need)" reflects the four-year carry forward for unretired RECs. Given MP's existing unretired RECs and annual renewable generation, the Company appears to have sufficient existing renewable generation capability to meet its RES requirement through the planning period.

[56] A REC represents 1 MWh of renewable energy.

The Department's proposed expansion plan includes the addition of 300 MW of wind in 2018 and up to 100 MW of additional wind in 2022, which would give MP further assurance of meeting its RES obligation.

E. SES COMPLIANCE

The SES Statute requires investor-owned utilities to procure 1.5 percent of their Minnesota retail sales from solar energy beginning in 2020. The SES Statute exempts retail electric sales to customers that are iron mining extraction and processing facilities, paper mills, wood products manufacturers, sawmills, or oriented strand board manufacturers. MP has significant retail sales to these exempted industrial customers. In 2014, MP reported energy sales totaling 6,336,953 MWh to SES exempt customers. Table 20, below estimates MP's total SES requirement assuming 2014 exempted sales levels over the planning period.

Table 20: MP Estimated SES Requirement

Year	Col. A Total Retail Sales	Col. B Exempted Retail Sales	Col. C Sales Subject to the SES (Col. A – Col. B)	Col. D Total SES Requirement (1.5% * Col. C)	Col. E Small Solar Carve-Out (10% * Col. D)
2015	11,236,758	6,336,953			
2016	11,591,051	6,336,953			
2017	12,135,164	6,336,953			
2018	12,222,147	6,336,953			
2019	12,278,287	6,336,953			
2020	12,368,891	6,336,953	6,031,938	90,479	9,048
2021	12,379,530	6,336,953	6,042,577	90,639	9,064
2022	12,424,405	6,336,953	6,087,452	91,312	9,131
2023	12,479,164	6,336,953	6,142,211	92,133	9,213
2024	12,561,284	6,336,953	6,224,331	93,365	9,336
2025	12,583,436	6,336,953	6,246,483	93,697	9,370
2026	12,641,473	6,336,953	6,304,520	94,568	9,457
2027	12,701,608	6,336,953	6,364,655	95,470	9,547
2028	12,797,604	6,336,953	6,460,651	96,910	9,691

MP has filed a request for approval of two solar projects in 2016: a 10 MW solar array at Camp Ripley, and a 1.04 MW community solar garden. MP's resource plan also includes the addition of 12 MW of solar in 2020 and 10 MW in 2025. Table 21 below estimates MP's ability to comply with its SES requirement assuming its proposed solar additions.

Table 21: Estimate of MP's SES Compliance

Year	Total SES Requirement (1.5% * Col. C)	Proposed Solar Additions MWs	Solar Energy Additions (MWhs) 20% Cap. Factor	Cumulative Generation	Solar Surplus/ (Need)
2015					
2016		11.04	9,671*		
2017			19,342	29,013	
2018			19,342	48,355	
2019			19,342	67,697	
2020	90,479	12.00	40,366	108,063	17,584
2021	90,639		40,366	148,429	57,791
2022	91,312		40,366	188,796	97,484
2023	92,133		40,366	229,162	137,028
2024	93,365		40,366	269,528	176,163
2025	93,697	10.00	57,886	327,414	233,717
2026	94,568		57,886	385,300	290,732
2027	95,470		57,886	443,186	347,716
2028	96,910		57,886	501,072	404,162

**Assumes the solar generation comes online mid-year*

As shown in Table 21, MP's proposed solar additions would result in its ability to meet its SES requirement in total; however, Table 21 does not estimate MP's ability to meet the Small Solar Carve-out of the SES. The Small Solar Carve-out requires that 10 percent of the total SES requirement be met through generation facilities of less than 20 kW. As reflected in Table 21, approximately 9,000 MWhs of MP's solar generation would need to come from solar facilities of less than 20 kW. In its most recent SES compliance report, MP reported that it had approximately 132 solar net metered customers on its system; however, the contract for those customers does not require transfer of the SRECs associated with the net metered solar generation to the Company. MP has requested the ability to count the solar generation from its community solar subscriptions towards its Small Solar Carve-out; however, the Commission has not yet ruled on the Company's request and concerns have been raised in that proceeding.[57]

The Department notes that its Strategist modeling resulted in an additional 50 MW of solar generation in scenarios with high (76.5 GWh) DSM, and an additional 100 MW at lower DSM levels (*e.g.*, 57.3 GWh).

F. ENVIRONMENTAL ISSUES

The Department generally reviews utility resource plans for compliance with pending state and national environmental legislation that impacts the electric utility's operations. MP provided information on the environmental regulations to which it is subject, and provided information on how it incorporated these regulations into its modeling.

[57] Docket No. E015/M-15-825.

MP specifically addressed the following regulations:

- Cross-State Air Pollution Rule (CSAPR);
- National Ambient Air Quality Standards (NAAQS);
- Mercury and Air Toxic Standards (MATS);
- National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial and Institutional Boilers (Boiler MACT);
- Minnesota Mercury Emissions Reduction Act (MERA);
- Clear Air Visibility Rule (Regional Haze);
- Clean Power Plan (CPP);
- Coal Combustion Residuals (CCR);
- 316b Rule – Standards to Protect Aquatic Ecosystems; and
- Water Effluent Regulation (Effluent Limit Guidelines, ELG)

MP indicated that it included compliance with all but three of the regulations listed above in its Base Case. The remaining three regulations, Clean Power Plan, Coal Combustion Residuals, and Effluent Limit Guidelines, were incorporated into MP's sensitivity analysis as part of its modeling. MP states that it continues to monitor and evaluate all regulations for changes and impact on its generation facilities.

As part of its IRP, MP provided a summary table outlining the potential impact of these regulations on its generation facilities.[58] As part of a consent decree with the U.S. EPA, MP is proposing to re-route the flue gas from its Boswell Units 1 & 2 through the Boswell Unit 3 scrubber as a means of reducing SO_2 emissions from Units 1 & 2 and complying with the consent decree. In addition, MP anticipates it may need to install equipment to prevent fish impingement (being trapped against screens at the point of water intake from lakes or streams) at several of its facilities, and expects additional requirements regarding entrainment (fish and eggs being drawn into the cooling water systems) to be determined by the Minnesota Pollution Control Agency (MPCA).

The Department concludes that MP is adequately considering and planning for compliance with the many environmental regulations to which the Company is subject.

G. MINNESOTA GREENHOUSE GAS EMISSIONS REDUCTION GOAL

1. Background

Minnesota Statutes 216H.01, Subdivision 2 states:

> Statewide greenhouse gas emissions include emissions of carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride emitted by anthropogenic sources within the state and from the generation of electricity imported from outside the state and consumed in Minnesota.

[58] Appendix E: Environmental Policy, p. 19.

Minnesota Statutes 216H.02, Subdivision 1 states:

> It is the goal of the state to reduce statewide greenhouse gas emissions across all sectors producing those emissions to a level at least 15 percent below 2005 levels by 2015, to a level at least 30 percent below 2005 levels by 2025, and to a level at least 80 percent below 2005 levels by 2050. The levels shall be reviewed based on the climate change action plan study.

Minnesota Statutes 216H.03, Subdivision 2 states:

> For the purpose of this section, "statewide power sector carbon dioxide emissions" means the total annual emissions of carbon dioxide from the generation of electricity within the state and all emissions of carbon dioxide from the generation of electricity imported from outside the state and consumed in Minnesota. Emissions of carbon dioxide associated with transmission and distribution line losses are included in this definition. Carbon dioxide that is injected into geological formations to prevent its release to the atmosphere in compliance with applicable laws, and emissions of carbon dioxide associated with the combustion of biomass, as defined in section 216B.2411, subdivision 2, paragraph (c), clauses (1) to (4), are not counted as contributing to statewide power sector carbon dioxide emissions[59].

On August 5, 2013, the Commission issued a Notice of Information in Future Resource Plan Filings (Commission's Letter). The Commission Letter states, in part:

> **PLEASE TAKE NOTICE** that the Commission expects utilities to include in their resource plans filed after August 1, 2013 an explanation of how the resource plan helps the utility achieve the greenhouse gas reduction goals, renewable energy standard, and solar energy standard as listed in the above-referenced legislation. Parties should also be prepared to discuss the matter in comments.

2. Minnesota Power's Response to Commission's August 1, 2013 Notice

On page 75 of its 2015 resource plan, Minnesota Power stated that by implementing its preferred plan, the Company will exceed Minnesota's greenhouse gas reduction goal of 15 percent from 2005 levels by 2015 and 30 percent reduction from 2005 levels by 2025. In

[59] (1) methane or other combustible gases derived from the processing of plant or animal material;
(2) alternative fuels derived from soybean and other agricultural plant oils or animal fats;
(3) combustion of barley hulls, corn, soy-based products, or other agricultural products;
(4) wood residue from the wood products industry in Minnesota or other wood products such as short-rotation woody or fibrous agricultural crops;

DOC IR No. 9 the Department asked the Company to provide its estimated CO_2 emissions for each year of the plan. MP's response is included as Attachment 14.

In DOC IR No. 9, the Department asked MP to explain how the Company calculated its 2005 and 2015-2029 CO_2 emissions. In response, MP outlined its approach as follows:

a. Summed total CO_2 emissions from MP owned generation.
b. Added known CO_2 emission from bilateral purchases that either point to a resource or based on average CO_2 emissions from the counterparty's power supply.
c. Added emissions from unidentified purchases, which includes both bilateral and the Midcontinent Independent System Operator ("MISO") market purchases. The CO_2 rate for unidentified purchases in 2005 is from the Emissions & Generation Resource Integrated Database ("eGRID") for the Midwest Reliability Organization ("MRO") West observed in 2005. The projected CO_2 rates for unidentified purchases from 2015 thru 2029 are from the eGRID for MRO West observed in 2010 (most recent available at the time of the analysis).
d. Subtract known CO_2 emissions from sales sourced from an identified generation resource.
e. Subtract CO_2 emissions from unidentified sales, which include bilateral and MISO market sales. The CO_2 emission rate is the average for Minnesota Power's total power supply.

3. Department's Analysis of MP's Greenhouse Gas Reduction Compliance

a. The Department's retail ratepayer methodology

The State's resource planning process is geared to identify the least-cost, most robust capacity expansion plans for meeting the needs of customers in an electric utility's entire system, some of whom may reside outside of Minnesota. For this reason, the Department proposed and used a greenhouse gas accounting methodology that mirrors the resource planning methodology. That is, the retail ratepayer methodology recognizes that a utility will use utility-owned generation to supply the electric needs of both its customers and other utility customers, make purchases from entities that are located both inside and outside of the State, and make some purchases from unidentified resources, which may or may not be located in Minnesota. The Department concludes that the Minnesota ratepayer approach provides the most reasonable estimate of how an electric utility's system-wide greenhouse gas emissions are changing.

Minnesota Power used a similar ratepayer methodology in this IRP. The Department reviewed the Company's methodology and concludes that it is reasonable. As MP noted in its response to DOC IR No. 9, the Company's projected CO_2 rates for unidentified purchases from 2015 thru 2029 are from the eGRID for MRO West observed in 2010, the most recent available eGRID data at the time of MP's analysis. However, eGRID values posted in October 2015 identify lower emission outlooks for the MRO West region (1,425 lbs./MWh vs. 1,536 lbs./MWh from the 2010 value). The Department agrees that using these values would project additional reduction in Minnesota Power's CO_2 reductions. Given that eGRID values

are often posted several years after the emissions occurs, MP and other parties' use of eGRID data will likely continue to overestimate future emissions from unidentified resources. This shortcoming may be overcome in the future by Xcel and other utilities providing the Department more up-to-date calculations of regional CO_2 emissions and the Department sharing this information with all of Minnesota's electric utilities. As discussed below, how much time parties put into improving this methodology is dependent on whether the Commission finds the Minnesota ratepayer methodology useful.

b. Minnesota Statutes' approach to measuring changes in greenhouse gas emissions

The Department's greenhouse gas accounting methodology is different from the methodology spelled out in Minnesota Statutes sections 216H.02 and 216H.03. Minnesota Statutes basically require counting the greenhouse gas emissions associated with electric generation sources located within the state (whether or not that electricity is consumed by Minnesota customers) as well as the emissions associated with all imports for consumption within the State, but not include emissions from certain types of biomass generation. The MPCA's methodology, based on its interpretation of Minnesota Statutes, accounts for these changes in greenhouse gas emissions in the electric utility industry by:

- Counting in-state emissions from operating facilities (which would include transmission and distribution losses);
- Adding in-state emissions of area greenhouse gas sources such as sulfur hexafluoride (SF6);
- Adding emissions associated with electricity imported for consumption in Minnesota; and
- Adding emissions due to transmission and distribution losses associated with electricity imported for consumption in Minnesota.

The MPCA does not allocate emissions associated with electricity imports to individual utilities or other power providers.

c. Department's discussion of greenhouse gas accounting methodologies

The Department notes that there are drawbacks to all of the greenhouse gas accounting methodologies. Because utility over-compliance with the CPP may result in emission allowances that can be sold, Minnesota Power's (or any other Minnesota electric utility's) estimate of CO_2 emission reductions beyond the CPP requirements may not result in national CO_2 reductions. Instead, another electric utility either inside or outside of Minnesota may purchase the allowances, negating the purchasing utility's need to reduce its CO_2 emissions.[60] Thus, in such an instance, other utilities would pay Minnesota to create the CO_2 emission reductions that the other utilities would need for compliance with CPP requirements.

[60] There are ways that a utility's over compliance could contribute to national CO_2 reductions that go beyond the CPP requirements. For example, the MPCA could decide to retire some of the State's allowances, an environmental group could purchase some of the allowances, or a utility could decide not to sell some of its allocated allowances.

The actual impact will depend on many factors including whether a mass or rate based approach is approved and whether excess allowances or credits are sold. Thus, the reductions calculated that are beyond CPP compliance may not result in net CO_2 reductions for the USA. In other words, compliance with the Minnesota greenhouse gas reduction goal, however measured, may in fact mean that Minnesota utilities will be sellers of allowances or credits, but not that their actions would result in marginal reductions in CO_2 emissions beyond the CPP requirements. Thus, over-compliance with the CPP only makes sense for ratepayers if the allowances sold compensate ratepayers for any premium incurred to achieve over-compliance.

There are also issues specific to the Minnesota ratepayer methodology and MPCA's approach. For example, the Minnesota ratepayer methodology estimates changes to a utility's system CO_2 emissions, and not Minnesota specific emissions. The methodology does not estimate changes in CO_2 emissions in the manner specified in Minnesota Statutes or the CPP. Further, using MPCA's method for counting progress towards the State's greenhouse gas reduction goal could lead to utilities increasing costs and global greenhouse gas emissions while maintaining compliance with the State's goal. For example, assume that a utility in Minnesota is exporting electricity from a combined cycle unit to another utility in Wisconsin—a sale from a particular unit and not a system sale. In response to the State's goal, the Minnesota utility could reduce generation at its plant (to stop the exports), thus decreasing its own greenhouse gas emissions but raising ratepayer costs due to the lost wholesale revenues. In turn, the Wisconsin utility might replace the lost energy with production from a higher-emitting resource such as a coal plant, thus increasing overall greenhouse gas emissions.

4. Department Recommendation

For future resource plans, the Department recommends that utility progress towards meeting the State's greenhouse gas reduction goal be measured by using the Minnesota ratepayer methodology because it is the best methodology for estimating changes in greenhouse gas emissions in the resource planning paradigm.[61] While this estimate would not comply with statutory methodology for estimating greenhouse gas reductions, this approach is the most reasonable method in this context. However, this approach does not measure actual tons of CO_2 reductions for the country as a whole, only for utilities operating in Minnesota.

If the Commission saw a benefit in doing so, the Commission could require parties at some point to include a methodology that was more in keeping with MPCA's interpretation of the Statutes. This evaluation could be done on a statewide basis, since the MPCA does not allocate emissions associated with imports to individual utilities, or on an individual utility basis, by allocating imported electricity. The Department invites direction from the Commission on this issue.

[61] The Department, Minnesota Power and other parties have been working to improve this methodology. Basically, this approach includes the following equation: 1. Calculate CO_2 emissions from utility-owned generation. 2. Add CO_2 emissions from purchased electricity. 3. Subtract CO_2 emissions from sales. The Department's approach is similar to Xcel's. In the context of MP's IRP, the Department made a few changes. In the future, the Department will also work with MP and other parties to determine an appropriate method for reflecting that future MISO purchases will have lower CO_2 emissions associated with them.

H. IMPACT OF PLAN IMPLEMENTATION ON ELECTRIC RATES AND BILLS

In this section, the Department discusses its review of MP's analysis of "the likely effect of plan implementation on electric rates and bills" over the next five years (2015-2019)[62].

The Department notes that the Company provided a table, labelled "Estimated Average Rate Impacts of Preferred Plan Relative to 2015 Projected Base Rates" (Table), showing the average rate impact (cents/kWh, percentage change and average impact) for each of its six customer classes: Residential, General Service, Large Light and Power, Large Power, Municipal Pumping, and Lighting.[63] The information presented is reproduced in Table 22 below.

[62] Minnesota Rules, Part 7843.0400, subpart 4 requires that each "utility include in its resource plan filing a nontechnical summary, not exceeding 25 pages in length and describing the utility's resource needs,… , activities required over the next five years to implement the plan, and the likely effect of plan implementation on electric rates and bills."
[63] Source: Table 1, page 4 of Appendix L, MP's September 1, 2015 IRP filing in Docket No. E015/RP-15-690.

Table 22: MP's Estimated Average Rate Impacts of Preferred Plan Relative to 2015 Projected Base Rates

Rate Class Impacts	2015	2016	2017	2018	2019	Compounded Annual Increase
Residential (average current rate, ¢/kWh)	10.238	10.238	10.238	10.238	10.238	-
Increase (¢/kWh)	0.023	1.075	1.461	1.858	2.283	-
Increase (%)	0.22%	10.50%	14.27%	18.15%	22.30%	4.11%
Average Impact ($ / month)	$0.19	$8.75	$11.89	$15.17	$18.69	-
General Service (average current rate, ¢/kWh)	10.233	10.233	10.233	10.233	10.233	-
Increase (¢/kWh)	0.018	0.953	1.285	1.617	1.975	-
Cumulative Increase (%)	0.18%	9.31%	12.56%	15.80%	19.30%	3.59%
Average Impact ($ / month)	$0.51	$26.99	$36.33	$45.81	$55.91	-
Large Light & Power (average current rate, ¢/kWh)	8.327	8.327	8.327	8.327	8.327	-
Increase (¢/kWh)	0.014	0.790	1.050	1.289	1.562	-
Increase (%)	0.17%	9.48%	12.61%	15.47%	18.76%	3.50%
Average Impact ($ / month)	$36	$2,146	$2,810	$3,527	$4,275	-
Large Power (average current rate, ¢/kWh)	5.995	5.995	5.995	5.995	5.995	-
Increase (¢/kWh)	0.010	0.666	0.834	0.998	1.207	-
Increase (%)	0.17%	11.11%	13.91%	16.65%	20.13%	3.74%
Average Impact ($ / month)	$5,297	$353,522	$395,722	$474,334	$575,391	-
Municipal Pumping (average current rate, ¢/kWh)	9.396	9.396	9.396	9.396	9.396	-
Increase (¢/kWh)	0.043	0.887	1.178	1.466	1.792	-
Increase (%)	0.46%	9.44%	12.53%	15.60%	19.07%	3.55%
Average Impact ($ / month)	$3.73	$77.97	$102.97	$127.49	$154.52	-
Lighting (average current rate, ¢/kWh)	15.916	15.916	15.916	15.916	15.916	-
Increase (¢/kWh)	0.014	1.438	1.974	2.580	3.203	-
Increase (%)	0.09%	9.04%	12.41%	16.21%	20.12%	3.74%
Average Impact ($ / month)	$0.11	$11.60	$15.74	$20.31	$24.90	-
Average Weighted Increase (¢/kWh)	0.013	0.756	0.980	1.199	1.457	-
Average Weighted Increase (%)	0.18%	10.53%	13.64%	16.69%	20.28%	3.76%

The Department provides the following summary of MP's calculation of the "likely effect of plan implementation on electric rates and bills:" [64]

- MP calculated each customer class' 2015 average current rate by adding the estimated current cost recovery rider rates customers will be paying in 2015 to each customers class' average rates without riders from the Company's last rate case. The rider rates are for the Renewable Resources Rider, Transmission Cost Recovery Rider, Boswell 4 Environmental Rider, Fuel and Purchased Energy Adjustment and the Conservation Program Adjustment. For example, as shown in Table 22 above, the 2015 average current rate for the Residential class is 10.238 cents/kWh, which is the current average rate the residential class is paying before any IRP action plan costs are considered.

- MP's 2015-2019 annual revenue requirements (Revenue Requirements) for its Preferred Plan are an outcome of the Strategist model. The Strategist model also creates 2015 baseline revenue requirements that reflect no action in 2015.

- The Incremental Revenue Requirements for each year of the period 2015-2019 are calculated as the difference between the relevant annual Revenue Requirements and the 2015 baseline revenue requirements.

- Before allocating the annual Incremental Revenue Requirements to each customer class, MP separated the incremental costs into three categories: solar costs, energy efficiency costs and incremental power supply costs:

    - Solar costs are divided by the projected non-exempt energy usage by class to obtain the solar cost rates by class.
    - The energy efficiency costs are divided by the projected energy usage by class that is subject to the conservation program adjustment charge to obtain the energy efficiency rates by class.
    - Each of the 2015-2019 annual incremental power supply costs are allocated to the Minnesota Jurisdiction and to customer classes assuming that the 2010 rate case relationships between jurisdictional and class revenue requirements, and jurisdictional and class energy at the meter remain constant. Given this assumption, MP allocated the 2015-2019 annual incremental power supply costs to customer classes based on the forecasted energy by jurisdiction and class from MP's 2014 Annual Electric Utility Forecast Report.

- Each of the 2015-2019 class annual incremental costs are then divided by the corresponding projected annual energy usage by class to obtain the relevant annual incremental power supply cost rates by class.

- While the incremental power supply costs include the revenue requirements associated with the Great Northern Transmission Line, they do not include the

[64] MP's discussed its methodology in Appendix L of its September 1, 2015 IRP filing in Docket No. E015/RP-15-690.

other projected revenue requirements for MP's Transmission Cost Recovery (TCR) Rider projects. An adjustment was made to include these costs in the rate impacts. The TCR adjustment costs were allocated to the Minnesota jurisdiction and to customer classes based on projected power supply production transmission allocators. The TCR adjustment cost rates by class was then calculated as the ratio of the class TCR adjustment costs and the corresponding projected annual energy usage by class.

- The annual solar cost rates, energy efficiency cost rates, incremental power supply cost rates and TCR adjustment cost rates are added by class to obtain the total annual adjusted Incremental Revenue Requirements (cents/kWh) by class. For example, as shown in Table 22 above, MP estimates that the 2015 average increase from current rates for the Residential class would be 0.023 cents/kWh.

The Department concludes that the steps described above provide for a reasonable calculation of the "likely effect of plan implementation on electric rates and bills" over the next five years.

Based on the discussion above and the fact that the relevant rules only require a nontechnical summary, the Department concludes that Minnesota Power complied with the Minnesota Rules, Part 7843.0400, subpart 4's requirement that a utility must include in its resource plan filing a nontechnical summary describing "the likely effect of plan implementation on electric rates and bills" over the next five years.

IV. DEPARTMENT RECOMMENDATIONS

The Department recommends that the Commission approve:

A five-year action plan that includes MP:

- acquiring up to 300 MW of wind capacity in about 2018;
- acquiring solar units of 11 MW in 2016 and 12 MW in 2020;
- shutting down the Taconite Harbor 1 and 2 units in 2017,
- procuring average annual average energy savings of 76.5 GWh, and
- conducting a distribution study to identify interconnection points on its distribution system for small-scale distributed generation resources.

A long-term action plan that includes MP:

- procuring approximately 100 MW of wind, 50 MW of solar, and 200 MW of CC, partly to replace Boswell units 1 and 2, and
- shutting down Boswell units 1 and 2 once the CC generation is online.

/lt

Key to Abbreviations

Scenario	
TEBE	Taconite Harbor 1 & 2 shut down early, Bosell 1 & 2 shut down early
TEBG	Taconite Harbor 1 & 2 shut down early, Bosell 1 & 2 convert to natural gas
TEBL	Taconite Harbor 1 & 2 shut down early, Bosell 1 & 2 shut down late
TLBE	Taconite Harbor 1 & 2 shut down late Bosell 1 & 2 shut down early
TLBG	Taconite Harbor 1 & 2 shut down late Bosell 1 & 2 convert to natural gas
TLBL	Taconite Harbor 1 & 2 shut down late, Bosell 1 & 2 shut down late
Forecast	
FCSLL	Low Forecast
FCSL	Mid-low forecast
FCSM	median forecast
FCSH	mid-high forecast
FCSHH	high forecast
Capital Cost	
CAPL	Low Capital Costs
CAPM	Median Capital Costs
CAPH	High Capital Costs
CO_2 Price	
CO2L	Low CO_2 and Externality Costs
CO2M	Median CO_2 and Externality Costs
CO2H	High CO_2 and Externality Costs
Coal Price	
CLL	Low Coal Cost
CLM	Median Coal Cost
CLH	High Coal Cost
Natural Gas Price	
GASLL	Low Natural Gas Cost
GASL	Mid-low Natural Gas Cost
GASM	Median Natural Gas Cost
GASH	Mid-high Natural Gas Cost
GASHH	High Natural Gas Cost
Wind Price	
WNDLL	Low Wind Cost
WNDL	Mid-low Wind Cost
WNDM	Median Wind Cost
WNDH	Mid-high Wind Cost
WNDHH	High Wind Cost
Solar Price	
SLRLL	Low Solar Cost
SLRL	Mid-low Solar Cost
SLRM	Median Solar Cost
SLRH	Mid-high Solar Cost
SLRHH	High Solar Cost

Key to Abbreviations

Market Price	
MKTL	Low Spot Market Price
MKTM	Median Spot Market Price
MKTH	High Spot Market Price

Standard Modeling Approach, Energy Efficiency +11 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO_2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 11,756	120,504	4	2	-	1	578	3	12,783	3,273	9,509
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 11,779	118,071	5	2	-	1	572	-	14,242	3,002	11,240
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 11,764	122,839	4	2	-	1	550	-	13,259	3,101	10,158
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 11,849	124,818	4	2	-	1	530	1	14,529	2,699	11,830
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 11,886	124,383	4	2	-	1	429	-	15,034	2,609	12,424
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 11,894	129,655	3	2	-	1	370	-	14,538	2,656	11,882
TEBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 12,040	125,142	3	-	-	2	282	3	12,391	3,292	9,099
TEBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 12,057	121,546	4	1	-	2	190	-	13,261	3,182	10,078
TEBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 12,050	126,902	3	1	-	2	168	-	12,385	3,301	9,084
TLBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 12,107	125,963	4	1	-	2	327	1	12,810	3,188	9,623
TLBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 12,156	126,782	4	1	-	2	264	-	14,445	2,756	11,690
TLBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 12,153	132,142	3	1	-	2	224	-	13,739	2,793	10,946
TEBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 12,353	124,914	4	2	-	2	303	3	12,875	3,302	9,574
TEBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 12,372	125,604	4	-	-	2	280	2	14,099	2,910	11,189
TEBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 12,363	126,520	4	2	-	2	301	-	12,781	3,318	9,464
TLBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 12,429	130,405	4	-	-	2	299	3	13,939	2,831	11,107
TLBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 12,480	128,221	5	-	-	2	332	-	15,627	2,534	13,092
TLBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 12,462	132,190	4	-	-	2	470	-	14,468	2,724	11,744
TEBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 11,466	118,104	4	-	-	1	656	3	12,114	3,411	8,703
TEBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 11,497	117,853	4	-	-	1	389	-	14,602	2,777	11,825
TEBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 11,484	120,955	4	-	-	1	583	-	12,968	3,103	9,865
TLBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 11,525	122,236	4	-	-	1	697	1	13,131	3,052	10,079
TLBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 11,559	121,776	4	-	-	1	570	-	13,623	2,938	10,685
TLBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 11,571	126,969	3	-	-	1	500	-	13,157	2,986	10,171
TEBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 11,195	116,346	3	-	-	1	312	1	12,567	3,241	9,325
TEBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 11,238	114,280	4	-	-	1	562	-	13,406	3,130	10,276
TEBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 11,227	119,580	3	-	-	1	483	-	12,587	3,170	9,417
TLBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 11,259	121,826	3	-	-	1	479	-	13,211	2,966	10,245
TLBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 11,288	121,554	3	-	-	1	390	-	13,205	2,957	10,248
TLBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 11,306	123,861	3	-	-	1	737	-	11,886	3,367	8,519

Standard Modeling Approach, Energy Efficiency +11 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO_2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 11,829	120,504	4	2	-	1	578	3	12,783	3,273	9,509
TEBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 11,845	118,071	5	2	-	1	572	-	14,242	3,002	11,240
TEBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 11,830	122,839	4	2	-	1	550	-	13,259	3,101	10,158
TLBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 11,908	124,818	4	2	-	1	530	1	14,529	2,699	11,830
TLBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 11,946	124,383	4	2	-	1	429	-	15,034	2,609	12,424
TLBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 11,953	129,655	3	2	-	1	370	-	14,538	2,656	11,882
TEBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 11,651	122,236	3	-	-	2	353	3	12,065	3,359	8,706
TEBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 11,678	119,033	4	-	-	2	263	-	13,111	3,203	9,908
TEBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 11,667	124,369	3	-	-	2	229	-	12,223	3,297	8,926
TLBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 11,758	123,544	4	-	-	2	467	1	12,640	3,215	9,425
TLBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 11,800	123,450	4	-	-	2	380	-	13,525	2,999	10,526
TLBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 11,800	128,771	3	-	-	2	331	-	12,883	3,064	9,820
TEBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 12,641	116,263	5	2	-	1	1,157	3	13,238	2,874	10,364
TEBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 12,648	116,251	5	2	-	1	629	-	15,659	2,214	13,445
TEBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 12,665	118,924	5	2	-	1	996	-	13,987	2,567	11,420
TLBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 12,763	120,995	5	2	-	1	1,028	1	15,272	2,176	13,096
TLBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 12,791	120,388	5	2	-	1	873	-	15,839	2,069	13,770
TLBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 12,828	124,227	4	2	-	1	1,098	-	14,992	2,226	12,766
TEBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 10,833	125,256	3	2	-	1	358	3	12,144	3,872	8,273
TEBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 10,873	125,296	3	2	-	1	89	-	14,739	3,149	11,589
TEBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 10,821	127,992	3	2	-	1	203	-	12,722	3,647	9,075
TLBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 10,897	129,848	3	2	-	1	173	1	13,998	3,248	10,750
TLBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 10,941	129,549	3	2	-	1	129	-	14,479	3,164	11,315
TLBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 10,906	134,585	2	2	-	1	135	-	13,726	3,316	10,410
TEBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ 12,304	117,611	4	-	-	2	525	3	12,840	2,664	10,176
TEBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ 12,327	116,450	4	-	-	2	293	-	14,534	2,248	12,286
TEBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ 12,339	120,618	4	2	-	1	609	-	14,842	2,120	12,722
TLBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ 12,447	121,187	4	-	-	2	515	1	14,195	2,213	11,982
TLBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ 12,484	120,124	5	2	-	1	861	-	15,919	1,981	13,938
TLBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ 12,511	123,998	4	2	-	1	1,086	-	15,076	2,146	12,930

Standard Modeling Approach, Energy Efficiency +11 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO_2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ 11,189	125,207	3	2	-	1	359	3	12,147	3,903	8,244
TEBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ 11,204	122,676	4	2	-	1	255	-	13,692	3,531	10,161
TEBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ 11,170	128,044	3	2	-	1	203	-	12,742	3,675	9,067
TLBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ 11,227	127,140	4	2	-	1	451	1	13,031	3,629	9,402
TLBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ 11,265	126,771	4	2	-	1	365	-	13,535	3,527	10,008
TLBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ 11,245	132,087	3	2	-	1	302	-	12,888	3,671	9,217
TEBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ 11,908	121,327	4	2	-	1	628	3	13,281	3,003	10,278
TEBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ 11,905	118,768	5	2	-	1	622	-	14,697	2,760	11,937
TEBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ 11,890	123,484	4	2	-	1	587	-	13,666	2,893	10,773
TLBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ 11,974	125,303	4	2	-	1	553	1	14,841	2,545	12,296
TLBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ 12,009	124,825	4	2	-	1	450	-	15,374	2,432	12,942
TLBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ 12,012	126,536	4	2	-	1	1,024	-	13,704	2,955	10,749
TEBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ 12,019	121,320	5	2	1	-	955	2	14,457	2,642	11,815
TEBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ 12,008	120,464	5	2	-	1	623	-	15,239	2,485	12,754
TEBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ 11,994	125,253	4	2	-	1	589	-	14,212	2,608	11,604
TLBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ 12,078	125,001	5	1	1	-	906	1	15,168	2,467	12,701
TLBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ 12,103	124,637	5	1	1	-	748	-	15,789	2,317	13,472
TLBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ 12,108	128,535	4	1	1	-	962	-	14,879	2,540	12,340
TEBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ 11,570	121,110	3	-	-	2	344	3	11,488	3,720	7,768
TEBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ 11,618	120,635	3	-	-	2	91	-	13,445	3,241	10,205
TEBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ 11,605	123,327	3	-	-	2	216	-	11,669	3,649	8,020
TLBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ 11,692	125,454	3	-	-	2	187	1	12,965	3,206	9,759
TLBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ 11,741	125,372	3	-	-	2	143	-	13,905	2,990	10,916
TLBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ 11,735	130,548	2	-	-	2	169	-	13,162	3,036	10,126
TEBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ 11,371	121,064	3	-	-	2	337	3	11,056	3,977	7,079
TEBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ 11,433	120,458	3	-	-	2	86	-	13,014	3,474	9,539
TEBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ 11,430	123,263	3	-	-	2	208	-	11,240	3,904	7,336
TLBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ 11,519	125,367	3	-	-	2	180	1	12,585	3,434	9,152
TLBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ 11,572	125,149	3	-	-	2	138	-	13,529	3,193	10,335
TLBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ 11,567	130,398	2	-	-	2	168	-	12,847	3,211	9,636

Standard Modeling Approach, Energy Efficiency +11 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO_2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 11,853	129,346	1	-	-	2	65	3	14,776	2,415	12,360
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 11,912	121,795	3	-	-	2	97	-	13,997	2,893	11,103
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 11,875	131,734	1	-	-	2	22	-	14,877	2,401	12,476
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 11,974	127,652	3	2	-	1	227	1	15,565	2,363	13,201
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 12,014	127,298	3	2	-	1	170	-	16,047	2,285	13,762
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 11,987	131,389	2	-	-	2	172	-	13,582	2,772	10,810
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEM	$ 11,862	132,182	-	-	-	2	28	3	15,983	2,071	13,913
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEM	$ 11,968	131,801	-	-	-	2	2	-	18,375	1,757	16,617
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEM	$ 11,885	134,655	-	-	-	2	7	-	16,056	2,059	13,997
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEM	$ 12,000	136,597	-	-	-	2	3	1	17,489	1,683	15,806
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEM	$ 12,079	136,681	-	-	-	2	2	-	18,552	1,583	16,968
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEM	$ 12,004	139,161	-	-	-	2	14	-	16,452	1,863	14,589
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 11,602	118,032	5	2	-	1	1,097	3	11,929	3,652	8,277
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 11,613	118,071	5	2	-	1	572	-	14,242	3,002	11,240
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 11,607	120,728	5	2	-	1	922	-	12,552	3,402	9,150
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 11,691	122,672	5	2	-	1	922	1	13,783	3,011	10,772
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 11,725	122,159	5	2	-	1	780	-	14,298	2,906	11,393
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 11,740	123,782	5	2	-	1	1,620	-	12,680	3,452	9,228
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEM	$ 11,436	118,032	5	2	-	1	1,097	3	11,929	3,652	8,277
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEM	$ 11,447	118,071	5	2	-	1	572	-	14,242	3,002	11,240
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEM	$ 11,441	120,728	5	2	-	1	922	-	12,552	3,402	9,150
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEM	$ 11,525	122,672	5	2	-	1	922	1	13,783	3,011	10,772
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEM	$ 11,559	122,159	5	2	-	1	780	-	14,298	2,906	11,393
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEM	$ 11,563	123,782	5	2	-	1	1,620	-	12,680	3,452	9,228
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ 11,769	120,504	4	2	-	1	578	3	12,783	3,273	9,509
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ 11,789	118,071	5	2	-	1	572	-	14,242	3,002	11,240
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ 11,774	122,839	4	2	-	1	550	-	13,259	3,101	10,158
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ 11,856	124,468	4	1	-	1	483	1	13,980	2,858	11,122
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ 11,896	124,383	4	2	-	1	429	-	15,034	2,609	12,424
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ 11,903	126,485	4	1	-	1	942	-	13,581	3,034	10,548

Standard Modeling Approach, Energy Efficiency +11 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO_2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ 11,772	122,236	3	-	-	2	353	3	12,065	3,359	8,706
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ 11,794	120,791	4	-	-	1	266	-	14,439	2,734	11,705
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ 11,784	124,369	3	-	-	2	229	-	12,223	3,297	8,926
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ 11,861	124,468	4	1	-	1	483	1	13,980	2,858	11,122
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ 11,902	124,864	4	1	-	1	398	-	15,237	2,533	12,704
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ 11,906	128,771	3	-	-	2	331	-	12,883	3,064	9,820
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ 11,743	120,504	4	2	-	1	578	3	12,783	3,273	9,509
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ 11,769	118,071	5	2	-	1	572	-	14,242	3,002	11,240
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ 11,754	122,839	4	2	-	1	550	-	13,259	3,101	10,158
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ 11,839	124,818	4	2	-	1	530	1	14,529	2,699	11,830
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ 11,876	124,383	4	2	-	1	429	-	15,034	2,609	12,424
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ 11,884	129,655	3	2	-	1	370	-	14,538	2,656	11,882
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ 11,728	120,298	4	2	-	1	606	3	12,671	3,323	9,349
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ 11,754	118,195	4	6	-	1	575	-	14,451	3,041	11,410
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ 11,744	122,839	4	2	-	1	550	-	13,259	3,101	10,158
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ 11,821	122,802	4	6	-	1	935	1	13,936	3,034	10,902
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ 11,866	124,383	4	2	-	1	429	-	15,034	2,609	12,424
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ 11,874	129,655	3	2	-	1	370	-	14,538	2,656	11,882
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ 11,932	122,203	4	2	-	1	477	3	10,816	4,667	6,150
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ 11,966	119,682	5	2	-	1	471	-	12,395	4,276	8,119
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ 11,944	122,462	5	2	-	1	782	-	10,618	4,783	5,834
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ 12,038	125,425	4	-	-	2	377	1	10,448	4,770	5,677
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ 12,078	123,913	5	2	-	1	653	-	12,357	4,225	8,132
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ 12,075	127,857	4	2	-	1	847	-	11,370	4,496	6,875
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ 11,612	120,465	3	2	-	1	574	3	16,649	1,231	15,418
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ 11,615	118,032	4	2	-	1	456	-	17,985	1,059	16,925
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ 11,614	123,183	3	2	-	1	401	-	17,373	1,015	16,358
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ 11,691	122,527	4	2	-	1	747	1	17,513	1,052	16,460
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ 11,722	122,056	4	2	-	1	617	-	18,044	972	17,073
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ 11,731	127,136	3	2	-	1	553	-	17,690	902	16,789

