

STATE OF IOWA
BEFORE THE IOWA UTILITIES BOARD

**FILED WITH
Executive Secretary
June 21, 2016
IOWA UTILITIES BOARD**

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MIDAMERICAN ENERGY COMPANY)
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DIRECT TESTIMONY
OF
NATHANIEL BAER

On Behalf of

Environmental Law & Policy Center
Iowa Environmental Council

June 21, 2016

1 **Q. What is your name and business address?**

2 A. My name is Nathaniel Baer. My title is Energy Program Director with the Iowa
3 Environmental Council. Our offices are located at 521 East Locust Street, Suite 220, Des
4 Moines, Iowa 50309.

5
6 **Q. On whose behalf are you testifying today?**

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

9
10 **Q. Please describe your background.**

11 A. I have a bachelor of arts degree from Earlham College in Richmond, Indiana and a law
12 degree from the University of Iowa College of Law in Iowa City, although I am not a
13 practicing attorney. I have worked for the Iowa Environmental Council (IEC) since 2007.
14 The Iowa Environmental Council is a 501(c)(3) non-profit, member-based corporation
15 that works to advance public policies that provide a safe, healthy environment and
16 sustainable future for all Iowans. In my capacity at IEC, I have worked on a wide range
17 of energy policy issues, including renewable energy, transmission, energy efficiency,
18 biofuels, and transportation. This has included work on state and federal legislation and
19 administrative rules both with federal and state agencies, as well as a range of dockets at
20 the IUB. I have served on stakeholder committees, such as energy research or policy
21 committees, established by the Iowa legislature, Midwestern Governors Association,
22 Iowa Department of Transportation, and the University of Northern Iowa's Center for
23 Energy and Environmental Education. I currently serve on the Iowa Energy Resources

1 working group for the Iowa Energy Plan and am on the board of directors for the regional
2 non-profit organization Wind on the Wires. I have participated regularly in the Iowa
3 energy efficiency stakeholder collaborative convened by the Office of Consumer
4 Advocate since 2009 and the Midcontinent Power Sector Collaborative since September
5 2014.

6
7 **Q. Have you testified with the Iowa Utilities Board before?**

8 A. I provided testimony in MidAmerican Energy's general rate case, RPU-2013-0004, and
9 in MidAmerican's last request for wind energy ratemaking principles in Wind X, RPU-
10 2015-0002. In addition, I have drafted or assisted in drafting our organization's
11 comments and joint comments in various dockets before the IUB, including NOI-2006-
12 0004, NOI-2009-0002, NOI-2011-0002, NOI-2011-0003, NOI-2014-0001, NOI-2014-
13 0002, NOI-2015-0001, RMU-2014-0007, TF-2012-0546, and TF-2012-0574.

14
15 **Q. What is the purpose of your testimony?**

16 A. The purpose of my testimony is to support and expand upon specific aspects of
17 MidAmerican's proposal to construct 2,000 MW of new wind generation in Iowa and its
18 proposed goal to meet 100% of retail sales with renewable electricity. I am not providing
19 testimony on ratemaking principles or every aspect of the Wind XI proposal.

20
21 **Q. MidAmerican Energy Witnesses Fehrman and Fehr emphasize the significance of**
22 **timing to access the full value of the federal production tax credit. What is your**
23 **response?**

1 A. In past years, Congress has allowed the federal PTC to expire or lapse and has also
2 extended the PTC for only short periods of time. Given such circumstances, the longer-
3 term extension of the PTC by Congress last December, and the phase out of its value over
4 time, is seen as a significant and uncommon legislative action. Although an additional
5 extension of the PTC by a future Congress could be helpful to the wind industry, that
6 extension cannot be expected or relied upon. The window of opportunity to use the full
7 value of the PTC is here today and may only be here today. MidAmerican’s proposal to
8 take advantage of that full value of the PTC with Wind XI is a key consideration.

