

October 10, 2014

RPU-2014-0002

2.0

2.1 Present Value Calculations **IOWA UTILITIES BOARD**

Please also refer to the testimony of MidAmerican witness Mark Yocum regarding Present Value Calculations.

Present value calculations were conducted for the 162 MW Wind IX Iowa Project (“Wind IX”). These calculations begin with estimates of investment costs, operating costs, return requirements and incremental benefits. These costs and benefits are the amounts that are subsequently present valued to determine the feasibility of Wind IX.

The Wind IX site is assumed to be a regulated asset with prudently incurred costs. As suggested by the Board’s proposed rules in Docket No. RMU-01-11, an analysis of the present value of revenue requirements is performed to assist in the determination of the reasonableness of the proposed project. The revenue requirement analysis incorporates a return on the capital costs, the projected fixed and variable operating costs, depreciation and the required income taxes. At this point in the analysis, the production tax credits, renewable energy credits, and avoided costs, and the incremental net system benefits are not included. Thus, at this point, the Wind IX revenue requirement is a “stand alone” figure. (“Stand alone” refers to the revenue requirement without consideration of the additional revenue streams that are projected to result from the production tax credits, renewable energy credits, and avoided costs, and net system benefits.) This “stand alone” revenue requirement is the starting point from which additional analysis is performed.

In order to determine actual ratepayer impacts, estimates of the incremental benefits from investment in Wind IX need to be made. This requires a projection of the incremental production tax credits, renewable energy credits and avoided costs, and net system benefit to determine the potential impact of Wind IX on ratepayers.

These variables, the potential cost to ratepayers (i.e. the stand alone revenue requirement) of Wind IX, and the potential benefits of Wind IX (i.e., the production tax credit, any renewable energy credits and avoided costs, and the net system benefit), are present valued and levelized using the cost of capital identified in Section 2.2 of this Ratemaking Principles Application. Each levelized value (i.e., costs and benefits) is then converted to a dollar per kWh basis.

To determine the estimated ratepayer impact, the incremental benefits are then subtracted from the stand alone revenue requirement. If the net result is a positive dollar per kWh, (i.e., the costs exceed the benefits), Wind IX would not be deemed to earn its revenue requirement. On the other hand, if the net result is zero or a negative dollar per kWh (i.e., the benefits equal or exceed the costs), Wind IX would be deemed to earn its revenue requirement as the Wind IX analysis projects that it will in this case.

MidAmerican has performed the above-mentioned economic analysis in good faith using reasonable estimates of projected costs and other reasonable assumptions relating to Wind IX's operating characteristics. Confidential Table 2.1 – 1(c) shows the calculations described above for the 162 MW Wind IX

project. Confidential Tables 2.1-1(b) and 2.1-1(c) can only be found in the confidential part of MidAmerican’s Application filing.

Assumptions are made for the following factors, in the above-described model, and the assumptions are as follows:

- (i) electric load growth in the region;
- (ii) construction costs for Wind IX’s 162 MW;
- (iii) capacity factor of 36.8% percent;
- (iv) fixed and variable O&M costs for Wind IX (valued at \$█, \$█, and \$█ per megawatt hour in 2016, 2017, 2018, respectively);
- (v) the ratemaking principles proposed in this Application.

The results of this analysis are summarized in Table 1 below and the full analysis can be found in Confidential Tables 2.1 – 1(c). Confidential Table 2.1-1(c) can only be found in the confidential part of MidAmerican’s Application filing.

Table 1	
CONFIDENTIAL	
MidAmerican Energy Company Wind IX Iowa Project Capital Budgeting Analysis Illustrated on a dollars per kWh Basis	
LINE No.	PV of Ratepayer Impact (Dollars per kWh basis)
1	█
<p>Note: This analysis assumes a conventional revenue requirement that ratepayers would otherwise be expected to pay and subtracts from that revenue requirement incremental cash flows and benefits that the 162 MW of Wind IX creates. A negative result, as shown above, means that Wind IX is expected to create enough incremental cash flows/benefits to offset the revenue requirement and yield an overall benefit for the Company and its ratepayers to share.</p>	

2.1.1 Production Cost Analysis

Regulated electric generating units are assumed to operate to meet regulated customer needs and to sell incrementally into the wholesale market on an as-available basis. Ventyx's PROMOD IV[®] model was used to develop 30-year forecasts for the scenario described above. Ventyx's PROMOD IV[®] simulates production cost by incorporating details of system operation and market interaction into an 8,760-hour unit commitment and dispatch model. PROMOD IV[®] provides forecasts of hourly unit generation, unit costs, and off-system sales and purchases. Key drivers of economic dispatch for each unit are entered into the model (fuel prices, market electric prices, heat rate, variable costs, outage schedules, forced outage rates, hourly regulated load forecast, etc.) and the model simulates hourly dispatch to serve regulated load through unit operation and market purchases. The model also simulates the sale of excess energy into the wholesale market. The input assumptions are based on historical results, third-party forecast information and internal MidAmerican forecasts.

Output from the PROMOD IV[®] is summarized to provide annual net system costs (fuel plus non-fuel variable costs plus wholesale purchases less wholesale sales), unit generation (in MWh) and fuel consumption. The PROMOD IV[®] output is provided in Confidential Table 2.1-2. These results are then used in the present value calculations described above in Section 2.1. Confidential Table 2.1-2 can only be found in the confidential part of MidAmerican's Application filing.