Standard Modeling Approach, Energy Efficiency +11 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 23	(2,433)	1	-	-	-	(5)	(3)	1,459	(271)	1,731
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 8	2,335	-	-	-	-	(27)	(3)	477	(172)	648
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 93	4,313	-	-	-	-	(48)	(2)	1,747	(574)	2,321
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 130	3,879	-	-	-	-	(149)	(3)	2,251	(664)	2,915
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 138	9,151	(1)	-	-	-	(208)	(3)	1,755	(617)	2,372
TEBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 18	(3,596)	1	1	-	-	(92)	(3)	870	(110)	980
TEBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 10	1,759	-	1	-	-	(114)	(3)	(6)	8	(14)
TLBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 67	821	1	1	-	-	45	(2)	419	(105)	524
TLBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 116	1,640	1	1	-	-	(18)	(3)	2,055	(536)	2,591
TLBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 113	7,000	-	1	-	-	(59)	(3)	1,348	(500)	1,848
TEBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 19	690	-	(2)	-	-	(23)	(1)	1,224	(392)	1,616
TEBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 11	1,605	-	-	-	-	(2)	(3)	(94)	16	(110)
TLBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 76	5,491	-	(2)	-	-	(4)	-	1,064	(470)	1,534
TLBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 128	3,307	1	(2)	-	-	29	(3)	2,752	(767)	3,519
TLBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 109	7,276	-	(2)	-	-	167	(3)	1,593	(578)	2,171
TEBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 31	(251)	-	-	-	-	(268)	(3)	2,489	(634)	3,122
TEBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 18	2,851	-	-	-	-	(74)	(3)	854	(307)	1,162
TLBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 60	4,132	-	-	-	-	41	(2)	1,017	(359)	1,376
TLBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 93	3,672	-	-	-	-	(87)	(3)	1,509	(473)	1,982
TLBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 106	8,865	(1)	-	-	-	(156)	(3)	1,043	(425)	1,468
TEBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 43	(2,066)	1	-	-	-	250	(1)	839	(112)	951
TEBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 33	3,233	-	-	-	-	171	(1)	20	(72)	92
TLBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 64	5,480	-	-	-	-	167	(1)	644	(276)	920
TLBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 93	5,208	-	-	-	-	78	(1)	638	(284)	922
TLBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 111	7,515	-	-	-	-	425	(1)	(680)	126	(806)

Standard Modeling Approach, Energy Efficiency +11 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 15	(2,433)	1	-	-	-	(5)	(3)	1,459	(271)	1,731
TEBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 0	2,335	-	-	-	-	(27)	(3)	477	(172)	648
TLBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 79	4,313	-	-	-	-	(48)	(2)	1,747	(574)	2,321
TLBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 116	3,879	-	-	-	-	(149)	(3)	2,251	(664)	2,915
TLBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 124	9,151	(1)	-	-	-	(208)	(3)	1,755	(617)	2,372
TEBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 27	(3,203)	1	-	-	-	(90)	(3)	1,046	(156)	1,202
TEBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 16	2,133	-	-	-	-	(124)	(3)	157	(62)	219
TLBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 107	1,307	1	-	-	-	113	(2)	575	(144)	719
TLBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 149	1,214	1	-	-	-	27	(3)	1,460	(360)	1,820
TLBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 149	6,534	-	-	-	-	(22)	(3)	818	(295)	1,113
TEBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 7	(12)	-	-	-	-	(529)	(3)	2,421	(660)	3,081
TEBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 25	2,661	-	-	-	-	(161)	(3)	749	(307)	1,056
TLBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 123	4,732	-	-	-	-	(130)	(2)	2,034	(698)	2,732
TLBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 150	4,125	-	-	-	-	(284)	(3)	2,602	(805)	3,407
TLBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 187	7,964	(1)	-	-	-	(59)	(3)	1,755	(648)	2,403
TEBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 11	(2,735)	-	-	-	-	155	3	(578)	225	(803)
TEBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 52	(2,696)	-	-	-	-	(115)	-	2,017	(498)	2,514
TEBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 76	1,857	-	-	-	-	(31)	1	1,276	(399)	1,675
TLBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 120	1,557	-	-	-	-	(74)	-	1,757	(483)	2,240
TLBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 85	6,593	(1)	-	-	-	(69)	-	1,004	(331)	1,335
TEBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ 23	(1,161)	-	-	-	-	(232)	(3)	1,694	(416)	2,110
TEBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ 35	3,007	-	2	-	(1)	85	(3)	2,002	(544)	2,546
TLBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ 143	3,576	-	-	-	-	(10)	(2)	1,354	(452)	1,806
TLBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ 180	2,513	1	2	-	(1)	336	(3)	3,078	(683)	3,762
TLBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ 206	6,387	-	2	-	(1)	561	(3)	2,236	(518)	2,754

Standard Modeling Approach, Energy Efficiency +11 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ 19	(2,838)	-	-	-	-	156	3	(595)	229	(823)
TEBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ 35	(5,369)	1	-	-	-	52	-	950	(144)	1,094
TEBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ 58	(904)	1	-	-	-	248	1	290	(46)	335
TLBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ 95	(1,273)	1	-	-	-	162	-	793	(148)	941
TLBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ 75	4,043	-	-	-	-	99	-	146	(3)	150
TEBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ 18	(2,157)	-	-	-	-	42	3	(385)	110	(495)
TEBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ 15	(4,716)	1	-	-	-	36	-	1,031	(133)	1,164
TEBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ 84	1,819	-	-	-	-	(34)	1	1,175	(348)	1,523
TLBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ 119	1,341	-	-	-	-	(137)	-	1,708	(461)	2,169
TLBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ 122	3,052	-	-	-	-	438	-	38	61	(24)
TEBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ 25	(3,933)	1	-	1	(1)	366	2	245	34	211
TEBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ 14	(4,789)	1	-	-	-	34	-	1,027	(123)	1,150
TEBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ 84	(252)	1	(1)	1	(1)	317	1	956	(141)	1,097
TLBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ 109	(616)	1	(1)	1	(1)	159	-	1,577	(291)	1,868
TLBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ 114	3,283	-	(1)	1	(1)	373	-	667	(68)	736
TEBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ 48	(474)	-	-	-	-	(254)	(3)	1,957	(479)	2,437
TEBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ 35	2,218	-	-	-	-	(128)	(3)	181	(71)	252
TLBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ 122	4,345	-	-	-	-	(157)	(2)	1,477	(514)	1,992
TLBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ 171	4,262	-	-	-	-	(201)	(3)	2,417	(730)	3,148
TLBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ 166	9,439	(1)	-	-	-	(175)	(3)	1,674	(684)	2,359
TEBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ 63	(606)	-	-	-	-	(251)	(3)	1,958	(503)	2,461
TEBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ 59	2,199	-	-	-	-	(128)	(3)	184	(73)	257
TLBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ 148	4,303	-	-	-	-	(156)	(2)	1,529	(544)	2,073
TLBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ 202	4,085	-	-	-	-	(199)	(3)	2,472	(784)	3,257
TLBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ 197	9,334	(1)	-	-	-	(168)	(3)	1,791	(766)	2,557

Standard Modeling Approach, Energy Efficiency +11 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 59	(7,551)	2	-	-	-	32	(3)	(779)	478	(1,257)
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 22	2,388	-	-	-	-	(43)	(3)	102	(14)	116
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 121	(1,694)	2	2	-	(1)	162	(2)	789	(52)	841
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 161	(2,048)	2	2	-	(1)	105	(3)	1,271	(130)	1,402
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 134	2,043	1	-	-	-	107	(3)	(1,194)	357	(1,550)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEM	$ 105	(382)	-	-	-	-	(26)	(3)	2,391	(313)	2,705
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEM	$ 23	2,472	-	-	-	-	(21)	(3)	72	(12)	84
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEM	$ 138	4,415	-	-	-	-	(25)	(2)	1,505	(388)	1,893
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEM	$ 217	4,498	-	-	-	-	(27)	(3)	2,568	(487)	3,056
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEM	$ 142	6,979	-	-	-	-	(14)	(3)	469	(208)	677
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 11	39	-	-	-	-	(525)	(3)	2,313	(650)	2,963
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 5	2,696	-	-	-	-	(175)	(3)	623	(250)	873
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 89	4,640	-	-	-	-	(175)	(2)	1,854	(641)	2,494
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 123	4,127	-	-	-	-	(317)	(3)	2,369	(746)	3,115
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 138	5,750	-	-	-	-	523	(3)	751	(199)	950
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEM	$ 11	39	-	-	-	-	(525)	(3)	2,313	(650)	2,963
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEM	$ 5	2,696	-	-	-	-	(175)	(3)	623	(250)	873
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEM	$ 89	4,640	-	-	-	-	(175)	(2)	1,854	(641)	2,494
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEM	$ 123	4,127	-	-	-	-	(317)	(3)	2,369	(746)	3,115
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEM	$ 127	5,750	-	-	-	-	523	(3)	751	(199)	950
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ 20	(2,433)	1	-	-	-	(5)	(3)	1,459	(271)	1,731
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ 5	2,335	-	-	-	-	(27)	(3)	477	(172)	648
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ 87	3,964	-	(1)	-	-	(95)	(2)	1,198	(415)	1,613
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ 127	3,879	-	-	-	-	(149)	(3)	2,251	(664)	2,915
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ 134	5,981	-	(1)	-	-	364	(3)	799	(240)	1,039

Standard Modeling Approach, Energy Efficiency +11 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ 23	(1,445)	1	-	-	(1)	(87)	(3)	2,373	(626)	2,999
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ 12	2,133	-	-	-	-	(124)	(3)	157	(62)	219
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ 90	2,232	1	1	-	(1)	130	(2)	1,915	(501)	2,416
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ 130	2,628	1	1	-	(1)	44	(3)	3,172	(826)	3,998
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ 135	6,534	-	-	-	-	(22)	(3)	818	(295)	1,113
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ 26	(2,433)	1	-	-	-	(5)	(3)	1,459	(271)	1,731
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ 11	2,335	-	-	-	-	(27)	(3)	477	(172)	648
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ 96	4,313	-	-	-	-	(48)	(2)	1,747	(574)	2,321
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ 133	3,879	-	-	-	-	(149)	(3)	2,251	(664)	2,915
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ 141	9,151	(1)	-	-	-	(208)	(3)	1,755	(617)	2,372
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ 26	(2,103)	-	4	-	-	(31)	(3)	1,779	(282)	2,061
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ 15	2,541	-	-	-	-	(55)	(3)	588	(221)	809
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ 93	2,504	-	4	-	-	330	(2)	1,264	(288)	1,553
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ 138	4,085	-	-	-	-	(176)	(3)	2,362	(713)	3,076
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ 145	9,357	(1)	-	-	-	(236)	(3)	1,866	(667)	2,533
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ 34	(2,521)	1	-	-	-	(6)	(3)	1,579	(391)	1,969
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ 12	259	1	-	-	-	306	(3)	(199)	117	(315)
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ 105	3,222	-	(2)	-	1	(100)	(2)	(368)	104	(472)
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ 146	1,710	1	-	-	-	177	(3)	1,541	(442)	1,982
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ 142	5,654	-	-	-	-	370	(3)	554	(171)	725
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ 3	(2,433)	1	-	-	-	(118)	(3)	1,336	(172)	1,508
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ 2	2,717	-	-	-	-	(173)	(3)	725	(216)	941
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ 79	2,062	1	-	-	-	173	(2)	864	(179)	1,043
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ 110	1,591	1	-	-	-	43	(3)	1,396	(259)	1,655
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ 119	6,671	-	-	-	-	(21)	(3)	1,042	(329)	1,371

Standard Modeling Approach, Energy Efficiency +15 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO_2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 11,748	121,118	4	1	-	1	510	3	13,024	3,146	9,878
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 11,775	118,354	5	1	-	1	540	-	14,349	2,942	11,407
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 11,759	122,834	4	2	-	1	577	-	13,494	3,019	10,475
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 11,825	124,263	4	1	-	1	492	1	13,892	2,875	11,018
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 11,861	124,109	4	2	-	1	446	-	14,910	2,645	12,265
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 11,859	126,968	4	2	-	1	666	-	13,587	2,994	10,593
TEBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 12,032	124,868	3	-	-	2	289	3	12,286	3,331	8,955
TEBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 12,038	120,364	5	3	-	1	443	-	14,353	2,965	11,389
TEBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 12,034	124,370	4	3	-	1	418	-	13,511	3,108	10,403
TLBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 12,093	126,223	4	3	-	1	375	1	13,997	2,926	11,070
TLBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 12,135	124,844	5	3	-	1	592	-	14,853	2,755	12,098
TLBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 12,128	129,460	4	3	-	1	571	-	14,025	2,887	11,138
TEBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 12,345	124,958	4	2	-	2	313	3	13,128	3,218	9,910
TEBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 12,366	125,330	4	-	-	2	287	2	13,989	2,946	11,043
TEBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 12,355	126,323	4	2	-	2	311	-	12,687	3,353	9,334
TLBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 12,424	130,130	4	-	-	2	309	3	13,832	2,871	10,961
TLBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 12,475	127,948	5	-	-	2	345	-	15,513	2,569	12,944
TLBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 12,448	132,683	4	-	-	2	354	-	14,489	2,673	11,816
TEBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 11,460	117,842	4	-	-	1	677	3	11,997	3,455	8,542
TEBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 11,491	117,585	4	-	-	1	404	-	14,471	2,818	11,653
TEBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 11,479	120,787	4	-	-	1	604	-	12,845	3,147	9,697
TLBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 11,520	121,932	4	-	-	1	721	1	13,010	3,094	9,916
TLBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 11,554	121,499	4	-	-	1	590	-	13,502	2,978	10,525
TLBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 11,562	126,575	3	-	-	1	521	-	12,993	3,044	9,950
TEBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 11,189	116,078	3	-	-	1	325	1	12,447	3,286	9,162
TEBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 11,233	114,011	4	-	-	1	583	-	13,282	3,168	10,115
TEBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 11,221	118,822	3	2	-	1	551	-	12,152	3,374	8,778
TLBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 11,253	120,706	3	2	-	1	559	-	12,744	3,160	9,584
TLBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 11,282	121,271	3	-	-	1	406	-	13,081	3,000	10,081
TLBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 11,298	123,463	3	-	-	1	760	-	11,750	3,432	8,318

Standard Modeling Approach, Energy Efficiency +15 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO_2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 11,821	121,118	4	1	-	1	510	3	13,024	3,146	9,878
TEBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 11,841	118,354	5	1	-	1	540	-	14,349	2,942	11,407
TEBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 11,822	122,834	4	2	-	1	577	-	13,494	3,019	10,475
TLBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 11,884	124,508	4	2	-	1	550	1	14,402	2,736	11,666
TLBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 11,921	124,109	4	2	-	1	446	-	14,910	2,645	12,265
TLBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 11,918	126,968	4	2	-	1	666	-	13,587	2,994	10,593
TEBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 11,647	121,965	3	-	-	2	363	3	11,961	3,400	8,561
TEBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 11,686	119,126	4	-	-	2	274	-	13,478	3,137	10,340
TEBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 11,669	124,344	3	-	-	2	240	-	12,516	3,222	9,293
TLBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 11,736	125,994	3	-	-	2	206	1	13,348	2,937	10,411
TLBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 11,778	123,174	4	-	-	2	394	-	13,426	3,034	10,392
TLBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 11,767	128,371	3	-	-	2	347	-	12,652	3,129	9,523
TEBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 12,634	116,016	5	2	-	1	1,191	3	13,123	2,912	10,210
TEBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 12,646	116,520	5	1	-	1	595	-	15,775	2,158	13,617
TEBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 12,661	118,992	5	2	-	1	1,052	-	14,209	2,506	11,702
TLBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 12,737	120,338	5	1	-	1	934	1	14,677	2,307	12,369
TLBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 12,765	120,127	5	2	-	1	903	-	15,722	2,102	13,619
TLBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 12,794	122,603	5	2	-	1	1,379	-	14,300	2,472	11,828
TEBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,819	128,600	3	1	1	-	222	2	13,108	3,065	10,043
TEBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,868	125,604	3	1	-	1	84	-	14,861	3,084	11,777
TEBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,817	128,221	3	1	-	1	197	-	12,842	3,582	9,260
TLBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,873	129,538	3	1	-	1	166	1	13,263	3,446	9,817
TLBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,918	129,621	3	1	-	1	123	-	14,151	3,221	10,930
TLBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,882	131,970	3	1	-	1	280	-	12,456	3,737	8,720
TEBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 12,298	118,005	4	2	-	1	641	3	14,149	2,390	11,760
TEBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 12,324	116,228	5	1	-	1	589	-	15,817	2,041	13,776
TEBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 12,337	120,693	4	2	-	1	652	-	15,106	2,051	13,055
TLBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 12,423	122,057	4	1	-	1	545	1	15,537	1,883	13,654
TLBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 12,460	119,861	5	2	-	1	890	-	15,800	2,015	13,785
TLBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 12,478	124,343	4	2	-	1	877	-	15,181	2,047	13,134

Standard Modeling Approach, Energy Efficiency +15 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO_2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 11,177	126,258	4	1	1	-	364	2	12,487	3,319	9,168
TEBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 11,201	122,960	4	1	-	1	240	-	13,803	3,469	10,334
TEBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 11,164	127,951	3	2	-	1	210	-	13,007	3,577	9,430
TLBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 11,205	126,825	4	2	-	1	470	1	12,903	3,667	9,236
TLBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 11,242	126,505	4	2	-	1	381	-	13,409	3,564	9,845
TLBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 11,215	131,698	3	2	-	1	310	-	12,687	3,741	8,946
TEBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 11,892	121,959	5	1	1	-	910	2	13,630	2,652	10,978
TEBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 11,901	121,211	5	1	1	-	587	-	15,519	2,330	13,190
TEBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 11,881	123,431	4	2	-	1	604	-	13,854	2,834	11,020
TLBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 11,949	125,008	4	2	-	1	574	1	14,717	2,578	12,139
TLBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 11,983	124,560	4	2	-	1	469	-	15,250	2,466	12,784
TLBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 11,977	127,465	4	2	-	1	691	-	13,895	2,836	11,059
TEBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 11,998	121,741	5	1	1	-	888	2	14,603	2,576	12,028
TEBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 11,994	121,034	5	1	1	-	574	-	16,349	2,270	14,078
TEBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 11,976	123,253	5	1	1	-	943	-	14,595	2,695	11,900
TLBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 12,053	124,711	5	1	1	-	937	1	15,042	2,504	12,538
TLBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 12,078	124,363	5	1	1	-	775	-	15,664	2,351	13,312
TLBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 12,076	129,517	4	1	1	-	637	-	15,107	2,417	12,690
TEBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 11,567	120,844	3	-	-	2	353	3	11,379	3,765	7,614
TEBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 11,629	118,174	4	-	-	2	258	-	12,918	3,515	9,403
TEBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 11,609	123,382	3	-	-	2	231	-	11,990	3,556	8,434
TLBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 11,670	125,142	3	-	-	2	195	1	12,858	3,247	9,612
TLBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 11,719	125,092	3	-	-	2	149	-	13,795	3,028	10,767
TLBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 11,710	127,589	3	-	-	2	339	-	12,206	3,417	8,788
TEBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 11,369	120,801	3	-	-	2	345	3	10,943	4,026	6,917
TEBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 11,453	120,636	3	-	-	2	93	-	13,457	3,393	10,064
TEBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 11,441	123,296	3	-	-	2	228	-	11,582	3,798	7,784
TLBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 11,498	125,044	3	-	-	2	187	1	12,474	3,478	8,996
TLBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 11,551	124,870	3	-	-	2	144	-	13,413	3,234	10,179
TLBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 11,550	127,459	3	-	-	2	332	-	11,841	3,629	8,212

Standard Modeling Approach, Energy Efficiency +15 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO_2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 11,847	129,073	1	-	-	2	67	3	14,645	2,460	12,185
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 11,912	123,393	3	1	-	1	105	-	16,247	2,308	13,939
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 11,875	131,655	1	-	-	2	24	-	15,260	2,330	12,930
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 11,947	127,070	3	1	-	1	209	1	14,842	2,535	12,307
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 11,988	127,018	3	2	-	1	178	-	15,914	2,319	13,595
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 11,973	129,273	3	2	-	1	379	-	14,339	2,716	11,622
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEH	$ 11,855	131,910	-	-	-	2	29	3	15,840	2,113	13,727
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEH	$ 11,983	129,025	1	-	-	2	5	-	17,568	2,000	15,567
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEH	$ 11,888	134,529	-	-	-	2	8	-	16,483	1,987	14,495
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEH	$ 11,975	136,223	-	-	-	2	3	1	17,347	1,723	15,625
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEH	$ 12,053	136,381	-	-	-	2	2	-	18,409	1,620	16,789
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEH	$ 11,979	138,877	-	-	-	2	15	-	16,318	1,902	14,416
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 11,591	118,612	5	1	-	1	984	3	12,143	3,535	8,608
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 11,609	118,354	5	1	-	1	540	-	14,349	2,942	11,407
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 11,603	120,736	5	2	-	1	960	-	12,754	3,332	9,423
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 11,668	122,141	5	1	-	1	863	1	13,214	3,171	10,043
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 11,701	121,895	5	2	-	1	809	-	14,184	2,943	11,241
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 11,708	124,497	5	1	-	1	1,173	-	12,619	3,363	9,256
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEH	$ 11,426	118,612	5	1	-	1	984	3	12,143	3,535	8,608
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEH	$ 11,443	118,354	5	1	-	1	540	-	14,349	2,942	11,407
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEH	$ 11,437	120,736	5	2	-	1	960	-	12,754	3,332	9,423
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEH	$ 11,503	122,141	5	1	-	1	863	1	13,214	3,171	10,043
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEH	$ 11,536	121,895	5	2	-	1	809	-	14,184	2,943	11,241
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEH	$ 11,543	124,497	5	1	-	1	1,173	-	12,619	3,363	9,256
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 11,751	121,118	4	1	-	1	510	3	13,024	3,146	9,878
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 11,778	118,354	5	1	-	1	540	-	14,349	2,942	11,407
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 11,765	123,069	4	1	-	1	531	-	13,377	3,040	10,337
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 11,829	124,263	4	1	-	1	492	1	13,892	2,875	11,018
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 11,868	124,268	4	1	-	1	402	-	14,766	2,658	12,108
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 11,864	127,135	4	1	-	1	608	-	13,426	3,007	10,419

Standard Modeling Approach, Energy Efficiency +15 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO_2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 11,755	121,118	4	1	-	1	510	3	13,024	3,146	9,878
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 11,782	118,354	5	1	-	1	540	-	14,349	2,942	11,407
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 11,769	122,391	4	1	-	1	531	-	13,377	3,040	10,337
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 11,832	124,263	4	1	-	1	492	1	13,892	2,875	11,018
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 11,872	124,268	4	1	-	1	402	-	14,766	2,658	12,108
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 11,868	127,135	4	1	-	1	608	-	13,426	3,007	10,419
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 11,737	120,242	4	2	-	1	597	3	12,662	3,315	9,347
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 11,770	118,156	5	2	-	1	599	-	14,558	2,933	11,625
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 11,749	122,834	4	2	-	1	577	-	13,494	3,019	10,475
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 11,815	124,508	4	2	-	1	550	1	14,402	2,736	11,666
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 11,851	124,109	4	2	-	1	446	-	14,910	2,645	12,265
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 11,849	126,968	4	2	-	1	666	-	13,587	2,994	10,593
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 11,722	120,036	4	2	-	1	626	3	12,552	3,364	9,187
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 11,745	117,934	4	6	-	1	600	-	14,332	3,080	11,252
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 11,735	123,110	3	6	-	1	505	-	13,500	3,119	10,381
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 11,800	122,497	4	6	-	1	970	1	13,822	3,075	10,747
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 11,841	124,109	4	2	-	1	446	-	14,910	2,645	12,265
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 11,839	126,968	4	2	-	1	666	-	13,587	2,994	10,593
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 11,925	121,940	4	2	-	1	494	3	10,695	4,712	5,983
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 11,963	119,983	5	1	-	1	442	-	12,487	4,225	8,262
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 11,940	122,461	5	2	-	1	810	-	10,837	4,690	6,146
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 12,012	123,888	5	1	-	1	734	1	11,216	4,569	6,647
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 12,053	123,648	5	2	-	1	679	-	12,243	4,264	7,979
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 12,042	128,364	4	2	-	1	654	-	11,360	4,474	6,886
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 11,601	118,896	4	1	-	1	712	3	16,119	1,348	14,771
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 11,610	118,345	4	1	-	1	430	-	18,098	1,033	17,065
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 11,610	123,253	3	2	-	1	422	-	17,566	997	16,570
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 11,669	122,243	4	2	-	1	771	1	17,390	1,076	16,313
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 11,699	121,773	4	2	-	1	639	-	17,927	993	16,934
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 11,703	126,710	3	2	-	1	562	-	17,517	940	16,576

Standard Modeling Approach, Energy Efficiency +15 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 27	(2,764)	1	-	-	-	30	(3)	1,325	(204)	1,529
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 12	1,716	-	1	-	-	67	(3)	470	(127)	597
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 77	3,146	-	-	-	-	(18)	(2)	868	(272)	1,140
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 114	2,991	-	1	-	-	(64)	(3)	1,886	(501)	2,387
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 111	5,850	-	1	-	-	156	(3)	562	(153)	715
TEBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 6	(4,504)	2	3	-	(1)	154	(3)	2,067	(367)	2,434
TEBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 3	(498)	1	3	-	(1)	129	(3)	1,225	(224)	1,448
TLBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 61	1,355	1	3	-	(1)	86	(2)	1,710	(405)	2,116
TLBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 104	(24)	2	3	-	(1)	303	(3)	2,567	(577)	3,144
TLBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 97	4,592	1	3	-	(1)	282	(3)	1,738	(445)	2,183
TEBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 20	372	-	(2)	-	-	(26)	(1)	862	(272)	1,133
TEBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10	1,365	-	-	-	-	(2)	(3)	(441)	135	(576)
TLBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 78	5,172	-	(2)	-	-	(5)	-	704	(347)	1,051
TLBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 129	2,991	1	(2)	-	-	32	(3)	2,385	(649)	3,034
TLBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 103	7,725	-	(2)	-	-	41	(3)	1,361	(545)	1,906
TEBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 30	(257)	-	-	-	-	(273)	(3)	2,474	(637)	3,111
TEBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 18	2,944	-	-	-	-	(73)	(3)	848	(307)	1,155
TLBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 60	4,090	-	-	-	-	44	(2)	1,013	(361)	1,374
TLBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 93	3,656	-	-	-	-	(87)	(3)	1,506	(477)	1,982
TLBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 102	8,733	(1)	-	-	-	(156)	(3)	997	(411)	1,407
TEBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 43	(2,067)	1	-	-	-	258	(1)	835	(118)	953
TEBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 32	2,743	-	2	-	-	226	(1)	(295)	88	(383)
TLBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 64	4,628	-	2	-	-	234	(1)	297	(125)	422
TLBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 93	5,193	-	-	-	-	81	(1)	633	(286)	919
TLBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 109	7,385	-	-	-	-	435	(1)	(697)	146	(843)

Standard Modeling Approach, Energy Efficiency +15 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 20	(2,764)	1	-	-	-	30	(3)	1,325	(204)	1,529
TEBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 1	1,716	-	1	-	-	67	(3)	470	(127)	597
TLBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 63	3,391	-	1	-	-	40	(2)	1,377	(410)	1,787
TLBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 100	2,991	-	1	-	-	(64)	(3)	1,886	(501)	2,387
TLBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 97	5,850	-	1	-	-	156	(3)	562	(153)	715
TEBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 38	(2,839)	1	-	-	-	(88)	(3)	1,517	(263)	1,779
TEBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 21	2,379	-	-	-	-	(122)	(3)	555	(178)	733
TLBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 88	4,029	-	-	-	-	(156)	(2)	1,387	(463)	1,850
TLBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 131	1,210	1	-	-	-	32	(3)	1,466	(366)	1,831
TLBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 120	6,407	-	-	-	-	(16)	(3)	691	(271)	962
TEBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 12	504	-	(1)	-	-	(595)	(3)	2,652	(754)	3,406
TEBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 27	2,977	-	-	-	-	(139)	(3)	1,086	(406)	1,492
TLBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 103	4,322	-	(1)	-	-	(257)	(2)	1,554	(605)	2,159
TLBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 131	4,111	-	-	-	-	(288)	(3)	2,599	(810)	3,409
TLBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 160	6,588	-	-	-	-	188	(3)	1,178	(440)	1,618
TEBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 2	379	-	-	1	(1)	26	2	266	(517)	783
TEBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 51	(2,617)	-	-	-	-	(113)	-	2,019	(498)	2,517
TEBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 56	1,317	-	-	-	-	(31)	1	421	(135)	557
TLBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 101	1,400	-	-	-	-	(74)	-	1,309	(361)	1,670
TLBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 65	3,749	-	-	-	-	84	-	(385)	155	(540)
TEBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 27	(1,777)	1	(1)	-	-	(52)	(3)	1,668	(348)	2,016
TEBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 39	2,688	-	-	-	-	11	(3)	957	(339)	1,296
TLBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 126	4,052	-	(1)	-	-	(97)	(2)	1,388	(506)	1,895
TLBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 162	1,856	1	-	-	-	249	(3)	1,651	(374)	2,025
TLBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 180	6,338	-	-	-	-	236	(3)	1,032	(343)	1,375

Standard Modeling Approach, Energy Efficiency +15 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 13	(1,693)	1	(1)	1	(1)	153	2	(520)	(258)	(262)
TEBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 36	(4,990)	1	(1)	-	-	30	-	796	(108)	904
TEBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 40	(1,126)	1	-	-	-	260	1	(104)	90	(194)
TLBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 77	(1,445)	1	-	-	-	171	-	402	(13)	415
TLBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 51	3,747	-	-	-	-	100	-	(320)	164	(484)
TEBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 10	(1,472)	1	(1)	1	(1)	306	2	(224)	(181)	(42)
TEBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 19	(2,220)	1	(1)	1	(1)	(17)	-	1,666	(504)	2,170
TEBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 68	1,577	-	-	-	-	(30)	1	864	(256)	1,119
TLBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 102	1,129	-	-	-	-	(136)	-	1,396	(368)	1,764
TLBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 96	4,034	-	-	-	-	86	-	41	3	39
TEBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 22	(1,512)	-	-	-	-	(55)	2	9	(119)	128
TEBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 18	(2,219)	-	-	-	-	(369)	-	1,754	(424)	2,178
TEBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 77	1,458	-	-	-	-	(6)	1	447	(191)	638
TLBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 102	1,110	-	-	-	-	(169)	-	1,069	(343)	1,412
TLBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 100	6,264	(1)	-	-	-	(306)	-	513	(278)	790
TEBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 62	(2,670)	1	-	-	-	(96)	(3)	1,540	(249)	1,789
TEBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 42	2,538	-	-	-	-	(122)	(3)	612	(209)	820
TLBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 103	4,298	-	-	-	-	(158)	(2)	1,480	(518)	1,998
TLBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 152	4,248	-	-	-	-	(204)	(3)	2,417	(736)	3,153
TLBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 143	6,745	-	-	-	-	(14)	(3)	827	(347)	1,174
TEBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 84	(165)	-	-	-	-	(252)	(3)	2,514	(632)	3,147
TEBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 72	2,495	-	-	-	-	(117)	(3)	639	(228)	867
TLBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 129	4,243	-	-	-	-	(157)	(2)	1,531	(547)	2,078
TLBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 182	4,069	-	-	-	-	(201)	(3)	2,470	(791)	3,262
TLBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 181	6,658	-	-	-	-	(13)	(3)	899	(396)	1,295

Standard Modeling Approach, Energy Efficiency +15 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 65	(5,679)	2	1	-	(1)	38	(3)	1,602	(152)	1,754
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 28	2,582	-	-	-	-	(43)	(3)	615	(130)	745
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 100	(2,002)	2	1	-	(1)	143	(2)	198	75	123
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 141	(2,054)	2	2	-	(1)	111	(3)	1,269	(141)	1,410
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 125	200	2	2	-	(1)	312	(3)	(306)	256	(563)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEH	$ 127	(2,885)	1	-	-	-	(24)	(3)	1,728	(112)	1,840
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEH	$ 33	2,618	-	-	-	-	(22)	(3)	643	(126)	769
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEH	$ 119	4,313	-	-	-	-	(26)	(2)	1,508	(390)	1,898
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEH	$ 198	4,471	-	-	-	-	(28)	(3)	2,570	(493)	3,062
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEH	$ 124	6,967	-	-	-	-	(14)	(3)	478	(211)	689
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 18	(258)	-	-	-	-	(444)	(3)	2,206	(593)	2,799
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 11	2,124	-	1	-	-	(24)	(3)	611	(204)	815
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 77	3,528	-	-	-	-	(121)	(2)	1,071	(364)	1,435
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 110	3,283	-	1	-	-	(175)	(3)	2,041	(593)	2,634
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 117	5,885	-	-	-	-	188	(3)	476	(172)	648
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEH	$ 18	(258)	-	-	-	-	(444)	(3)	2,206	(593)	2,799
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEH	$ 11	2,124	-	1	-	-	(24)	(3)	611	(204)	815
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEH	$ 77	3,528	-	-	-	-	(121)	(2)	1,071	(364)	1,435
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEH	$ 110	3,283	-	1	-	-	(175)	(3)	2,041	(593)	2,634
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEH	$ 117	5,885	-	-	-	-	188	(3)	476	(172)	648
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 27	(2,764)	1	-	-	-	30	(3)	1,325	(204)	1,529
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 14	1,952	-	-	-	-	20	(3)	353	(106)	459
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 77	3,146	-	-	-	-	(18)	(2)	868	(272)	1,140
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 116	3,151	-	-	-	-	(108)	(3)	1,741	(488)	2,230
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 113	6,018	-	-	-	-	97	(3)	402	(139)	540

Standard Modeling Approach, Energy Efficiency +15 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 27	(2,764)	1	-	-	-	30	(3)	1,325	(204)	1,529
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 14	1,273	-	-	-	-	20	(3)	353	(106)	459
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 77	3,146	-	-	-	-	(18)	(2)	868	(272)	1,140
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 116	3,151	-	-	-	-	(108)	(3)	1,741	(488)	2,230
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 113	6,018	-	-	-	-	97	(3)	402	(139)	540
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 33	(2,086)	1	-	-	-	2	(3)	1,896	(382)	2,278
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 12	2,592	-	-	-	-	(20)	(3)	832	(296)	1,128
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 78	4,266	-	-	-	-	(47)	(2)	1,740	(579)	2,318
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 114	3,867	-	-	-	-	(151)	(3)	2,248	(670)	2,918
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 112	6,726	-	-	-	-	68	(3)	925	(321)	1,246
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 22	(2,102)	-	4	-	-	(26)	(3)	1,780	(284)	2,065
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 12	3,074	(1)	4	-	-	(121)	(3)	948	(245)	1,194
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 78	2,461	-	4	-	-	344	(2)	1,270	(290)	1,560
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 119	4,073	-	-	-	-	(179)	(3)	2,358	(720)	3,078
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 117	6,932	-	-	-	-	40	(3)	1,035	(371)	1,406
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 38	(1,956)	1	(1)	-	-	(51)	(3)	1,792	(487)	2,279
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 15	521	1	-	-	-	316	(3)	142	(22)	163
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 87	1,949	1	(1)	-	-	240	(2)	521	(143)	664
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 128	1,708	1	-	-	-	185	(3)	1,548	(448)	1,996
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 117	6,425	-	-	-	-	160	(3)	665	(238)	903
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 9	(550)	-	-	-	-	(282)	(3)	1,978	(315)	2,294
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 8	4,357	(1)	1	-	-	(290)	(3)	1,447	(352)	1,799
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 67	3,347	-	1	-	-	60	(2)	1,270	(272)	1,542
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 97	2,877	-	1	-	-	(73)	(3)	1,807	(356)	2,163
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 101	7,815	(1)	1	-	-	(150)	(3)	1,397	(408)	1,805

Standard Modeling Approach, Energy Efficiency +30 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO_2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,724	119,920	4	1	-	1	595	3	12,466	3,350	9,116
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,746	119,409	4	1	-	1	338	-	14,579	2,820	11,759
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,736	121,979	4	1	-	1	612	-	12,859	3,216	9,644
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,801	123,958	4	1	-	1	590	1	14,121	2,807	11,314
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,836	123,509	4	1	-	1	481	-	14,628	2,711	11,917
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,837	126,394	4	1	-	1	710	-	13,325	3,060	10,265
TEBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,996	123,315	4	2	-	1	451	3	13,603	3,043	10,560
TEBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 12,011	119,794	5	2	-	1	473	-	14,067	3,034	11,034
TEBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 12,008	124,493	4	2	-	1	449	-	13,228	3,171	10,057
TLBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 12,066	126,089	4	2	-	1	408	1	14,051	2,869	11,182
TLBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 12,109	126,395	4	2	-	1	339	-	15,243	2,568	12,675
TLBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 12,103	128,887	4	2	-	1	609	-	13,754	2,950	10,804
TEBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 12,332	124,290	4	2	-	2	357	3	13,094	3,248	9,846
TEBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 12,345	123,814	4	1	-	2	327	2	13,427	3,158	10,269
TEBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 12,344	125,929	4	2	-	2	361	-	13,040	3,265	9,775
TLBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 12,407	128,767	4	1	-	2	360	3	13,325	3,084	10,240
TLBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 12,455	128,840	4	1	-	2	206	-	15,635	2,524	13,111
TLBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 12,432	131,304	4	1	-	2	412	-	13,960	2,884	11,076
TEBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,450	119,049	3	-	-	1	531	3	12,258	3,332	8,925
TEBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,478	116,555	4	-	-	1	471	-	13,980	2,975	11,005
TEBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,469	121,875	3	-	-	1	399	-	13,130	3,001	10,129
TLBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,510	124,085	3	-	-	1	397	1	13,859	2,751	11,108
TLBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,545	120,867	4	-	-	1	682	-	13,392	3,018	10,374
TLBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,553	125,943	3	-	-	1	596	-	12,919	3,071	9,848
TEBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,174	115,452	3	-	-	1	385	1	12,399	3,315	9,084
TEBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,212	115,235	3	1	-	1	319	-	13,611	3,053	10,557
TEBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,201	117,922	3	1	-	1	594	-	11,892	3,458	8,435
TLBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,232	120,144	3	1	-	1	601	-	12,472	3,242	9,231
TLBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,262	119,831	3	1	-	1	492	-	12,482	3,232	9,250
TLBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,283	122,068	3	1	-	1	882	-	11,181	3,663	7,518