9

10 **Q. Witness Fehrman discusses the potential for Wind XI to assist with compliance with**
11 **the Clean Power Plan. What is your response?**

12 A. I expect wind energy in general to be a major compliance option for the Clean Power
13 Plan, particularly in places like Iowa with a robust wind resource. For example, the U.S.
14 Energy Information Administration (EIA) released an analysis in 2015 indicating that
15 wind energy would be one of the most important compliance options for the Clean Power
16 Plan.¹ This year, the EIA has released a partial ‘early release’ of its Annual Energy
17 Outlook (the full AEO is due out later this summer) and this partial release indicates that
18 the region in which Iowa is located “takes advantage of abundant, low-cost renewable
19 resources in response to the CPP.”²

20

¹ U.S. Energy Information Administration, *Analysis of the Impacts of the Clean Power Plan* (May 2015).

² U.S. Energy Information Administration, *Annual Energy Outlook 2016 Early Release: Annotated Summary of Two Cases* (May 2016).

1 Wind XI will provide substantial compliance benefits for MidAmerican, which I discuss
2 in more detail for both rate-based and mass-based plan options below. The Clean Power
3 Plan provides states with significant flexibility in determining compliance pathways and
4 there are a number of options for meeting the emissions guidelines. As a general matter,
5 however, in a state plan that demonstrates compliance by meeting a lower carbon dioxide
6 emissions rate, or rate-based plan, wind energy can be expected to reduce emissions by
7 offsetting the need for fossil fuel-fired generation and will generate emission rate credits
8 (ERCs) that can be used to demonstrate compliance. In a state plan that demonstrates
9 compliance by meeting a lower total amount of carbon dioxide emissions, or mass-based
10 plan, wind energy can also be expected to reduce emissions by offsetting the need for
11 fossil fuel-fired generation and will reduce the number of allowances needed for
12 compliance.

13
14 **Q. Why would MidAmerican add wind for the Clean Power Plan given the timing for**
15 **compliance in the final rule?**

16 A. As MidAmerican observed, there is currently a court stay on the Clean Power Plan.
17 However, it is reasonable to implement compliance measures for the Clean Power Plan
18 now. This is particularly true for compliance measures that carry multiple benefits, such
19 as Wind XI, and that can be seen as a ‘no regrets’ option.

20
21 Even without the court stay, there would have been some level of uncertainty over a
22 number of details in the state plan for Iowa, like in most other states. In the absence of the
23 court stay, the Clean Power Plan would require an initial submittal by September 2016

1 and allow states up to September 2018 to submit a final state plan. It is likely Iowa would
2 have submitted its state plan in 2018, more than two years from now, and used the next
3 two years to make decisions about what type of state plan (rate, mass, trading ready, etc.)
4 to submit as well as a number of design options in that state plan. There would be
5 uncertainties with or without the court stay, and Wind XI is a reasonable and appropriate
6 action to take to prepare for the Clean Power Plan given the uncertainties presented in
7 either circumstance. With the full value of the federal PTC available now and a limited
8 window of opportunity to build a wind project in 2016 using the full value of the PTC, it
9 makes sense to propose and build Wind XI now.

10
11 **Q. How will Wind XI help MidAmerican comply with a rate-based approach to the**
12 **Clean Power Plan?**

13 **A.** Wind energy produced by Wind XI is a major compliance option and very likely allows
14 MidAmerican to fully comply with its 2030 emission reduction target in a rate-based
15 plan. MidAmerican has provided analysis on Wind XI's anticipated role in meeting its
16 potential compliance obligation under the Clean Power Plan. MidAmerican Response to
17 Environmental Intervenors Data Requests 5 and 6, filed as Exhibit EI-1 and Exhibit EI-2
18 (Confidential). MidAmerican used the three economic modeling scenarios for this
19 analysis as in other aspects of its ratemaking application: ABB, IHS, and PIRA. Under
20 each of those scenarios, without Wind XI, MidAmerican does not generate sufficient
21 ERCs from existing wind projects to comply with the Clean Power Plan. While the Iowa
22 emission rate target is 1,283 lbs/MWh, MidAmerican's projected emissions rates are
23 above that rate and vary by scenario: [REDACTED] lbs/MWh (ABB), [REDACTED] lbs/MWh (IHS), and

