STATE OF IOWA
BEFORE THE IOWA UTILITIES BOARD

IN RE:	)	
	)	
APPLICATION OF MIDAMERICAN	)	DOCKET NO. RPU-2016-0001
ENERGY COMPANY FOR A	)	
DETERMINATION OF	)	
RATEMAKING PRINCIPLES	)	

DIRECT TESTIMONY
OF
THOMAS A. WIND

On Behalf of

Iowa Environmental Council
Environmental Law & Policy Center

June 21, 2016

Q. What is your name and business address?

A. My name is Thomas A. Wind and I work for Wind Utility Consulting, PC at 1639 320th St., Jamaica, IA 50128.

Q. On whose behalf are you testifying today?

A. I am testifying on behalf of the Iowa Environmental Council and the Environmental Law & Policy Center.

Q. Please describe your background and experience in the field of wind generation.

A. I graduated from Iowa State University in 1974 as an electrical engineer. I was employed by Iowa Southern Utilities for 15 years from 1974 through 1989, primarily in the area of transmission and generation resource planning. In 1989 I started my consulting business as a professional engineer. My main areas of practice have included transmission planning, electric load forecasting, energy efficiency program planning, and generation resource planning. For the last 23 years I have been involved with planning and development of wind generation projects that typically consist of 1 to 10 large utility-scale wind turbines. Over this time period I have provided consulting and development services for 39 projects totaling 112 megawatts of wind generation, which are now all in operation. I also have a minority ownership interest in two multi-turbine community-owned wind farms, and I provide ongoing management services for one of them.

Q. What is the purpose of your testimony?

A. The purpose of my testimony today is to comment on MidAmerican Energy Company's (MidAmerican) capacity factor projections for their proposed Wind XI projects.

Q. Please describe your experience related to wind generation capacity factor projections.

A. The vast majority of my consulting work for wind generation projects involves the technical and financial feasibility of proposed projects. A key factor is projecting the annual capacity factor. I have made these projections for 35 of the 39 wind projects for which I have provided consulting services. Based on my long experience, I have generally become more conservative in my projections.

Q. What type of capacity factors are you projecting for new wind turbine projects that you are involved with?

A. The most recent project I have been involved with has a projected average annual capacity factor of 51%. This project has a single GE turbine with a rating of 1.79 MW with a 100-meter rotor on an 80-meter tower. It was installed last week south of Anita, Iowa.

Q. How does that project compare with the projects being proposed by MidAmerican?

A. The project I described had only one wind turbine and was connected to a distribution substation. Since there is only one turbine, there will be no wake effect losses for this project. Secondly, the wind speed at the project will be less than the average wind speeds

for the Wind XI turbines, due in part to the shorter tower. Thirdly, Wind XI will use the Vestas V110-2.0 wind turbine model, which is different than the model in the project I described.

Q. How would the differences between the project you described and the Wind XI wind farms affect the projected annual capacity factors?

A. Based on the data provided in the confidential technical report by DNV-GL supplied by MidAmerican in response to the OCA data request 7, I have made calculations to adjust for the three differences between the single turbine project and the Wind XI wind farms. The first adjustment is for the higher wake effect losses. Table 8 in the DNV-GL report showed wake effect losses of [redacted] based on other MidAmerican wind farm layouts. Using the individual site weightings shown in section 3.1.4 of the DNV-GL report, a weighted average wake effect loss would be [redacted] for the Wind XI wind farms versus 0% for the single turbine at Anita. The second adjustment was for a higher projected wind speed for the Wind XI projects. Again using the individual site weightings, the Wind XI average wind speed was projected to be [redacted] meters per second at [redacted] meters height, compared to 8.1 meters per second for the single turbine project at 80 meters height. The third adjustment is for a different turbine model. The Vestas V110-2.0 turbine model will have a higher capacity factor based on the power curve data. The cumulative impact of these three calculated adjustments shows that the average annual capacity factor for the Wind XI wind farms will be [redacted]

Q. How does your projection of the Wind XI annual capacity factor compare to MidAmerican's projections?

A. On page 29 of Mr. Fehr's testimony, he projects the approximate annual capacity factor of the Wind XI projects to be [redacted], This agrees with the projection that I have made for the Wind XI projects.

Q. Are there some uncertainties in your capacity factor projections?

A. Yes there are uncertainties in my projections. They primarily stem from these two factors: 1) MidAmerican has not finalized its selection of the specific wind farm sites, and 2) the turbine layout and engineering have not been done. Both of these factors affect the capacity factor projections. Having these uncertainties is not uncommon in wind farm planning and development. The best way to minimize these uncertainties is to base assumptions on past experience, adjust for factors that will be different, and then to be conservative in the estimates. I believe this is what MidAmerican has done in its projections.

Q. Do you think MidAmerican's projected capacity factors are reasonable?

A. Yes. I have reviewed the detailed analysis provided in Mr. Fehr's and Mr. Hammer's testimonies and exhibits concerning MidAmerican's capacity factor projections, and I have found nothing that I thought was unreasonable. My calculations predict the same capacity factor as projected by MidAmerican.

Q. Does this complete your testimony?

A. Yes, this completes my testimony.

STATE OF IOWA)
)
COUNTY OF GREENE)

I, Tom Wind, being first duly sworn on oath, depose and state:

1. that I am president of Wind Utility Consulting, PC; and

2. that I have personal knowledge of the facts alleged in the attached testimony; and

3. that said facts are true and correct to the best of my knowledge and belief as of the date of this Affidavit.

Further affiant sayeth not.

/s/ Thomas A. Wind

Thomas A. Wind

Subscribed and sworn to before me this 17th day of June, 2016.

/s/ Jaclynn Cunningham

Notary Public in and for the State of Iowa