Standard Modeling Approach, Energy Efficiency +30 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO_2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,798	119,920	4	1	-	1	595	3	12,466	3,350	9,116
TEBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,812	119,409	4	1	-	1	338	-	14,579	2,820	11,759
TEBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,802	122,262	4	1	-	1	635	-	13,159	3,114	10,045
TLBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,860	123,958	4	1	-	1	590	1	14,121	2,807	11,314
TLBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,895	123,509	4	1	-	1	481	-	14,628	2,711	11,917
TLBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,896	126,394	4	1	-	1	710	-	13,325	3,060	10,265
TEBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,651	119,920	4	1	-	1	595	3	12,466	3,350	9,116
TEBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,680	119,409	4	1	-	1	338	-	14,579	2,820	11,759
TEBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,670	121,979	4	1	-	1	612	-	12,859	3,216	9,644
TLBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,741	123,958	4	1	-	1	590	1	14,121	2,807	11,314
TLBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,777	123,509	4	1	-	1	481	-	14,628	2,711	11,917
TLBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,776	128,286	3	-	-	2	397	-	13,445	2,958	10,487
TEBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 12,607	115,668	5	1	-	1	1,192	3	12,929	2,933	9,996
TEBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 12,611	115,412	5	1	-	1	696	-	15,244	2,304	12,940
TEBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 12,634	118,091	5	1	-	1	1,089	-	13,605	2,670	10,935
TLBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 12,711	120,165	5	1	-	1	1,122	1	14,881	2,278	12,603
TLBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 12,736	119,542	5	1	-	1	956	-	15,451	2,164	13,287
TLBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 12,769	122,038	5	1	-	1	1,451	-	14,049	2,535	11,514
TEBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,798	128,082	3	-	1	-	245	2	12,829	3,145	9,684
TEBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,845	124,493	3	1	-	1	105	-	14,253	3,258	10,995
TEBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,799	127,152	3	1	-	1	232	-	12,275	3,749	8,526
TLBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,853	129,007	3	1	-	1	200	1	13,546	3,349	10,198
TLBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,896	128,688	3	1	-	1	152	-	14,025	3,265	10,760
TLBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,865	131,085	3	1	-	1	329	-	12,385	3,785	8,600
TEBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$ 12,270	117,658	4	1	-	1	639	3	13,960	2,409	11,551
TEBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$ 12,295	115,120	5	1	-	1	688	-	15,285	2,191	13,094
TEBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$ 12,308	119,758	4	1	-	1	672	-	14,451	2,227	12,224
TLBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$ 12,400	121,919	4	1	-	1	672	1	15,799	1,844	13,955
TLBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$ 12,434	121,339	4	1	-	1	553	-	16,351	1,747	14,604
TLBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$ 12,453	123,759	4	1	-	1	929	-	14,921	2,109	12,813

Standard Modeling Approach, Energy Efficiency +30 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO_2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,155	125,724	4	-	1	-	398	2	12,224	3,397	8,827
TEBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,175	121,871	4	1	-	1	292	-	13,247	3,643	9,604
TEBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,142	127,208	3	1	-	1	233	-	12,289	3,782	8,507
TLBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,182	129,100	3	1	-	1	208	1	13,550	3,387	10,163
TLBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,219	125,934	4	1	-	1	413	-	13,113	3,634	9,479
TLBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,193	131,166	3	1	-	1	338	-	12,402	3,815	8,587
TEBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$ 11,869	121,385	5	-	1	-	974	2	13,380	2,715	10,665
TEBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$ 11,875	117,961	5	1	-	1	690	-	14,293	2,863	11,430
TEBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$ 11,860	122,845	4	1	-	1	663	-	13,518	2,919	10,599
TLBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$ 11,924	124,466	4	1	-	1	615	1	14,436	2,640	11,795
TLBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$ 11,957	123,978	4	1	-	1	504	-	14,967	2,527	12,440
TLBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$ 11,954	126,901	4	1	-	1	736	-	13,630	2,899	10,730
TEBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$ 11,975	121,172	5	-	1	-	950	2	14,316	2,637	11,680
TEBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$ 11,970	120,329	5	-	1	-	633	-	15,983	2,344	13,639
TEBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$ 11,960	122,928	5	-	1	-	1,012	-	14,164	2,766	11,397
TLBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$ 12,029	126,361	4	-	1	-	585	1	15,609	2,238	13,371
TLBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$ 12,055	123,646	5	-	1	-	850	-	15,335	2,429	12,906
TLBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$ 12,053	128,802	4	-	1	-	706	-	14,797	2,500	12,297
TEBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$ 11,578	121,409	3	1	-	1	399	3	12,834	3,306	9,528
TEBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$ 11,623	118,799	4	1	-	1	317	-	14,218	3,057	11,161
TEBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$ 11,618	121,455	4	1	-	1	584	-	12,519	3,449	9,069
TLBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$ 11,685	123,608	4	1	-	1	571	1	13,835	2,995	10,840
TLBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$ 11,723	123,029	4	1	-	1	465	-	14,336	2,901	11,435
TLBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$ 11,724	127,735	3	-	-	2	387	-	13,122	3,170	9,952
TEBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$ 11,405	121,379	3	-	-	2	379	3	12,360	3,548	8,812
TEBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$ 11,484	121,258	3	-	-	2	110	-	14,813	2,917	11,896
TEBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$ 11,476	123,998	3	-	-	2	257	-	12,998	3,306	9,692
TLBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$ 11,540	125,686	3	-	-	2	231	1	13,917	3,009	10,908
TLBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$ 11,576	125,025	3	-	-	2	169	-	14,383	2,923	11,460
TLBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$ 11,580	127,578	3	-	-	2	378	-	12,869	3,317	9,552

Standard Modeling Approach, Energy Efficiency +30 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO_2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 11,829	126,941	2	1	-	1	88	3	15,230	2,349	12,881
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 11,875	122,221	3	1	-	1	128	-	15,648	2,470	13,178
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 11,851	124,754	3	1	-	1	282	-	13,800	2,862	10,938
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 11,920	126,775	3	1	-	1	260	1	15,120	2,461	12,659
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 11,959	126,411	3	1	-	1	196	-	15,608	2,377	13,231
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 11,947	128,699	3	1	-	1	409	-	14,057	2,780	11,277
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEHH	$ 11,870	132,238	-	-	-	2	33	3	17,418	1,840	15,578
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEHH	$ 11,972	129,400	1	1	-	1	6	-	19,178	1,613	17,565
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEHH	$ 11,900	132,157	1	1	-	1	29	-	16,924	1,949	14,975
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEHH	$ 11,996	134,149	1	1	-	1	21	1	18,399	1,583	16,816
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEHH	$ 12,059	133,816	1	1	-	1	13	-	18,936	1,582	17,355
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEHH	$ 11,990	138,787	-	-	-	2	18	-	17,412	1,751	15,660
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 11,575	117,457	5	1	-	1	1,130	3	11,634	3,734	7,900
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 11,585	117,240	5	1	-	1	638	-	13,836	3,113	10,723
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 11,584	119,895	5	1	-	1	1,014	-	12,176	3,520	8,656
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 11,647	121,841	5	1	-	1	1,014	1	13,401	3,126	10,275
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 11,679	121,313	5	1	-	1	861	-	13,920	3,015	10,904
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 11,690	123,785	5	1	-	1	1,337	-	12,514	3,425	9,089
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEHH	$ 11,409	117,457	5	1	-	1	1,130	3	11,634	3,734	7,900
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEHH	$ 11,419	117,240	5	1	-	1	638	-	13,836	3,113	10,723
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEHH	$ 11,418	119,895	5	1	-	1	1,014	-	12,176	3,520	8,656
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEHH	$ 11,482	121,841	5	1	-	1	1,014	1	13,401	3,126	10,275
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEHH	$ 11,513	121,313	5	1	-	1	861	-	13,920	3,015	10,904
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEHH	$ 11,524	123,785	5	1	-	1	1,337	-	12,514	3,425	9,089
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$ 11,729	120,362	4	-	-	1	567	3	12,657	3,267	9,389
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$ 11,750	119,409	4	1	-	1	338	-	14,579	2,820	11,759
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$ 11,741	121,979	4	1	-	1	612	-	12,859	3,216	9,644
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$ 11,805	123,958	4	1	-	1	590	1	14,121	2,807	11,314
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$ 11,840	123,509	4	1	-	1	481	-	14,628	2,711	11,917
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$ 11,841	126,394	4	1	-	1	710	-	13,325	3,060	10,265

Standard Modeling Approach, Energy Efficiency +30 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO_2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$ 11,729	120,362	4	-	-	1	567	3	12,657	3,267	9,389
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$ 11,755	119,409	4	1	-	1	338	-	14,579	2,820	11,759
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$ 11,744	122,711	4	-	-	1	601	-	13,359	3,032	10,326
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$ 11,808	123,886	4	-	-	1	563	1	13,895	2,862	11,033
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$ 11,844	123,429	4	-	-	1	458	-	14,403	2,762	11,641
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$ 11,844	126,322	4	-	-	1	684	-	13,099	3,115	9,984
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$ 11,719	119,920	4	1	-	1	595	3	12,466	3,350	9,116
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$ 11,741	119,409	4	1	-	1	338	-	14,579	2,820	11,759
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$ 11,732	121,979	4	1	-	1	612	-	12,859	3,216	9,644
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$ 11,796	123,958	4	1	-	1	590	1	14,121	2,807	11,314
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$ 11,831	123,509	4	1	-	1	481	-	14,628	2,711	11,917
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$ 11,832	126,394	4	1	-	1	710	-	13,325	3,060	10,265
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$ 11,706	120,220	3	5	-	1	509	2	13,630	3,186	10,444
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$ 11,727	117,235	4	5	-	1	640	-	13,971	3,171	10,800
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$ 11,718	122,517	3	5	-	1	546	-	13,148	3,205	9,942
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$ 11,784	124,625	3	5	-	1	509	1	14,476	2,775	11,701
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$ 11,827	123,509	4	1	-	1	481	-	14,628	2,711	11,917
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$ 11,827	126,394	4	1	-	1	710	-	13,325	3,060	10,265
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$ 11,896	121,665	4	1	-	1	489	3	10,470	4,767	5,703
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$ 11,933	118,867	5	1	-	1	530	-	11,974	4,410	7,563
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$ 11,912	123,802	4	1	-	1	500	-	10,830	4,616	6,214
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$ 11,986	125,803	4	1	-	1	474	1	12,083	4,166	7,917
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$ 12,028	125,355	4	1	-	1	385	-	12,587	4,044	8,542
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$ 12,016	128,356	4	1	-	1	578	-	11,209	4,498	6,710
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$ 11,580	119,801	3	1	-	1	585	3	16,373	1,253	15,120
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$ 11,587	117,148	4	1	-	1	509	-	17,585	1,119	16,466
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$ 11,586	122,258	3	1	-	1	444	-	16,992	1,068	15,925
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$ 11,645	124,372	3	1	-	1	424	1	18,206	821	17,385
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$ 11,676	121,154	4	1	-	1	678	-	17,666	1,033	16,632
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$ 11,680	126,082	3	1	-	1	596	-	17,271	981	16,290

Standard Modeling Approach, Energy Efficiency +30 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 21	(511)	-	-	-	-	(256)	(3)	2,113	(530)	2,643
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 12	2,059	-	-	-	-	17	(3)	393	(134)	528
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 76	4,038	-	-	-	-	(5)	(2)	1,655	(543)	2,198
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 111	3,589	-	-	-	-	(114)	(3)	2,162	(639)	2,801
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 112	6,474	-	-	-	-	116	(3)	859	(290)	1,149
TEBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 16	(3,522)	1	-	-	-	23	(3)	464	(9)	473
TEBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 13	1,178	-	-	-	-	(2)	(3)	(375)	128	(503)
TLBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 70	2,774	-	-	-	-	(43)	(2)	448	(173)	622
TLBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 113	3,079	-	-	-	-	(112)	(3)	1,640	(475)	2,115
TLBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 107	5,571	-	-	-	-	159	(3)	151	(93)	244
TEBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 13	(475)	-	(1)	-	-	(29)	(1)	334	(90)	423
TEBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 12	1,639	-	-	-	-	4	(3)	(54)	17	(71)
TLBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 74	4,478	-	(1)	-	-	3	-	231	(163)	394
TLBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 122	4,550	-	(1)	-	-	(151)	(3)	2,541	(724)	3,265
TLBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 99	7,014	-	(1)	-	-	55	(3)	867	(364)	1,230
TEBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 28	(2,494)	1	-	-	-	(60)	(3)	1,722	(357)	2,080
TEBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 19	2,826	-	-	-	-	(132)	(3)	872	(331)	1,204
TLBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 60	5,037	-	-	-	-	(134)	(2)	1,601	(581)	2,182
TLBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 95	1,818	1	-	-	-	151	(3)	1,134	(315)	1,449
TLBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 103	6,894	-	-	-	-	65	(3)	662	(261)	923
TEBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 37	(216)	-	1	-	-	(65)	(1)	1,212	(261)	1,473
TEBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 27	2,470	-	1	-	-	209	(1)	(507)	143	(649)
TLBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 58	4,692	-	1	-	-	216	(1)	73	(73)	147
TLBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 88	4,379	-	1	-	-	108	(1)	83	(83)	166
TLBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 109	6,616	-	1	-	-	497	(1)	(1,218)	348	(1,566)

Standard Modeling Approach, Energy Efficiency +30 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 14	(511)	-	-	-	-	(256)	(3)	2,113	(530)	2,643
TEBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 4	2,342	-	-	-	-	40	(3)	693	(236)	929
TLBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 62	4,038	-	-	-	-	(5)	(2)	1,655	(543)	2,198
TLBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 97	3,589	-	-	-	-	(114)	(3)	2,162	(639)	2,801
TLBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 98	6,474	-	-	-	-	116	(3)	859	(290)	1,149
TEBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 29	(511)	-	-	-	-	(256)	(3)	2,113	(530)	2,643
TEBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 19	2,059	-	-	-	-	17	(3)	393	(134)	528
TLBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 90	4,038	-	-	-	-	(5)	(2)	1,655	(543)	2,198
TLBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 126	3,589	-	-	-	-	(114)	(3)	2,162	(639)	2,801
TLBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 125	8,366	(1)	(1)	-	1	(197)	(3)	979	(392)	1,371
TEBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 4	(255)	-	-	-	-	(496)	(3)	2,315	(629)	2,944
TEBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 27	2,423	-	-	-	-	(102)	(3)	676	(263)	939
TLBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 105	4,497	-	-	-	-	(70)	(2)	1,952	(655)	2,607
TLBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 130	3,874	-	-	-	-	(236)	(3)	2,522	(769)	3,291
TLBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 162	6,370	-	-	-	-	259	(3)	1,120	(398)	1,517
TEBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 47	(3,589)	-	1	(1)	1	(140)	(2)	1,425	113	1,312
TEBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 1	(929)	-	1	(1)	1	(13)	(2)	(554)	604	(1,158)
TLBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 56	925	-	1	(1)	1	(45)	(1)	718	204	514
TLBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 98	607	-	1	(1)	1	(94)	(2)	1,196	119	1,076
TLBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 67	3,003	-	1	(1)	1	83	(2)	(444)	639	(1,084)
TEBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$ 26	(2,538)	1	-	-	-	49	(3)	1,324	(219)	1,543
TEBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$ 38	2,101	-	-	-	-	33	(3)	490	(182)	673
TLBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$ 131	4,262	-	-	-	-	33	(2)	1,838	(566)	2,404
TLBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$ 165	3,682	-	-	-	-	(86)	(3)	2,390	(663)	3,053
TLBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$ 183	6,101	-	-	-	-	290	(3)	961	(300)	1,261

Standard Modeling Approach, Energy Efficiency +30 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$ 13	(1,484)	1	(1)	1	(1)	165	2	(65)	(386)	320
TEBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$ 34	(5,337)	1	-	-	-	59	-	958	(139)	1,097
TEBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$ 40	1,892	-	-	-	-	(25)	1	1,261	(395)	1,656
TLBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$ 78	(1,274)	1	-	-	-	180	-	823	(148)	972
TLBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$ 51	3,958	-	-	-	-	105	-	113	33	80
TEBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$ 8	(1,460)	1	(1)	1	(1)	310	2	(139)	(204)	65
TEBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$ 15	(4,884)	1	-	-	-	27	-	775	(56)	831
TEBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$ 64	1,620	-	-	-	-	(48)	1	917	(279)	1,196
TLBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$ 97	1,133	-	-	-	-	(160)	-	1,449	(392)	1,841
TLBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$ 94	4,056	-	-	-	-	73	-	111	(20)	131
TEBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$ 15	(1,756)	-	-	-	-	(62)	2	153	(130)	282
TEBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$ 10	(2,599)	-	-	-	-	(379)	-	1,820	(422)	2,242
TEBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$ 69	3,433	(1)	-	-	-	(427)	1	1,446	(528)	1,974
TLBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$ 96	718	-	-	-	-	(163)	-	1,171	(337)	1,509
TLBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$ 93	5,874	(1)	-	-	-	(306)	-	634	(266)	899
TEBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$ 45	(2,610)	1	-	-	-	(82)	(3)	1,383	(250)	1,633
TEBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$ 40	46	1	-	-	-	186	(3)	(315)	143	(458)
TLBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$ 107	2,199	1	-	-	-	172	(2)	1,001	(311)	1,313
TLBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$ 145	1,620	1	-	-	-	66	(3)	1,502	(405)	1,907
TLBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$ 145	6,326	-	(1)	-	1	(12)	(3)	287	(137)	424
TEBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$ 79	(121)	-	-	-	-	(270)	(3)	2,453	(631)	3,084
TEBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$ 71	2,619	-	-	-	-	(122)	(3)	638	(242)	880
TLBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$ 135	4,308	-	-	-	-	(149)	(2)	1,557	(539)	2,095
TLBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$ 172	3,646	-	-	-	-	(210)	(3)	2,023	(625)	2,647
TLBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$ 175	6,199	-	-	-	-	(2)	(3)	509	(231)	740

Standard Modeling Approach, Energy Efficiency +30 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 46	(4,720)	1	-	-	-	40	(3)	418	122	297
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 21	(2,187)	1	-	-	-	194	(3)	(1,430)	513	(1,944)
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 91	(166)	1	-	-	-	172	(2)	(110)	113	(222)
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 129	(530)	1	-	-	-	108	(3)	378	28	350
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 118	1,758	1	-	-	-	321	(3)	(1,173)	432	(1,605)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 103	(2,838)	1	1	-	(1)	(27)	(3)	1,760	(227)	1,987
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 30	(81)	1	1	-	(1)	(4)	(3)	(494)	109	(603)
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 126	1,912	1	1	-	(1)	(12)	(2)	982	(257)	1,238
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 189	1,578	1	1	-	(1)	(20)	(3)	1,519	(258)	1,777
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 120	6,549	-	-	-	-	(15)	(3)	(6)	(88)	83
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 10	(217)	-	-	-	-	(491)	(3)	2,202	(621)	2,823
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 9	2,438	-	-	-	-	(115)	(3)	541	(215)	756
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 73	4,384	-	-	-	-	(115)	(2)	1,767	(608)	2,375
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 104	3,856	-	-	-	-	(268)	(3)	2,285	(719)	3,004
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 115	6,328	-	-	-	-	208	(3)	880	(310)	1,189
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 10	(217)	-	-	-	-	(491)	(3)	2,202	(621)	2,823
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 9	2,438	-	-	-	-	(115)	(3)	541	(215)	756
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 73	4,384	-	-	-	-	(115)	(2)	1,767	(608)	2,375
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 104	3,856	-	-	-	-	(268)	(3)	2,285	(719)	3,004
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 115	6,328	-	-	-	-	208	(3)	880	(310)	1,189
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$ 22	(953)	-	1	-	-	(229)	(3)	1,922	(447)	2,370
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$ 12	1,617	-	1	-	-	44	(3)	203	(52)	254
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$ 77	3,596	-	1	-	-	23	(2)	1,464	(460)	1,924
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$ 112	3,147	-	1	-	-	(87)	(3)	1,971	(557)	2,528
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$ 113	6,032	-	1	-	-	143	(3)	669	(207)	876

Standard Modeling Approach, Energy Efficiency +30 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$ 27	(953)	-	1	-	-	(229)	(3)	1,922	(447)	2,370
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$ 16	2,349	-	-	-	-	33	(3)	702	(235)	937
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$ 79	3,524	-	-	-	-	(4)	(2)	1,239	(405)	1,644
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$ 115	3,067	-	-	-	-	(110)	(3)	1,746	(505)	2,251
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$ 115	5,960	-	-	-	-	116	(3)	443	(152)	595
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$ 22	(511)	-	-	-	-	(256)	(3)	2,113	(530)	2,643
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$ 13	2,059	-	-	-	-	17	(3)	393	(134)	528
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$ 77	4,038	-	-	-	-	(5)	(2)	1,655	(543)	2,198
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$ 112	3,589	-	-	-	-	(114)	(3)	2,162	(639)	2,801
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$ 113	6,474	-	-	-	-	116	(3)	859	(290)	1,149
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$ 20	(2,985)	1	-	-	-	132	(2)	341	(15)	356
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$ 11	2,297	-	-	-	-	38	(2)	(483)	19	(502)
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$ 78	4,405	-	-	-	-	1	(1)	846	(411)	1,257
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$ 120	3,289	1	(4)	-	-	(28)	(2)	997	(475)	1,473
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$ 121	6,174	1	(4)	-	-	202	(2)	(305)	(126)	(179)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$ 36	(2,798)	1	-	-	-	41	(3)	1,504	(357)	1,861
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$ 16	2,137	-	-	-	-	11	(3)	360	(152)	512
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$ 90	4,137	-	-	-	-	(15)	(2)	1,613	(602)	2,215
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$ 131	3,689	-	-	-	-	(104)	(3)	2,117	(723)	2,840
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$ 120	6,690	-	-	-	-	89	(3)	739	(269)	1,007
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$ 7	(2,652)	1	-	-	-	(76)	(3)	1,212	(134)	1,346
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$ 6	2,458	-	-	-	-	(141)	(3)	620	(185)	804
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$ 65	4,572	-	-	-	-	(161)	(2)	1,834	(432)	2,265
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$ 96	1,353	1	-	-	-	94	(3)	1,293	(220)	1,512
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$ 100	6,281	-	-	-	-	12	(3)	898	(272)	1,170

No Externalities/Carbon Cost Modeling Approach, Energy Efficiency +11 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO_2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,427	10,427	-	-	-	2	13.079	3	13910.2	3196.3	10,714
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,494	128,379	3	-	-	1	68.951	0	13455.4	3614	9,841
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,422	140,186	-	-	-	2	2.4505	0	13870.5	3235.7	10,635
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,501	133,006	3	1	1	0	133.07	1	13193.1	3483.9	9,709
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,546	132,603	3	1	1	0	97.918	0	13999.1	3320.4	10,679
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,492	144,129	-	-	-	2	3.6768	0	13946.7	3234.2	10,712
TEBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,669	10,669	1	-	-	2	26.751	3	12970.5	3538.8	9,432
TEBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,736	132,074	3	-	1	1	51.231	0	12682	3669.2	9,013
TEBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,663	141,074	1	-	-	2	6.638	0	12838.9	3585.1	9,254
TLBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,730	142,024	1	1	-	2	1.5293	1	14004.9	3244.6	10,760
TLBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,783	135,938	3	-	1	1	54.917	0	13509.6	3488.1	10,021
TLBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,724	147,161	-	1	-	2	1.0122	0	15164.3	2873.5	12,291
TEBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,986	10,986	1	2	-	2	19.161	3	14326.6	3248.1	11,078
TEBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	11,009	135,802	3	-	1	1	64.639	1	13638.9	3206.1	10,433
TEBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,951	144,713	1	-	-	2	12.934	2	14006.3	3220.5	10,786
TLBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	11,011	140,324	3	-	1	1	91.412	2	13025.8	3360.3	9,665
TLBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	11,082	138,628	3	-	-	2	27.267	0	15153.1	3214.2	11,939
TLBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	11,011	141,305	3	-	-	2	90.728	0	13055.9	3782.3	9,274
TEBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,168	10,168	1	-	-	1	60.356	3	13819.7	3310.2	10,510
TEBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,236	124,890	3	-	-	1	102.08	0	13712.4	3647.9	10,065
TEBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,174	132,443	2	-	-	1	45.532	0	13713.9	3427.9	10,286
TLBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,203	129,343	3	-	-	1	219.63	1	11801.8	4179.4	7,622
TLBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,244	129,041	3	-	-	1	165.89	0	12257.1	4070.6	8,186
TLBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,203	138,523	1	-	-	1	45.79	0	13502.6	3549.3	9,953
TEBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	9,942	9,942	1	-	-	1	11.861	1	13473	3430.2	10,043
TEBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,007	121,470	3	-	-	1	164.97	0	12342.1	4079.3	8,263
TEBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	9,935	131,151	1	-	-	1	38.808	0	13319.5	3489.9	9,830
TLBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	9,959	132,919	1	-	-	1	32.032	0	14016.2	3324.8	10,691
TLBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	9,993	132,882	1	-	-	1	21.356	0	13909	3385.4	10,524
TLBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	9,945	135,891	1	-	-	1	55.578	0	12198.3	3944.9	8,253

No Externalities/Carbon Cost Modeling Approach, Energy Efficiency +11 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO_2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,523	10,523	2	2	-	1	57.605	3	13640.7	3508.4	10,132
TEBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,564	127,561	3	2	-	1	75.509	0	14201.5	3542.8	10,659
TEBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,505	130,476	3	2	-	1	176.32	0	12119.5	4145.7	7,974
TLBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,560	133,006	3	1	1	0	133.07	1	13193.1	3483.9	9,709
TLBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,602	132,603	3	1	1	0	97.918	0	13999.1	3320.4	10,679
TLBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,559	135,075	3	1	1	0	237.21	0	12247.8	3921.7	8,326
TEBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,306	10,306	-	-	-	2	13.079	3	13910.2	3196.3	10,714
TEBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,393	128,303	3	-	-	2	69.173	0	12047.4	4146	7,901
TEBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,305	140,186	-	-	-	2	2.4505	0	13870.5	3235.7	10,635
TLBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,403	139,157	1	-	-	2	4.8586	1	13972.2	3292.9	10,679
TLBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,464	132,174	3	-	-	2	97.398	0	12101.3	4131.5	7,970
TLBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,385	144,129	-	-	-	2	3.6768	0	13946.7	3234.2	10,712
TEBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,427	10,427	-	-	-	2	13.079	3	13910.2	3196.3	10,714
TEBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,494	128,379	3	-	-	1	68.951	0	13455.4	3614	9,841
TEBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,422	140,186	-	-	-	2	2.4505	0	13870.5	3235.7	10,635
TLBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,501	133,006	3	1	1	0	133.07	1	13193.1	3483.9	9,709
TLBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,546	132,603	3	1	1	0	97.918	0	13999.1	3320.4	10,679
TLBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,492	144,129	-	-	-	2	3.6768	0	13946.7	3234.2	10,712
TEBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,427	10,427	-	-	-	2	13.079	3	13910.2	3196.3	10,714
TEBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,494	128,379	3	-	-	1	68.951	0	13455.4	3614	9,841
TEBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,422	140,186	-	-	-	2	2.4505	0	13870.5	3235.7	10,635
TLBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,501	133,006	3	1	1	0	133.07	1	13193.1	3483.9	9,709
TLBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,546	132,603	3	1	1	0	97.918	0	13999.1	3320.4	10,679
TLBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	10,492	144,129	-	-	-	2	3.6768	0	13946.7	3234.2	10,712
TEBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	11,049	11,049	1	-	-	2	49.036	3	13517.6	3015.1	10,502
TEBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	11,108	124,865	3	-	-	1	87.224	0	14366.7	2920.6	11,446
TEBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	11,068	126,964	3	2	-	1	212.95	0	13125.1	3330.9	9,794
TLBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	11,163	128,735	3	1	-	1	166.78	1	13807.3	3124.2	10,683
TLBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	11,210	128,628	3	2	-	1	135.01	0	14930.4	2865.3	12,065
TLBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	11,182	131,028	3	2	-	1	299.54	0	13252.2	3351.2	9,901

No Externalities/Carbon Cost Modeling Approach, Energy Efficiency +11 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO_2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	9,751	9,751	-	-	-	2	8.4449	3	13562.1	3465.3	10,097
TEBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	9,846	128,962	3	-	-	1	51.007	0	12918	4040.5	8,878
TEBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	9,719	140,652	-	-	-	2	0.6202	0	13463.1	3538.7	9,924
TLBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	9,787	142,380	-	-	-	2	0.1517	1	14795.6	3151.5	11,644
TLBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	9,862	133,466	3	1	1	0	79.698	0	13306.9	3921.5	9,385
TLBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	9,745	145,038	-	-	-	2	2.9225	0	13364.7	3663.4	9,701
TEBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	10,580	10,580	2	2	-	1	56.195	3	14312.6	3053.5	11,259
TEBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	10,605	127,343	3	2	-	1	73.057	0	14721.6	3189.7	11,532
TEBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	10,541	130,289	3	2	-	1	173.04	0	12586.6	3832.7	8,754
TLBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	10,614	131,760	3	2	-	1	143.52	1	13718	3529	10,189
TLBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	10,656	131,440	3	2	-	1	106.61	0	14212.2	3404.1	10,808
TLBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	10,611	133,904	3	2	-	1	252.45	0	12437.5	4024.2	8,413
TEBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	10,712	10,712	3	2	-	1	315.33	3	12872.6	3519.2	9,353
TEBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	10,717	127,109	3	2	-	1	70.197	0	15392	2872.7	12,519
TEBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	10,650	130,062	3	2	-	1	169.56	0	13155.1	3528.6	9,626
TLBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	10,726	131,582	3	2	-	1	141.04	1	14175.7	3304.3	10,871
TLBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	10,764	131,251	3	2	-	1	104.59	0	14707.5	3169.5	11,538
TLBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	10,716	133,737	3	2	-	1	250.12	0	12884.4	3805	9,079
TEBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	10,228	10,228	-	-	-	2	13.188	3	13323	3682.5	9,640
TEBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	10,349	131,614	1	-	-	2	2.0246	0	14535	3641.4	10,894
TEBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	10,247	137,562	-	-	-	2	2.5074	0	13322.3	3684.6	9,638
TLBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	10,341	139,527	-	-	-	2	0.1565	1	14748.5	3230	11,518
TLBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	10,428	139,450	-	-	-	2	0.0213	0	15899.1	3073.9	12,825
TLBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	10,328	142,389	-	-	-	2	3.6856	0	13508.7	3623.1	9,886
TEBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	10,022	10,022	-	-	-	2	13.523	3	13094.7	3870.6	9,224
TEBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	10,166	129,925	1	-	-	2	2.0627	0	14276.8	3855.6	10,421
TEBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	10,065	135,982	-	-	-	2	2.5439	0	13089.1	3866.4	9,223
TLBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	10,164	138,261	-	-	-	2	0.1565	1	14520.6	3392.4	11,128
TLBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	10,258	138,144	-	-	-	2	0.0213	0	15676.5	3236.9	12,440
TLBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	10,164	141,207	-	-	-	2	3.6921	0	13318.2	3768.4	9,550

No Externalities/Carbon Cost Modeling Approach, Energy Efficiency +11 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO_2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	10,427	10,427	-	-	-	2	13.079	3	13910.2	3196.3	10,714
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	10,537	136,664	-	-	-	2	1.4384	0	16568.7	2670.3	13,898
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	10,422	140,186	-	-	-	2	2.4505	0	13870.5	3235.7	10,635
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	10,516	141,542	-	-	-	2	0.1565	1	15234.6	2834.9	12,400
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	10,595	141,213	-	-	-	2	0.0213	0	16434.6	2651.1	13,784
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	10,492	144,129	-	-	-	2	3.6768	0	13946.7	3234.2	10,712
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEM	10,427	10,427	-	-	-	2	13.079	3	13910.2	3196.3	10,714
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEM	10,537	136,664	-	-	-	2	1.4384	0	16568.7	2670.3	13,898
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEM	10,422	140,186	-	-	-	2	2.4505	0	13870.5	3235.7	10,635
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEM	10,516	141,542	-	-	-	2	0.1565	1	15234.6	2834.9	12,400
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEM	10,595	141,213	-	-	-	2	0.0213	0	16434.6	2651.1	13,784
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEM	10,492	144,129	-	-	-	2	3.6768	0	13946.7	3234.2	10,712
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	10,338	10,338	4	1	1	0	306.51	2	11690.8	3874.6	7,816
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	10,376	124,864	4	2	-	1	223.35	0	13114.8	3952.1	9,163
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	10,330	130,476	3	2	-	1	176.32	0	12119.5	4145.7	7,974
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	10,384	130,087	4	1	1	0	362.97	1	12253.9	3875.9	8,378
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	10,427	129,646	4	1	1	0	289.25	0	13027.6	3714.7	9,313
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	10,394	132,653	4	1	1	0	448.15	0	11561.4	4226.5	7,335
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEM	10,180	10,180	5	1	1	0	680.64	2	10886.5	4295.3	6,591
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEM	10,218	122,635	5	2	-	1	458.95	0	12410.5	4260.6	8,150
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEM	10,178	126,392	5	1	1	0	701.34	0	11115.9	4356	6,760
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEM	10,229	127,749	5	1	1	0	689.06	1	11623.3	4189.9	7,433
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEM	10,269	127,263	5	1	1	0	570.86	0	12367.5	4032.1	8,335
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEM	10,244	129,762	5	1	1	0	952.81	0	10872	4571.6	6,300
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	10,427	10,427	-	-	-	2	13.079	3	13910.2	3196.3	10,714
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	10,494	128,379	3	-	-	1	68.951	0	13455.4	3614	9,841
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	10,422	140,186	-	-	-	2	2.4505	0	13870.5	3235.7	10,635
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	10,505	133,006	3	1	1	0	133.07	1	13193.1	3483.9	9,709
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	10,551	132,603	3	1	1	0	97.918	0	13999.1	3320.4	10,679
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	10,492	144,129	-	-	-	2	3.6768	0	13946.7	3234.2	10,712

No Externalities/Carbon Cost Modeling Approach, Energy Efficiency +11 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO_2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	10,427	10,427	-	-	-	2	13.079	3	13910.2	3196.3	10,714
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	10,494	128,379	3	-	-	1	68.951	0	13455.4	3614	9,841
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	10,422	140,186	-	-	-	2	2.4505	0	13870.5	3235.7	10,635
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	10,509	132,519	3	-	-	1	133.15	1	12400.9	3938.1	8,463
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	10,555	132,249	3	-	-	1	97.239	0	13268.3	3709.7	9,559
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	10,492	144,129	-	-	-	2	3.6768	0	13946.7	3234.2	10,712
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	10,427	10,427	-	-	-	2	13.079	3	13910.2	3196.3	10,714
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	10,488	127,561	3	2	-	1	75.509	0	14201.5	3542.8	10,659
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	10,422	140,186	-	-	-	2	2.4505	0	13870.5	3235.7	10,635
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	10,496	133,006	3	1	1	0	133.07	1	13193.1	3483.9	9,709
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	10,542	132,603	3	1	1	0	97.918	0	13999.1	3320.4	10,679
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	10,492	144,129	-	-	-	2	3.6768	0	13946.7	3234.2	10,712
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	10,422	10,422	2	2	-	1	63.014	3	13490.5	3556.3	9,934
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	10,478	127,561	3	2	-	1	75.509	0	14201.5	3542.8	10,659
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	10,419	130,476	3	2	-	1	176.32	0	12119.5	4145.7	7,974
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	10,489	131,828	3	2	-	1	145.84	1	13351.7	3765.2	9,586
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	10,533	131,537	3	2	-	1	108.78	0	13816.5	3677	10,140
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	10,491	133,970	3	2	-	1	254.78	0	12081.7	4269	7,813
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	10,554	10,554	1	-	-	2	32.056	3	11580.1	4569.5	7,011
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	10,628	129,177	3	-	-	1	52.504	0	12367.5	4499	7,868
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	10,550	138,598	1	-	-	2	6.5901	0	11545.4	4634.6	6,911
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	10,639	133,533	3	-	-	1	109.21	1	11270.7	4928.9	6,342
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	10,690	133,254	3	-	-	1	79.943	0	12171	4651.7	7,519
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	10,629	142,437	1	-	-	2	17.434	0	11696.5	4602.7	7,094
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	10,309	10,309	-	-	-	2	19.236	3	15974.9	1835.5	14,139
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	10,381	127,056	3	-	-	1	89.841	0	15251.6	2296.4	12,955
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	10,304	139,152	-	-	-	2	4.7453	0	15914.7	1873.6	14,041
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	10,383	131,354	3	1	1	0	166.28	1	15048.3	2210	12,838
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	10,424	130,986	3	1	1	0	122.34	0	15800	2093.7	13,706
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	10,371	142,896	-	-	-	2	5.5606	0	15965.4	1901	14,064

No Externalities/Carbon Cost Modeling Approach, Energy Efficiency +11 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 5	(129,759)	-	-	-	-	11	3	40	(39)	79
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 72	(11,807)	3	-	-	(1)	67	-	(415)	378	(793)
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 79	(7,180)	3	1	1	(2)	131	1	(677)	248	(926)
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 124	(7,583)	3	1	1	(2)	95	-	129	85	44
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 70	3,944	-	-	-	-	1	-	76	(1)	78
TEBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 6	(130,405)	-	-	-	-	20	3	132	(46)	178
TEBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 73	(9,000)	2	-	1	(1)	45	-	(157)	84	(241)
TEBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 68	950	-	1	-	-	(5)	1	1,166	(340)	1,507
TLBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 121	(5,136)	2	-	1	(1)	48	-	671	(97)	768
TLBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 61	6,087	(1)	1	-	-	(6)	-	2,325	(712)	3,037
TEBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 35	(133,727)	-	2	-	-	6	1	320	28	293
TEBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 59	(8,911)	2	-	1	(1)	52	(1)	(367)	(14)	(353)
TEBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 60	(4,389)	2	-	1	(1)	78	-	(981)	140	(1,120)
TLBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 132	(6,085)	2	-	-	-	14	(2)	1,147	(6)	1,153
TLBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 60	(3,408)	2	-	-	-	78	(2)	(950)	562	(1,512)
TEBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 67	114,722	2	-	-	-	42	(3)	(107)	338	(445)
TEBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 6	122,275	1	-	-	-	(15)	(3)	(106)	118	(223)
TLBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 34	119,175	2	-	-	-	159	(2)	(2,018)	869	(2,887)
TLBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 76	118,872	2	-	-	-	106	(3)	(1,563)	760	(2,323)
TLBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 35	128,355	-	-	-	-	(15)	(3)	(317)	239	(556)
TEBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 7	(121,209)	-	-	-	-	(27)	1	154	(60)	213
TEBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 72	(9,681)	2	-	-	-	126	-	(977)	589	(1,567)
TEBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 24	1,769	-	-	-	-	(7)	-	697	(165)	862
TLBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 58	1,731	-	-	-	-	(17)	-	589	(104)	694
TLBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 10	4,741	-	-	-	-	17	-	(1,121)	455	(1,576)