1 [REDACTED] lbs/MWh (PIRA). To achieve the 2030 emissions rate, MidAmerican would need
2 additional emission rate credits to comply: [REDACTED] ERCs in the ABB scenario,
3 [REDACTED] in the IHS scenario, and [REDACTED] in the PIRA scenario. MidAmerican would
4 need to generate those ERCs from additional eligible resources or potentially purchase
5 ERCs in a trading market.
6

7 I will note that MidAmerican did not include other potential sources of ERCs in its
8 analysis, such as those generated from eligible energy efficiency resources or eligible
9 solar resources. It is possible that other sources of ERCs from such existing or future
10 eligible resources, including efficiency or solar, would help MidAmerican achieve
11 compliance, particularly in the ABB scenario that requires the fewest additional ERCs for
12 compliance. Regardless, MidAmerican will need to take additional actions, such as
13 building wind energy projects like Wind XI, adding other sources of renewable energy
14 like solar, and/or implementing new energy efficiency programs, to achieve compliance.
15 Given the availability and significant benefit of the PTC today, it makes sense to add
16 enough wind to ensure compliance with the Clean Power Plan in future years.
17

18 When Wind XI is added to the scenario analysis, Wind XI puts MidAmerican into
19 compliance in each of the three scenarios. Wind XI would also allow MidAmerican to
20 exceed its compliance obligation and generate excess ERCs. MidAmerican's projected
21 emissions rates range from [REDACTED] lbs/MWh (ABB) to [REDACTED] lbs/MWh (IHS) and [REDACTED]
22 lbs/MWh (PIRA) – all below the 1,283 lbs/MWh target for Iowa. Excess ERCs can

1 provide additional benefit to MidAmerican's customers, as I discuss in more detail
2 below.

3
4 **Q. How will Wind XI help MidAmerican comply with a mass-based approach to the**
5 **Clean Power Plan?**

6 A. In general, Wind XI would help MidAmerican comply in several ways. First, adding
7 wind generation would allow MidAmerican to back down affected fossil generating units
8 and emit less CO2 from those units. By running affected fossil units less while meeting
9 overall energy needs with added wind, MidAmerican would need fewer allowances and
10 would be in a better position to cover its emissions with allowances under whatever
11 allowance allocation approach the state plan takes. Second, it is possible that Wind XI
12 could be directly allocated allowances. For example, the proposed Federal Plan includes a
13 set-aside of allowances for renewable energy projects, in which a pool of allowances are
14 available to be directly allocated to renewable energy projects.³ This pool of allowances
15 is proposed to grow over time as the allowances otherwise allocated to fossil-fueled units
16 that retire would then go into the renewable energy set-aside pool.⁴ If MidAmerican did
17 not need any allowances directly allocated to Wind XI to cover its own emissions, it
18 could sell those allowances to other utilities. Like excess ERCs, excess allowances can
19 provide an additional benefit to MidAmerican's customers. I discuss the nature of this
20 benefit with a focus on excess ERCs below.

21

³ Environmental Protection Agency, Federal Plan Requirements for Greenhouse Gas Emissions from Electric Utility
Generating Units Constructed on or Before January 8, 2014, 80 Fed. Reg. 65,022-65,025 (October 23, 2015).

⁴ *Id.* at 65,026-65,027.

1 Q. **In addition to MidAmerican’s compliance, what opportunities could Wind XI create**
2 **under the Clean Power Plan?**

3 A. The Clean Power Plan provides options for trading across utility service territories and
4 state lines. Utilities that take actions to exceed their compliance obligation will have
5 excess credits that are expected to have value and can be sold to other utilities. If the
6 utility exceeding compliance is in a rate-based state, the excess credit will be an ERC. If
7 the utility exceeding compliance is in a mass-based state, the excess credit will be an
8 allowance. ERCs and allowances are expected to have value during the 2022-2030
9 compliance period. There are multiple modeling efforts underway to quantify the
10 potential range of values for ERCs and allowances in different potential trading markets.
11 The modeling I have reviewed indicates there are scenarios where the value is low or
12 even zero in the early years of the 2022-2030 time frame, but the value tends to increase
13 as time gets closer to year 2030. It is important to note that compliance continues after
14 2030 as well, with the expectation of an ongoing compliance obligation and trading
15 market for ERCs and allowances, but most modeling is focused on the 2022-2030 time
16 frame.