2.1.2 Installed Cost

The total estimated direct and indirect costs associated with construction of Wind IX's 162 MW totals approximately \$232.7 million. MidAmerican would own and operate 100% of Wind IX. This estimated cost excludes allowance for funds used during construction ("AFUDC") and includes the costs of transmission facilities and substation facilities for Wind IX.

A summary breakdown of the Wind IX costs is as follows:

Table 2	
CONFIDENTIAL	
Description	Amount (\$ x 1,000)
Plant Development and Construction Costs (site development, permitting, plant construction (turbines, towers, and balance of plant), testing and commissioning costs, operating spare parts and insurance.	\$ [REDACTED]
Onsite Substation and Transmission	\$ [REDACTED]
MEC development costs (contract negotiation, contract administration, development costs, owner's engineer costs, legal fees, wind resource expert, environmental consultants and real estate services)	\$ [REDACTED]
Total Representative 162 MW Site Costs	\$ [REDACTED]
Additional Substation and Transmission (off-site – beyond the collector substations)	\$ [REDACTED]
Total On-site and Off-site Transmission Costs without AFUDC	\$229,720
AFUDC	\$2,932
Total On-site and Off-site Transmission Costs with AFUDC	\$232,652

The amounts shown above have been adjusted to account for expected inflation to the time the associated costs are actually incurred. Using the expected

nameplate rating of 162 MW, the above cost on a per kilowatt basis is \$1,436 per kilowatt, with AFUDC included. The analysis assumes that the Company would book construction work in progress and accrue the associated AFUDC while Wind IX is being built.

2.1.3 Fixed Expenses

The expected fixed expenses for Wind IX's 162 MW were forecast and included in Confidential Tables 2.1-1 through 2.1-2. Confidential Tables 2.1-1 through 2.1-2 can only be found in the confidential part of MidAmerican's Application filing. Included in the tables are fixed operation and maintenance costs and property taxes. These costs were incorporated in the present value analysis included in this Section 2.

2.1.4 Variable Expenses

Variable expenses for Wind IX's 162 MW are expected to be quite small and have been assumed to be zero in this analysis.

Confidential Tables 2.1-1 through 2.1-2 along with the present value models described in this Section 2 are provided in Excel format in the confidential section of MidAmerican's Ratemaking Principle Application.

The following is a summary of the reference tables included in this Section.

Table 3		
MidAmerican Energy Company Wind IX Iowa Project		
Modeling Table References		
LINE No.	Revenue Requirement Analysis	Production Cost Modeling
1	Table 2.1-1	Table 2.1-2

Confidential Tables 2.1-1 through 2.1-2 can only be found in the confidential part of MidAmerican's Application filing.

2.2 Cost of Capital

41.3(2)b

The cost of capital has been calculated using an assumed capital structure containing 50% long-term debt and 50% common equity. No preferred stock was included as this component is becoming negligible in MidAmerican's actual capital structure and a reduced source of financing nationally. This assumed capital structure is within the range of capital structures for single-A public utilities under Standard & Poor's rating criteria.

The cost of long-term debt was estimated at 5.0%. This rate is believed to be representative of the full cost of financing (coupon, issuance expense and discount) that is available to MidAmerican for fixed income securities with approximately 20 years to maturity. The cost of equity is assumed to be 11.75%. MidAmerican witness Dr. James Vander Weide, of Duke University, supports the cost of equity in his direct testimony.

For forecasting purposes, the 5.0% cost of debt is used throughout the life of Wind IX as MidAmerican's cost of borrowing. Similarly the cost of equity is assumed constant at the 11.75% level. These assumptions lead to a weighted nominal cost of capital of 8.38%. This cost is adjusted to an after-tax cost of capital, assuming a tax rate of 41.57%, to arrive at a weighted after-tax cost of capital of 7.34%.

Table 1					
MidAmerican Energy Company Wind IX Iowa Project 162 MW Site Assumed Cost of Capital					
Component	Weight	Nominal Cost	After- Tax Cost	Weighted Nominal Cost	Weighted After-Tax Cost
Long-Term Debt	50%	5.00%	2.92%	2.50%	1.46%
Preferred Stock	0%	N/A	N/A	N/A	N/A
Common Equity	50%	11.75%	11.75%	5.88%	5.88%
Total	100%			8.38%	7.34%

2.3 Cash Flows

41.3(2)c

As suggested by the Board's proposed rules in Docket No. RMU-01-11, an analysis of the present value of revenue requirements was performed for Wind IX's 162 MW. These revenue requirements represent the expected impact on ratepayers in the absence of other incremental cash flows and avoided costs. (i.e., cash flows and avoided costs produced by Wind IX). The other incremental cash flows include revenues associated with production tax credits, environmental credits, and net system costs.

Thus the model represents the expected revenue requirement scenario for Wind IX's 162 MW. The location of the calculations for my model can be found in the Confidential Table identified below. (This table can be found in the confidential part of MidAmerican's filing.)

Table 1	
MidAmerican Energy Company Wind IX Iowa Project	
Location of Revenue Requirement Calculation	
LINE No.	162MW Site
1	Table 2.1-1(b)

The incremental cash flow analysis is contained in the location identified in Table 2 below.

Table 2	
MidAmerican Energy Company Wind IX Iowa Project	
Location of Customer Impact Analysis Summary	
LINE No.	162MW Site
1	Table 2.1-1(c)