No Externalities/Carbon Cost Modeling Approach, Energy Efficiency +11 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 18	(119,953)	(1)	-	-	-	(119)	3	1,521	(637)	2,159
TEBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 59	(2,916)	-	-	-	-	(101)	-	2,082	(603)	2,685
TEBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 55	2,529	-	(1)	1	(1)	(43)	1	1,074	(662)	1,735
TLBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 97	2,127	-	(1)	1	(1)	(78)	-	1,880	(825)	2,705
TLBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 54	4,599	-	(1)	1	(1)	61	-	128	(224)	352
TEBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 1	(129,879)	-	-	-	-	11	3	40	(39)	79
TEBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 88	(11,883)	3	-	-	-	67	-	(1,823)	910	(2,733)
TEBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 98	(1,028)	1	-	-	-	2	1	102	57	45
TLBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 159	(8,012)	3	-	-	-	95	-	(1,769)	896	(2,665)
TLBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 80	3,944	-	-	-	-	1	-	76	(1)	78
TEBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 5	(129,759)	-	-	-	-	11	3	40	(39)	79
TEBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 72	(11,807)	3	-	-	(1)	67	-	(415)	378	(793)
TEBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 79	(7,180)	3	1	1	(2)	131	1	(677)	248	(926)
TLBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 124	(7,583)	3	1	1	(2)	95	-	129	85	44
TLBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 70	3,944	-	-	-	-	1	-	76	(1)	78
TEBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 5	(129,759)	-	-	-	-	11	3	40	(39)	79
TEBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 72	(11,807)	3	-	-	(1)	67	-	(415)	378	(793)
TEBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 79	(7,180)	3	1	1	(2)	131	1	(677)	248	(926)
TLBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 124	(7,583)	3	1	1	(2)	95	-	129	85	44
TLBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 70	3,944	-	-	-	-	1	-	76	(1)	78
TEBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ 60	113,817	2	-	-	(1)	38	(3)	849	(94)	944
TEBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ 19	115,916	2	2	-	(1)	164	(3)	(392)	316	(708)
TLBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ 114	117,687	2	1	-	(1)	118	(2)	290	109	181
TLBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ 161	117,579	2	2	-	(1)	86	(3)	1,413	(150)	1,563
TLBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ 133	119,979	2	2	-	(1)	251	(3)	(265)	336	(601)

No Externalities/Carbon Cost Modeling Approach, Energy Efficiency +11 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ 32	(130,901)	-	-	-	-	8	3	99	(73)	173
TEBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ 127	(11,690)	3	-	-	(1)	50	-	(545)	502	(1,047)
TEBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ 68	1,728	-	-	-	-	(0)	1	1,333	(387)	1,720
TLBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ 143	(7,186)	3	1	1	(2)	79	-	(156)	383	(539)
TLBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ 26	4,386	-	-	-	-	2	-	(98)	125	(223)
TEBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ 39	(119,709)	(1)	-	-	-	(117)	3	1,726	(779)	2,505
TEBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ 64	(2,946)	-	-	-	-	(100)	-	2,135	(643)	2,778
TEBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ 73	1,472	-	-	-	-	(30)	1	1,131	(304)	1,435
TLBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ 115	1,151	-	-	-	-	(66)	-	1,626	(429)	2,054
TLBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ 69	3,615	-	-	-	-	79	-	(149)	191	(341)
TEBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ 62	(119,351)	-	-	-	-	146	3	(282)	(9)	(273)
TEBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ 67	(2,953)	-	-	-	-	(99)	-	2,237	(656)	2,893
TEBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ 76	1,520	-	-	-	-	(29)	1	1,021	(224)	1,245
TLBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ 114	1,188	-	-	-	-	(65)	-	1,552	(359)	1,912
TLBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ 66	3,675	-	-	-	-	81	-	(271)	276	(547)
TEBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ 122	121,387	1	-	-	-	(11)	(3)	1,212	(41)	1,253
TEBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ 19	127,334	-	-	-	-	(11)	(3)	(1)	2	(3)
TLBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ 113	129,299	-	-	-	-	(13)	(2)	1,425	(453)	1,878
TLBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ 200	129,223	-	-	-	-	(13)	(3)	2,576	(609)	3,185
TLBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ 101	132,161	-	-	-	-	(10)	(3)	186	(59)	245
TEBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ 144	119,903	1	-	-	-	(11)	(3)	1,182	(15)	1,197
TEBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ 43	125,960	-	-	-	-	(11)	(3)	(6)	(4)	(1)
TLBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ 142	128,239	-	-	-	-	(13)	(2)	1,426	(478)	1,904
TLBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ 235	128,122	-	-	-	-	(14)	(3)	2,582	(634)	3,216
TLBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ 141	131,184	-	-	-	-	(10)	(3)	224	(102)	326

No Externalities/Carbon Cost Modeling Approach, Energy Efficiency +11 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 5	(129,759)	-	-	-	-	11	3	40	(39)	79
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 115	(3,521)	-	-	-	-	(1)	-	2,698	(565)	3,264
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 94	1,356	-	-	-	-	(2)	1	1,364	(401)	1,765
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 173	1,028	-	-	-	-	(2)	-	2,564	(585)	3,149
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 70	3,944	-	-	-	-	1	-	76	(1)	78
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 5	(129,759)	-	-	-	-	11	3	40	(39)	79
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 115	(3,521)	-	-	-	-	(1)	-	2,698	(565)	3,264
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 94	1,356	-	-	-	-	(2)	1	1,364	(401)	1,765
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 173	1,028	-	-	-	-	(2)	-	2,564	(585)	3,149
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 70	3,944	-	-	-	-	1	-	76	(1)	78
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 8	(120,138)	1	(1)	1	(1)	130	2	(429)	(271)	(158)
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 46	(5,613)	1	-	-	-	47	-	995	(194)	1,189
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 55	(389)	1	(1)	1	(1)	187	1	134	(270)	404
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 98	(830)	1	(1)	1	(1)	113	-	908	(431)	1,339
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 64	2,177	1	(1)	1	(1)	272	-	(558)	81	(639)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEM	$ 2	(116,211)	-	-	-	-	(21)	2	(229)	(61)	(169)
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEM	$ 40	(3,756)	-	1	(1)	1	(242)	-	1,295	(95)	1,390
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEM	$ 51	1,357	-	-	-	-	(12)	1	507	(166)	674
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEM	$ 91	871	-	-	-	-	(130)	-	1,252	(324)	1,575
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEM	$ 66	3,371	-	-	-	-	251	-	(244)	216	(459)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ 5	(129,759)	-	-	-	-	11	3	40	(39)	79
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ 72	(11,807)	3	-	-	(1)	67	-	(415)	378	(793)
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ 83	(7,180)	3	1	1	(2)	131	1	(677)	248	(926)
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ 129	(7,583)	3	1	1	(2)	95	-	129	85	44
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ 70	3,944	-	-	-	-	1	-	76	(1)	78

No Externalities/Carbon Cost Modeling Approach, Energy Efficiency +11 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ 5	(129,759)	-	-	-	-	11	3	40	(39)	79
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ 72	(11,807)	3	-	-	(1)	67	-	(415)	378	(793)
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ 87	(7,667)	3	-	-	(1)	131	1	(1,470)	702	(2,172)
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ 133	(7,937)	3	-	-	(1)	95	-	(602)	474	(1,076)
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ 70	3,944	-	-	-	-	1	-	76	(1)	78
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ 5	(129,759)	-	-	-	-	11	3	40	(39)	79
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ 66	(12,625)	3	2	-	(1)	73	-	331	307	24
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ 74	(7,180)	3	1	1	(2)	131	1	(677)	248	(926)
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ 120	(7,583)	3	1	1	(2)	95	-	129	85	44
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ 70	3,944	-	-	-	-	1	-	76	(1)	78
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ 3	(120,055)	(1)	-	-	-	(113)	3	1,371	(589)	1,960
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ 59	(2,916)	-	-	-	-	(101)	-	2,082	(603)	2,685
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ 70	1,352	-	-	-	-	(30)	1	1,232	(380)	1,613
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ 115	1,061	-	-	-	-	(68)	-	1,697	(469)	2,166
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ 73	3,493	-	-	-	-	78	-	(38)	123	(161)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ 3	(128,044)	-	-	-	-	25	3	35	(65)	100
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ 78	(9,421)	2	-	-	(1)	46	-	822	(136)	958
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ 88	(5,065)	2	-	-	(1)	103	1	(275)	294	(569)
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ 140	(5,344)	2	-	-	(1)	73	-	626	17	608
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ 79	3,839	-	-	-	-	11	-	151	(32)	183
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ 5	(128,843)	-	-	-	-	14	3	60	(38)	98
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ 77	(12,097)	3	-	-	(1)	85	-	(663)	423	(1,086)
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ 79	(7,798)	3	1	1	(2)	162	1	(866)	336	(1,203)
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ 120	(8,166)	3	1	1	(2)	118	-	(115)	220	(335)
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ 68	3,743	-	-	-	-	1	-	51	27	23

No Externalities/Carbon Cost Modeling Approach, Energy Efficiency +15 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO_2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,424	137,625	-	-	-	2	14	3	13,761	3,249	10,512
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,490	128,484	3	1	1	-	69	-	14,739	3,030	11,709
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,426	140,010	-	-	-	2	3	-	14,342	3,123	11,220
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,479	132,736	3	1	1	-	140	1	13,061	3,526	9,534
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,525	132,251	3	1	1	-	103	-	13,863	3,362	10,502
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,472	143,900	-	-	-	2	4	-	13,804	3,284	10,520
TEBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,663	140,575	-	-	-	2	9	3	14,075	3,147	10,928
TEBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,730	131,913	3	-	1	1	53	-	12,567	3,715	8,853
TEBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,656	143,226	-	-	-	2	3	-	13,881	3,202	10,680
TLBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,724	142,067	1	-	-	2	2	1	14,011	3,221	10,789
TLBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,777	135,606	3	-	1	1	58	-	13,386	3,534	9,852
TLBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,717	147,189	-	-	-	2	1	-	15,169	2,845	12,324
TEBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,984	140,096	1	2	-	2	20	3	14,713	3,145	11,568
TEBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 11,006	135,644	3	-	1	1	66	1	13,520	3,250	10,270
TEBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,946	144,613	1	-	-	2	13	2	13,862	3,268	10,594
TLBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 11,008	140,071	3	-	1	1	95	2	12,911	3,407	9,504
TLBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 11,079	138,299	3	-	-	2	29	-	15,017	3,258	11,759
TLBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 11,009	141,060	3	-	-	2	95	-	12,930	3,828	9,102
TEBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,163	132,265	1	-	-	1	63	3	13,650	3,361	10,289
TEBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,232	124,741	3	-	-	1	108	-	13,563	3,692	9,871
TEBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,169	134,413	1	-	-	1	21	-	14,643	3,108	11,535
TLBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,200	136,059	1	-	-	1	15	1	14,803	3,056	11,747
TLBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,243	128,697	3	-	-	1	174	-	12,123	4,116	8,007
TLBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,199	138,277	1	-	-	1	48	-	13,350	3,603	9,747
TEBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 9,938	128,575	1	-	-	1	13	1	13,319	3,481	9,838
TEBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,004	121,310	3	-	-	1	174	-	12,206	4,126	8,080
TEBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 9,931	131,019	1	-	-	1	41	-	13,160	3,539	9,621
TLBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 9,955	132,669	1	-	-	1	34	-	13,851	3,374	10,477
TLBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 9,990	132,515	1	-	-	1	23	-	13,746	3,435	10,311
TLBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 9,942	137,834	-	-	-	1	28	-	13,146	3,612	9,534

No Externalities/Carbon Cost Modeling Approach, Energy Efficiency +15 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO_2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,503	129,297	3	1	1	-	197	2	12,364	3,570	8,793
TEBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,548	128,484	3	1	1	-	69	-	14,739	3,030	11,709
TEBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,488	131,346	3	1	1	-	168	-	12,634	3,643	8,991
TLBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,538	132,736	3	1	1	-	140	1	13,061	3,526	9,534
TLBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,580	132,251	3	1	1	-	103	-	13,863	3,362	10,502
TLBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,538	134,799	3	1	1	-	247	-	12,124	3,964	8,160
TEBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,303	137,625	-	-	-	2	14	3	13,761	3,249	10,512
TEBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,405	128,080	3	-	-	2	71	-	12,488	4,050	8,438
TEBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,313	140,010	-	-	-	2	3	-	14,342	3,123	11,220
TLBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,383	138,916	1	-	-	2	5	1	13,838	3,344	10,494
TLBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,446	131,849	3	-	-	2	103	-	11,997	4,173	7,824
TLBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,365	143,900	-	-	-	2	4	-	13,804	3,284	10,520
TEBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,424	137,625	-	-	-	2	14	3	13,761	3,249	10,512
TEBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,490	128,484	3	1	1	-	69	-	14,739	3,030	11,709
TEBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,426	140,010	-	-	-	2	3	-	14,342	3,123	11,220
TLBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,479	132,736	3	1	1	-	140	1	13,061	3,526	9,534
TLBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,525	132,251	3	1	1	-	103	-	13,863	3,362	10,502
TLBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,472	143,900	-	-	-	2	4	-	13,804	3,284	10,520
TEBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,424	137,625	-	-	-	2	14	3	13,761	3,249	10,512
TEBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,490	128,484	3	1	1	-	69	-	14,739	3,030	11,709
TEBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,426	140,010	-	-	-	2	3	-	14,342	3,123	11,220
TLBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,479	132,736	3	1	1	-	140	1	13,061	3,526	9,534
TLBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,525	132,251	3	1	1	-	103	-	13,863	3,362	10,502
TLBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10,472	143,900	-	-	-	2	4	-	13,804	3,284	10,520
TEBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 11,046	130,724	1	-	-	2	51	3	13,387	3,063	10,324
TEBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 11,104	124,600	3	1	-	1	91	-	15,238	2,780	12,457
TEBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 11,063	127,332	3	1	-	1	207	-	13,251	3,264	9,987
TLBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 11,137	128,568	3	1	-	1	171	1	13,708	3,143	10,566
TLBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 11,185	128,469	3	1	-	1	128	-	14,597	2,925	11,672
TLBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 11,158	130,996	3	1	-	1	289	-	12,918	3,418	9,500

No Externalities/Carbon Cost Modeling Approach, Energy Efficiency +15 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO_2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 9,749	138,034	-	-	-	2	9	3	13,407	3,520	9,886
TEBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 9,847	128,577	3	1	-	1	54	-	13,789	3,912	9,877
TEBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 9,725	140,497	-	-	-	2	1	-	13,934	3,428	10,506
TLBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 9,767	142,153	-	-	-	2	0	1	14,641	3,207	11,434
TLBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 9,840	132,730	3	1	-	1	84	-	12,797	4,335	8,462
TLBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 9,726	144,800	-	-	-	2	3	-	13,217	3,717	9,500
TEBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 10,568	133,074	2	1	-	1	44	3	14,631	2,904	11,727
TEBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 10,599	127,725	3	1	-	1	70	-	14,871	3,112	11,759
TEBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 10,536	130,637	3	1	-	1	168	-	12,720	3,762	8,958
TLBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 10,593	131,502	3	2	-	1	151	1	13,578	3,570	10,009
TLBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 10,633	131,675	3	1	-	1	102	-	13,932	3,414	10,518
TLBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 10,588	134,244	3	1	-	1	245	-	12,154	4,042	8,112
TEBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 10,699	128,239	3	1	-	1	278	3	13,166	3,368	9,798
TEBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 10,711	127,484	3	1	-	1	67	-	15,551	2,800	12,751
TEBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 10,643	129,867	3	2	-	1	175	-	13,324	3,511	9,813
TLBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 10,704	131,325	3	2	-	1	149	1	14,028	3,348	10,680
TLBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 10,741	130,899	3	2	-	1	111	-	14,562	3,209	11,353
TLBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 10,695	133,474	3	2	-	1	261	-	12,753	3,850	8,903
TEBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 10,226	134,941	-	-	-	2	14	3	13,174	3,737	9,436
TEBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 10,370	131,652	1	-	-	2	2	-	15,115	3,507	11,607
TEBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 10,256	137,684	-	-	-	2	3	-	13,824	3,541	10,283
TLBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 10,322	139,245	-	-	-	2	0	1	14,598	3,281	11,317
TLBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 10,408	139,013	-	-	-	2	0	-	15,746	3,124	12,621
TLBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 10,309	142,096	-	-	-	2	4	-	13,369	3,669	9,700
TEBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 10,021	133,295	-	-	-	2	14	3	12,945	3,926	9,019
TEBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 10,193	130,114	1	-	-	2	2	-	14,852	3,719	11,133
TEBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 10,081	136,262	-	-	-	2	3	-	13,589	3,720	9,869
TLBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 10,145	137,967	-	-	-	2	0	1	14,370	3,444	10,926
TLBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 10,238	137,685	-	-	-	2	0	-	15,523	3,287	12,235
TLBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 10,145	140,905	-	-	-	2	4	-	13,176	3,818	9,359

No Externalities/Carbon Cost Modeling Approach, Energy Efficiency +15 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO_2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 10,424	137,625	-	-	-	2	14	3	13,761	3,249	10,512
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 10,559	136,508	-	-	-	2	1	-	17,155	2,576	14,579
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 10,426	140,010	-	-	-	2	3	-	14,342	3,123	11,220
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 10,495	141,311	-	-	-	2	0	1	15,083	2,887	12,196
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 10,574	140,840	-	-	-	2	0	-	16,279	2,702	13,578
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 10,472	143,900	-	-	-	2	4	-	13,804	3,284	10,520
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEH	$ 10,424	137,625	-	-	-	2	14	3	13,761	3,249	10,512
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEH	$ 10,559	136,508	-	-	-	2	1	-	17,155	2,576	14,579
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEH	$ 10,426	140,010	-	-	-	2	3	-	14,342	3,123	11,220
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEH	$ 10,495	141,311	-	-	-	2	0	1	15,083	2,887	12,196
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEH	$ 10,574	140,840	-	-	-	2	0	-	16,279	2,702	13,578
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEH	$ 10,472	143,900	-	-	-	2	4	-	13,804	3,284	10,520
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 10,319	126,986	4	1	1	-	320	2	11,568	3,920	7,648
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 10,362	125,690	4	1	1	-	208	-	13,603	3,481	10,122
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 10,315	128,470	4	1	1	-	411	-	11,664	4,056	7,608
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 10,364	129,814	4	1	1	-	378	1	12,133	3,917	8,215
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 10,407	129,301	4	1	1	-	302	-	12,904	3,755	9,149
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 10,373	134,799	3	1	1	-	247	-	12,124	3,964	8,160
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEH	$ 10,162	124,220	5	1	1	-	705	2	10,774	4,340	6,434
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEH	$ 10,199	123,385	5	1	1	-	429	-	12,849	3,838	9,011
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEH	$ 10,159	126,180	5	1	1	-	727	-	11,000	4,403	6,597
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEH	$ 10,210	127,480	5	1	1	-	716	1	11,511	4,233	7,278
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEH	$ 10,250	126,928	5	1	1	-	594	-	12,254	4,074	8,180
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEH	$ 10,225	129,489	5	1	1	-	985	-	10,768	4,612	6,156
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 10,424	137,625	-	-	-	2	14	3	13,761	3,249	10,512
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 10,494	128,484	3	1	1	-	69	-	14,739	3,030	11,709
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 10,426	140,010	-	-	-	2	3	-	14,342	3,123	11,220
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 10,484	132,736	3	1	1	-	140	1	13,061	3,526	9,534
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 10,529	132,251	3	1	1	-	103	-	13,863	3,362	10,502
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 10,472	143,900	-	-	-	2	4	-	13,804	3,284	10,520

No Externalities/Carbon Cost Modeling Approach, Energy Efficiency +15 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO_2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 10,424	137,625	-	-	-	2	14	3	13,761	3,249	10,512
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 10,499	128,484	3	1	1	-	69	-	14,739	3,030	11,709
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 10,426	140,010	-	-	-	2	3	-	14,342	3,123	11,220
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 10,488	132,736	3	1	1	-	140	1	13,061	3,526	9,534
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 10,534	132,251	3	1	1	-	103	-	13,863	3,362	10,502
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 10,472	143,900	-	-	-	2	4	-	13,804	3,284	10,520
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 10,424	137,625	-	-	-	2	14	3	13,761	3,249	10,512
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 10,485	128,484	3	1	1	-	69	-	14,739	3,030	11,709
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 10,425	131,346	3	1	1	-	168	-	12,634	3,643	8,991
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 10,475	132,736	3	1	1	-	140	1	13,061	3,526	9,534
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 10,520	132,251	3	1	1	-	103	-	13,863	3,362	10,502
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 10,472	143,900	-	-	-	2	4	-	13,804	3,284	10,520
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 10,417	132,303	2	2	-	1	66	3	13,342	3,599	9,743
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 10,480	128,484	3	1	1	-	69	-	14,739	3,030	11,709
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 10,416	130,250	3	2	-	1	182	-	12,372	4,056	8,316
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 10,468	131,571	3	2	-	1	154	1	13,212	3,807	9,404
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 10,512	131,173	3	2	-	1	115	-	13,679	3,718	9,961
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 10,471	133,705	3	2	-	1	266	-	11,957	4,312	7,645
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 10,551	136,077	1	-	-	2	33	3	11,443	4,629	6,815
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 10,632	128,766	3	1	-	1	55	-	13,374	4,274	9,100
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 10,554	138,422	1	-	-	2	7	-	11,994	4,499	7,495
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 10,616	133,065	3	1	-	1	117	1	11,576	4,912	6,664
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 10,667	132,679	3	1	-	1	86	-	12,472	4,634	7,839
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 10,608	144,670	-	-	-	2	3	-	12,758	4,102	8,656
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 10,307	137,143	-	-	1	1	20	3	16,410	1,560	14,850
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 10,365	127,077	3	1	1	-	91	-	16,462	1,925	14,537
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 10,306	139,463	-	-	1	1	5	-	16,887	1,511	15,375
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 10,363	131,078	3	1	1	-	174	1	14,921	2,249	12,672
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 10,403	130,644	3	1	1	-	129	-	15,671	2,131	13,540
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 10,352	143,062	-	-	1	1	6	-	16,270	1,692	14,578

No Externalities/Carbon Cost Modeling Approach, Energy Efficiency +15 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 65	(9,141)	3	1	1	(2)	56	(3)	978	(218)	1,196
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 2	2,385	-	-	-	-	(11)	(3)	581	(126)	707
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 55	(4,889)	3	1	1	(2)	126	(2)	(700)	278	(978)
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 100	(5,373)	3	1	1	(2)	90	(3)	102	113	(11)
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 48	6,276	-	-	-	-	(9)	(3)	43	36	8
TEBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 7	(2,651)	-	-	-	-	6	3	194	(55)	249
TEBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 75	(11,313)	3	-	1	(1)	51	-	(1,314)	513	(1,827)
TEBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 68	(1,159)	1	-	-	-	(1)	1	129	20	110
TLBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 121	(7,619)	3	-	1	(1)	55	-	(495)	332	(828)
TLBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 61	3,963	-	-	-	-	(2)	-	1,288	(357)	1,644
TEBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 38	(4,517)	-	2	-	-	7	1	851	(123)	974
TEBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 59	(8,969)	2	-	1	(1)	53	(1)	(342)	(18)	(324)
TEBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 62	(4,542)	2	-	1	(1)	81	-	(951)	140	(1,090)
TLBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 133	(6,314)	2	-	-	-	15	(2)	1,156	(10)	1,165
TLBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 63	(3,553)	2	-	-	-	81	(2)	(931)	560	(1,492)
TEBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 69	(7,524)	2	-	-	-	45	(3)	(88)	331	(418)
TEBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 6	2,148	-	-	-	-	(42)	(3)	993	(253)	1,246
TLBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 37	3,794	-	-	-	-	(48)	(2)	1,152	(305)	1,458
TLBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 80	(3,567)	2	-	-	-	111	(3)	(1,528)	754	(2,282)
TLBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 36	6,012	-	-	-	-	(14)	(3)	(301)	241	(542)
TEBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 7	(2,444)	-	-	-	-	(28)	1	160	(58)	218
TEBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 73	(9,710)	2	-	-	-	133	-	(953)	587	(1,541)
TEBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 24	1,650	-	-	-	-	(7)	-	691	(165)	856
TLBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 59	1,496	-	-	-	-	(18)	-	586	(104)	691
TLBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 11	6,815	(1)	-	-	-	(13)	-	(14)	73	(87)

No Externalities/Carbon Cost Modeling Approach, Energy Efficiency +15 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 15	(2,049)	-	-	-	-	29	2	(271)	(73)	(198)
TEBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 60	(2,862)	-	-	-	-	(99)	-	2,105	(613)	2,718
TEBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 50	1,390	-	-	-	-	(28)	1	427	(117)	544
TLBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 92	905	-	-	-	-	(65)	-	1,229	(281)	1,511
TLBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 50	3,453	-	-	-	-	79	-	(510)	321	(831)
TEBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 101	(9,545)	3	-	-	-	57	(3)	(1,273)	801	(2,074)
TEBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 10	2,385	-	-	-	-	(11)	(3)	581	(126)	707
TLBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 79	1,291	1	-	-	-	(8)	(2)	78	96	(18)
TLBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 142	(5,775)	3	-	-	-	89	(3)	(1,764)	925	(2,689)
TLBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 62	6,276	-	-	-	-	(9)	(3)	43	36	8
TEBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 65	(9,141)	3	1	1	(2)	56	(3)	978	(218)	1,196
TEBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 2	2,385	-	-	-	-	(11)	(3)	581	(126)	707
TLBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 55	(4,889)	3	1	1	(2)	126	(2)	(700)	278	(978)
TLBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 100	(5,373)	3	1	1	(2)	90	(3)	102	113	(11)
TLBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 48	6,276	-	-	-	-	(9)	(3)	43	36	8
TEBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 65	(9,141)	3	1	1	(2)	56	(3)	978	(218)	1,196
TEBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 2	2,385	-	-	-	-	(11)	(3)	581	(126)	707
TLBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 55	(4,889)	3	1	1	(2)	126	(2)	(700)	278	(978)
TLBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 100	(5,373)	3	1	1	(2)	90	(3)	102	113	(11)
TLBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 48	6,276	-	-	-	-	(9)	(3)	43	36	8
TEBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 58	(6,124)	2	1	-	(1)	41	(3)	1,851	(283)	2,134
TEBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 16	(3,392)	2	1	-	(1)	156	(3)	(136)	201	(337)
TLBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 91	(2,156)	2	1	-	(1)	121	(2)	322	80	242
TLBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 139	(2,255)	2	1	-	(1)	77	(3)	1,211	(138)	1,348
TLBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 111	272	2	1	-	(1)	239	(3)	(469)	355	(824)

No Externalities/Carbon Cost Modeling Approach, Energy Efficiency +15 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 24	(2,464)	-	-	-	-	8	3	(527)	93	(619)
TEBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 122	(11,920)	3	1	-	(1)	53	-	(145)	485	(629)
TEBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 43	1,656	-	-	-	-	(1)	1	707	(221)	928
TLBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 115	(7,768)	3	1	-	(1)	83	-	(1,137)	908	(2,044)
TLBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 1	4,302	-	-	-	-	3	-	(717)	289	(1,006)
TEBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 32	2,437	(1)	-	-	-	(124)	3	1,910	(858)	2,768
TEBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 63	(2,911)	-	-	-	-	(99)	-	2,151	(650)	2,800
TEBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 57	865	-	1	-	-	(17)	1	858	(192)	1,050
TLBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 98	1,038	-	-	-	-	(67)	-	1,212	(348)	1,559
TLBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 52	3,607	-	-	-	-	77	-	(566)	280	(847)
TEBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 55	(1,628)	-	(1)	-	-	102	3	(158)	(143)	(15)
TEBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 68	(2,382)	-	(1)	-	-	(108)	-	2,227	(711)	2,938
TEBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 61	1,459	-	-	-	-	(27)	1	704	(164)	867
TLBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 98	1,032	-	-	-	-	(65)	-	1,238	(302)	1,540
TLBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 51	3,607	-	-	-	-	85	-	(572)	339	(910)
TEBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 144	(3,289)	1	-	-	-	(12)	(3)	1,941	(230)	2,171
TEBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 29	2,743	-	-	-	-	(11)	(3)	650	(196)	846
TLBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 95	4,304	-	-	-	-	(14)	(2)	1,424	(456)	1,880
TLBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 182	4,072	-	-	-	-	(14)	(3)	2,572	(613)	3,185
TLBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 83	7,156	-	-	-	-	(10)	(3)	195	(68)	263
TEBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 172	(3,181)	1	-	-	-	(12)	(3)	1,907	(207)	2,114
TEBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 60	2,967	-	-	-	-	(11)	(3)	644	(206)	850
TLBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 123	4,672	-	-	-	-	(14)	(2)	1,425	(482)	1,907
TLBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 217	4,391	-	-	-	-	(14)	(3)	2,578	(639)	3,217
TLBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 124	7,610	-	-	-	-	(10)	(3)	231	(109)	340

No Externalities/Carbon Cost Modeling Approach, Energy Efficiency +15 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 135	(1,117)	-	-	-	-	(12)	(3)	3,394	(673)	4,066
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 2	2,385	-	-	-	-	(11)	(3)	581	(126)	707
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 71	3,686	-	-	-	-	(13)	(2)	1,322	(361)	1,684
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 150	3,215	-	-	-	-	(13)	(3)	2,518	(547)	3,065
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 48	6,276	-	-	-	-	(9)	(3)	43	36	8
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 135	(1,117)	-	-	-	-	(12)	(3)	3,394	(673)	4,066
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 2	2,385	-	-	-	-	(11)	(3)	581	(126)	707
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 71	3,686	-	-	-	-	(13)	(2)	1,322	(361)	1,684
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 150	3,215	-	-	-	-	(13)	(3)	2,518	(547)	3,065
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 48	6,276	-	-	-	-	(9)	(3)	43	36	8
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 4	(1,485)	-	-	-	-	(91)	2	(95)	(136)	41
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 47	(2,780)	-	-	-	-	(203)	-	1,940	(575)	2,515
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 49	1,344	-	-	-	-	(32)	1	469	(138)	607
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 92	831	-	-	-	-	(109)	-	1,241	(301)	1,542
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 58	6,328	(1)	-	-	-	(164)	-	461	(92)	552
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 3	(1,960)	-	-	-	-	(22)	2	(226)	(62)	(163)
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 40	(2,795)	-	-	-	-	(298)	-	1,849	(565)	2,414
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 51	1,301	-	-	-	-	(11)	1	511	(169)	681
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 90	748	-	-	-	-	(133)	-	1,254	(329)	1,583
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 66	3,309	-	-	-	-	258	-	(232)	210	(441)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 70	(9,141)	3	1	1	(2)	56	(3)	978	(218)	1,196
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 2	2,385	-	-	-	-	(11)	(3)	581	(126)	707
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 60	(4,889)	3	1	1	(2)	126	(2)	(700)	278	(978)
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 105	(5,373)	3	1	1	(2)	90	(3)	102	113	(11)
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 48	6,276	-	-	-	-	(9)	(3)	43	36	8

No Externalities/Carbon Cost Modeling Approach, Energy Efficiency +15 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 75	(9,141)	3	1	1	(2)	56	(3)	978	(218)	1,196
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 2	2,385	-	-	-	-	(11)	(3)	581	(126)	707
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 64	(4,889)	3	1	1	(2)	126	(2)	(700)	278	(978)
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 110	(5,373)	3	1	1	(2)	90	(3)	102	113	(11)
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 48	6,276	-	-	-	-	(9)	(3)	43	36	8
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 61	(9,141)	3	1	1	(2)	56	(3)	978	(218)	1,196
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 1	(6,279)	3	1	1	(2)	155	(3)	(1,127)	395	(1,521)
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 50	(4,889)	3	1	1	(2)	126	(2)	(700)	278	(978)
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 96	(5,373)	3	1	1	(2)	90	(3)	102	113	(11)
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 48	6,276	-	-	-	-	(9)	(3)	43	36	8
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 1	2,053	(1)	-	-	-	(116)	3	970	(457)	1,427
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 64	(1,766)	-	(1)	1	(1)	(113)	-	2,368	(1,025)	3,393
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 52	1,321	-	-	-	-	(28)	1	840	(249)	1,089
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 96	923	-	-	-	-	(67)	-	1,308	(338)	1,646
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 55	3,455	-	-	-	-	84	-	(414)	256	(670)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 81	(7,310)	2	1	-	(1)	22	(3)	1,931	(355)	2,285
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 3	2,345	-	-	-	-	(26)	(3)	550	(130)	680
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 65	(3,012)	2	1	-	(1)	83	(2)	133	283	(150)
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 115	(3,398)	2	1	-	(1)	52	(3)	1,029	5	1,024
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 57	8,593	(1)	-	-	-	(30)	(3)	1,314	(527)	1,841
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 1	(2,320)	-	-	-	-	15	3	(477)	48	(525)
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 59	(12,386)	3	1	-	(1)	86	-	(425)	413	(838)
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 57	(8,384)	3	1	-	(1)	169	1	(1,966)	738	(2,704)
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 97	(8,819)	3	1	-	(1)	124	-	(1,216)	619	(1,836)
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 46	3,600	-	-	-	-	1	-	(617)	181	(798)

No Externalities/Carbon Cost Modeling Approach, Energy Efficiency +30 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO_2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,412	133,482	2	-	1	-	26	2	14,128	2,813	11,315
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,472	127,826	3	-	1	-	82	-	14,347	3,136	11,210
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,416	134,526	2	1	-	1	34	-	13,770	3,489	10,281
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,465	131,944	3	-	1	-	162	1	13,027	3,557	9,470
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,508	131,637	3	-	1	-	122	-	13,495	3,463	10,031
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,471	134,073	3	-	1	-	282	-	11,812	4,066	7,745
TEBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,658	139,817	-	-	-	2	11	3	14,063	3,184	10,879
TEBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,714	130,129	3	2	-	1	68	-	13,893	3,618	10,276
TEBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,646	142,431	-	-	-	2	3	-	13,331	3,405	9,926
TLBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,713	134,157	3	2	-	1	114	1	12,805	3,942	8,863
TLBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,760	133,945	3	2	-	1	78	-	14,096	3,572	10,524
TLBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,701	146,325	-	-	-	2	2	-	14,570	3,036	11,534
TEBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,960	141,398	1	-	1	1	9	2	15,087	2,497	12,589
TEBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,996	134,715	3	-	1	1	74	1	13,077	3,416	9,661
TEBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,934	145,311	-	1	-	2	16	2	14,110	3,203	10,907
TLBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,001	138,785	3	1	1	1	112	2	12,374	3,668	8,705
TLBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,070	137,852	3	-	1	1	37	-	14,814	3,186	11,628
TLBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,006	140,482	3	-	1	1	112	-	12,774	3,760	9,014
TEBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,156	131,379	1	-	-	1	72	3	13,025	3,551	9,474
TEBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,232	123,772	3	-	-	1	132	-	12,997	3,867	9,130
TEBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,162	133,501	1	-	-	1	26	-	13,982	3,297	10,685
TLBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,192	135,171	1	-	-	1	19	1	14,680	3,088	11,593
TLBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,245	127,788	3	-	-	1	208	-	11,977	4,149	7,828
TLBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,196	137,908	1	-	-	1	37	-	13,469	3,551	9,918
TEBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 9,931	127,586	1	-	-	1	17	1	13,302	3,503	9,799
TEBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 9,998	120,697	3	-	1	-	206	-	12,156	3,939	8,217
TEBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 9,919	132,414	-	1	-	1	13	-	13,751	3,360	10,392
TLBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 9,945	131,373	1	1	-	1	46	-	13,067	3,641	9,426
TLBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 9,982	131,327	1	1	-	1	31	-	12,975	3,702	9,273
TLBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 9,930	136,571	-	1	-	1	36	-	12,332	3,909	8,424

No Externalities/Carbon Cost Modeling Approach, Energy Efficiency +30 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO_2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,481	133,482	2	-	1	-	26	2	14,128	2,813	11,315
TEBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,531	127,826	3	-	1	-	82	-	14,347	3,136	11,210
TEBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,476	130,644	3	-	1	-	193	-	12,279	3,744	8,534
TLBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,521	131,944	3	-	1	-	162	1	13,027	3,557	9,470
TLBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,564	131,637	3	-	1	-	122	-	13,495	3,463	10,031
TLBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,526	134,073	3	-	1	-	282	-	11,812	4,066	7,745
TEBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,335	134,601	1	-	-	2	46	3	14,024	3,306	10,717
TEBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,408	126,893	3	1	-	1	90	-	13,699	3,664	10,035
TEBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,341	136,870	1	-	-	2	14	-	14,560	3,210	11,350
TLBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,409	131,944	3	-	1	-	162	1	13,027	3,557	9,470
TLBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,452	131,637	3	-	1	-	122	-	13,495	3,463	10,031
TLBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,398	143,042	-	-	-	2	6	-	15,027	3,052	11,975
TEBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,412	133,482	2	-	1	-	26	2	14,128	2,813	11,315
TEBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,472	127,826	3	-	1	-	82	-	14,347	3,136	11,210
TEBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,416	134,526	2	1	-	1	34	-	13,770	3,489	10,281
TLBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,465	131,944	3	-	1	-	162	1	13,027	3,557	9,470
TLBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,508	131,637	3	-	1	-	122	-	13,495	3,463	10,031
TLBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,471	134,073	3	-	1	-	282	-	11,812	4,066	7,745
TEBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,412	133,482	2	-	1	-	26	2	14,128	2,813	11,315
TEBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,472	127,826	3	-	1	-	82	-	14,347	3,136	11,210
TEBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,416	134,526	2	1	-	1	34	-	13,770	3,489	10,281
TLBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,465	131,944	3	-	1	-	162	1	13,027	3,557	9,470
TLBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,508	131,637	3	-	1	-	122	-	13,495	3,463	10,031
TLBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 10,471	134,073	3	-	1	-	282	-	11,812	4,066	7,745
TEBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,034	123,573	3	1	-	1	373	3	12,167	3,634	8,533
TEBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,082	123,417	3	1	-	1	113	-	14,627	2,953	11,673
TEBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,046	126,148	3	1	-	1	243	-	12,682	3,431	9,250
TLBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,121	128,124	3	1	-	1	209	1	14,002	3,037	10,965
TLBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,165	127,723	3	1	-	1	158	-	14,477	2,961	11,517
TLBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$ 11,143	130,132	3	1	-	1	340	-	12,847	3,454	9,393