17
18 I have focused here on the opportunity to trade excess credits in a rate-based system. By
19 allowing MidAmerican to exceed the target emissions rate of 1,283 lbs/MWh, Wind XI
20 provides MidAmerican with the opportunity to generate and trade excess ERCs.

21 With Wind XI, MidAmerican projects excess ERCs ranging from [REDACTED] (PIRA),
22 [REDACTED] (IHS), and [REDACTED] (ABB).

23

1 MidAmerican has not assessed a value to these excess ERCs, but other modeling efforts
2 have identified potential values for ERCs in 2030. For example, recent modeling results
3 from the Electric Power Research Institute find a range of ERC prices between \$10 and
4 \$18 in 2030, depending on different scenarios and assumptions.⁵ I have also seen a
5 similar range of ERC prices from other modeling results.⁶ Final versions of some of these
6 modeling results have not been published yet, but I can supplement my testimony if final
7 modeling results are published and would inform significantly different ERC price
8 assumptions.

9
10 With the fewest excess ERCs, [REDACTED], and an ERC value of \$10, sale of excess ERCs
11 would generate [REDACTED] in revenue in a single year. Wind XI would be expected
12 generate ERCs every year it is in operation during Clean Power Plan compliance years
13 (e.g., starting in 2022). Sales of this quantity of ERCs at this price over a five year period,
14 for example, would generate [REDACTED]. With the most ERCs, [REDACTED], and an ERC
15 value of \$10, sale of excess ERCs would generate [REDACTED] in revenue in a single
16 year. With the same quantity of ERC sales annually over a five year period, sale of all
17 excess ERCs would generate [REDACTED] in revenue.

18
19 If ERC prices are lower, such as \$5, these amounts would be reduced appropriately (e.g.,
20 by half). If ERC prices are higher, such as \$15, these amounts would be increased.

⁵ Electric Power Research Institute, *State-Level Modeling of Clean Power Plan Compliance Pathways with EPRI's US-REGEN Model* (February 2016).

⁶ This includes modeling by The Nicholas Institute, Bipartisan Policy Center, FACETs, and an MJ Bradley data visualizer tool that produces ERC prices in different scenarios.

1 **Q. What becomes of the revenue that might be available from excess ERCs?**

2 A. MidAmerican has indicated it will manage any ERC revenues for the benefit of
3 customers consistent with the “Environmental Benefits, CO2 credits, and the Like”
4 ratemaking principle. MidAmerican Response to Environmental Intervenor Data Request
5 filed as Exhibit EI-1 (Confidential). However, MidAmerican did not project revenue
6 from ERC (or allowance) sales in its ratemaking application and analysis for Wind XI. I
7 believe this was a conservative approach given several specific uncertainties in the type
8 of state plan that Iowa may adopt and the timing of implementation of the Clean Power
9 Plan given the court stay. However, it is important to note that this revenue is a
10 potentially significant added benefit to the overall economics for Wind XI and an added
11 benefit for customers.

12
13 In addition to the potential added revenue from ERCs, there is an important timing
14 consideration. Revenue from ERCs could provide a new source of revenue from Wind XI
15 as the revenue from the federal PTC tapers off.

16
17 **Q. MidAmerican has not proposed to sell renewable energy credits, or RECs. Can**

18 **MidAmerican treat ERCs in a different way than it treats RECs?**

19 A. EPA addressed this issue in the final Clean Power Plan rule. EPA stated that ERCs are
20 unique instruments specifically intended for compliance with the Clean Power Plan.
21 According to EPA, an “ERC is issued separately from any other instruments that may be
22 issued for a MWh of energy generation or energy savings from a qualifying measure”

1 including instruments like a renewable energy credit or energy efficiency credit.⁷ EPA
2 discusses how states have the flexibility to assess how ERCs interact with other
3 instruments like RECs in the development of a state plan.

4
5 Given this guidance from EPA, I believe it is reasonable for MidAmerican to plan to sell
6 ERCs while not planning to sell RECs. The EPA has indicated these are separate
7 compliance instruments (e.g., ERCs for the Clean Power Plan and RECs for a state
8 renewable portfolio standard or a company renewable energy target). The state plan that
9 Iowa ultimately adopts, which will be developed and submitted to EPA assuming
10 litigation upholds the Clean Power Plan, can provide further clarity for MidAmerican to
11 have these options.

12
13 **Q. You include MidAmerican’s projections for compliance using three economic**
14 **scenarios. Have you conducted any additional analysis regarding MidAmerican’s**
15 **compliance under the Clean Power Plan?**

16 A. I have conducted analysis for the state of Iowa as a whole using publicly available
17 spreadsheet tools from MJ Bradley & Associates and Synapse Energy Economics. I have
18 not conducted analysis for a specific utility such as MidAmerican Energy. Because the
19 results of these tools are for the state of Iowa, they are not directly comparable to
20 MidAmerican’s projections, but they can provide a useful context to evaluate the
21 MidAmerican projects. At a high level, MidAmerican’s results are consistent with the
22 results I have obtained from these publicly available modeling tools, in terms of the
23 approximate quantity of wind needed for compliance under a rate-based plan. For

⁷ EPA, 80 Fed. Reg. 64,908 (October 23, 2015).

1 example, using the MJ Bradley tool, accounting for on some key input assumptions, I
2 have found that approximately 2,500 MW of new wind energy, along with modest energy
3 efficiency savings, would put the state of Iowa into compliance with the Clean Power
4 Plan by achieving a rate of 1,280 lbs/MWh in 2030. MidAmerican's scenarios achieve
5 emissions rates for MidAmerican alone that are lower than 1,280 lbs/MWh from 2,000
6 MW in Wind XI. I am not attempting to evaluate the exact accuracy of MidAmerican's
7 numbers, but I believe they are reasonable projections in the context of other analysis I
8 have seen and my use of these publicly available modeling tools.

9
10 **Q. Witness Fehrman discusses a future where renewable energy plays an increasingly**
11 **prominent role. Do you agree?**

12 A. Yes. There are a number of drivers that are significantly increasing the role of renewable
13 energy. Witnesses Fehrman, Fehr and Hammer discuss many of them in different areas of
14 testimony. I agree with their overall conclusion and expand on some of the key drivers
15 below, including the reduced cost of renewable energy, renewable resource potential,
16 private sector renewable energy commitments, and economic benefits.

17
18 Iowa has experienced and continues to experience many of these drivers in very positive
19 ways. Although Iowa – and MidAmerican – has seen success with renewable energy to
20 date, there is enormous potential to continue the transition to renewable energy in coming
21 years and to reap the benefits of that transition. Wind XI is an important step toward
22 more renewable energy for MidAmerican and the state of Iowa.

23

1 **Q. How does MidAmerican’s proposal to add 2,000 MW of wind fit into Iowa’s**
2 **renewable energy future?**

3 A. Iowa has a very significant renewable energy resource potential that is well in excess of
4 current electricity use or generation. Witness Hammer included data from a recent NREL
5 report that is focused on available technical and economic potential for primary sources
6 of renewable energy. That report includes NREL’s updated wind technical potential
7 estimate for Iowa of 276 gigawatts (GW) of capacity or 1,045,000 gigawatt-hours (GWh)
8 of generation. Compared to a technical resource potential of 276 GW, MidAmerican’s
9 proposal to add 2 GW of wind will use a small fraction of this overall resource.