No Externalities/Carbon Cost Modeling Approach, Energy Efficiency +30 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO_2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$ 9,755	134,743	1	1	-	1	39	3	13,803	3,595	10,208
TEBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$ 9,834	127,527	3	1	-	1	70	-	13,145	4,110	9,036
TEBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$ 9,727	137,214	1	1	-	1	9	-	14,332	3,523	10,810
TLBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$ 9,777	138,982	1	-	-	1	6	1	15,330	3,204	12,126
TLBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$ 9,829	132,522	3	-	1	-	101	-	12,780	4,084	8,696
TLBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$ 9,746	141,634	1	1	-	1	13	-	14,172	3,697	10,475
TEBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$ 10,548	131,965	2	1	-	1	55	3	13,883	3,139	10,744
TEBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$ 10,579	126,663	3	1	-	1	87	-	14,222	3,307	10,914
TEBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$ 10,521	129,545	3	1	-	1	200	-	12,120	3,948	8,173
TLBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$ 10,574	130,949	3	1	-	1	169	1	13,249	3,644	9,606
TLBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$ 10,614	130,610	3	1	-	1	127	-	13,740	3,516	10,224
TLBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$ 10,573	133,072	3	1	-	1	289	-	12,019	4,146	7,873
TEBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$ 10,679	128,030	3	-	1	-	209	2	14,101	2,982	11,120
TEBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$ 10,689	126,413	3	1	-	1	84	-	14,885	2,985	11,900
TEBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$ 10,628	129,184	3	1	-	1	201	-	12,926	3,600	9,325
TLBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$ 10,684	130,768	3	1	-	1	166	1	13,693	3,418	10,275
TLBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$ 10,720	130,415	3	1	-	1	125	-	14,226	3,276	10,950
TLBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$ 10,677	132,903	3	1	-	1	287	-	12,463	3,923	8,541
TEBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$ 10,267	134,880	-	-	-	2	16	3	15,035	3,225	11,810
TEBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$ 10,364	124,846	3	1	-	1	91	-	13,277	4,031	9,247
TEBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$ 10,296	137,618	-	-	-	2	3	-	15,675	3,030	12,645
TLBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$ 10,360	132,404	3	-	1	-	166	1	12,321	4,013	8,308
TLBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$ 10,407	132,116	3	-	1	-	125	-	12,756	3,932	8,824
TLBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$ 10,347	141,691	-	-	-	2	6	-	14,680	3,332	11,348
TEBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$ 10,083	133,812	-	-	-	2	17	3	14,825	3,374	11,451
TEBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$ 10,239	130,809	1	-	-	2	2	-	16,451	3,138	13,313
TEBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$ 10,142	136,782	-	-	-	2	3	-	15,464	3,170	12,294
TLBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$ 10,215	135,719	1	-	-	2	7	1	14,826	3,405	11,421
TLBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$ 10,285	137,971	-	-	-	2	0	-	16,796	2,932	13,864
TLBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$ 10,198	140,928	-	-	-	2	6	-	14,499	3,451	11,048

No Externalities/Carbon Cost Modeling Approach, Energy Efficiency +30 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO_2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 10,442	136,578	-	1	-	1	16	3	15,800	2,809	12,992
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 10,550	133,342	1	1	-	1	2	-	17,441	2,525	14,916
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 10,442	139,035	-	1	-	1	3	-	16,447	2,656	13,791
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 10,522	137,885	1	1	-	1	7	1	16,257	2,731	13,526
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 10,589	137,529	1	1	-	1	4	-	16,844	2,704	14,141
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 10,495	142,842	-	1	-	1	6	-	16,047	2,820	13,227
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEHH	$ 10,442	136,578	-	1	-	1	16	3	15,800	2,809	12,992
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEHH	$ 10,567	135,573	-	1	-	1	1	-	19,236	2,086	17,150
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEHH	$ 10,442	139,035	-	1	-	1	3	-	16,447	2,656	13,791
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEHH	$ 10,525	140,589	-	-	-	1	0	1	17,466	2,338	15,128
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEHH	$ 10,591	140,240	-	-	-	1	0	-	18,043	2,312	15,730
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEHH	$ 10,495	142,842	-	1	-	1	6	-	16,047	2,820	13,227
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 10,304	126,413	4	-	1	-	352	2	11,305	4,005	7,299
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 10,348	125,018	4	-	1	-	237	-	13,244	3,591	9,654
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 10,306	128,290	4	-	1	-	365	-	11,499	4,084	7,415
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 10,352	129,035	4	-	1	-	422	1	12,088	3,961	8,128
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 10,394	128,671	4	-	1	-	342	-	12,567	3,859	8,708
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 10,361	134,073	3	-	1	-	282	-	11,812	4,066	7,745
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEHH	$ 10,151	123,649	5	-	1	-	761	2	10,530	4,423	6,107
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEHH	$ 10,188	122,708	5	-	1	-	480	-	12,509	3,943	8,566
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEHH	$ 10,154	125,486	5	-	1	-	804	-	10,703	4,510	6,193
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEHH	$ 10,200	126,718	5	-	1	-	785	1	11,456	4,285	7,171
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEHH	$ 10,240	126,296	5	-	1	-	659	-	11,940	4,178	7,761
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEHH	$ 10,220	128,776	5	-	1	-	1,080	-	10,501	4,707	5,794
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$ 10,412	133,482	2	-	1	-	26	2	14,128	2,813	11,315
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$ 10,472	127,826	3	-	1	-	82	-	14,347	3,136	11,210
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$ 10,417	130,644	3	-	1	-	193	-	12,279	3,744	8,534
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$ 10,465	131,944	3	-	1	-	162	1	13,027	3,557	9,470
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$ 10,508	131,637	3	-	1	-	122	-	13,495	3,463	10,031
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$ 10,471	134,073	3	-	1	-	282	-	11,812	4,066	7,745

No Externalities/Carbon Cost Modeling Approach, Energy Efficiency +30 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO_2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$ 10,412	133,482	2	-	1	-	26	2	14,128	2,813	11,315
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$ 10,472	127,826	3	-	1	-	82	-	14,347	3,136	11,210
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$ 10,417	130,644	3	-	1	-	193	-	12,279	3,744	8,534
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$ 10,465	131,944	3	-	1	-	162	1	13,027	3,557	9,470
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$ 10,508	131,637	3	-	1	-	122	-	13,495	3,463	10,031
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$ 10,471	134,073	3	-	1	-	282	-	11,812	4,066	7,745
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$ 10,412	133,482	2	-	1	-	26	2	14,128	2,813	11,315
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$ 10,470	126,893	3	1	-	1	90	-	13,699	3,664	10,035
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$ 10,411	134,526	2	1	-	1	34	-	13,770	3,489	10,281
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$ 10,465	131,944	3	-	1	-	162	1	13,027	3,557	9,470
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$ 10,508	131,637	3	-	1	-	122	-	13,495	3,463	10,031
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$ 10,471	134,073	3	-	1	-	282	-	11,812	4,066	7,745
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$ 10,408	132,245	2	1	-	1	57	3	13,208	3,599	9,609
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$ 10,465	126,893	3	1	-	1	90	-	13,699	3,664	10,035
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$ 10,407	134,526	2	1	-	1	34	-	13,770	3,489	10,281
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$ 10,461	131,020	3	1	-	1	171	1	12,880	3,884	8,996
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$ 10,504	130,712	3	1	-	1	129	-	13,348	3,790	9,558
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$ 10,467	133,142	3	1	-	1	292	-	11,665	4,393	7,272
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$ 10,545	129,873	3	-	1	-	190	2	10,593	4,724	5,868
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$ 10,609	127,730	3	1	-	1	72	-	12,743	4,485	8,258
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$ 10,543	130,701	3	1	-	1	171	-	10,666	5,175	5,491
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$ 10,601	132,035	3	1	-	1	144	1	11,900	4,772	7,128
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$ 10,648	131,713	3	1	-	1	109	-	12,362	4,666	7,696
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$ 10,600	134,246	3	1	-	1	256	-	10,636	5,361	5,274
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$ 10,289	132,049	2	-	1	-	36	2	16,091	1,623	14,468
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$ 10,351	126,390	3	-	1	-	105	-	16,080	2,007	14,074
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$ 10,293	135,372	1	1	-	1	20	-	16,480	2,002	14,479
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$ 10,350	130,308	3	-	1	-	199	1	14,830	2,319	12,510
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$ 10,390	129,989	3	-	1	-	150	-	15,316	2,213	13,103
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$ 10,349	139,825	1	-	1	-	39	-	16,553	1,801	14,751

No Externalities/Carbon Cost Modeling Approach, Energy Efficiency +30 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 60	(5,656)	1	-	-	-	55	(2)	218	323	(105)
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 4	1,044	-	1	(1)	1	8	(2)	(358)	676	(1,034)
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 53	(1,538)	1	-	-	-	136	(1)	(1,101)	744	(1,845)
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 96	(1,845)	1	-	-	-	95	(2)	(634)	650	(1,284)
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 59	591	1	-	-	-	256	(2)	(2,317)	1,253	(3,570)
TEBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 12	(2,614)	-	-	-	-	8	3	732	(221)	953
TEBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 69	(12,303)	3	2	-	(1)	65	-	562	213	349
TEBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 67	(8,274)	3	2	-	(1)	111	1	(526)	537	(1,063)
TLBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 115	(8,487)	3	2	-	(1)	75	-	765	168	597
TLBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 55	3,894	-	-	-	-	(1)	-	1,239	(369)	1,607
TEBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 26	(3,914)	1	(1)	1	(1)	(7)	-	977	(705)	1,682
TEBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 62	(10,596)	3	(1)	1	(1)	58	(1)	(1,033)	213	(1,246)
TEBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 67	(6,526)	3	-	1	(1)	96	-	(1,736)	466	(2,202)
TLBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 137	(7,459)	3	(1)	1	(1)	21	(2)	704	(17)	721
TLBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 72	(4,829)	3	(1)	1	(1)	96	(2)	(1,336)	558	(1,894)
TEBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 76	(7,607)	2	-	-	-	61	(3)	(29)	316	(345)
TEBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 6	2,122	-	-	-	-	(45)	(3)	957	(254)	1,210
TLBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 36	3,792	-	-	-	-	(52)	(2)	1,655	(463)	2,118
TLBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 89	(3,591)	2	-	-	-	136	(3)	(1,048)	598	(1,646)
TLBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 40	6,528	-	-	-	-	(35)	(3)	443	(0)	443
TEBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 12	(4,828)	1	(1)	-	-	4	1	(450)	143	(593)
TEBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 79	(11,717)	3	(1)	1	(1)	193	-	(1,595)	579	(2,175)
TEBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 25	(1,042)	1	-	-	-	33	-	(684)	282	(966)
TLBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 62	(1,087)	1	-	-	-	18	-	(776)	342	(1,118)
TLBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 11	4,157	-	-	-	-	23	-	(1,419)	549	(1,968)

No Externalities/Carbon Cost Modeling Approach, Energy Efficiency +30 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 5	2,838	(1)	-	-	-	(167)	2	1,850	(931)	2,781
TEBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 55	(2,819)	-	-	-	-	(111)	-	2,068	(608)	2,676
TEBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 45	1,299	-	-	-	-	(31)	1	748	(187)	935
TLBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 88	993	-	-	-	-	(71)	-	1,216	(281)	1,497
TLBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 51	3,428	-	-	-	-	89	-	(467)	322	(789)
TEBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 73	(7,708)	2	1	-	(1)	44	(3)	(325)	358	(683)
TEBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 6	2,270	-	-	-	-	(33)	(3)	536	(96)	632
TLBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 74	(2,657)	2	-	1	(2)	116	(2)	(997)	251	(1,248)
TLBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 117	(2,964)	2	-	1	(2)	76	(3)	(529)	157	(686)
TLBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 63	8,441	(1)	-	-	-	(41)	(3)	1,003	(254)	1,257
TEBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 60	(5,656)	1	-	-	-	55	(2)	218	323	(105)
TEBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 4	1,044	-	1	(1)	1	8	(2)	(358)	676	(1,034)
TLBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 53	(1,538)	1	-	-	-	136	(1)	(1,101)	744	(1,845)
TLBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 96	(1,845)	1	-	-	-	95	(2)	(634)	650	(1,284)
TLBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 59	591	1	-	-	-	256	(2)	(2,317)	1,253	(3,570)
TEBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 60	(5,656)	1	-	-	-	55	(2)	218	323	(105)
TEBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 4	1,044	-	1	(1)	1	8	(2)	(358)	676	(1,034)
TLBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 53	(1,538)	1	-	-	-	136	(1)	(1,101)	744	(1,845)
TLBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 96	(1,845)	1	-	-	-	95	(2)	(634)	650	(1,284)
TLBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 59	591	1	-	-	-	256	(2)	(2,317)	1,253	(3,570)
TEBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$ 48	(156)	-	-	-	-	(260)	(3)	2,460	(680)	3,140
TEBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$ 12	2,576	-	-	-	-	(130)	(3)	515	(202)	717
TLBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$ 87	4,552	-	-	-	-	(164)	(2)	1,835	(597)	2,432
TLBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$ 131	4,151	-	-	-	-	(215)	(3)	2,310	(673)	2,984
TLBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$ 108	6,559	-	-	-	-	(33)	(3)	680	(180)	859

No Externalities/Carbon Cost Modeling Approach, Energy Efficiency +30 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$ 29	(2,471)	-	-	-	-	30	3	(530)	73	(602)
TEBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$ 108	(9,687)	2	-	-	-	60	-	(1,187)	587	(1,774)
TEBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$ 50	1,768	-	(1)	-	-	(4)	1	998	(318)	1,316
TLBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$ 102	(4,693)	2	(1)	1	(1)	92	-	(1,553)	561	(2,114)
TLBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$ 19	4,420	-	-	-	-	4	-	(160)	174	(334)
TEBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$ 27	2,419	(1)	-	-	-	(145)	3	1,763	(809)	2,571
TEBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$ 58	(2,883)	-	-	-	-	(112)	-	2,101	(641)	2,742
TEBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$ 52	1,404	-	-	-	-	(31)	1	1,129	(304)	1,433
TLBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$ 93	1,065	-	-	-	-	(73)	-	1,619	(431)	2,051
TLBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$ 52	3,527	-	-	-	-	89	-	(102)	198	(300)
TEBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$ 51	(1,155)	-	(1)	1	(1)	8	2	1,176	(619)	1,795
TEBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$ 61	(2,772)	-	-	-	-	(116)	-	1,960	(615)	2,575
TEBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$ 56	1,584	-	-	-	-	(34)	1	768	(182)	950
TLBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$ 92	1,231	-	-	-	-	(76)	-	1,301	(325)	1,625
TLBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$ 48	3,719	-	-	-	-	86	-	(462)	322	(785)
TEBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$ 97	(10,033)	3	1	-	(1)	75	(3)	(1,757)	806	(2,564)
TEBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$ 29	2,738	-	-	-	-	(13)	(3)	640	(195)	835
TLBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$ 92	(2,476)	3	-	1	(2)	150	(2)	(2,714)	788	(3,502)
TLBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$ 140	(2,764)	3	-	1	(2)	109	(3)	(2,279)	707	(2,986)
TLBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$ 79	6,811	-	-	-	-	(11)	(3)	(355)	107	(462)
TEBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$ 156	(3,003)	1	-	-	-	(14)	(3)	1,626	(236)	1,862
TEBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$ 59	2,970	-	-	-	-	(14)	(3)	639	(205)	843
TLBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$ 132	1,907	1	-	-	-	(9)	(2)	1	31	(30)
TLBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$ 203	4,160	-	-	-	-	(17)	(3)	1,971	(443)	2,413
TLBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$ 115	7,117	-	-	-	-	(11)	(3)	(327)	76	(403)

No Externalities/Carbon Cost Modeling Approach, Energy Efficiency +30 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 109	(3,235)	1	-	-	-	(14)	(3)	1,640	(284)	1,924
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 0	2,457	-	-	-	-	(13)	(3)	647	(153)	800
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 80	1,307	1	-	-	-	(9)	(2)	456	(78)	534
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 147	952	1	-	-	-	(12)	(3)	1,044	(105)	1,149
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 53	6,264	-	-	-	-	(11)	(3)	247	11	236
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 125	(1,005)	-	-	-	-	(15)	(3)	3,435	(723)	4,158
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 0	2,457	-	-	-	-	(13)	(3)	647	(153)	800
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 83	4,011	-	(1)	-	-	(16)	(2)	1,665	(471)	2,136
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 149	3,662	-	(1)	-	-	(16)	(3)	2,242	(497)	2,739
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 53	6,264	-	-	-	-	(11)	(3)	247	11	236
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 44	(1,395)	-	-	-	-	(115)	(2)	1,939	(415)	2,354
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 2	1,877	-	-	-	-	13	(2)	195	79	116
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 48	2,622	-	-	-	-	70	(1)	784	(45)	828
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 90	2,258	-	-	-	-	(10)	(2)	1,262	(147)	1,408
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 57	7,660	(1)	-	-	-	(70)	(2)	507	61	446
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 38	(941)	-	-	-	-	(282)	(2)	1,980	(480)	2,459
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 3	1,837	-	-	-	-	43	(2)	173	88	85
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 49	3,069	-	-	-	-	23	(1)	926	(138)	1,064
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 89	2,647	-	-	-	-	(102)	(2)	1,410	(244)	1,654
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 69	5,127	-	-	-	-	319	(2)	(29)	284	(313)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$ 60	(5,656)	1	-	-	-	55	(2)	218	323	(105)
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$ 5	(2,838)	1	-	-	-	167	(2)	(1,850)	931	(2,781)
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$ 53	(1,538)	1	-	-	-	136	(1)	(1,101)	744	(1,845)
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$ 96	(1,845)	1	-	-	-	95	(2)	(634)	650	(1,284)
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$ 59	591	1	-	-	-	256	(2)	(2,317)	1,253	(3,570)

No Externalities/Carbon Cost Modeling Approach, Energy Efficiency +30 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$ 60	(5,656)	1	-	-	-	55	(2)	218	323	(105)
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$ 5	(2,838)	1	-	-	-	167	(2)	(1,850)	931	(2,781)
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$ 53	(1,538)	1	-	-	-	136	(1)	(1,101)	744	(1,845)
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$ 96	(1,845)	1	-	-	-	95	(2)	(634)	650	(1,284)
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$ 59	591	1	-	-	-	256	(2)	(2,317)	1,253	(3,570)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$ 0	(1,044)	-	(1)	1	(1)	(8)	2	358	(676)	1,034
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$ 58	(7,633)	1	-	-	-	56	-	(71)	176	(247)
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$ 53	(2,583)	1	(1)	1	(1)	128	1	(743)	69	(812)
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$ 97	(2,889)	1	(1)	1	(1)	88	-	(276)	(25)	(250)
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$ 59	(454)	1	(1)	1	(1)	248	-	(1,959)	578	(2,536)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$ 2	(2,281)	-	-	-	-	23	3	(563)	110	(673)
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$ 58	(7,633)	1	-	-	-	56	-	(71)	176	(247)
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$ 54	(3,506)	1	-	-	-	137	1	(890)	395	(1,285)
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$ 97	(3,814)	1	-	-	-	95	-	(422)	301	(723)
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$ 60	(1,384)	1	-	-	-	258	-	(2,105)	904	(3,009)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$ 2	(828)	-	(1)	1	(1)	19	2	(74)	(451)	377
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$ 67	(2,971)	-	-	-	-	(100)	-	2,077	(690)	2,767
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$ 58	1,333	-	-	-	-	(27)	1	1,234	(403)	1,637
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$ 105	1,012	-	-	-	-	(62)	-	1,696	(509)	2,205
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$ 57	3,544	-	-	-	-	85	-	(30)	186	(217)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$ 62	(5,659)	1	-	-	-	69	(2)	(11)	384	(395)
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$ 4	3,323	(1)	1	(1)	1	(17)	(2)	389	379	10
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$ 61	(1,741)	1	-	-	-	163	(1)	(1,262)	697	(1,958)
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$ 101	(2,060)	1	-	-	-	113	(2)	(775)	590	(1,365)
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$ 60	7,776	(1)	-	-	-	3	(2)	461	178	283

Societal Discount Modeling Approach, Energy Efficiency +11 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 20,053	120,546	4	2	-	1	578	3	12,783	3,273	9,509
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 20,086	118,071	5	2	-	1	572	-	14,242	3,002	11,240
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 20,067	122,839	4	2	-	1	550	-	13,259	3,101	10,158
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 20,198	124,433	4	1	-	1	483	1	13,980	2,858	11,122
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 20,251	124,329	4	2	-	1	429	-	15,034	2,609	12,424
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 20,249	126,764	4	2	-	1	764	-	13,559	3,019	10,539
TEBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 20,540	122,521	4	-	-	2	521	3	11,644	3,609	8,035
TEBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 20,561	120,626	5	3	-	1	425	-	14,478	2,928	11,550
TEBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 20,553	124,143	4	1	-	2	372	-	11,650	3,596	8,054
TLBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 20,639	125,937	4	1	-	2	327	1	12,810	3,188	9,623
TLBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 20,710	125,064	5	3	-	1	569	-	14,973	2,720	12,252
TLBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 20,700	129,211	4	1	-	2	511	-	12,849	3,147	9,701
TEBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 21,049	124,507	4	2	-	2	442	3	12,689	3,382	9,307
TEBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 21,071	123,377	5	-	-	2	401	2	13,506	3,141	10,365
TEBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 21,066	126,520	4	2	-	2	301	-	12,781	3,318	9,464
TLBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 21,160	129,940	4	-	-	2	440	3	13,780	2,910	10,870
TLBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 21,237	128,172	5	-	-	2	332	-	15,627	2,534	13,092
TLBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 21,201	132,995	4	-	-	2	343	-	14,601	2,635	11,967
TEBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 19,557	118,141	4	-	-	1	656	3	12,114	3,411	8,703
TEBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 19,608	117,853	4	-	-	1	389	-	14,602	2,777	11,825
TEBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 19,589	120,470	4	-	-	1	705	-	12,803	3,183	9,620
TLBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 19,657	122,202	4	-	-	1	697	1	13,131	3,052	10,079
TLBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 19,703	121,732	4	-	-	1	570	-	13,623	2,938	10,685
TLBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 19,721	124,621	4	-	-	1	832	-	12,385	3,299	9,086
TEBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 19,108	116,392	3	-	-	1	312	1	12,567	3,241	9,325
TEBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 19,173	114,280	4	-	-	1	562	-	13,406	3,130	10,276
TEBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 19,163	119,580	3	-	-	1	483	-	12,587	3,170	9,417
TLBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 19,222	121,789	3	-	-	1	479	-	13,211	2,966	10,245
TLBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 19,262	118,731	4	-	-	1	826	-	12,295	3,344	8,951
TLBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 19,285	123,773	3	-	-	1	736	-	11,866	3,389	8,477

Societal Discount Modeling Approach, Energy Efficiency +11 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 20,197	120,546	4	2	-	1	578	3	12,783	3,273	9,509
TEBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 20,221	118,071	5	2	-	1	572	-	14,242	3,002	11,240
TEBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 20,202	122,839	4	2	-	1	550	-	13,259	3,101	10,158
TLBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 20,325	124,778	4	2	-	1	530	1	14,529	2,699	11,830
TLBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 20,376	124,329	4	2	-	1	429	-	15,034	2,609	12,424
TLBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 20,373	126,764	4	2	-	1	764	-	13,559	3,019	10,539
TEBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 19,850	122,273	3	-	-	2	353	3	12,065	3,359	8,706
TEBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 19,887	119,033	4	-	-	2	263	-	13,111	3,203	9,908
TEBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 19,876	124,369	3	-	-	2	229	-	12,223	3,297	8,926
TLBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 20,014	123,518	4	-	-	2	467	1	12,640	3,215	9,425
TLBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 20,073	123,410	4	-	-	2	380	-	13,525	2,999	10,526
TLBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 20,062	128,683	3	-	-	2	335	-	12,750	3,090	9,660
TEBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 21,613	116,287	5	2	-	1	1,157	3	13,238	2,874	10,364
TEBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 21,626	116,251	5	2	-	1	629	-	15,659	2,214	13,445
TEBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 21,656	118,924	5	2	-	1	996	-	13,987	2,567	11,420
TLBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 21,807	120,505	5	1	-	1	919	1	14,758	2,293	12,465
TLBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 21,843	120,357	5	2	-	1	873	-	15,839	2,069	13,770
TLBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 21,889	122,879	5	2	-	1	1,340	-	14,414	2,437	11,977
TEBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 18,413	125,323	3	2	-	1	358	3	12,144	3,872	8,273
TEBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 18,478	125,296	3	2	-	1	89	-	14,739	3,149	11,589
TEBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 18,402	127,992	3	2	-	1	203	-	12,722	3,647	9,075
TLBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 18,512	129,698	3	1	-	1	162	1	13,364	3,427	9,937
TLBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 18,581	129,452	3	2	-	1	129	-	14,478	3,164	11,314
TLBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 18,528	132,423	3	1	-	1	271	-	12,984	3,587	9,396
TEBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ 20,961	115,977	5	2	-	1	1,148	3	13,318	2,763	10,554
TEBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ 20,990	115,958	5	2	-	1	622	-	15,701	2,098	13,602
TEBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ 21,014	118,647	5	2	-	1	987	-	14,045	2,457	11,588
TLBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ 21,176	120,252	5	1	-	1	907	1	14,833	2,211	12,622
TLBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ 21,223	120,090	5	2	-	1	861	-	15,919	1,981	13,938
TLBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ 21,259	124,636	4	2	-	1	852	-	15,298	2,010	13,288

Societal Discount Modeling Approach, Energy Efficiency +11 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ 19,108	123,141	4	2	-	1	520	3	11,442	4,164	7,279
TEBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ 19,135	122,676	4	2	-	1	255	-	13,692	3,531	10,161
TEBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ 19,086	125,312	4	2	-	1	481	-	11,828	4,015	7,813
TLBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ 19,178	127,087	4	2	-	1	451	1	13,031	3,629	9,402
TLBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ 19,232	126,703	4	2	-	1	365	-	13,535	3,527	10,008
TLBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ 19,201	132,025	3	2	-	1	298	-	12,810	3,701	9,108
TEBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ 20,339	121,362	4	2	-	1	628	3	13,281	3,003	10,278
TEBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ 20,335	118,768	5	2	-	1	622	-	14,697	2,760	11,937
TEBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ 20,318	123,484	4	2	-	1	587	-	13,666	2,893	10,773
TLBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ 20,446	125,269	4	2	-	1	553	1	14,841	2,545	12,296
TLBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ 20,490	122,621	5	2	-	1	815	-	14,641	2,714	11,927
TLBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ 20,486	127,245	4	2	-	1	788	-	13,865	2,865	11,000
TEBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ 20,537	121,343	5	2	1	-	955	2	14,457	2,642	11,815
TEBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ 20,530	120,464	5	2	-	1	623	-	15,239	2,485	12,754
TEBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ 20,512	123,093	5	2	-	1	983	-	13,444	2,904	10,540
TLBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ 20,630	124,980	5	1	1	-	906	1	15,168	2,467	12,701
TLBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ 20,665	124,608	5	1	1	-	748	-	15,789	2,317	13,472
TLBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ 20,666	127,078	5	1	1	-	1,184	-	14,276	2,760	11,516
TEBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ 19,698	121,149	3	-	-	2	344	3	11,488	3,720	7,768
TEBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ 19,766	120,635	3	-	-	2	91	-	13,445	3,241	10,205
TEBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ 19,751	123,327	3	-	-	2	216	-	11,669	3,649	8,020
TLBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ 19,888	125,416	3	-	-	2	187	1	12,965	3,206	9,759
TLBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ 19,957	125,315	3	-	-	2	143	-	13,905	2,990	10,916
TLBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ 19,945	127,900	3	-	-	2	328	-	12,306	3,376	8,930
TEBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ 19,308	121,117	3	-	-	2	337	3	11,056	3,977	7,079
TEBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ 19,393	120,458	3	-	-	2	86	-	13,014	3,474	9,539
TEBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ 19,393	123,263	3	-	-	2	208	-	11,240	3,904	7,336
TLBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ 19,538	125,316	3	-	-	2	180	1	12,585	3,434	9,152
TLBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ 19,611	125,079	3	-	-	2	138	-	13,529	3,193	10,335
TLBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ 19,612	127,780	3	-	-	2	322	-	11,946	3,585	8,361

Societal Discount Modeling Approach, Energy Efficiency +11 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 20,256	129,417	1	-	-	2	65	3	14,776	2,415	12,360
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 20,333	123,077	3	2	-	1	109	-	16,117	2,368	13,750
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 20,288	131,734	1	-	-	2	22	-	14,877	2,401	12,476
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 20,425	127,243	3	1	-	1	204	1	14,938	2,521	12,416
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 20,486	127,234	3	2	-	1	170	-	16,047	2,285	13,762
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 20,462	129,595	3	2	-	1	366	-	14,463	2,678	11,785
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEM	$ 20,275	132,264	-	-	-	2	28	3	15,983	2,071	13,913
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEM	$ 20,424	131,801	-	-	-	2	2	-	18,375	1,757	16,617
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEM	$ 20,308	134,655	-	-	-	2	7	-	16,056	2,059	13,997
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEM	$ 20,479	136,498	-	-	-	2	3	1	17,488	1,683	15,805
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEM	$ 20,592	136,578	-	-	-	2	2	-	18,552	1,583	16,968
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEM	$ 20,486	139,232	-	-	-	2	14	-	16,452	1,863	14,589
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 19,764	118,065	5	2	-	1	1,097	3	11,929	3,652	8,277
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 19,784	118,071	5	2	-	1	572	-	14,242	3,002	11,240
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 19,778	120,728	5	2	-	1	922	-	12,552	3,402	9,150
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 19,907	122,304	5	1	-	1	850	1	13,300	3,152	10,148
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 19,953	122,112	5	2	-	1	780	-	14,298	2,906	11,393
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 19,965	124,630	5	2	-	1	1,228	-	12,867	3,315	9,552
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEM	$ 19,461	118,065	5	2	-	1	1,097	3	11,929	3,652	8,277
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEM	$ 19,482	118,071	5	2	-	1	572	-	14,242	3,002	11,240
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEM	$ 19,476	120,728	5	2	-	1	922	-	12,552	3,402	9,150
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEM	$ 19,605	122,304	5	1	-	1	850	1	13,300	3,152	10,148
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEM	$ 19,651	122,112	5	2	-	1	780	-	14,298	2,906	11,393
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEM	$ 19,663	124,630	5	2	-	1	1,228	-	12,867	3,315	9,552
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ 20,078	120,546	4	2	-	1	578	3	12,783	3,273	9,509
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ 20,107	118,071	5	2	-	1	572	-	14,242	3,002	11,240
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ 20,088	122,839	4	2	-	1	550	-	13,259	3,101	10,158
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ 20,208	124,433	4	1	-	1	483	1	13,980	2,858	11,122
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ 20,268	122,572	5	1	-	1	726	-	14,488	2,828	11,660
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ 20,265	127,234	4	1	-	1	721	-	13,747	2,940	10,807

Societal Discount Modeling Approach, Energy Efficiency +11 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ 20,094	121,745	4	-	-	1	488	3	12,799	3,129	9,669
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ 20,124	118,580	5	-	-	1	508	-	13,734	3,027	10,707
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ 20,109	122,839	4	2	-	1	550	-	13,259	3,101	10,158
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ 20,218	124,433	4	1	-	1	483	1	13,980	2,858	11,122
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ 20,277	122,572	5	1	-	1	726	-	14,488	2,828	11,660
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ 20,274	127,234	4	1	-	1	721	-	13,747	2,940	10,807
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ 20,028	120,546	4	2	-	1	578	3	12,783	3,273	9,509
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ 20,065	118,071	5	2	-	1	572	-	14,242	3,002	11,240
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ 20,047	122,839	4	2	-	1	550	-	13,259	3,101	10,158
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ 20,180	124,778	4	2	-	1	530	1	14,529	2,699	11,830
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ 20,231	124,329	4	2	-	1	429	-	15,034	2,609	12,424
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ 20,228	126,764	4	2	-	1	764	-	13,559	3,019	10,539
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ 20,001	118,225	4	5	-	1	823	2	12,378	3,567	8,811
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ 20,040	118,195	4	6	-	1	575	-	14,451	3,041	11,410
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ 20,026	122,839	4	2	-	1	550	-	13,259	3,101	10,158
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ 20,143	122,756	4	6	-	1	935	1	13,936	3,034	10,902
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ 20,206	122,249	4	6	-	1	787	-	14,459	2,919	11,540
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ 20,207	126,764	4	2	-	1	764	-	13,559	3,019	10,539
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ 20,351	119,690	5	2	-	1	956	3	10,066	5,038	5,028
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ 20,401	119,682	5	2	-	1	471	-	12,395	4,276	8,119
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ 20,373	122,462	5	2	-	1	782	-	10,618	4,783	5,834
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ 20,512	124,047	5	1	-	1	721	1	11,303	4,543	6,760
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ 20,569	123,844	5	2	-	1	653	-	12,357	4,225	8,132
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ 20,561	128,695	4	2	-	1	631	-	11,475	4,434	7,041
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ 19,814	118,284	4	2	-	1	799	3	15,868	1,427	14,440
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ 19,820	118,032	4	2	-	1	456	-	17,985	1,059	16,925
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ 19,823	120,471	4	2	-	1	765	-	16,333	1,302	15,031
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ 19,941	122,097	4	1	-	1	684	1	17,119	1,078	16,041
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ 19,984	122,039	4	2	-	1	617	-	18,044	972	17,073
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ 19,999	127,013	3	2	-	1	545	-	17,635	920	16,714

Societal Discount Modeling Approach, Energy Efficiency +11 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 33	(2,475)	1	-	-	-	(5)	(3)	1,459	(271)	1,731
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 15	2,293	-	-	-	-	(27)	(3)	477	(172)	648
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 146	3,886	-	(1)	-	-	(95)	(2)	1,198	(415)	1,613
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 199	3,783	-	-	-	-	(149)	(3)	2,251	(664)	2,915
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 196	6,218	-	-	-	-	187	(3)	776	(254)	1,030
TEBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 21	(1,895)	1	3	-	(1)	(97)	(3)	2,833	(681)	3,514
TEBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 13	1,622	-	1	-	-	(150)	(3)	5	(13)	18
TLBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 99	3,416	-	1	-	-	(195)	(2)	1,166	(421)	1,587
TLBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 170	2,543	1	3	-	(1)	48	(3)	3,328	(889)	4,217
TLBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 161	6,690	-	1	-	-	(10)	(3)	1,204	(462)	1,666
TEBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 23	(1,130)	1	(2)	-	-	(40)	(1)	818	(241)	1,058
TEBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 17	2,013	-	-	-	-	(141)	(3)	92	(64)	157
TLBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 111	5,433	-	(2)	-	-	(1)	-	1,092	(472)	1,563
TLBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 188	3,665	1	(2)	-	-	(110)	(3)	2,938	(848)	3,785
TLBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 153	8,488	-	(2)	-	-	(99)	(3)	1,912	(747)	2,660
TEBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 51	(288)	-	-	-	-	(268)	(3)	2,489	(634)	3,122
TEBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 32	2,329	-	-	-	-	49	(3)	689	(227)	917
TLBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 100	4,061	-	-	-	-	41	(2)	1,017	(359)	1,376
TLBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 146	3,591	-	-	-	-	(87)	(3)	1,509	(473)	1,982
TLBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 164	6,480	-	-	-	-	175	(3)	271	(112)	383
TEBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 65	(2,111)	1	-	-	-	250	(1)	839	(112)	951
TEBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 55	3,188	-	-	-	-	171	(1)	20	(72)	92
TLBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 114	5,397	-	-	-	-	167	(1)	644	(276)	920
TLBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 154	2,339	1	-	-	-	514	(1)	(272)	102	(374)
TLBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 177	7,381	-	-	-	-	424	(1)	(700)	147	(848)

Societal Discount Modeling Approach, Energy Efficiency +11 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 24	(2,475)	1	-	-	-	(5)	(3)	1,459	(271)	1,731
TEBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 5	2,293	-	-	-	-	(27)	(3)	477	(172)	648
TLBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 129	4,231	-	-	-	-	(48)	(2)	1,747	(574)	2,321
TLBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 179	3,783	-	-	-	-	(149)	(3)	2,251	(664)	2,915
TLBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 176	6,218	-	-	-	-	187	(3)	776	(254)	1,030
TEBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 37	(3,240)	1	-	-	-	(90)	(3)	1,046	(156)	1,202
TEBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 26	2,096	-	-	-	-	(124)	(3)	157	(62)	219
TLBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 163	1,245	1	-	-	-	113	(2)	575	(144)	719
TLBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 223	1,137	1	-	-	-	27	(3)	1,460	(360)	1,820
TLBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 212	6,410	-	-	-	-	(18)	(3)	684	(269)	954
TEBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 13	(37)	-	-	-	-	(529)	(3)	2,421	(660)	3,081
TEBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 43	2,636	-	-	-	-	(161)	(3)	749	(307)	1,056
TLBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 195	4,218	-	(1)	-	-	(238)	(2)	1,520	(581)	2,101
TLBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 230	4,070	-	-	-	-	(284)	(3)	2,602	(805)	3,407
TLBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 276	6,591	-	-	-	-	182	(3)	1,176	(437)	1,613
TEBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 10	(2,669)	-	-	-	-	155	3	(578)	225	(803)
TEBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 76	(2,696)	-	-	-	-	(115)	-	2,017	(498)	2,514
TEBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 110	1,706	-	(1)	-	-	(42)	1	642	(220)	862
TLBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 179	1,460	-	-	-	-	(74)	-	1,756	(483)	2,239
TLBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 126	4,431	-	(1)	-	-	68	-	262	(59)	321
TEBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ 30	(19)	-	-	-	-	(526)	(3)	2,383	(665)	3,048
TEBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ 53	2,670	-	-	-	-	(161)	(3)	728	(306)	1,034
TLBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ 216	4,276	-	(1)	-	-	(241)	(2)	1,515	(552)	2,067
TLBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ 263	4,113	-	-	-	-	(287)	(3)	2,601	(782)	3,383
TLBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ 298	8,660	(1)	-	-	-	(296)	(3)	1,981	(754)	2,734

Societal Discount Modeling Approach, Energy Efficiency +11 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ 23	(2,171)	-	-	-	-	40	3	(386)	148	(534)
TEBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ 49	(2,636)	-	-	-	-	(226)	-	1,864	(484)	2,348
TEBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ 93	1,775	-	-	-	-	(29)	1	1,204	(386)	1,590
TLBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ 146	1,392	-	-	-	-	(115)	-	1,707	(488)	2,196
TLBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ 115	6,713	(1)	-	-	-	(183)	-	982	(314)	1,295
TEBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ 21	(2,122)	-	-	-	-	42	3	(385)	110	(495)
TEBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ 17	(4,716)	1	-	-	-	36	-	1,031	(133)	1,164
TEBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ 128	1,785	-	-	-	-	(34)	1	1,175	(348)	1,523
TLBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ 172	(863)	1	-	-	-	228	-	975	(179)	1,154
TLBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ 168	3,761	-	-	-	-	201	-	199	(28)	227
TEBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ 25	(1,750)	-	-	1	(1)	(27)	2	1,013	(262)	1,275
TEBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ 18	(2,629)	-	-	-	-	(359)	-	1,795	(420)	2,215
TEBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ 118	1,888	-	(1)	1	(1)	(77)	1	1,724	(437)	2,161
TLBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ 153	1,515	-	(1)	1	(1)	(235)	-	2,345	(588)	2,933
TLBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ 154	3,985	-	(1)	1	(1)	202	-	832	(145)	977
TEBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ 68	(514)	-	-	-	-	(254)	(3)	1,957	(479)	2,437
TEBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ 53	2,178	-	-	-	-	(128)	(3)	181	(71)	252
TLBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ 190	4,267	-	-	-	-	(157)	(2)	1,477	(514)	1,992
TLBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ 259	4,166	-	-	-	-	(201)	(3)	2,417	(730)	3,148
TLBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ 247	6,751	-	-	-	-	(16)	(3)	818	(344)	1,163
TEBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ 85	(660)	-	-	-	-	(251)	(3)	1,958	(503)	2,461
TEBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ 85	2,145	-	-	-	-	(128)	(3)	184	(73)	257
TLBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ 230	4,199	-	-	-	-	(156)	(2)	1,529	(544)	2,073
TLBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ 303	3,961	-	-	-	-	(199)	(3)	2,472	(784)	3,257
TLBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ 305	6,663	-	-	-	-	(15)	(3)	890	(393)	1,283

Societal Discount Modeling Approach, Energy Efficiency +11 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 77	(6,340)	2	2	-	(1)	44	(3)	1,342	(48)	1,389
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 32	2,317	-	-	-	-	(43)	(3)	102	(14)	116
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 169	(2,174)	2	1	-	(1)	139	(2)	162	106	56
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 230	(2,183)	2	2	-	(1)	105	(3)	1,271	(130)	1,402
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 206	178	2	2	-	(1)	301	(3)	(313)	263	(576)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 148	(464)	-	-	-	-	(26)	(3)	2,391	(313)	2,705
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 33	2,391	-	-	-	-	(21)	(3)	72	(12)	84
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 203	4,234	-	-	-	-	(25)	(2)	1,504	(388)	1,892
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 317	4,314	-	-	-	-	(27)	(3)	2,568	(487)	3,056
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 210	6,968	-	-	-	-	(14)	(3)	469	(208)	677
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 20	6	-	-	-	-	(525)	(3)	2,313	(650)	2,963
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 14	2,662	-	-	-	-	(175)	(3)	623	(250)	873
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 143	4,238	-	(1)	-	-	(248)	(2)	1,371	(500)	1,871
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 190	4,046	-	-	-	-	(317)	(3)	2,369	(746)	3,115
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 202	6,565	-	-	-	-	131	(3)	938	(337)	1,275
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 20	6	-	-	-	-	(525)	(3)	2,313	(650)	2,963
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 14	2,662	-	-	-	-	(175)	(3)	623	(250)	873
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 143	4,238	-	(1)	-	-	(248)	(2)	1,371	(500)	1,871
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 190	4,046	-	-	-	-	(317)	(3)	2,369	(746)	3,115
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 202	6,565	-	-	-	-	131	(3)	938	(337)	1,275
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ 29	(2,475)	1	-	-	-	(5)	(3)	1,459	(271)	1,731
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ 10	2,293	-	-	-	-	(27)	(3)	477	(172)	648
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ 130	3,886	-	(1)	-	-	(95)	(2)	1,198	(415)	1,613
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ 190	2,026	1	(1)	-	-	148	(3)	1,705	(445)	2,150
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ 186	6,688	-	(1)	-	-	143	(3)	964	(334)	1,298

Societal Discount Modeling Approach, Energy Efficiency +11 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ 30	(3,166)	1	-	-	-	20	(3)	936	(102)	1,038
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ 15	1,094	-	2	-	-	62	(3)	461	(28)	488
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ 123	2,687	-	1	-	-	(5)	(2)	1,182	(271)	1,453
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ 183	826	1	1	-	-	238	(3)	1,689	(301)	1,990
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ 180	5,489	-	1	-	-	233	(3)	948	(190)	1,138
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ 38	(2,475)	1	-	-	-	(5)	(3)	1,459	(271)	1,731
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ 19	2,293	-	-	-	-	(27)	(3)	477	(172)	648
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ 153	4,231	-	-	-	-	(48)	(2)	1,747	(574)	2,321
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ 203	3,783	-	-	-	-	(149)	(3)	2,251	(664)	2,915
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ 200	6,218	-	-	-	-	187	(3)	776	(254)	1,030
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ 40	(30)	-	1	-	-	(248)	(2)	2,073	(526)	2,599
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ 25	4,614	-	(3)	-	-	(273)	(2)	881	(466)	1,347
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ 143	4,531	-	1	-	-	113	(1)	1,558	(533)	2,091
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ 205	4,024	-	1	-	-	(35)	(2)	2,081	(648)	2,729
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ 207	8,539	-	(3)	-	-	(58)	(2)	1,181	(548)	1,728
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ 50	(7)	-	-	-	-	(485)	(3)	2,329	(762)	3,091
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ 22	2,772	-	-	-	-	(174)	(3)	551	(255)	806
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ 161	4,358	-	(1)	-	-	(234)	(2)	1,237	(495)	1,732
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ 218	4,154	-	-	-	-	(303)	(3)	2,291	(813)	3,104
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ 210	9,005	(1)	-	-	-	(324)	(3)	1,409	(603)	2,012
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ 6	(253)	-	-	-	-	(342)	(3)	2,117	(368)	2,485
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ 9	2,187	-	-	-	-	(34)	(3)	465	(126)	590
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ 127	3,812	-	(1)	-	-	(114)	(2)	1,251	(350)	1,601
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ 170	3,754	-	-	-	-	(182)	(3)	2,176	(456)	2,632
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ 185	8,728	(1)	-	-	-	(254)	(3)	1,767	(507)	2,274

Societal Discount Modeling Approach, Energy Efficiency +15 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 20,030	121,157	4	1	-	1	510	3	13,024	3,146	9,878
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 20,070	118,354	5	1	-	1	540	-	14,349	2,942	11,407
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 20,053	123,128	4	1	-	1	531	-	13,377	3,040	10,337
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 20,146	124,299	4	1	-	1	492	1	13,892	2,875	11,018
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 20,202	124,268	4	1	-	1	402	-	14,766	2,658	12,108
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 20,199	126,655	4	1	-	1	731	-	13,282	3,070	10,211
TEBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 20,511	120,994	5	3	-	1	889	3	12,849	3,396	9,453
TEBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 20,514	120,364	5	3	-	1	443	-	14,353	2,965	11,389
TEBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 20,515	122,952	5	3	-	1	721	-	12,826	3,377	9,450
TLBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 20,601	126,258	4	3	-	1	375	1	13,997	2,926	11,070
TLBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 20,664	124,844	5	3	-	1	592	-	14,853	2,755	12,098
TLBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 20,660	129,495	4	3	-	1	571	-	14,025	2,887	11,138
TEBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 21,032	124,554	4	2	-	2	454	3	12,943	3,299	9,644
TEBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 21,057	123,109	5	-	-	2	414	2	13,402	3,175	10,227
TEBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 21,045	126,245	4	2	-	2	311	-	12,687	3,353	9,334
TLBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 21,147	129,697	4	-	-	2	452	3	13,674	2,950	10,724
TLBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 21,223	127,948	5	-	-	2	345	-	15,513	2,569	12,944
TLBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 21,188	132,716	4	-	-	2	354	-	14,489	2,673	11,816
TEBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 19,543	117,879	4	-	-	1	677	3	11,997	3,455	8,542
TEBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 19,592	117,585	4	-	-	1	404	-	14,471	2,818	11,653
TEBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 19,575	120,203	4	-	-	1	728	-	12,681	3,227	9,453
TLBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 19,643	121,965	4	-	-	1	721	1	13,010	3,094	9,916
TLBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 19,689	121,499	4	-	-	1	590	-	13,502	2,978	10,525
TLBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 19,709	124,345	4	-	-	1	858	-	12,274	3,337	8,937
TEBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 19,093	116,123	3	-	-	1	325	1	12,447	3,286	9,162
TEBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 19,158	114,011	4	-	-	1	583	-	13,282	3,168	10,115
TEBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 19,147	118,519	3	2	-	1	551	-	12,152	3,374	8,778
TLBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 19,206	120,742	3	2	-	1	559	-	12,744	3,160	9,584
TLBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 19,249	121,271	3	-	-	1	406	-	13,081	3,000	10,081
TLBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 19,272	123,492	3	-	-	1	760	-	11,750	3,432	8,318

Societal Discount Modeling Approach, Energy Efficiency +15 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 20,174	121,157	4	1	-	1	510	3	13,024	3,146	9,878
TEBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 20,204	118,354	5	1	-	1	540	-	14,349	2,942	11,407
TEBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 20,186	122,968	4	2	-	1	577	-	13,494	3,019	10,475
TLBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 20,278	124,548	4	2	-	1	550	1	14,402	2,736	11,666
TLBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 20,328	124,109	4	2	-	1	446	-	14,910	2,645	12,265
TLBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 20,327	126,491	4	2	-	1	789	-	13,442	3,057	10,386
TEBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 19,839	122,001	3	-	-	2	363	3	11,961	3,400	8,561
TEBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 19,895	119,126	4	-	-	2	274	-	13,478	3,137	10,340
TEBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 19,875	124,516	3	-	-	2	240	-	12,516	3,222	9,293
TLBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 19,972	123,273	4	-	-	2	483	1	12,542	3,251	9,291
TLBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 20,031	123,174	4	-	-	2	394	-	13,426	3,034	10,392
TLBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 20,020	128,399	3	-	-	2	347	-	12,652	3,129	9,523
TEBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 21,594	116,827	5	1	-	1	1,043	3	13,468	2,745	10,723
TEBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 21,615	116,520	5	1	-	1	595	-	15,775	2,158	13,617
TEBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 21,644	119,179	5	1	-	1	955	-	14,105	2,510	11,595
TLBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 21,753	120,357	5	1	-	1	934	1	14,677	2,307	12,369
TLBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 21,793	120,127	5	2	-	1	903	-	15,722	2,102	13,619
TLBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 21,839	122,698	5	1	-	1	1,266	-	14,164	2,473	11,691
TEBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 18,384	125,940	3	1	-	1	317	3	12,377	3,742	8,634
TEBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 18,460	125,588	3	1	-	1	84	-	14,860	3,084	11,776
TEBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 18,384	128,281	3	1	-	1	197	-	12,842	3,582	9,260
TLBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 18,463	129,598	3	1	-	1	166	1	13,263	3,446	9,817
TLBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 18,529	129,606	3	1	-	1	123	-	14,150	3,221	10,929
TLBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 18,477	132,024	3	1	-	1	280	-	12,456	3,737	8,720
TEBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 20,937	116,519	5	1	-	1	1,034	3	13,548	2,634	10,915
TEBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 20,976	116,228	5	1	-	1	589	-	15,817	2,041	13,776
TEBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 20,998	118,903	5	1	-	1	947	-	14,164	2,398	11,766
TLBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 21,124	120,106	5	1	-	1	920	1	14,751	2,225	12,526
TLBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 21,170	119,915	5	1	-	1	798	-	15,668	2,018	13,651
TLBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 21,206	124,435	4	1	-	1	805	-	15,015	2,043	12,973

Societal Discount Modeling Approach, Energy Efficiency +15 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 19,083	123,750	4	1	-	1	454	3	11,663	4,048	7,616
TEBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 19,119	122,960	4	1	-	1	240	-	13,803	3,469	10,334
TEBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 19,070	125,597	4	1	-	1	462	-	11,934	3,960	7,974
TLBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 19,130	126,895	4	1	-	1	433	1	12,394	3,808	8,586
TLBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 19,185	126,846	4	1	-	1	347	-	13,250	3,581	9,669
TLBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 19,153	132,083	3	1	-	1	288	-	12,476	3,762	8,714
TEBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 20,301	121,976	5	1	1	-	910	2	13,630	2,652	10,978
TEBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 20,320	119,042	5	1	-	1	586	-	14,810	2,707	12,102
TEBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 20,300	123,534	4	2	-	1	604	-	13,854	2,834	11,020
TLBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 20,398	125,041	4	2	-	1	574	1	14,717	2,578	12,139
TLBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 20,443	124,508	5	1	1	-	784	-	15,036	2,405	12,631
TLBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 20,439	126,982	4	2	-	1	814	-	13,750	2,900	10,850
TEBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 20,494	121,761	5	1	1	-	888	2	14,603	2,576	12,028
TEBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 20,497	121,034	5	1	1	-	574	-	16,349	2,270	14,078
TEBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 20,474	123,490	5	1	1	-	943	-	14,595	2,695	11,900
TLBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 20,583	124,732	5	1	1	-	937	1	15,042	2,504	12,538
TLBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 20,617	124,363	5	1	1	-	775	-	15,664	2,351	13,312
TLBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 20,620	126,806	5	1	1	-	1,220	-	14,159	2,796	11,364
TEBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 19,689	120,883	3	-	-	2	353	3	11,379	3,765	7,614
TEBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 19,784	120,815	3	-	-	2	97	-	13,869	3,167	10,703
TEBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 19,755	123,572	3	-	-	2	231	-	11,990	3,556	8,434
TLBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 19,846	125,180	3	-	-	2	195	1	12,858	3,247	9,612
TLBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 19,915	125,092	3	-	-	2	149	-	13,795	3,028	10,767
TLBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 19,905	127,620	3	-	-	2	339	-	12,206	3,417	8,788
TEBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 19,301	120,854	3	-	-	2	345	3	10,943	4,026	6,917
TEBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 19,422	120,636	3	-	-	2	93	-	13,457	3,393	10,064
TEBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 19,408	123,499	3	-	-	2	228	-	11,582	3,798	7,784
TLBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 19,498	125,095	3	-	-	2	187	1	12,474	3,478	8,996
TLBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 19,570	124,870	3	-	-	2	144	-	13,413	3,234	10,179
TLBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 19,574	127,503	3	-	-	2	332	-	11,841	3,629	8,212

Societal Discount Modeling Approach, Energy Efficiency +15 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 20,241	129,143	1	-	-	2	67	3	14,645	2,460	12,185
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 20,321	123,393	3	1	-	1	105	-	16,247	2,308	13,939
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 20,277	125,941	3	1	-	1	243	-	14,369	2,696	11,672
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 20,371	127,114	3	1	-	1	209	1	14,842	2,535	12,307
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 20,435	127,018	3	2	-	1	178	-	15,914	2,319	13,595
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 20,412	129,486	3	1	-	1	350	-	14,146	2,727	11,420
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEH	$ 20,258	131,991	-	-	-	2	29	3	15,840	2,113	13,727
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEH	$ 20,449	131,805	-	-	-	2	2	-	18,895	1,705	17,189
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEH	$ 20,309	134,787	-	-	-	2	8	-	16,483	1,987	14,495
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEH	$ 20,429	136,301	-	-	-	2	3	1	17,347	1,723	15,625
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEH	$ 20,542	136,381	-	-	-	2	2	-	18,409	1,620	16,789
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEH	$ 20,437	138,947	-	-	-	2	15	-	16,318	1,902	14,416
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 19,737	118,643	5	1	-	1	984	3	12,143	3,535	8,608
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 19,768	118,354	5	1	-	1	540	-	14,349	2,942	11,407
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 19,761	121,001	5	1	-	1	883	-	12,657	3,346	9,312
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 19,856	122,171	5	1	-	1	863	1	13,214	3,171	10,043
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 19,903	122,046	5	1	-	1	734	-	14,062	2,953	11,110
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 19,915	124,522	5	1	-	1	1,173	-	12,619	3,363	9,256
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEH	$ 19,435	118,643	5	1	-	1	984	3	12,143	3,535	8,608
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEH	$ 19,466	118,354	5	1	-	1	540	-	14,349	2,942	11,407
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEH	$ 19,459	121,001	5	1	-	1	883	-	12,657	3,346	9,312
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEH	$ 19,554	122,171	5	1	-	1	863	1	13,214	3,171	10,043
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEH	$ 19,601	122,046	5	1	-	1	734	-	14,062	2,953	11,110
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEH	$ 19,613	124,522	5	1	-	1	1,173	-	12,619	3,363	9,256
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 20,039	121,157	4	1	-	1	510	3	13,024	3,146	9,878
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 20,078	118,354	5	1	-	1	540	-	14,349	2,942	11,407
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 20,062	123,128	4	1	-	1	531	-	13,377	3,040	10,337
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 20,154	124,299	4	1	-	1	492	1	13,892	2,875	11,018
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 20,210	124,268	4	1	-	1	402	-	14,766	2,658	12,108
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 20,208	126,655	4	1	-	1	731	-	13,282	3,070	10,211

Societal Discount Modeling Approach, Energy Efficiency +15 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 20,047	121,157	4	1	-	1	510	3	13,024	3,146	9,878
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 20,087	118,354	5	1	-	1	540	-	14,349	2,942	11,407
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 20,070	123,128	4	1	-	1	531	-	13,377	3,040	10,337
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 20,163	124,299	4	1	-	1	492	1	13,892	2,875	11,018
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 20,219	124,268	4	1	-	1	402	-	14,766	2,658	12,108
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 20,216	126,655	4	1	-	1	731	-	13,282	3,070	10,211
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 20,012	120,283	4	2	-	1	597	3	12,662	3,315	9,347
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 20,061	118,354	5	1	-	1	540	-	14,349	2,942	11,407
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 20,036	122,968	4	2	-	1	577	-	13,494	3,019	10,475
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 20,133	124,548	4	2	-	1	550	1	14,402	2,736	11,666
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 20,183	124,109	4	2	-	1	446	-	14,910	2,645	12,265
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 20,182	126,491	4	2	-	1	789	-	13,442	3,057	10,386
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 19,985	120,077	4	2	-	1	626	3	12,552	3,364	9,187
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 20,017	117,934	4	6	-	1	600	-	14,332	3,080	11,252
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 20,006	120,597	4	6	-	1	980	-	12,586	3,482	9,104
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 20,103	122,543	4	6	-	1	970	1	13,822	3,075	10,747
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 20,162	124,109	4	2	-	1	446	-	14,910	2,645	12,265
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 20,161	126,491	4	2	-	1	789	-	13,442	3,057	10,386
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 20,328	120,299	5	1	-	1	850	3	10,250	4,936	5,314
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 20,387	119,983	5	1	-	1	442	-	12,487	4,225	8,262
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 20,358	122,754	5	1	-	1	747	-	10,708	4,737	5,971
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 20,459	123,939	5	1	-	1	734	1	11,216	4,569	6,647
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 20,518	123,830	5	1	-	1	615	-	12,073	4,312	7,761
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 20,510	128,611	4	1	-	1	607	-	11,153	4,523	6,629
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 19,786	118,903	4	1	-	1	712	3	16,119	1,348	14,771
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 19,802	118,345	4	1	-	1	430	-	18,098	1,033	17,065
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 19,805	120,768	4	1	-	1	734	-	16,455	1,273	15,182
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 19,891	121,927	4	1	-	1	695	1	17,037	1,089	15,948
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 19,934	121,904	4	1	-	1	576	-	17,867	973	16,894
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 19,949	126,864	3	1	-	1	515	-	17,417	928	16,489

Societal Discount Modeling Approach, Energy Efficiency +15 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 39	(2,803)	1	-	-	-	30	(3)	1,325	(204)	1,529
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 23	1,971	-	-	-	-	20	(3)	353	(106)	459
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 115	3,141	-	-	-	-	(18)	(2)	868	(272)	1,140
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 171	3,111	-	-	-	-	(108)	(3)	1,741	(488)	2,230
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 169	5,498	-	-	-	-	221	(3)	257	(76)	333
TEBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 3	(629)	-	-	-	-	(446)	(3)	1,505	(431)	1,936
TEBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 4	1,958	-	-	-	-	(168)	(3)	(23)	(19)	(3)
TLBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 90	5,265	(1)	-	-	-	(514)	(2)	1,148	(470)	1,618
TLBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 153	3,850	-	-	-	-	(297)	(3)	2,004	(641)	2,645
TLBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 149	8,501	(1)	-	-	-	(318)	(3)	1,176	(509)	1,685
TEBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 26	(1,444)	1	(2)	-	-	(40)	(1)	459	(123)	582
TEBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 14	1,692	-	-	-	-	(143)	(3)	(256)	55	(311)
TLBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 115	5,144	-	(2)	-	-	(3)	-	731	(349)	1,080
TLBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 191	3,395	1	(2)	-	-	(109)	(3)	2,570	(730)	3,300
TLBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 156	8,163	-	(2)	-	-	(100)	(3)	1,546	(625)	2,172
TEBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 49	(294)	-	-	-	-	(273)	(3)	2,474	(637)	3,111
TEBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 33	2,324	-	-	-	-	51	(3)	684	(227)	911
TLBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 101	4,086	-	-	-	-	44	(2)	1,013	(361)	1,374
TLBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 146	3,620	-	-	-	-	(87)	(3)	1,506	(477)	1,982
TLBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 166	6,466	-	-	-	-	181	(3)	278	(117)	395
TEBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 65	(2,112)	1	-	-	-	258	(1)	835	(118)	953
TEBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 54	2,396	-	2	-	-	226	(1)	(295)	88	(383)
TLBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 113	4,620	-	2	-	-	234	(1)	297	(125)	422
TLBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 156	5,148	-	-	-	-	81	(1)	633	(286)	919
TLBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 179	7,369	-	-	-	-	435	(1)	(697)	146	(843)

Societal Discount Modeling Approach, Energy Efficiency +15 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 30	(2,803)	1	-	-	-	30	(3)	1,325	(204)	1,529
TEBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 12	1,810	-	1	-	-	67	(3)	470	(127)	597
TLBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 104	3,391	-	1	-	-	40	(2)	1,377	(410)	1,787
TLBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 153	2,952	-	1	-	-	(64)	(3)	1,886	(501)	2,387
TLBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 153	5,334	-	1	-	-	279	(3)	418	(90)	507
TEBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 56	(2,875)	1	-	-	-	(88)	(3)	1,517	(263)	1,779
TEBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 36	2,515	-	-	-	-	(122)	(3)	555	(178)	733
TLBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 133	1,272	1	-	-	-	121	(2)	581	(149)	730
TLBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 191	1,174	1	-	-	-	32	(3)	1,466	(366)	1,831
TLBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 181	6,398	-	-	-	-	(16)	(3)	691	(271)	962
TEBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 20	(307)	-	-	-	-	(448)	(3)	2,307	(587)	2,894
TEBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 49	2,353	-	-	-	-	(87)	(3)	637	(235)	872
TLBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 159	3,530	-	-	-	-	(109)	(2)	1,209	(438)	1,647
TLBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 198	3,300	-	1	-	-	(140)	(3)	2,254	(643)	2,897
TLBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 244	5,871	-	-	-	-	223	(3)	697	(272)	968
TEBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 76	(352)	-	-	-	-	(233)	(3)	2,483	(658)	3,142
TEBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 0	2,340	-	-	-	-	(120)	(3)	465	(161)	625
TLBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 79	3,658	-	-	-	-	(151)	(2)	886	(296)	1,182
TLBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 146	3,666	-	-	-	-	(194)	(3)	1,774	(522)	2,295
TLBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 93	6,084	-	-	-	-	(36)	(3)	80	(6)	85
TEBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 39	(290)	-	-	-	-	(446)	(3)	2,269	(592)	2,861
TEBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 61	2,384	-	-	-	-	(87)	(3)	615	(236)	851
TLBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 187	3,588	-	-	-	-	(114)	(2)	1,203	(409)	1,611
TLBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 233	3,396	-	-	-	-	(236)	(3)	2,120	(616)	2,736
TLBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 269	7,916	(1)	-	-	-	(229)	(3)	1,467	(591)	2,058

Societal Discount Modeling Approach, Energy Efficiency +15 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 13	(1,847)	-	-	-	-	(8)	3	(270)	88	(358)
TEBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 49	(2,637)	-	-	-	-	(222)	-	1,869	(491)	2,360
TEBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 61	1,297	-	-	-	-	(29)	1	460	(151)	612
TLBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 115	1,249	-	-	-	-	(115)	-	1,316	(379)	1,695
TLBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 83	6,486	(1)	-	-	-	(174)	-	542	(198)	740
TEBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 2	(1,559)	1	(1)	1	(1)	306	2	(224)	(181)	(42)
TEBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 21	(4,492)	1	(1)	-	-	(19)	-	956	(126)	1,082
TEBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 98	1,507	-	-	-	-	(30)	1	864	(256)	1,119
TLBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 144	974	1	(1)	1	(1)	179	-	1,182	(429)	1,611
TLBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 139	3,447	-	-	-	-	210	-	(104)	67	(170)
TEBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 19	(1,729)	-	-	-	-	(55)	2	9	(119)	128
TEBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 23	(2,457)	-	-	-	-	(369)	-	1,754	(424)	2,178
TEBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 108	1,242	-	-	-	-	(6)	1	447	(191)	638
TLBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 142	873	-	-	-	-	(169)	-	1,069	(343)	1,412
TLBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 145	3,316	-	-	-	-	277	-	(435)	101	(536)
TEBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 95	(68)	-	-	-	-	(257)	(3)	2,491	(598)	3,089
TEBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 66	2,689	-	-	-	-	(122)	(3)	612	(209)	820
TLBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 157	4,297	-	-	-	-	(158)	(2)	1,480	(518)	1,998
TLBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 226	4,209	-	-	-	-	(204)	(3)	2,417	(736)	3,153
TLBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 216	6,738	-	-	-	-	(14)	(3)	827	(347)	1,174
TEBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 121	(218)	-	-	-	-	(252)	(3)	2,514	(632)	3,147
TEBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 107	2,645	-	-	-	-	(117)	(3)	639	(228)	867
TLBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 198	4,241	-	-	-	-	(157)	(2)	1,531	(547)	2,078
TLBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 270	4,016	-	-	-	-	(201)	(3)	2,470	(791)	3,262
TLBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 273	6,649	-	-	-	-	(13)	(3)	899	(396)	1,295

Societal Discount Modeling Approach, Energy Efficiency +15 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 80	(5,749)	2	1	-	(1)	38	(3)	1,602	(152)	1,754
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 36	(3,202)	2	1	-	(1)	176	(3)	(276)	236	(513)
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 130	(2,028)	2	1	-	(1)	143	(2)	198	75	123
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 194	(2,124)	2	2	-	(1)	111	(3)	1,269	(141)	1,410
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 171	343	2	1	-	(1)	283	(3)	(498)	267	(765)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 191	(187)	-	-	-	-	(27)	(3)	3,055	(407)	3,462
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 51	2,796	-	-	-	-	(22)	(3)	643	(126)	769
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 171	4,309	-	-	-	-	(26)	(2)	1,508	(390)	1,898
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 284	4,390	-	-	-	-	(28)	(3)	2,570	(493)	3,062
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 179	6,955	-	-	-	-	(14)	(3)	478	(211)	689
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 30	(289)	-	-	-	-	(444)	(3)	2,206	(593)	2,799
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 24	2,359	-	-	-	-	(101)	(3)	514	(190)	704
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 119	3,528	-	-	-	-	(121)	(2)	1,071	(364)	1,435
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 166	3,403	-	-	-	-	(251)	(3)	1,919	(582)	2,502
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 178	5,879	-	-	-	-	188	(3)	476	(172)	648
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 30	(289)	-	-	-	-	(444)	(3)	2,206	(593)	2,799
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 24	2,359	-	-	-	-	(101)	(3)	514	(190)	704
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 119	3,528	-	-	-	-	(121)	(2)	1,071	(364)	1,435
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 166	3,403	-	-	-	-	(251)	(3)	1,919	(582)	2,502
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 178	5,879	-	-	-	-	188	(3)	476	(172)	648
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 39	(2,803)	1	-	-	-	30	(3)	1,325	(204)	1,529
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 23	1,971	-	-	-	-	20	(3)	353	(106)	459
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 115	3,141	-	-	-	-	(18)	(2)	868	(272)	1,140
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 171	3,111	-	-	-	-	(108)	(3)	1,741	(488)	2,230
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 169	5,498	-	-	-	-	221	(3)	257	(76)	333

Societal Discount Modeling Approach, Energy Efficiency +15 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 39	(2,803)	1	-	-	-	30	(3)	1,325	(204)	1,529
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 23	1,971	-	-	-	-	20	(3)	353	(106)	459
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 115	3,141	-	-	-	-	(18)	(2)	868	(272)	1,140
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 171	3,111	-	-	-	-	(108)	(3)	1,741	(488)	2,230
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 169	5,498	-	-	-	-	221	(3)	257	(76)	333
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 50	(1,929)	1	(1)	-	-	(57)	(3)	1,687	(373)	2,060
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 24	2,684	-	-	-	-	(20)	(3)	832	(296)	1,128
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 121	4,265	-	-	-	-	(47)	(2)	1,740	(579)	2,318
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 171	3,825	-	-	-	-	(151)	(3)	2,248	(670)	2,918
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 170	6,207	-	-	-	-	192	(3)	780	(258)	1,038
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 32	(2,143)	-	4	-	-	(26)	(3)	1,780	(284)	2,065
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 21	519	-	4	-	-	354	(3)	34	118	(84)
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 118	2,465	-	4	-	-	344	(2)	1,270	(290)	1,560
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 177	4,031	-	-	-	-	(179)	(3)	2,358	(720)	3,078
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 176	6,413	-	-	-	-	164	(3)	891	(308)	1,198
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 59	(316)	-	-	-	-	(408)	(3)	2,237	(711)	2,948
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 30	2,455	-	-	-	-	(103)	(3)	458	(199)	657
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 131	3,640	-	-	-	-	(117)	(2)	965	(367)	1,333
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 189	3,530	-	-	-	-	(235)	(3)	1,823	(624)	2,447
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 182	8,312	(1)	-	-	-	(243)	(3)	902	(413)	1,315
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 16	(558)	-	-	-	-	(282)	(3)	1,978	(315)	2,294
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 18	1,865	-	-	-	-	22	(3)	335	(75)	411
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 105	3,024	-	-	-	-	(17)	(2)	918	(259)	1,177
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 148	3,001	-	-	-	-	(135)	(3)	1,748	(376)	2,123
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 163	7,961	(1)	-	-	-	(197)	(3)	1,298	(420)	1,718

Societal Discount Modeling Approach, Energy Efficiency +30 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 19,967	119,920	4	1	-	1	595	3	12,466	3,350	9,116
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 20,000	119,351	4	1	-	1	338	-	14,579	2,820	11,759
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 19,987	121,943	4	1	-	1	612	-	12,859	3,216	9,644
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 20,086	123,920	4	1	-	1	590	1	14,121	2,807	11,314
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 20,133	123,509	4	1	-	1	481	-	14,628	2,711	11,917
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 20,138	125,855	4	1	-	1	840	-	13,183	3,123	10,060
TEBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 20,427	122,888	4	2	-	1	613	3	13,431	3,133	10,298
TEBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 20,442	119,744	5	2	-	1	473	-	14,067	3,034	11,034
TEBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 20,443	124,458	4	2	-	1	449	-	13,228	3,171	10,057
TLBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 20,530	126,054	4	2	-	1	408	1	14,051	2,869	11,182
TLBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 20,593	124,135	5	2	-	1	645	-	14,520	2,836	11,684
TLBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 20,587	128,854	4	2	-	1	609	-	13,754	2,950	10,804
TEBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 20,987	123,849	4	2	-	2	505	3	12,911	3,331	9,580
TEBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 20,998	123,764	4	1	-	2	327	2	13,427	3,158	10,269
TEBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 21,003	126,946	4	1	-	2	421	2	12,119	3,510	8,609
TLBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 21,093	128,274	4	1	-	2	510	3	13,169	3,160	10,009
TLBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 21,167	128,840	4	1	-	2	206	-	15,635	2,524	13,111
TLBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 21,135	131,272	4	1	-	2	412	-	13,960	2,884	11,076
TEBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 19,507	119,049	3	-	-	1	531	3	12,258	3,332	8,925
TEBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 19,550	116,498	4	-	-	1	471	-	13,980	2,975	11,005
TEBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 19,542	119,144	4	-	-	1	824	-	12,227	3,397	8,830
TLBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 19,608	121,307	4	-	-	1	826	1	12,899	3,137	9,762
TLBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 19,653	120,867	4	-	-	1	682	-	13,392	3,018	10,374
TLBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 19,673	125,909	3	-	-	1	596	-	12,919	3,071	9,848
TEBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 19,045	115,452	3	-	-	1	385	1	12,399	3,315	9,084
TEBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 19,099	115,171	3	1	-	1	319	-	13,611	3,053	10,557
TEBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 19,085	117,881	3	1	-	1	594	-	11,892	3,458	8,435
TLBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 19,145	120,109	3	1	-	1	601	-	12,472	3,242	9,231
TLBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 19,188	119,831	3	1	-	1	492	-	12,482	3,232	9,250
TLBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 19,218	122,042	3	1	-	1	882	-	11,181	3,663	7,518

Societal Discount Modeling Approach, Energy Efficiency +30 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 20,111	119,920	4	1	-	1	595	3	12,466	3,350	9,116
TEBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 20,135	119,351	4	1	-	1	338	-	14,579	2,820	11,759
TEBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 20,121	121,943	4	1	-	1	612	-	12,859	3,216	9,644
TLBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 20,210	123,920	4	1	-	1	590	1	14,121	2,807	11,314
TLBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 20,258	123,509	4	1	-	1	481	-	14,628	2,711	11,917
TLBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 20,262	125,855	4	1	-	1	840	-	13,183	3,123	10,060
TEBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 19,823	119,920	4	1	-	1	595	3	12,466	3,350	9,116
TEBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 19,866	119,351	4	1	-	1	338	-	14,579	2,820	11,759
TEBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 19,852	121,943	4	1	-	1	612	-	12,859	3,216	9,644
TLBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 19,961	123,920	4	1	-	1	590	1	14,121	2,807	11,314
TLBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 20,009	123,509	4	1	-	1	481	-	14,628	2,711	11,917
TLBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 20,013	125,855	4	1	-	1	840	-	13,183	3,123	10,060
TEBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 21,521	115,668	5	1	-	1	1,192	3	12,929	2,933	9,996
TEBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 21,530	115,378	5	1	-	1	696	-	15,244	2,304	12,940
TEBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 21,568	118,070	5	1	-	1	1,089	-	13,605	2,670	10,935
TLBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 21,689	120,147	5	1	-	1	1,122	1	14,881	2,278	12,603
TLBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 21,717	119,542	5	1	-	1	956	-	15,451	2,164	13,287
TLBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 21,771	122,022	5	1	-	1	1,451	-	14,049	2,535	11,514
TEBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 18,327	128,082	3	-	1	-	245	2	12,829	3,145	9,684
TEBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 18,399	124,405	3	1	-	1	105	-	14,253	3,258	10,995
TEBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 18,332	127,090	3	1	-	1	232	-	12,275	3,749	8,526
TLBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 18,413	128,945	3	1	-	1	200	1	13,546	3,349	10,198
TLBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 18,474	128,688	3	1	-	1	152	-	14,025	3,265	10,760
TLBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 18,428	131,030	3	1	-	1	329	-	12,385	3,785	8,600
TEBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$ 20,871	117,658	4	1	-	1	639	3	13,960	2,409	11,551
TEBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$ 20,904	115,081	5	1	-	1	688	-	15,285	2,191	13,094
TEBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$ 20,928	119,731	4	1	-	1	672	-	14,451	2,227	12,224
TLBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$ 21,067	121,895	4	1	-	1	672	1	15,799	1,844	13,955
TLBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$ 21,107	119,272	5	1	-	1	943	-	15,532	2,076	13,456
TLBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$ 21,140	123,737	4	1	-	1	929	-	14,921	2,109	12,813

Societal Discount Modeling Approach, Energy Efficiency +30 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$ 19,023	125,246	4	-	1	-	523	2	12,086	3,469	8,617
TEBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$ 19,055	121,798	4	1	-	1	292	-	13,247	3,643	9,604
TEBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$ 19,010	127,144	3	1	-	1	233	-	12,289	3,782	8,507
TLBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$ 19,071	126,262	4	1	-	1	507	1	12,610	3,741	8,869
TLBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$ 19,122	125,934	4	1	-	1	413	-	13,113	3,634	9,479
TLBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$ 19,090	131,111	3	1	-	1	338	-	12,402	3,815	8,587
TEBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$ 20,235	121,385	5	-	1	-	974	2	13,380	2,715	10,665
TEBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$ 20,253	117,920	5	1	-	1	690	-	14,293	2,863	11,430
TEBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$ 20,234	122,622	4	1	-	1	651	-	13,267	2,996	10,271
TLBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$ 20,328	124,434	4	1	-	1	615	1	14,436	2,640	11,795
TLBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$ 20,374	123,978	4	1	-	1	504	-	14,967	2,527	12,440
TLBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$ 20,372	126,368	4	1	-	1	866	-	13,487	2,963	10,524
TEBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$ 20,426	121,172	5	-	1	-	950	2	14,316	2,637	11,680
TEBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$ 20,429	120,298	5	-	1	-	633	-	15,983	2,344	13,639
TEBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$ 20,416	122,909	5	-	1	-	1,012	-	14,164	2,766	11,397
TLBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$ 20,515	124,121	5	-	1	-	1,002	1	14,764	2,566	12,197
TLBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$ 20,551	123,646	5	-	1	-	850	-	15,335	2,429	12,906
TLBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$ 20,556	128,277	4	-	1	-	836	-	14,656	2,563	12,092
TEBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$ 19,690	119,238	4	1	-	1	560	3	12,062	3,629	8,433
TEBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$ 19,754	118,734	4	1	-	1	317	-	14,218	3,057	11,161
TEBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$ 19,748	121,414	4	1	-	1	584	-	12,519	3,449	9,069
TLBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$ 19,851	123,408	4	-	-	1	540	1	13,583	3,069	10,515
TLBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$ 19,901	122,856	4	-	-	1	437	-	14,085	2,974	11,112
TLBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$ 19,911	125,332	4	-	-	1	790	-	12,660	3,377	9,283
TEBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$ 19,357	121,379	3	-	-	2	379	3	12,360	3,548	8,812
TEBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$ 19,472	121,169	3	-	-	2	110	-	14,813	2,917	11,896
TEBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$ 19,463	123,940	3	-	-	2	257	-	12,998	3,306	9,692
TLBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$ 19,565	125,628	3	-	-	2	231	1	13,917	3,009	10,908
TLBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$ 19,609	125,025	3	-	-	2	169	-	14,383	2,923	11,460
TLBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$ 19,618	127,528	3	-	-	2	378	-	12,869	3,317	9,552