10

11 Several additional studies illustrate possible near-term installation rates for wind

12 generation in Iowa. In 2008, the U.S. Department of Energy released a comprehensive
13 study on achieving 20% of the U.S. electricity supply with wind energy by year 2030.⁸

14 To reach the 300,000 MW of wind needed to supply 20% of U.S. electricity, each state
15 would contribute a share of the total. Iowa’s share in the study is 19,910 MW of wind by
16 2030.⁹ Last year, the U.S. Department of Energy updated and expanded this study with

17 its *Wind Vision* study.¹⁰ The *Wind Vision* study includes several scenarios for wind

18 capacity development nationally and in each state in order to reach 20% wind by 2030

19 and 35% wind by 2050. Iowa’s share of the capacity needed to reach these national goals

20 is between 17,000 MW and 20,000 MW by 2030 and between 37,000 and 46,000 MW by

21 2050 in several main scenarios.¹¹

⁸ U.S. DOE, *20% Wind Energy by 2030* (2008).

⁹ U.S. DOE, *20% Wind*, Appendix A Data Tables (2008).

¹⁰ U.S. DOE, *Wind Vision* (2015) at <http://energy.gov/eere/wind/wind-vision>.

¹¹ U.S. DOE, *Wind Vision Study Scenario Viewer*, at http://en.openei.org/apps/wv_viewer/#.

1 Iowa ended 2015 with about 6,200 MW of installed wind capacity and is likely to reach
2 7,000 MW of wind capacity in the next year given projects that are proposed or under
3 construction (including Wind X). Wind XI would then bring Iowa to approximately 9,000
4 MW of wind. This keeps Iowa on track to reach the benchmarks for wind development in
5 the two Department of Energy reports of approximately 10,000 MW by 2020 and 20,000
6 MW by 2030. Wind XI is a very significant and important step towards Iowa's renewable
7 energy future, but it is also only one of many more needed steps. Assuming Wind XI is
8 built on schedule, Iowa will need another 1,000 MW to reach the 2020 benchmark or
9 11,000 MW to reach the 2030 benchmark.

10
11 **Q. What costs and cost trends are driving renewable energy development?**

12 A. Renewable energy costs have dropped significantly in recent years, allowing renewable
13 energy to compete with other sources of generation on a cost basis. MidAmerican
14 Witnesses Fehr and Hammer both reference renewable energy cost information from
15 several recent National Renewable Energy Lab and Department of Energy reports. In
16 addition to those reports, the latest Lazard analysis from 2015 on the levelized cost of
17 energy from different energy resources provides helpful cost information on renewable
18 energy, including wind and solar. The Lazard analysis also allows for a comparison of
19 renewables to a broader range of possible energy resources.¹²

20
21 The unsubsidized levelized cost of wind, such as without the federal PTC, ranges from
22 3.2 cents/kWh to 7.7 cents/kWh. I would expect Iowa to be on the low end of this

¹² Lazard, *Lazard's Levelized Cost of Energy Analysis – Version 9.0* (2015) at <https://www.lazard.com/perspective/levelized-cost-of-energy-analysis-90/>.

1 levelized cost range – closer to 3.2 cents/kWh – given the wind resource, the price data
2 for the Interior region for wind from the Department of Energy,¹³ and the regional data in
3 Lazard showing the Midwest with the lowest LCOE for wind (3.2 cents/kWh to 5.1
4 cents/kWh, the only region that goes as low as 3.2 cents/kWh).

5
6 This low end range for wind is well below the low end ranges for other new generation
7 resources. For example, gas combined cycle is 5.2 cents/kWh to 7.8 cents/kWh and
8 nuclear is 9.7 cents/kWh to 13.6 cents/kWh. With federal subsidies included, the picture
9 becomes even more favorable for wind with a range of 1.4 cents/kWh to 6.3 cents/kWh.

10
11 This Lazard analysis also provides a summary of cost declines in recent years for both
12 wind and solar. Between 2009 and 2015, the LCOE for wind dropped 61%, from a low
13 end range of 10.1 cents/kWh in 2009 to the cost discussed above, 3.2 cents/kWh, in 2015.
14 Similarly, utility-scale solar has dropped 82% in the same time frame.

15
16 As the Lazard, DOE and NREL studies all indicate, MidAmerican has an opportunity to
17 add a low cost generating resource that is favorable on a cost basis to other sources of
18 generation and to do so while taking advantage of the full value of the federal PTC to
19 provide additional benefits to customers.

20
21 **Q. How is the private sector driving more renewable energy?**

¹³ Department of Energy, *2014 Wind Technologies Market Report* (August 2015) at viii and 50.

1 A. Witness Fehrman references that a number of private sector companies have made
2 pledges regarding renewable energy and identifies some specific companies that have
3 made pledges on page 7 of his testimony. I would like to elaborate on this issue.

4
5 Private sector companies have made a variety of renewable energy, carbon reduction, and
6 sustainability pledges in recent years, with increasing numbers of companies involved
7 and more ambitious pledges made each year. While these pledges include commitments
8 to improve a variety of environmental metrics, many are focused on increasing use of
9 renewable energy.

10
11 For example, 78 Fortune 500 companies have joined EPA's Green Power Partnership
12 and are using renewable energy in some way to meet at least a portion of annual
13 electricity needs.¹⁴ At least 40 Fortune 500 companies have gone further and established
14 specific renewable energy targets.¹⁵ Of these, a number have set the aggressive target to
15 meet 100% of their electricity needs with renewable energy, including: Walmart, Apple,
16 Amazon, Procter and Gamble, Biogen, Microsoft, Nike, HP, Google, Starbucks, Voya
17 Financial (formerly ING Group), Unilever, Goldman Sachs, Johnson & Johnson, and

¹⁴ EPA, *Green Power Partnership Fortune 500 Partners List* (April 25, 2016) at

<https://www.epa.gov/greenpower/green-power-partnership-fortune-500r-partners-list>.

¹⁵ These companies include Wal-Mart, Chevron, Apple, General Motors Company, General Electric Company, Hewlett-Packard, Verizon Communications, AT&T, Procter & Gamble, Johnson & Johnson, Caterpillar, Dow Chemical Company, Intel Corporation, Google, Cisco Systems, DuPont, Hess Corporation, Sprint Nextel, News Corporation, McDonald's, Macy's, Raytheon Company, EMC Corporation, Kohl's, eBay, PG&E, Baxter International, J.C. Penney, Waste Management, Starbucks, HJ Heinz Company, Sempra Energy, DTE Energy, Caesars Entertainment, Motorola Solutions, Becton Dickinson, Campbell Soup Company, Coca-Cola Enterprises, Enbridge Energy Partners, Allergan, Inc., CA Technologies, Facebook. Calvert Investments, Ceres, David Gardiner & Associates and World Wildlife Fund, Power Forward 2.0 How American Companies Are Setting Clean Energy Targets and Capturing Greater Business Value, Supplement: Fortune 500 Targets (June 19, 2014) at 1- 19. Available at <https://www.ceres.org/resources/reports/power-forward-supplement-climate-and-energy-targets-set-by-fortune-500-companies>.

1 Salesforce.¹⁶ While the projected dates for reaching these commitments vary, many are in
2 the near future and some companies are already meeting the 100% target with current
3 operations. The number of companies setting these targets continues to grow.

4
5 An even larger number of companies are using an internal carbon price today and have
6 identified carbon reduction or greenhouse gas reduction goals, with increased use of
7 renewable energy identified as a key strategy to meet those goals. For example, a Climate
8 Disclosure Project analysis of nearly 2,000 global corporations found almost half are
9 either using an internal carbon price today or plan to in the next two years.¹⁷ While 27%
10 had set an emissions reduction target in 2010, 44% had set a target in 2015.¹⁸ Over one-
11 third (36%) of companies are using renewable energy to reduce emissions and meet such
12 targets.¹⁹

13
14 Customers will not be able to meet ambitious renewable energy or carbon emissions
15 targets without the utilities serving them taking similarly ambitious actions to change
16 their generation mix to include more renewable and carbon-free sources of energy.

17
18 **Q. How are communities driving the development of renewable energy?**

¹⁶ See, RE100, available at <http://there100.org/companies>. See also, Brief of Amici Curiae Amazon.com Inc., Apple Inc., Google Inc., and Microsoft Corp. in Support of Respondents, *State of West Virginia, et al., v. United States Environmental Protection Agency, et al.*, D.C. Cir., No. 15-1363 (April 1, 2016) at 4-8, available at https://www.edf.org/sites/default/files/content/2016.04.01_major_tech_companies_amicus_brief_for_epa.pdf.