Societal Discount Modeling Approach, Energy Efficiency +30 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 20,175	122,151	3	1	-	1	413	3	13,210	3,070	10,140
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 20,234	122,149	3	1	-	1	128	-	15,648	2,470	13,178
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 20,199	124,708	3	1	-	1	282	-	13,800	2,862	10,938
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 20,305	126,727	3	1	-	1	260	1	15,120	2,461	12,659
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 20,358	126,411	3	1	-	1	196	-	15,608	2,377	13,231
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 20,341	128,659	3	1	-	1	409	-	14,057	2,780	11,277
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEHH	$ 20,271	129,301	1	1	-	1	75	3	16,253	2,095	14,158
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEHH	$ 20,418	129,288	1	1	-	1	6	-	19,178	1,613	17,565
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEHH	$ 20,314	132,077	1	1	-	1	29	-	16,924	1,949	14,975
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEHH	$ 20,455	134,075	1	1	-	1	21	1	18,399	1,583	16,816
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEHH	$ 20,541	133,816	1	1	-	1	13	-	18,936	1,582	17,355
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEHH	$ 20,445	138,713	-	-	-	2	18	-	17,412	1,751	15,660
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 19,686	117,878	5	-	-	1	1,079	3	11,810	3,655	8,155
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 19,705	117,189	5	1	-	1	638	-	13,836	3,113	10,723
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 19,707	119,864	5	1	-	1	1,014	-	12,176	3,520	8,656
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 19,804	121,809	5	1	-	1	1,014	1	13,401	3,126	10,275
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 19,845	121,313	5	1	-	1	861	-	13,920	3,015	10,904
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 19,864	123,759	5	1	-	1	1,337	-	12,514	3,425	9,089
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEHH	$ 19,384	117,878	5	-	-	1	1,079	3	11,810	3,655	8,155
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEHH	$ 19,403	117,189	5	1	-	1	638	-	13,836	3,113	10,723
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEHH	$ 19,405	119,864	5	1	-	1	1,014	-	12,176	3,520	8,656
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEHH	$ 19,502	121,809	5	1	-	1	1,014	1	13,401	3,126	10,275
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEHH	$ 19,543	121,313	5	1	-	1	861	-	13,920	3,015	10,904
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEHH	$ 19,562	123,759	5	1	-	1	1,337	-	12,514	3,425	9,089
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$ 19,971	120,362	4	-	-	1	567	3	12,657	3,267	9,389
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$ 20,010	119,351	4	1	-	1	338	-	14,579	2,820	11,759
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$ 19,997	121,943	4	1	-	1	612	-	12,859	3,216	9,644
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$ 20,092	123,851	4	-	-	1	563	1	13,895	2,862	11,033
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$ 20,141	123,429	4	-	-	1	458	-	14,403	2,762	11,641
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$ 20,144	125,786	4	-	-	1	813	-	12,958	3,178	9,780

Societal Discount Modeling Approach, Energy Efficiency +30 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$ 19,971	120,362	4	-	-	1	567	3	12,657	3,267	9,389
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$ 20,020	119,351	4	1	-	1	338	-	14,579	2,820	11,759
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$ 19,999	122,674	4	-	-	1	601	-	13,359	3,032	10,326
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$ 20,092	123,851	4	-	-	1	563	1	13,895	2,862	11,033
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$ 20,141	123,429	4	-	-	1	458	-	14,403	2,762	11,641
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$ 20,144	125,786	4	-	-	1	813	-	12,958	3,178	9,780
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$ 19,956	119,920	4	1	-	1	595	3	12,466	3,350	9,116
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$ 19,991	119,351	4	1	-	1	338	-	14,579	2,820	11,759
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$ 19,977	121,943	4	1	-	1	612	-	12,859	3,216	9,644
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$ 20,076	123,920	4	1	-	1	590	1	14,121	2,807	11,314
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$ 20,123	123,509	4	1	-	1	481	-	14,628	2,711	11,917
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$ 20,128	125,855	4	1	-	1	840	-	13,183	3,123	10,060
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$ 19,934	117,656	4	5	-	1	972	2	12,664	3,544	9,120
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$ 19,963	117,172	4	5	-	1	640	-	13,971	3,171	10,800
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$ 19,955	122,465	3	5	-	1	546	-	13,148	3,205	9,942
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$ 20,054	121,902	4	5	-	1	1,000	1	13,526	3,148	10,378
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$ 20,112	121,435	4	5	-	1	843	-	14,052	3,025	11,026
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$ 20,118	125,855	4	1	-	1	840	-	13,183	3,123	10,060
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$ 20,263	121,228	4	1	-	1	671	3	10,332	4,844	5,488
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$ 20,313	118,793	5	1	-	1	530	-	11,974	4,410	7,563
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$ 20,288	123,741	4	1	-	1	500	-	10,830	4,616	6,214
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$ 20,399	125,743	4	1	-	1	474	1	12,083	4,166	7,917
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$ 20,452	123,080	5	1	-	1	727	-	11,967	4,355	7,612
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$ 20,440	127,767	4	1	-	1	700	-	11,091	4,551	6,540
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$ 19,731	119,801	3	1	-	1	585	3	16,373	1,253	15,120
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$ 19,741	117,129	4	1	-	1	509	-	17,585	1,119	16,466
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$ 19,746	122,246	3	1	-	1	444	-	16,992	1,068	15,925
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$ 19,838	121,636	4	1	-	1	817	1	17,124	1,121	16,003
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$ 19,875	121,154	4	1	-	1	678	-	17,666	1,033	16,632
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$ 19,888	126,075	3	1	-	1	596	-	17,271	981	16,290

Societal Discount Modeling Approach, Energy Efficiency +30 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 34	(569)	-	-	-	-	(256)	(3)	2,113	(530)	2,643
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 20	2,023	-	-	-	-	17	(3)	393	(134)	528
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 119	4,000	-	-	-	-	(5)	(2)	1,655	(543)	2,198
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 166	3,589	-	-	-	-	(114)	(3)	2,162	(639)	2,801
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 171	5,935	-	-	-	-	245	(3)	717	(227)	944
TEBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 15	(3,143)	1	-	-	-	(140)	(3)	637	(99)	736
TEBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 15	1,570	-	-	-	-	(165)	(3)	(203)	38	(241)
TLBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 103	3,167	-	-	-	-	(205)	(2)	620	(264)	884
TLBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 165	1,247	1	-	-	-	31	(3)	1,090	(296)	1,386
TLBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 160	5,966	-	-	-	-	(4)	(3)	324	(183)	507
TEBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 11	(85)	-	(1)	-	-	(178)	(1)	516	(173)	689
TEBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 17	3,097	-	(1)	-	-	(85)	(1)	(792)	179	(971)
TLBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 107	4,425	-	(1)	-	-	5	-	258	(171)	429
TLBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 180	4,991	-	(1)	-	-	(300)	(3)	2,724	(807)	3,531
TLBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 149	7,423	-	(1)	-	-	(94)	(3)	1,049	(447)	1,496
TEBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 43	(2,550)	1	-	-	-	(60)	(3)	1,722	(357)	2,080
TEBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 35	96	1	-	-	-	293	(3)	(31)	65	(96)
TLBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 101	2,258	1	-	-	-	295	(2)	641	(195)	836
TLBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 147	1,818	1	-	-	-	151	(3)	1,134	(315)	1,449
TLBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 166	6,861	-	-	-	-	65	(3)	662	(261)	923
TEBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 54	(280)	-	1	-	-	(65)	(1)	1,212	(261)	1,473
TEBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 41	2,429	-	1	-	-	209	(1)	(507)	143	(649)
TLBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 100	4,658	-	1	-	-	216	(1)	73	(73)	147
TLBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 143	4,379	-	1	-	-	108	(1)	83	(83)	166
TLBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 173	6,590	-	1	-	-	497	(1)	(1,218)	348	(1,566)

Societal Discount Modeling Approach, Energy Efficiency +30 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 24	(569)	-	-	-	-	(256)	(3)	2,113	(530)	2,643
TEBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 11	2,023	-	-	-	-	17	(3)	393	(134)	528
TLBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 100	4,000	-	-	-	-	(5)	(2)	1,655	(543)	2,198
TLBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 147	3,589	-	-	-	-	(114)	(3)	2,162	(639)	2,801
TLBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 151	5,935	-	-	-	-	245	(3)	717	(227)	944
TEBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 43	(569)	-	-	-	-	(256)	(3)	2,113	(530)	2,643
TEBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 30	2,023	-	-	-	-	17	(3)	393	(134)	528
TLBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 138	4,000	-	-	-	-	(5)	(2)	1,655	(543)	2,198
TLBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 186	3,589	-	-	-	-	(114)	(3)	2,162	(639)	2,801
TLBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 190	5,935	-	-	-	-	245	(3)	717	(227)	944
TEBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 9	(290)	-	-	-	-	(496)	(3)	2,315	(629)	2,944
TEBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 47	2,402	-	-	-	-	(102)	(3)	676	(263)	939
TLBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 168	4,479	-	-	-	-	(70)	(2)	1,952	(655)	2,607
TLBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 196	3,874	-	-	-	-	(236)	(3)	2,522	(769)	3,291
TLBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 249	6,354	-	-	-	-	259	(3)	1,120	(398)	1,517
TEBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 72	(3,676)	-	1	(1)	1	(140)	(2)	1,425	113	1,312
TEBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 5	(991)	-	1	(1)	1	(13)	(2)	(554)	604	(1,158)
TLBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 86	863	-	1	(1)	1	(45)	(1)	718	204	514
TLBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 147	607	-	1	(1)	1	(94)	(2)	1,196	119	1,076
TLBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 101	2,948	-	1	(1)	1	83	(2)	(444)	639	(1,084)
TEBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$ 33	(2,577)	1	-	-	-	49	(3)	1,324	(219)	1,543
TEBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$ 57	2,074	-	-	-	-	33	(3)	490	(182)	673
TLBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$ 196	4,237	-	-	-	-	33	(2)	1,838	(566)	2,404
TLBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$ 236	1,615	1	-	-	-	305	(3)	1,572	(333)	1,905
TLBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$ 269	6,080	-	-	-	-	290	(3)	961	(300)	1,261

Societal Discount Modeling Approach, Energy Efficiency +30 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$ 13	(1,899)	1	(1)	1	(1)	290	2	(203)	(313)	110
TEBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$ 44	(5,346)	1	-	-	-	59	-	958	(139)	1,097
TEBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$ 61	(882)	1	-	-	-	274	1	321	(41)	361
TLBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$ 112	(1,210)	1	-	-	-	180	-	823	(148)	972
TLBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$ 79	3,966	-	-	-	-	105	-	113	33	80
TEBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$ 0	(1,236)	1	(1)	1	(1)	323	2	113	(280)	394
TEBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$ 19	(4,702)	1	-	-	-	39	-	1,026	(132)	1,159
TEBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$ 93	1,812	-	-	-	-	(35)	1	1,169	(355)	1,524
TLBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$ 139	1,357	-	-	-	-	(147)	-	1,701	(468)	2,169
TLBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$ 137	3,746	-	-	-	-	215	-	220	(33)	253
TEBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$ 10	(1,737)	-	-	-	-	(62)	2	153	(130)	282
TEBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$ 13	(2,611)	-	-	-	-	(379)	-	1,820	(422)	2,242
TEBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$ 99	1,213	-	-	-	-	(11)	1	600	(200)	800
TLBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$ 135	738	-	-	-	-	(163)	-	1,171	(337)	1,509
TLBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$ 140	5,368	(1)	-	-	-	(176)	-	492	(203)	695
TEBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$ 64	(504)	-	-	-	-	(243)	(3)	2,155	(572)	2,728
TEBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$ 58	2,176	-	-	-	-	25	(3)	457	(180)	636
TLBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$ 161	4,170	-	(1)	-	-	(19)	(2)	1,521	(560)	2,081
TLBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$ 211	3,618	-	(1)	-	-	(122)	(3)	2,023	(655)	2,679
TLBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$ 221	6,095	-	(1)	-	-	230	(3)	598	(252)	850
TEBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$ 115	(209)	-	-	-	-	(270)	(3)	2,453	(631)	3,084
TEBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$ 106	2,561	-	-	-	-	(122)	(3)	638	(242)	880
TLBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$ 208	4,250	-	-	-	-	(149)	(2)	1,557	(539)	2,095
TLBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$ 251	3,646	-	-	-	-	(210)	(3)	2,023	(625)	2,647
TLBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$ 260	6,149	-	-	-	-	(2)	(3)	509	(231)	740

Societal Discount Modeling Approach, Energy Efficiency +30 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 60	(2)	-	-	-	-	(285)	(3)	2,439	(600)	3,038
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 24	2,557	-	-	-	-	(131)	(3)	590	(208)	798
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 130	4,576	-	-	-	-	(153)	(2)	1,911	(609)	2,519
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 183	4,260	-	-	-	-	(217)	(3)	2,398	(693)	3,091
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 166	6,508	-	-	-	-	(4)	(3)	847	(290)	1,137
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 147	(13)	-	-	-	-	(69)	(3)	2,925	(482)	3,407
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 43	2,776	-	-	-	-	(46)	(3)	670	(146)	817
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 184	4,774	-	-	-	-	(54)	(2)	2,146	(512)	2,658
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 270	4,515	-	-	-	-	(61)	(3)	2,683	(513)	3,196
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$ 174	9,413	(1)	(1)	-	1	(56)	(3)	1,159	(344)	1,502
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 19	(689)	-	1	-	-	(441)	(3)	2,026	(542)	2,568
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 22	1,986	-	1	-	-	(65)	(3)	366	(135)	501
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 119	3,930	-	1	-	-	(65)	(2)	1,591	(529)	2,120
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 159	3,435	-	1	-	-	(218)	(3)	2,110	(640)	2,750
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 178	5,881	-	1	-	-	258	(3)	704	(230)	934
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 19	(689)	-	1	-	-	(441)	(3)	2,026	(542)	2,568
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 21	1,986	-	1	-	-	(65)	(3)	366	(135)	501
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 119	3,930	-	1	-	-	(65)	(2)	1,591	(529)	2,120
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 159	3,435	-	1	-	-	(218)	(3)	2,110	(640)	2,750
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$ 178	5,881	-	1	-	-	258	(3)	704	(230)	934
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$ 39	(1,011)	-	1	-	-	(229)	(3)	1,922	(447)	2,370
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$ 26	1,580	-	1	-	-	44	(3)	203	(52)	254
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$ 122	3,489	-	-	-	-	(4)	(2)	1,239	(405)	1,644
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$ 170	3,067	-	-	-	-	(110)	(3)	1,746	(505)	2,251
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$ 174	5,424	-	-	-	-	246	(3)	301	(90)	391

Societal Discount Modeling Approach, Energy Efficiency +30 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$ 49	(1,011)	-	1	-	-	(229)	(3)	1,922	(447)	2,370
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$ 29	2,312	-	-	-	-	33	(3)	702	(235)	937
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$ 122	3,489	-	-	-	-	(4)	(2)	1,239	(405)	1,644
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$ 170	3,067	-	-	-	-	(110)	(3)	1,746	(505)	2,251
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$ 174	5,424	-	-	-	-	246	(3)	301	(90)	391
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$ 35	(569)	-	-	-	-	(256)	(3)	2,113	(530)	2,643
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$ 22	2,023	-	-	-	-	17	(3)	393	(134)	528
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$ 120	4,000	-	-	-	-	(5)	(2)	1,655	(543)	2,198
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$ 168	3,589	-	-	-	-	(114)	(3)	2,162	(639)	2,801
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$ 172	5,935	-	-	-	-	245	(3)	717	(227)	944
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$ 29	(485)	-	-	-	-	(332)	(2)	1,307	(373)	1,680
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$ 22	4,809	(1)	-	-	-	(426)	(2)	484	(339)	823
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$ 120	4,246	-	-	-	-	28	(1)	862	(396)	1,259
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$ 179	3,778	-	-	-	-	(129)	(2)	1,388	(518)	1,906
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$ 185	8,198	-	(4)	-	-	(132)	(2)	519	(421)	940
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$ 51	(2,435)	1	-	-	-	(140)	(3)	1,642	(433)	2,075
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$ 25	2,513	-	-	-	-	(171)	(3)	498	(228)	726
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$ 137	4,515	-	-	-	-	(197)	(2)	1,751	(678)	2,429
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$ 189	1,851	1	-	-	-	56	(3)	1,635	(489)	2,124
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$ 178	6,539	-	-	-	-	29	(3)	759	(293)	1,052
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$ 10	(2,672)	1	-	-	-	(76)	(3)	1,212	(134)	1,346
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$ 16	2,446	-	-	-	-	(141)	(3)	620	(185)	804
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$ 107	1,836	1	-	-	-	233	(2)	751	(132)	883
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$ 144	1,353	1	-	-	-	94	(3)	1,293	(220)	1,512
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$ 157	6,274	-	-	-	-	12	(3)	898	(272)	1,170

Market Off Modeling Approach, Energy Efficiency +11 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 12,958	111,998	5	-	-	2	1,529	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 13,185	110,721	5	-	-	2	870	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 12,985	114,048	5	-	-	2	1,351	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 13,204	115,827	5	-	-	2	1,300	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 13,343	115,385	5	-	-	2	1,099	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 13,165	118,453	5	-	-	2	1,690	-	-	-	-
TEBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 13,298	114,666	5	-	-	2	1,205	3	-	-	-
TEBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 13,499	113,011	5	1	-	2	685	-	-	-	-
TEBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 13,304	116,390	5	1	-	2	1,063	-	-	-	-
TLBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 13,496	118,085	5	1	-	2	1,001	1	-	-	-
TLBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 13,693	117,415	5	2	-	2	988	-	-	-	-
TLBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 13,510	120,472	5	2	-	2	1,537	-	-	-	-
TEBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 13,729	117,964	5	-	-	2	869	3	-	-	-
TEBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 13,915	120,567	5	2	1	1	628	1	-	-	-
TEBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 13,737	120,234	5	-	-	2	938	1	-	-	-
TLBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 13,923	121,587	5	1	-	2	857	2	-	-	-
TLBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 14,245	119,747	5	3	-	2	769	-	-	-	-
TLBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 14,023	122,969	5	3	-	2	1,219	-	-	-	-
TEBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 12,768	109,660	5	1	-	1	1,752	2	-	-	-
TEBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 13,057	108,104	5	3	-	1	1,559	-	-	-	-
TEBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 12,856	111,471	5	3	-	1	2,264	-	-	-	-
TLBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 12,949	113,707	5	3	-	1	2,178	-	-	-	-
TLBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 13,062	114,327	5	-	-	1	1,508	-	-	-	-
TLBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 12,920	117,181	5	-	-	1	2,241	-	-	-	-
TEBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 12,495	105,716	5	1	-	1	1,980	1	-	-	-
TEBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 12,665	104,438	5	3	-	1	2,031	-	-	-	-
TEBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 12,488	107,914	5	3	-	1	2,827	-	-	-	-
TLBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 12,558	110,063	5	3	-	1	2,862	-	-	-	-
TLBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 12,576	109,574	5	3	-	1	2,521	-	-	-	-
TLBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 12,488	113,216	5	2	-	1	3,180	-	-	-	-

Market Off Modeling Approach, Energy Efficiency +11 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 13,079	111,998	5	-	-	2	1,529	3	-	-	-
TEBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 13,302	110,721	5	-	-	2	870	-	-	-	-
TEBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 13,102	114,048	5	-	-	2	1,351	-	-	-	-
TLBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 13,314	115,827	5	-	-	2	1,300	1	-	-	-
TLBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 13,450	115,385	5	-	-	2	1,099	-	-	-	-
TLBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 13,271	118,453	5	-	-	2	1,690	-	-	-	-
TEBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 12,838	111,998	5	-	-	2	1,529	3	-	-	-
TEBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 13,069	110,721	5	-	-	2	870	-	-	-	-
TEBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 12,868	114,048	5	-	-	2	1,351	-	-	-	-
TLBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 13,094	115,827	5	-	-	2	1,300	1	-	-	-
TLBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 13,237	115,385	5	-	-	2	1,099	-	-	-	-
TLBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 13,058	118,453	5	-	-	2	1,690	-	-	-	-
TEBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 13,846	111,113	5	-	-	2	1,533	3	-	-	-
TEBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 14,064	109,783	5	-	-	2	871	-	-	-	-
TEBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 13,889	113,216	5	-	-	2	1,352	-	-	-	-
TLBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 14,122	115,114	5	-	-	2	1,300	1	-	-	-
TLBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 14,258	114,611	5	-	-	2	1,097	-	-	-	-
TLBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 14,103	117,794	5	-	-	2	1,688	-	-	-	-
TEBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 12,027	117,084	5	-	1	1	1,296	2	-	-	-
TEBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 12,279	114,303	5	-	1	1	872	-	-	-	-
TEBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 12,051	117,520	5	-	1	1	1,353	-	-	-	-
TLBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 12,258	118,752	5	-	1	1	1,302	1	-	-	-
TLBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 12,403	118,319	5	-	1	1	1,101	-	-	-	-
TLBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 12,199	121,262	5	-	1	1	1,692	-	-	-	-
TEBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ 13,513	110,969	5	-	-	2	1,532	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ 13,747	109,625	5	-	-	2	870	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ 13,565	113,070	5	-	-	2	1,351	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ 13,814	115,004	5	-	-	2	1,301	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ 13,956	114,475	5	-	-	2	1,099	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ 13,793	117,692	5	-	-	2	1,690	-	-	-	-

Market Off Modeling Approach, Energy Efficiency +11 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ 12,364	117,093	5	-	1	1	1,296	2	-	-	-
TEBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ 12,596	114,249	5	-	1	1	872	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ 12,377	117,426	5	-	1	1	1,353	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ 12,568	118,735	5	-	1	1	1,302	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ 12,705	118,330	5	-	1	1	1,100	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ 12,510	121,254	5	-	1	1	1,692	-	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ 13,151	116,821	5	-	1	1	1,296	2	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ 13,367	113,799	5	-	1	1	871	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ 13,159	117,030	5	-	1	1	1,352	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ 13,379	118,337	5	-	1	1	1,302	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ 13,513	117,865	5	-	1	1	1,101	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ 13,328	120,853	5	-	1	1	1,692	-	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ 13,322	116,712	5	-	-	2	1,529	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ 13,519	115,281	5	-	-	2	873	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ 13,305	118,523	5	-	-	2	1,354	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ 13,528	119,646	5	-	-	2	1,304	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ 13,656	119,010	5	-	-	2	1,103	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ 13,468	121,924	5	-	-	2	1,694	-	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ 12,763	110,926	5	-	-	2	1,533	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ 13,005	109,598	5	-	-	2	871	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ 12,812	113,037	5	-	-	2	1,352	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ 13,032	114,977	5	-	-	2	1,302	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ 13,177	114,443	5	-	-	2	1,099	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ 13,005	117,674	5	-	-	2	1,690	-	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ 12,576	110,742	5	-	-	2	1,539	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ 12,831	109,278	5	-	-	2	872	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ 12,648	112,826	5	-	-	2	1,355	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ 12,869	114,751	5	-	-	2	1,304	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ 13,016	114,086	5	-	-	2	1,100	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ 12,852	117,421	5	-	-	2	1,693	-	-	-	-

Market Off Modeling Approach, Energy Efficiency +11 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 13,124	111,998	5	-	-	2	1,529	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 13,351	110,721	5	-	-	2	870	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 13,150	114,048	5	-	-	2	1,351	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 13,370	115,827	5	-	-	2	1,300	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 13,509	115,385	5	-	-	2	1,099	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 13,330	118,453	5	-	-	2	1,690	-	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEM	$ 13,276	113,929	4	-	-	2	1,093	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEM	$ 13,514	112,725	4	-	-	2	486	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEM	$ 13,296	115,999	4	-	-	2	841	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEM	$ 13,519	117,833	4	-	-	2	767	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEM	$ 13,667	117,486	4	-	-	2	624	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEM	$ 13,472	120,486	4	-	-	2	1,072	-	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 12,793	111,998	5	-	-	2	1,529	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 13,020	110,721	5	-	-	2	870	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 12,819	114,048	5	-	-	2	1,351	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 13,039	115,827	5	-	-	2	1,300	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 13,178	115,385	5	-	-	2	1,099	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 12,999	118,453	5	-	-	2	1,690	-	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEM	$ 12,627	111,998	5	-	-	2	1,529	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEM	$ 12,854	110,721	5	-	-	2	870	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEM	$ 12,654	114,048	5	-	-	2	1,351	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEM	$ 12,873	115,827	5	-	-	2	1,300	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEM	$ 13,012	115,385	5	-	-	2	1,099	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEM	$ 12,834	118,453	5	-	-	2	1,690	-	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ 12,958	111,998	5	-	-	2	1,529	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ 13,185	110,721	5	-	-	2	870	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ 12,985	114,048	5	-	-	2	1,351	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ 13,204	115,827	5	-	-	2	1,300	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ 13,343	115,385	5	-	-	2	1,099	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ 13,165	118,453	5	-	-	2	1,690	-	-	-	-

Market Off Modeling Approach, Energy Efficiency +11 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ 12,958	111,998	5	-	-	2	1,529	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ 13,185	110,721	5	-	-	2	870	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ 12,985	114,048	5	-	-	2	1,351	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ 13,204	115,827	5	-	-	2	1,300	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ 13,343	115,385	5	-	-	2	1,099	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ 13,165	118,453	5	-	-	2	1,690	-	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ 12,958	111,998	5	-	-	2	1,529	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ 13,185	110,721	5	-	-	2	870	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ 12,985	114,048	5	-	-	2	1,351	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ 13,204	115,827	5	-	-	2	1,300	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ 13,343	115,385	5	-	-	2	1,099	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ 13,165	118,453	5	-	-	2	1,690	-	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ 12,958	111,998	5	-	-	2	1,529	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ 13,185	110,721	5	-	-	2	870	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ 12,985	114,048	5	-	-	2	1,351	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ 13,204	115,827	5	-	-	2	1,300	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ 13,343	115,385	5	-	-	2	1,099	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ 13,165	118,453	5	-	-	2	1,690	-	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ 13,022	111,998	5	-	-	2	1,529	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ 13,249	110,721	5	-	-	2	870	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ 13,048	114,048	5	-	-	2	1,351	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ 13,267	115,827	5	-	-	2	1,300	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ 13,406	115,385	5	-	-	2	1,099	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ 13,228	118,453	5	-	-	2	1,690	-	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ 12,960	111,998	5	-	-	2	1,529	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ 13,186	110,721	5	-	-	2	870	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ 12,986	114,048	5	-	-	2	1,351	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ 13,205	115,827	5	-	-	2	1,300	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ 13,344	115,385	5	-	-	2	1,099	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ 13,166	118,453	5	-	-	2	1,690	-	-	-	-

Market Off Modeling Approach, Energy Efficiency +11 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 227	(1,277)	-	-	-	-	(659)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 26	2,050	-	-	-	-	(178)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 246	3,830	-	-	-	-	(229)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 385	3,387	-	-	-	-	(430)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 206	6,455	-	-	-	-	161	(3)	-	-	-
TEBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 201	(1,655)	-	1	-	-	(521)	(3)	-	-	-
TEBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 5	1,724	-	1	-	-	(143)	(3)	-	-	-
TLBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 198	3,419	-	1	-	-	(205)	(2)	-	-	-
TLBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 395	2,749	-	2	-	-	(217)	(3)	-	-	-
TLBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 212	5,806	-	2	-	-	332	(3)	-	-	-
TEBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 186	2,602	-	2	1	(1)	(241)	(2)	-	-	-
TEBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 7	2,270	-	-	-	-	69	(2)	-	-	-
TLBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 194	3,623	-	1	-	-	(12)	(1)	-	-	-
TLBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 515	1,783	-	3	-	-	(99)	(3)	-	-	-
TLBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 293	5,004	-	3	-	-	351	(3)	-	-	-
TEBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 289	(1,556)	-	2	-	-	(193)	(2)	-	-	-
TEBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 88	1,811	-	2	-	-	513	(2)	-	-	-
TLBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 181	4,047	-	2	-	-	426	(2)	-	-	-
TLBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 294	4,666	-	(1)	-	-	(244)	(2)	-	-	-
TLBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 152	7,521	-	(1)	-	-	490	(2)	-	-	-
TEBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 8	(2,198)	-	(2)	-	-	(847)	1	-	-	-
TEBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 178	(3,476)	-	-	-	-	(796)	-	-	-	-
TEBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 70	2,149	-	-	-	-	34	-	-	-	-
TLBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 89	1,660	-	-	-	-	(306)	-	-	-	-
TLBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 1	5,302	-	(1)	-	-	353	-	-	-	-

Market Off Modeling Approach, Energy Efficiency +11 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 223	(1,277)	-	-	-	-	(659)	(3)	-	-	-
TEBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 23	2,050	-	-	-	-	(178)	(3)	-	-	-
TLBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 235	3,830	-	-	-	-	(229)	(2)	-	-	-
TLBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 371	3,387	-	-	-	-	(430)	(3)	-	-	-
TLBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 192	6,455	-	-	-	-	161	(3)	-	-	-
TEBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 231	(1,277)	-	-	-	-	(659)	(3)	-	-	-
TEBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 30	2,050	-	-	-	-	(178)	(3)	-	-	-
TLBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 256	3,830	-	-	-	-	(229)	(2)	-	-	-
TLBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 399	3,387	-	-	-	-	(430)	(3)	-	-	-
TLBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 220	6,455	-	-	-	-	161	(3)	-	-	-
TEBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 217	(1,330)	-	-	-	-	(662)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 43	2,103	-	-	-	-	(181)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 276	4,001	-	-	-	-	(233)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 412	3,498	-	-	-	-	(436)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 257	6,681	-	-	-	-	155	(3)	-	-	-
TEBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 252	(2,781)	-	-	-	-	(424)	(2)	-	-	-
TEBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 24	436	-	-	-	-	58	(2)	-	-	-
TLBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 232	1,668	-	-	-	-	6	(1)	-	-	-
TLBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 376	1,235	-	-	-	-	(195)	(2)	-	-	-
TLBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEM	$ 172	4,178	-	-	-	-	396	(2)	-	-	-
TEBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ 235	(1,345)	-	-	-	-	(662)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ 52	2,100	-	-	-	-	(181)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ 301	4,034	-	-	-	-	(231)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ 443	3,505	-	-	-	-	(433)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEM	$ 281	6,723	-	-	-	-	158	(3)	-	-	-

Market Off Modeling Approach, Energy Efficiency +11 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ 232	(2,845)	-	-	-	-	(424)	(2)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ 13	332	-	-	-	-	57	(2)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ 204	1,642	-	-	-	-	6	(1)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ 341	1,236	-	-	-	-	(196)	(2)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEM	$ 147	4,161	-	-	-	-	396	(2)	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ 216	(3,021)	-	-	-	-	(424)	(2)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ 8	210	-	-	-	-	57	(2)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ 228	1,517	-	-	-	-	6	(1)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ 362	1,045	-	-	-	-	(194)	(2)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEM	$ 178	4,033	-	-	-	-	397	(2)	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ 17	(1,810)	-	-	-	-	175	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ 214	(3,242)	-	-	-	-	(481)	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ 223	1,124	-	-	-	-	(51)	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ 351	487	-	-	-	-	(251)	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEM	$ 163	3,401	-	-	-	-	340	-	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ 242	(1,328)	-	-	-	-	(662)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ 49	2,111	-	-	-	-	(181)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ 270	4,051	-	-	-	-	(231)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ 414	3,517	-	-	-	-	(434)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEM	$ 242	6,748	-	-	-	-	157	(3)	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ 255	(1,463)	-	-	-	-	(667)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ 72	2,085	-	-	-	-	(184)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ 293	4,009	-	-	-	-	(235)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ 441	3,344	-	-	-	-	(439)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEM	$ 276	6,679	-	-	-	-	154	(3)	-	-	-

Market Off Modeling Approach, Energy Efficiency +11 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 227	(1,277)	-	-	-	-	(659)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 26	2,050	-	-	-	-	(178)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 246	3,830	-	-	-	-	(229)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 385	3,387	-	-	-	-	(430)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 206	6,455	-	-	-	-	161	(3)	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 238	(1,204)	-	-	-	-	(607)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 21	2,070	-	-	-	-	(252)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 243	3,904	-	-	-	-	(326)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 391	3,557	-	-	-	-	(469)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEM	$ 196	6,557	-	-	-	-	(21)	(3)	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 227	(1,277)	-	-	-	-	(659)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 26	2,050	-	-	-	-	(178)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 246	3,830	-	-	-	-	(229)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 385	3,387	-	-	-	-	(430)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 206	6,455	-	-	-	-	161	(3)	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 227	(1,277)	-	-	-	-	(659)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 26	2,050	-	-	-	-	(178)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 246	3,830	-	-	-	-	(229)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 385	3,387	-	-	-	-	(430)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEM	$ 206	6,455	-	-	-	-	161	(3)	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ 227	(1,277)	-	-	-	-	(659)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ 26	2,050	-	-	-	-	(178)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ 246	3,830	-	-	-	-	(229)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ 385	3,387	-	-	-	-	(430)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEM	$ 206	6,455	-	-	-	-	161	(3)	-	-	-

Market Off Modeling Approach, Energy Efficiency +11 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ 227	(1,277)	-	-	-	-	(659)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ 26	2,050	-	-	-	-	(178)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ 246	3,830	-	-	-	-	(229)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ 385	3,387	-	-	-	-	(430)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEM	$ 206	6,455	-	-	-	-	161	(3)	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ 227	(1,277)	-	-	-	-	(659)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ 26	2,050	-	-	-	-	(178)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ 246	3,830	-	-	-	-	(229)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ 385	3,387	-	-	-	-	(430)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEM	$ 206	6,455	-	-	-	-	161	(3)	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ 227	(1,277)	-	-	-	-	(659)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ 26	2,050	-	-	-	-	(178)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ 246	3,830	-	-	-	-	(229)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ 385	3,387	-	-	-	-	(430)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEM	$ 206	6,455	-	-	-	-	161	(3)	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ 227	(1,277)	-	-	-	-	(659)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ 26	2,050	-	-	-	-	(178)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ 246	3,830	-	-	-	-	(229)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ 385	3,387	-	-	-	-	(430)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEM	$ 206	6,455	-	-	-	-	161	(3)	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ 227	(1,277)	-	-	-	-	(659)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ 26	2,050	-	-	-	-	(178)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ 246	3,830	-	-	-	-	(229)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ 385	3,387	-	-	-	-	(430)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEM	$ 206	6,455	-	-	-	-	161	(3)	-	-	-

Market Off Modeling Approach, Energy Efficiency +15 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 12,945	111,763	5	-	-	2	1,571	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 13,227	110,668	5	-	-	2	901	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 13,004	114,119	5	-	-	2	1,391	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 13,177	115,542	5	-	-	2	1,344	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 13,315	115,093	5	-	-	2	1,138	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 13,138	118,165	5	-	-	2	1,740	-	-	-	-
TEBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 13,279	114,427	5	-	-	2	1,239	3	-	-	-
TEBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 13,491	113,204	5	-	-	2	666	-	-	-	-
TEBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 13,296	116,459	5	-	-	2	1,062	-	-	-	-
TLBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 13,479	117,838	5	1	-	2	1,035	1	-	-	-
TLBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 13,676	117,170	5	2	-	2	1,023	-	-	-	-
TLBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 13,496	120,221	5	2	-	2	1,584	-	-	-	-
TEBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 13,737	117,981	5	-	-	2	893	3	-	-	-
TEBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 13,893	120,313	5	2	1	1	650	1	-	-	-
TEBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 13,718	119,980	5	-	-	2	964	1	-	-	-
TLBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 13,906	121,333	5	1	-	2	885	2	-	-	-
TLBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 14,224	119,506	5	3	-	2	799	-	-	-	-
TLBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 14,004	122,721	5	3	-	2	1,259	-	-	-	-
TEBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 12,748	109,427	5	1	-	1	1,804	2	-	-	-
TEBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 13,038	107,877	5	3	-	1	1,610	-	-	-	-
TEBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 12,840	111,238	5	3	-	1	2,329	-	-	-	-
TLBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 12,930	114,097	5	2	-	1	1,998	-	-	-	-
TLBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 13,042	114,085	5	-	-	1	1,556	-	-	-	-
TLBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 12,902	116,938	5	-	-	1	2,303	-	-	-	-
TEBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 12,474	105,493	5	1	-	1	2,043	1	-	-	-
TEBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 12,650	104,632	5	2	-	1	1,971	-	-	-	-
TEBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 12,474	107,989	5	2	-	1	2,809	-	-	-	-
TLBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 12,541	109,832	5	3	-	1	2,939	-	-	-	-
TLBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 12,560	109,335	5	3	-	1	2,592	-	-	-	-
TLBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 12,469	112,981	5	2	-	1	3,264	-	-	-	-

Market Off Modeling Approach, Energy Efficiency +15 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 13,066	111,763	5	-	-	2	1,571	3	-	-	-
TEBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 13,340	110,668	5	-	-	2	901	-	-	-	-
TEBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 13,118	114,119	5	-	-	2	1,391	-	-	-	-
TLBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 13,287	115,542	5	-	-	2	1,344	1	-	-	-
TLBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 13,422	115,093	5	-	-	2	1,138	-	-	-	-
TLBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 13,244	118,165	5	-	-	2	1,740	-	-	-	-
TEBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 12,824	111,763	5	-	-	2	1,571	3	-	-	-
TEBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 13,114	110,668	5	-	-	2	901	-	-	-	-
TEBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 12,891	114,119	5	-	-	2	1,391	-	-	-	-
TLBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 13,067	115,542	5	-	-	2	1,344	1	-	-	-
TLBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 13,209	115,093	5	-	-	2	1,138	-	-	-	-
TLBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 13,032	118,165	5	-	-	2	1,740	-	-	-	-
TEBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 13,830	110,884	5	-	-	2	1,575	3	-	-	-
TEBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 14,104	109,792	5	-	-	2	902	-	-	-	-
TEBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 13,908	113,356	5	-	-	2	1,392	-	-	-	-
TLBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 14,092	114,835	5	-	-	2	1,345	1	-	-	-
TLBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 14,227	114,325	5	-	-	2	1,137	-	-	-	-
TLBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 14,074	117,512	5	-	-	2	1,740	-	-	-	-
TEBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 12,030	115,342	5	-	1	1	1,571	3	-	-	-
TEBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 12,322	114,060	5	-	1	1	903	-	-	-	-
TEBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 12,071	117,369	5	-	1	1	1,393	-	-	-	-
TLBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 12,234	118,466	5	-	1	1	1,346	1	-	-	-
TLBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 12,378	118,029	5	-	1	1	1,140	-	-	-	-
TLBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 12,175	120,973	5	-	1	1	1,742	-	-	-	-
TEBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 13,498	110,742	5	-	-	2	1,573	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 13,791	109,649	5	-	-	2	901	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 13,586	113,223	5	-	-	2	1,391	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 13,785	114,723	5	-	-	2	1,345	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 13,926	114,187	5	-	-	2	1,138	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 13,765	117,409	5	-	-	2	1,740	-	-	-	-

Market Off Modeling Approach, Energy Efficiency +15 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 12,363	115,214	5	-	1	1	1,572	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 12,636	114,064	5	-	1	1	903	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 12,394	117,349	5	-	1	1	1,393	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 12,542	118,449	5	-	1	1	1,346	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 12,678	118,039	5	-	1	1	1,140	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 12,485	120,966	5	-	1	1	1,742	-	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 13,139	114,818	5	-	1	1	1,571	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 13,403	113,628	5	-	1	1	903	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 13,173	116,979	5	-	1	1	1,392	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 13,350	118,051	5	-	1	1	1,346	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 13,483	117,572	5	-	1	1	1,140	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 13,300	120,563	5	-	1	1	1,743	-	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 13,306	116,487	5	-	-	2	1,571	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 13,552	114,865	5	-	-	2	904	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 13,316	118,188	5	-	-	2	1,394	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 13,498	119,369	5	-	-	2	1,348	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 13,626	118,728	5	-	-	2	1,143	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 13,439	121,643	5	-	-	2	1,745	-	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 12,751	110,697	5	-	-	2	1,576	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 13,053	109,628	5	-	-	2	902	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 12,838	113,199	5	-	-	2	1,392	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 13,006	114,696	5	-	-	2	1,346	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 13,150	114,155	5	-	-	2	1,138	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 12,979	117,390	5	-	-	2	1,740	-	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 12,565	110,514	5	-	-	2	1,581	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 12,885	109,316	5	-	-	2	903	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 12,680	112,990	5	-	-	2	1,395	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 12,844	114,471	5	-	-	2	1,348	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 12,990	113,797	5	-	-	2	1,138	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 12,828	117,138	5	-	-	2	1,743	-	-	-	-

Market Off Modeling Approach, Energy Efficiency +15 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 13,111	111,763	5	-	-	2	1,571	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 13,393	110,668	5	-	-	2	901	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 13,170	114,119	5	-	-	2	1,391	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 13,342	115,542	5	-	-	2	1,344	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 13,481	115,093	5	-	-	2	1,138	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 13,303	120,183	4	-	-	2	1,106	-	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEH	$ 13,260	113,684	4	-	-	2	1,121	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEH	$ 13,558	110,668	5	-	-	2	901	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEH	$ 13,320	116,072	4	-	-	2	867	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEH	$ 13,490	117,534	4	-	-	2	795	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEH	$ 13,637	117,181	4	-	-	2	648	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEH	$ 13,443	120,183	4	-	-	2	1,106	-	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 12,779	111,763	5	-	-	2	1,571	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 13,061	110,668	5	-	-	2	901	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 12,839	114,119	5	-	-	2	1,391	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 13,011	115,542	5	-	-	2	1,344	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 13,150	115,093	5	-	-	2	1,138	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 12,972	118,165	5	-	-	2	1,740	-	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEH	$ 12,614	111,763	5	-	-	2	1,571	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEH	$ 12,896	110,668	5	-	-	2	901	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEH	$ 12,673	114,119	5	-	-	2	1,391	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEH	$ 12,846	115,542	5	-	-	2	1,344	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEH	$ 12,984	115,093	5	-	-	2	1,138	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEH	$ 12,807	118,165	5	-	-	2	1,740	-	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 12,945	111,763	5	-	-	2	1,571	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 13,227	110,668	5	-	-	2	901	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 13,004	114,119	5	-	-	2	1,391	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 13,177	115,542	5	-	-	2	1,344	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 13,315	115,093	5	-	-	2	1,138	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 13,138	118,165	5	-	-	2	1,740	-	-	-	-

Market Off Modeling Approach, Energy Efficiency +15 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 12,945	111,763	5	-	-	2	1,571	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 13,227	110,668	5	-	-	2	901	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 13,004	114,119	5	-	-	2	1,391	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 13,177	115,542	5	-	-	2	1,344	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 13,315	115,093	5	-	-	2	1,138	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 13,138	118,165	5	-	-	2	1,740	-	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 12,945	111,763	5	-	-	2	1,571	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 13,227	110,668	5	-	-	2	901	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 13,004	114,119	5	-	-	2	1,391	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 13,177	115,542	5	-	-	2	1,344	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 13,315	115,093	5	-	-	2	1,138	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 13,138	118,165	5	-	-	2	1,740	-	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 12,945	111,763	5	-	-	2	1,571	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 13,227	110,668	5	-	-	2	901	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 13,004	114,119	5	-	-	2	1,391	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 13,177	115,542	5	-	-	2	1,344	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 13,315	115,093	5	-	-	2	1,138	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 13,138	118,165	5	-	-	2	1,740	-	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 13,008	111,763	5	-	-	2	1,571	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 13,290	110,668	5	-	-	2	901	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 13,068	114,119	5	-	-	2	1,391	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 13,240	115,542	5	-	-	2	1,344	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 13,379	115,093	5	-	-	2	1,138	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 13,201	118,165	5	-	-	2	1,740	-	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 12,946	111,763	5	-	-	2	1,571	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 13,228	110,668	5	-	-	2	901	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 13,005	114,119	5	-	-	2	1,391	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 13,178	115,542	5	-	-	2	1,344	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 13,316	115,093	5	-	-	2	1,138	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 13,139	118,165	5	-	-	2	1,740	-	-	-	-

Market Off Modeling Approach, Energy Efficiency +15 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 282	(1,095)	-	-	-	-	(670)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 59	2,356	-	-	-	-	(181)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 232	3,779	-	-	-	-	(227)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 370	3,330	-	-	-	-	(434)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 193	6,402	-	-	-	-	169	(3)	-	-	-
TEBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 211	(1,224)	-	-	-	-	(573)	(3)	-	-	-
TEBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 16	2,032	-	-	-	-	(176)	(3)	-	-	-
TLBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 199	3,411	-	1	-	-	(203)	(2)	-	-	-
TLBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 397	2,742	-	2	-	-	(215)	(3)	-	-	-
TLBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 216	5,794	-	2	-	-	345	(3)	-	-	-
TEBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 19	(1,999)	-	-	-	-	(71)	2	-	-	-
TEBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 175	333	-	2	1	(1)	(314)	-	-	-	-
TEBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 189	1,353	-	1	-	-	(79)	1	-	-	-
TLBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 506	(474)	-	3	-	-	(165)	(1)	-	-	-
TLBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 287	2,740	-	3	-	-	295	(1)	-	-	-
TEBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 290	(1,550)	-	2	-	-	(194)	(2)	-	-	-
TEBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 92	1,812	-	2	-	-	525	(2)	-	-	-
TLBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 182	4,671	-	1	-	-	194	(2)	-	-	-
TLBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 294	4,658	-	(1)	-	-	(248)	(2)	-	-	-
TLBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 155	7,511	-	(1)	-	-	499	(2)	-	-	-
TEBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 5	(7,488)	-	(1)	-	-	(1,222)	1	-	-	-
TEBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 181	(8,349)	-	-	-	-	(1,293)	-	-	-	-
TEBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 5	(4,992)	-	-	-	-	(455)	-	-	-	-
TLBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 72	(3,150)	-	1	-	-	(325)	-	-	-	-
TLBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 91	(3,647)	-	1	-	-	(672)	-	-	-	-
TLBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-

Market Off Modeling Approach, Energy Efficiency +15 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 275	(1,095)	-	-	-	-	(670)	(3)	-	-	-
TEBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 52	2,356	-	-	-	-	(181)	(3)	-	-	-
TLBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 221	3,779	-	-	-	-	(227)	(2)	-	-	-
TLBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 356	3,330	-	-	-	-	(434)	(3)	-	-	-
TLBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 179	6,402	-	-	-	-	169	(3)	-	-	-
TEBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 289	(1,095)	-	-	-	-	(670)	(3)	-	-	-
TEBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 67	2,356	-	-	-	-	(181)	(3)	-	-	-
TLBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 242	3,779	-	-	-	-	(227)	(2)	-	-	-
TLBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 384	3,330	-	-	-	-	(434)	(3)	-	-	-
TLBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 207	6,402	-	-	-	-	169	(3)	-	-	-
TEBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 274	(1,092)	-	-	-	-	(673)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 79	2,471	-	-	-	-	(183)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 262	3,951	-	-	-	-	(230)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 397	3,441	-	-	-	-	(438)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 244	6,628	-	-	-	-	164	(3)	-	-	-
TEBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 292	(1,282)	-	-	-	-	(668)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 42	2,027	-	-	-	-	(179)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 204	3,125	-	-	-	-	(225)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 348	2,687	-	-	-	-	(431)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEH	$ 145	5,631	-	-	-	-	171	(3)	-	-	-
TEBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 293	(1,093)	-	-	-	-	(672)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 88	2,481	-	-	-	-	(182)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 287	3,982	-	-	-	-	(228)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 428	3,445	-	-	-	-	(435)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEH	$ 267	6,668	-	-	-	-	167	(3)	-	-	-

Market Off Modeling Approach, Energy Efficiency +15 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 273	(1,150)	-	-	-	-	(669)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 31	2,135	-	-	-	-	(179)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 178	3,235	-	-	-	-	(226)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 315	2,825	-	-	-	-	(432)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEH	$ 121	5,752	-	-	-	-	170	(3)	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 264	(1,190)	-	-	-	-	(668)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 33	2,160	-	-	-	-	(178)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 210	3,232	-	-	-	-	(224)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 344	2,754	-	-	-	-	(430)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEH	$ 160	5,745	-	-	-	-	172	(3)	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 246	(1,622)	-	-	-	-	(667)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 10	1,701	-	-	-	-	(177)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 193	2,882	-	-	-	-	(223)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 320	2,241	-	-	-	-	(429)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEH	$ 134	5,156	-	-	-	-	173	(3)	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 302	(1,068)	-	-	-	-	(674)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 87	2,503	-	-	-	-	(183)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 256	3,999	-	-	-	-	(230)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 399	3,458	-	-	-	-	(438)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEH	$ 228	6,694	-	-	-	-	165	(3)	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 321	(1,198)	-	-	-	-	(678)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 115	2,476	-	-	-	-	(186)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 280	3,957	-	-	-	-	(233)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 426	3,283	-	-	-	-	(443)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEH	$ 263	6,624	-	-	-	-	162	(3)	-	-	-

Market Off Modeling Approach, Energy Efficiency +15 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 282	(1,095)	-	-	-	-	(670)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 59	2,356	-	-	-	-	(181)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 232	3,779	-	-	-	-	(227)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 370	3,330	-	-	-	-	(434)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 193	8,420	(1)	-	-	-	(465)	(3)	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 298	(3,016)	1	-	-	-	(220)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 60	2,388	-	-	-	-	(254)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 230	3,850	-	-	-	-	(326)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 377	3,497	-	-	-	-	(473)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEH	$ 183	6,499	-	-	-	-	(15)	(3)	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 282	(1,095)	-	-	-	-	(670)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 59	2,356	-	-	-	-	(181)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 232	3,779	-	-	-	-	(227)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 370	3,330	-	-	-	-	(434)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 193	6,402	-	-	-	-	169	(3)	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 282	(1,095)	-	-	-	-	(670)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 59	2,356	-	-	-	-	(181)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 232	3,779	-	-	-	-	(227)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 370	3,330	-	-	-	-	(434)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEH	$ 193	6,402	-	-	-	-	169	(3)	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 282	(1,095)	-	-	-	-	(670)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 59	2,356	-	-	-	-	(181)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 232	3,779	-	-	-	-	(227)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 370	3,330	-	-	-	-	(434)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEH	$ 193	6,402	-	-	-	-	169	(3)	-	-	-

Market Off Modeling Approach, Energy Efficiency +15 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 282	(1,095)	-	-	-	-	(670)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 59	2,356	-	-	-	-	(181)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 232	3,779	-	-	-	-	(227)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 370	3,330	-	-	-	-	(434)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEH	$ 193	6,402	-	-	-	-	169	(3)	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 282	(1,095)	-	-	-	-	(670)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 59	2,356	-	-	-	-	(181)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 232	3,779	-	-	-	-	(227)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 370	3,330	-	-	-	-	(434)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEH	$ 193	6,402	-	-	-	-	169	(3)	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 282	(1,095)	-	-	-	-	(670)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 59	2,356	-	-	-	-	(181)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 232	3,779	-	-	-	-	(227)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 370	3,330	-	-	-	-	(434)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEH	$ 193	6,402	-	-	-	-	169	(3)	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 282	(1,095)	-	-	-	-	(670)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 59	2,356	-	-	-	-	(181)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 232	3,779	-	-	-	-	(227)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 370	3,330	-	-	-	-	(434)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEH	$ 193	6,402	-	-	-	-	169	(3)	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 282	(1,095)	-	-	-	-	(670)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 59	2,356	-	-	-	-	(181)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 232	3,779	-	-	-	-	(227)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 370	3,330	-	-	-	-	(434)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEH	$ 193	6,402	-	-	-	-	169	(3)	-	-	-

Market Off Modeling Approach, Energy Efficiency +30 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 13,000	111,708	5	-	-	2	1,740	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 13,270	110,700	5	-	-	2	1,031	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 13,058	114,046	5	-	-	2	1,561	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 13,243	115,543	5	-	-	2	1,518	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 13,344	114,798	5	-	-	2	1,292	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 13,177	117,800	5	-	-	2	1,940	-	-	-	-
TEBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 13,250	113,753	5	-	-	2	1,376	3	-	-	-
TEBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 13,426	112,276	5	-	-	2	765	-	-	-	-
TEBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 13,242	115,511	5	-	-	2	1,197	-	-	-	-
TLBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 13,463	117,563	5	-	-	2	1,130	1	-	-	-
TLBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 13,638	117,052	5	1	-	2	1,011	-	-	-	-
TLBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 13,450	120,565	5	-	-	2	1,467	-	-	-	-
TEBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 13,706	117,289	5	-	-	2	997	3	-	-	-
TEBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 13,832	119,688	5	1	1	1	708	1	-	-	-
TEBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 13,669	122,773	5	1	1	1	1,131	1	-	-	-
TLBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 13,864	119,842	5	2	-	2	1,279	3	-	-	-
TLBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 14,159	119,007	5	2	-	2	838	-	-	-	-
TLBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 13,948	122,189	5	2	-	2	1,316	-	-	-	-
TEBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 12,712	109,478	5	-	-	1	2,203	3	-	-	-
TEBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 12,974	107,406	5	2	-	1	1,691	-	-	-	-
TEBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 12,785	110,743	5	2	-	1	2,437	-	-	-	-
TLBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 12,872	113,183	5	2	-	1	2,247	-	-	-	-
TLBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 12,988	111,357	5	3	-	1	2,209	-	-	-	-
TLBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 12,876	114,223	5	3	-	1	3,120	-	-	-	-
TEBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 12,451	105,283	5	-	-	1	2,161	1	-	-	-
TEBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 12,587	103,738	5	2	-	1	2,195	-	-	-	-
TEBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 12,422	107,086	5	2	-	1	3,089	-	-	-	-
TLBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 12,489	109,236	5	2	-	1	3,123	-	-	-	-
TLBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 12,508	108,717	5	2	-	1	2,759	-	-	-	-
TLBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 12,419	112,060	5	2	-	1	3,585	-	-	-	-

TEBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	13,108	111,708	5	-	-	2	1,740	3	-	-	-
TEBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	13,371	110,700	5	-	-	2	1,031	-	-	-	-
TEBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	13,159	114,046	5	-	-	2	1,561	-	-	-	-
TLBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	13,340	115,543	5	-	-	2	1,518	1	-	-	-
TLBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	13,441	114,798	5	-	-	2	1,292	-	-	-	-
TLBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	13,274	117,800	5	-	-	2	1,940	-	-	-	-
TEBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	12,891	111,708	5	-	-	2	1,740	3	-	-	-
TEBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	13,169	110,700	5	-	-	2	1,031	-	-	-	-
TEBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	12,957	114,046	5	-	-	2	1,561	-	-	-	-
TLBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	13,145	115,543	5	-	-	2	1,518	1	-	-	-
TLBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	13,246	114,798	5	-	-	2	1,292	-	-	-	-
TLBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	13,079	117,800	5	-	-	2	1,940	-	-	-	-
TEBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	13,880	111,005	5	-	-	2	1,747	3	-	-	-
TEBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	14,142	110,050	5	-	-	2	1,033	-	-	-	-
TEBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	13,957	113,458	5	-	-	2	1,563	-	-	-	-
TLBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	14,153	115,036	5	-	-	2	1,518	1	-	-	-
TLBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	14,248	114,205	5	-	-	2	1,292	-	-	-	-
TLBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	14,105	117,283	5	-	-	2	1,940	-	-	-	-
TEBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	12,096	113,625	5	-	1	1	1,739	3	-	-	-
TEBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	12,376	112,357	5	-	1	1	1,030	-	-	-	-
TEBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	12,137	115,630	5	-	1	1	1,560	-	-	-	-
TLBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	12,310	117,090	5	-	1	1	1,517	1	-	-	-
TLBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	12,418	116,430	5	-	1	1	1,293	-	-	-	-
TLBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	12,225	119,353	5	-	1	1	1,940	-	-	-	-
TEBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$	13,556	110,901	5	-	-	2	1,742	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$	13,837	109,958	5	-	-	2	1,032	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$	13,643	113,365	5	-	-	2	1,561	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$	13,855	114,958	5	-	-	2	1,518	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$	13,955	114,102	5	-	-	2	1,293	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$	13,804	117,204	5	-	-	2	1,940	-	-	-	-

TEBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$	12,419	113,498	5	-	1	1	1,739	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$	12,679	112,362	5	-	1	1	1,029	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$	12,449	115,610	5	-	1	1	1,560	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$	12,606	117,084	5	-	1	1	1,517	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$	12,708	116,441	5	-	1	1	1,292	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$	12,525	119,346	5	-	1	1	1,940	-	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$	13,177	113,097	5	-	1	1	1,739	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$	13,429	111,918	5	-	1	1	1,029	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$	13,210	115,236	5	-	1	1	1,559	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$	13,398	116,688	5	-	1	1	1,517	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$	13,497	115,967	5	-	1	1	1,293	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$	13,324	118,940	5	-	1	1	1,940	-	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$	13,335	115,120	5	-	-	2	1,736	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$	13,569	113,514	5	-	-	2	1,030	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$	13,345	116,797	5	-	-	2	1,559	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$	13,537	118,050	5	-	-	2	1,518	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$	13,634	117,408	5	-	-	2	1,295	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$	13,457	120,303	5	-	-	2	1,942	-	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$	12,822	110,918	5	-	-	2	1,747	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$	13,113	109,964	5	-	-	2	1,032	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$	12,908	113,404	5	-	-	2	1,563	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$	13,090	114,982	5	-	-	2	1,519	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$	13,192	114,093	5	-	-	2	1,293	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$	13,030	117,237	5	-	-	2	1,941	-	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$	12,654	110,722	5	-	-	2	1,750	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$	12,964	109,636	5	-	-	2	1,033	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$	12,768	113,181	5	-	-	2	1,565	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$	12,947	114,747	5	-	-	2	1,522	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$	13,047	113,725	5	-	-	2	1,293	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$	12,894	116,977	5	-	-	2	1,943	-	-	-	-

TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$	13,166	111,708	5	-	-	2	1,740	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$	13,435	110,700	5	-	-	2	1,031	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$	13,224	114,046	5	-	-	2	1,561	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$	13,408	115,543	5	-	-	2	1,518	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$	13,509	114,798	5	-	-	2	1,292	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$	13,342	117,800	5	-	-	2	1,940	-	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEHH	$	13,324	113,634	4	-	-	2	1,235	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEHH	$	13,601	110,700	5	-	-	2	1,031	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEHH	$	13,382	116,004	4	-	-	2	979	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEHH	$	13,566	117,533	4	-	-	2	908	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEHH	$	13,670	116,874	4	-	-	2	746	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDHH	SLRM	MKTM	EEHH	$	13,487	119,796	4	-	-	2	1,243	-	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$	12,834	111,708	5	-	-	2	1,740	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$	13,104	110,700	5	-	-	2	1,031	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$	12,892	114,046	5	-	-	2	1,561	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$	13,077	115,543	5	-	-	2	1,518	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$	13,178	114,798	5	-	-	2	1,292	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$	13,011	117,800	5	-	-	2	1,940	-	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEHH	$	12,669	111,708	5	-	-	2	1,740	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEHH	$	12,939	110,700	5	-	-	2	1,031	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEHH	$	12,727	114,046	5	-	-	2	1,561	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEHH	$	12,911	115,543	5	-	-	2	1,518	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEHH	$	13,013	114,798	5	-	-	2	1,292	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDLL	SLRM	MKTM	EEHH	$	12,845	117,800	5	-	-	2	1,940	-	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$	13,000	111,708	5	-	-	2	1,740	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$	13,270	110,700	5	-	-	2	1,031	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$	13,058	114,046	5	-	-	2	1,561	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$	13,243	115,543	5	-	-	2	1,518	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$	13,344	114,798	5	-	-	2	1,292	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$	13,177	117,800	5	-	-	2	1,940	-	-	-	-

TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$	13,000	111,708	5	-	-	2	1,740	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$	13,270	110,700	5	-	-	2	1,031	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$	13,058	114,046	5	-	-	2	1,561	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$	13,243	115,543	5	-	-	2	1,518	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$	13,344	114,798	5	-	-	2	1,292	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$	13,177	117,800	5	-	-	2	1,940	-	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$	13,000	111,708	5	-	-	2	1,740	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$	13,270	110,700	5	-	-	2	1,031	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$	13,058	114,046	5	-	-	2	1,561	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$	13,243	115,543	5	-	-	2	1,518	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$	13,344	114,798	5	-	-	2	1,292	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$	13,177	117,800	5	-	-	2	1,940	-	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$	13,000	111,708	5	-	-	2	1,740	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$	13,270	110,700	5	-	-	2	1,031	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$	13,058	114,046	5	-	-	2	1,561	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$	13,243	115,543	5	-	-	2	1,518	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$	13,344	114,798	5	-	-	2	1,292	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$	13,177	117,800	5	-	-	2	1,940	-	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$	13,063	111,708	5	-	-	2	1,740	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$	13,333	110,700	5	-	-	2	1,031	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$	13,121	114,046	5	-	-	2	1,561	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$	13,306	115,543	5	-	-	2	1,518	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$	13,407	114,798	5	-	-	2	1,292	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$	13,240	117,800	5	-	-	2	1,940	-	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$	13,001	111,708	5	-	-	2	1,740	3	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$	13,271	110,700	5	-	-	2	1,031	-	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$	13,059	114,046	5	-	-	2	1,561	-	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$	13,244	115,543	5	-	-	2	1,518	1	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$	13,345	114,798	5	-	-	2	1,292	-	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$	13,178	117,800	5	-	-	2	1,940	-	-	-	-

Market Off Modeling Approach, Energy Efficiency +30 GWh

Scenario	Forecast	Capital Cost	CO2 Price	Coal Price	Natural Gas Price	Wind Price	Solar Price	Market Price	Energy Efficiency	PVSC ($ Million)	CO2 Emissions (,000 tons)	Wind Units	Solar Units	CT Units	CC Units	Dump Energy (GWh)	Bridge PPA Units	Imports (GWh)	Exports (GWh)	Net Imports (GWh)
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 270	(1,008)	-	-	-	-	(708)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 58	2,338	-	-	-	-	(179)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 243	3,835	-	-	-	-	(222)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 344	3,090	-	-	-	-	(447)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 177	6,092	-	-	-	-	200	(3)	-	-	-
TEBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 9	(1,758)	-	-	-	-	179	3	-	-	-
TEBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 184	(3,235)	-	-	-	-	(433)	-	-	-	-
TEBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 221	2,052	-	-	-	-	(67)	1	-	-	-
TLBG	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 396	1,541	-	1	-	-	(187)	-	-	-	-
TLBL	FCSH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 209	5,054	-	-	-	-	269	-	-	-	-
TEBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 37	(5,484)	-	(1)	(1)	1	(134)	2	-	-	-
TEBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 163	(3,085)	-	-	-	-	(423)	-	-	-	-
TEBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TLBE	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 195	(2,931)	-	1	(1)	1	148	2	-	-	-
TLBG	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 491	(3,765)	-	1	(1)	1	(293)	(1)	-	-	-
TLBL	FCSHH	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 279	(583)	-	1	(1)	1	186	(1)	-	-	-
TEBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-
TEBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 263	(2,072)	-	2	-	-	(512)	(3)	-	-	-
TEBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 73	1,265	-	2	-	-	234	(3)	-	-	-
TLBE	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 160	3,704	-	2	-	-	45	(3)	-	-	-
TLBG	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 277	1,878	-	3	-	-	6	(3)	-	-	-
TLBL	FCSL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 164	4,745	-	3	-	-	917	(3)	-	-	-
TEBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 32	(6,777)	-	(2)	-	-	(1,424)	1	-	-	-
TEBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 168	(8,322)	-	-	-	-	(1,389)	-	-	-	-
TEBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 3	(4,974)	-	-	-	-	(496)	-	-	-	-
TLBE	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 70	(2,824)	-	-	-	-	(461)	-	-	-	-
TLBG	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ 89	(3,343)	-	-	-	-	(825)	-	-	-	-
TLBL	FCSLL	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$ -	-	-	-	-	-	-	-	-	-	-

TEBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	262	(1,008)	-	-	-	-	(708)	(3)	-	-
TEBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	51	2,338	-	-	-	-	(179)	(3)	-	-
TLBE	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	232	3,835	-	-	-	-	(222)	(2)	-	-
TLBG	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	333	3,090	-	-	-	-	(447)	(3)	-	-
TLBL	FCSM	CAPH	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	166	6,092	-	-	-	-	200	(3)	-	-
TEBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	277	(1,008)	-	-	-	-	(708)	(3)	-	-
TEBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	65	2,338	-	-	-	-	(179)	(3)	-	-
TLBE	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	254	3,835	-	-	-	-	(222)	(2)	-	-
TLBG	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	355	3,090	-	-	-	-	(447)	(3)	-	-
TLBL	FCSM	CAPL	CO2M	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	187	6,092	-	-	-	-	200	(3)	-	-
TEBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	263	(955)	-	-	-	-	(714)	(3)	-	-
TEBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	77	2,453	-	-	-	-	(184)	(3)	-	-
TLBE	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	274	4,031	-	-	-	-	(228)	(2)	-	-
TLBG	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	369	3,200	-	-	-	-	(455)	(3)	-	-
TLBL	FCSM	CAPM	CO2H	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	225	6,278	-	-	-	-	193	(3)	-	-
TEBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	280	(1,268)	-	-	-	-	(709)	(3)	-	-
TEBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	41	2,005	-	-	-	-	(179)	(3)	-	-
TLBE	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	214	3,464	-	-	-	-	(222)	(2)	-	-
TLBG	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	322	2,805	-	-	-	-	(446)	(3)	-	-
TLBL	FCSM	CAPM	CO2L	CLM	GASM	WNDM	SLRM	MKTM	EEHH	$	129	5,728	-	-	-	-	201	(3)	-	-
TEBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$	281	(943)	-	-	-	-	(710)	(3)	-	-
TEBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$	87	2,464	-	-	-	-	(181)	(3)	-	-
TLBE	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$	299	4,057	-	-	-	-	(224)	(2)	-	-
TLBG	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$	399	3,201	-	-	-	-	(449)	(3)	-	-
TLBL	FCSM	CAPM	CO2M	CLH	GASM	WNDM	SLRM	MKTM	EEHH	$	248	6,303	-	-	-	-	198	(3)	-	-

TEBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$	260	(1,136)	-	-	-	-	(709)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$	30	2,113	-	-	-	-	(179)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$	188	3,587	-	-	-	-	(221)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$	290	2,944	-	-	-	-	(446)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLL	GASM	WNDM	SLRM	MKTM	EEHH	$	106	5,849	-	-	-	-	201	(3)	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$	-	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$	252	(1,179)	-	-	-	-	(709)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$	33	2,139	-	-	-	-	(180)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$	221	3,591	-	-	-	-	(222)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$	320	2,870	-	-	-	-	(446)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASH	WNDM	SLRM	MKTM	EEHH	$	147	5,843	-	-	-	-	202	(3)	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$	-	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$	234	(1,607)	-	-	-	-	(706)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$	10	1,677	-	-	-	-	(177)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$	202	2,930	-	-	-	-	(217)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$	298	2,287	-	-	-	-	(441)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASHH	WNDM	SLRM	MKTM	EEHH	$	122	5,183	-	-	-	-	206	(3)	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$	-	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$	291	(954)	-	-	-	-	(714)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$	86	2,486	-	-	-	-	(183)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$	268	4,064	-	-	-	-	(227)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$	370	3,175	-	-	-	-	(454)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASL	WNDM	SLRM	MKTM	EEHH	$	208	6,319	-	-	-	-	194	(3)	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$	-	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$	309	(1,086)	-	-	-	-	(717)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$	114	2,458	-	-	-	-	(185)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$	292	4,025	-	-	-	-	(228)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$	393	3,003	-	-	-	-	(457)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASLL	WNDM	SLRM	MKTM	EEHH	$	239	6,255	-	-	-	-	193	(3)	-	-	-

TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$	270	(1,008)	-	-	-	-	(708)	(3)	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$	58	2,338	-	-	-	-	(179)	(3)	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$	243	3,835	-	-	-	-	(222)	(2)	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$	344	3,090	-	-	-	-	(447)	(3)	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$	177	6,092	-	-	-	-	200	(3)	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$	277	(2,934)	1	-	-	-	(203)	(3)	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$	58	2,370	-	-	-	-	(255)	(3)	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$	243	3,899	-	-	-	-	(326)	(2)	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$	346	3,239	-	-	-	-	(488)	(3)	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDH	SLRM	MKTM	EEHH	$	163	6,161	-	-	-	-	9	(3)	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$	270	(1,008)	-	-	-	-	(708)	(3)	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$	58	2,338	-	-	-	-	(179)	(3)	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$	243	3,835	-	-	-	-	(222)	(2)	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$	344	3,090	-	-	-	-	(447)	(3)	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$	177	6,092	-	-	-	-	200	(3)	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$	270	(1,008)	-	-	-	-	(708)	(3)	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$	58	2,338	-	-	-	-	(179)	(3)	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$	243	3,835	-	-	-	-	(222)	(2)	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$	344	3,090	-	-	-	-	(447)	(3)	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDL	SLRM	MKTM	EEHH	$	177	6,092	-	-	-	-	200	(3)	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$	270	(1,008)	-	-	-	-	(708)	(3)	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$	58	2,338	-	-	-	-	(179)	(3)	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$	243	3,835	-	-	-	-	(222)	(2)	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$	344	3,090	-	-	-	-	(447)	(3)	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRH	MKTM	EEHH	$	177	6,092	-	-	-	-	200	(3)	-	-

TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$	-	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$	270	(1,008)	-	-	-	-	(708)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$	58	2,338	-	-	-	-	(179)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$	243	3,835	-	-	-	-	(222)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$	344	3,090	-	-	-	-	(447)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRHH	MKTM	EEHH	$	177	6,092	-	-	-	-	200	(3)	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$	-	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$	270	(1,008)	-	-	-	-	(708)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$	58	2,338	-	-	-	-	(179)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$	243	3,835	-	-	-	-	(222)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$	344	3,090	-	-	-	-	(447)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRL	MKTM	EEHH	$	177	6,092	-	-	-	-	200	(3)	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$	-	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$	270	(1,008)	-	-	-	-	(708)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$	58	2,338	-	-	-	-	(179)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$	243	3,835	-	-	-	-	(222)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$	344	3,090	-	-	-	-	(447)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRLL	MKTM	EEHH	$	177	6,092	-	-	-	-	200	(3)	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$	-	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$	270	(1,008)	-	-	-	-	(708)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$	58	2,338	-	-	-	-	(179)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$	243	3,835	-	-	-	-	(222)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$	344	3,090	-	-	-	-	(447)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTH	EEHH	$	177	6,092	-	-	-	-	200	(3)	-	-	-
TEBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$	-	-	-	-	-	-	-	-	-	-	-
TEBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$	270	(1,008)	-	-	-	-	(708)	(3)	-	-	-
TEBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$	58	2,338	-	-	-	-	(179)	(3)	-	-	-
TLBE	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$	243	3,835	-	-	-	-	(222)	(2)	-	-	-
TLBG	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$	344	3,090	-	-	-	-	(447)	(3)	-	-	-
TLBL	FCSM	CAPM	CO2M	CLM	GASM	WNDM	SLRM	MKTL	EEHH	$	177	6,092	-	-	-	-	200	(3)	-	-	-

MINNESOTA POWER'S PROJECTION OF CO2 EMISSIONS OVER PLANNING PERIOD

	ACTUAL	PROJECTED																		
Annual CO2 Emissions (tons)	2005	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
State GHG Goal Calculation	**[TRADE SECRET EXCISED**																				
CO2 Reduction from 2005 Levels																					**TRADE SECRET EXCISED]**

CERTIFICATE OF SERVICE

I, Linda Chavez, hereby certify that I have this day served copies of the following document on the attached list of persons by electronic filing, e-mail, or by depositing a true and correct copy thereof properly enveloped with postage paid in the United States Mail at St. Paul, Minnesota.

MINNESOTA DEPARTMENT OF COMMERCE – DER - COMMENTS

Docket Nos. **E015/RP-15-690**

Dated this **4th** day of **January, 2016**.

/s/Linda Chavez

_____

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Christopher	Anderson	canderson@allete.com	Minnesota Power	30 W Superior St Duluth, MN 558022191	Electronic Service	Yes	OFF_SL_15-690_RP-15-690
Julia	Anderson	Julia.Anderson@ag.state.mn.us	Office of the Attorney General-DOC	1800 BRM Tower 445 Minnesota St St. Paul, MN 551012134	Electronic Service	Yes	OFF_SL_15-690_RP-15-690
William A.	Blazar	bblazar@mnchamber.com	Minnesota Chamber Of Commerce	Suite 1500 400 Robert Street North St. Paul, MN 55101	Electronic Service	No	OFF_SL_15-690_RP-15-690
Jon	Brekke	jbrekke@grenergy.com	Great River Energy	12300 Elm Creek Boulevard Maple Grove, MN 553694718	Electronic Service	No	OFF_SL_15-690_RP-15-690
Christina	Brusven	cbrusven@fredlaw.com	Fredrikson Byron	200 S 6th St Ste 4000 Minneapolis, MN 554021425	Electronic Service	No	OFF_SL_15-690_RP-15-690
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Emma	Fazio	emma.fazio@stoel.com	Stoel Rives LLP	33 South Sixth Street Suite 4200 Minneapolis, MN 55402	Electronic Service	No	OFF_SL_15-690_RP-15-690
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Dave	Frederickson	Dave.Frederickson@state.mn.us	MN Department of Agriculture	625 North Robert Street St. Paul, MN 551552538	Electronic Service	No	OFF_SL_15-690_RP-15-690
Edward	Garvey	garveyed@aol.com	Residence	32 Lawton St Saint Paul, MN 55102	Electronic Service	No	OFF_SL_15-690_RP-15-690

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Benjamin	Gerber	bgerber@mnchamber.com	Minnesota Chamber of Commerce	400 Robert Street North Suite 1500 St. Paul, Minnesota 55101	Electronic Service	No	OFF_SL_15-690_RP-15-690
Barbara	Gervais	toftemn@boreal.org	Town of Tofte	P O Box 2293 7240 Tofte Park Road Tofte, MN 55615	Electronic Service	No	OFF_SL_15-690_RP-15-690
Janice	Hall	N/A	Cook County Board of Commissioners	411 W 2nd St Court House Grand Marais, MN 55604-2307	Paper Service	No	OFF_SL_15-690_RP-15-690
Lori	Hoyum	lhoyum@mnpower.com	Minnesota Power	30 West Superior Street Duluth, MN 55802	Electronic Service	Yes	OFF_SL_15-690_RP-15-690
Michael	Krikava	mkrikava@briggs.com	Briggs And Morgan, P.A.	2200 IDS Center 80 S 8th St Minneapolis, MN 55402	Electronic Service	No	OFF_SL_15-690_RP-15-690
John	Lindell	agorud.ecf@ag.state.mn.us	Office of the Attorney General-RUD	1400 BRM Tower 445 Minnesota St St. Paul, MN 551012130	Electronic Service	Yes	OFF_SL_15-690_RP-15-690
Pam	Marshall	pam@energycents.org	Energy CENTS Coalition	823 7th St E St. Paul, MN 55106	Electronic Service	No	OFF_SL_15-690_RP-15-690
Daryl	Maxwell	dmaxwell@hydro.mb.ca	Manitoba Hydro	360 Portage Ave FL 16 PO Box 815, Station Main Winnipeg, Manitoba R3C 2P4 Canada	Electronic Service	No	OFF_SL_15-690_RP-15-690
Marion Ann	McKeever	N/A	Satellites Country Inn	9436 W Hwy 61 Schroeder, MN 55613	Paper Service	No	OFF_SL_15-690_RP-15-690
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Ron	Spangler, Jr.	rlspangler@otpco.com	Otter Tail Power Company	215 So. Cascade St. PO Box 496 Fergus Falls, MN 565380496	Electronic Service	No	OFF_SL_15-690_RP-15-690
John Linc	Stine	john.stine@state.mn.us	MN Pollution Control Agency	520 Lafayette Rd Saint Paul, MN 55155	Electronic Service	No	OFF_SL_15-690_RP-15-690
Eric	Swanson	eswanson@winthrop.com	Winthrop Weinstine	225 S 6th St Ste 3500 Capella Tower Minneapolis, MN 554024629	Electronic Service	No	OFF_SL_15-690_RP-15-690
Daniel P	Wolf	dan.wolf@state.mn.us	Public Utilities Commission	121 7th Place East Suite 350 St. Paul, MN 551012147	Electronic Service	Yes	OFF_SL_15-690_RP-15-690

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
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