¹⁷ Climate Disclosure Project, *Climate Change Report 2015: The mainstreaming of low carbon on Wall Street* (November 2015) at 30.

¹⁸ *Id.* at 28.

¹⁹ *Id.* at 30.

1 A. Mayor Frank Cownie’s testimony provides a good example of why and how communities
2 are interested in renewable energy development to meet interrelated sustainability,
3 economic development, and carbon reduction goals.

4
5 **Q. How are economic impacts driving renewable energy?**

6 A. Witness Fehr highlights the valuable economic impacts of Wind XI specifically,
7 including anticipated property tax revenue, land lease payments, and job creation. In
8 addition to Witness Fehr’s discussion of these benefits, I would like to expand upon them
9 by summarizing the broader context for wind energy’s economic benefits in Iowa and
10 addressing how Wind XI can expand these benefits to new communities in Iowa.

11
12 According to the latest data from the American Wind Energy Association, wind energy
13 was responsible for between 6,001 and 7,000 direct and indirect jobs in Iowa in 2015.²⁰
14 This total jobs number includes a mix of jobs in construction, operations and
15 maintenance, manufacturing, and the wind energy supply chain. A recent report by the
16 Environmental Law & Policy Center identifies 75 companies engaged in the wind
17 industry supply chain in Iowa.²¹ The ELPC report includes a map showing that these
18 businesses are distributed across Iowa, meaning that communities throughout the state
19 benefit from job and business creation from wind energy in Iowa.

20

²⁰ American Wind Energy Association, *Iowa Wind Energy* (2016), available at <http://awea.files.cms-plus.com/FileDownloads/pdfs/iowa.pdf>.

²¹ Environmental Law & Policy Center, *Iowa Wind Power & Solar Energy Supply Chain Businesses* (2015) at <http://elpc.org/tag/iowa-clean-energy-supply-chain-report>. Note that this report was published before more recent information from AWEA, so the ELPC job numbers are lower than the AWEA information I am using in this testimony.

1 Wind turbines are also becoming significant sources of local property tax revenue in the
2 counties that host wind farms. For example, according to the Iowa Wind Energy
3 Association, wind energy accounted for almost 10% of the county tax base in Pocahontas
4 County and brought in over \$3M in tax revenue in a recent three-year period.²²
5

6 **Q. Is there anything else to consider regarding the economic impact of Wind XI?**

7 A. Yes. Wind XI is very likely to bring the many economic benefits of wind energy to new
8 counties in Iowa. I have reviewed the list of potential sites included in Witness Fehr's
9 Confidential Schedule 1. I have compared this list to a county by county map of existing
10 wind turbines in Iowa, which was updated by Tom Wind, Wind Utility Consulting, in
11 August 2015 and is attached as Exhibit EI-3. Many of the counties with sites under
12 consideration by MidAmerican for Wind XI have few or no existing wind turbines as of
13 August 2015. Depending on which sites are ultimately selected, Wind XI could bring
14 wind energy to approximately █ counties that have either no wind turbines or only a few
15 wind turbines █
16 █
17 █

18
19 Wind XI can help spread the economic benefits of wind energy to more parts of Iowa. It
20 can provide new property tax revenue to counties with no such revenue from wind
21 turbines and provide landowner lease payments to landowners in counties that have not
22 had that option to date. Wind XI can boost local economic activity with temporary
23 construction jobs and some permanent operations jobs. From the perspective of the

²² Iowa Wind Energy Association, *Wind Power Facts* at <http://www.iowawindenergy.org/whywind.php>.

1 economic benefits from Wind XI, it is significant that Wind XI could add a large number
2 of turbines and associated economic development to new places in Iowa rather than add
3 more turbines to counties that already have significant wind development.

4
5 **Q. Are there other important impacts from the list of potential sites MidAmerican is**
6 **considering for Wind XI?**

7 A. Yes. Wind XI can improve the geographic diversity of MidAmerican's wind energy
8 portfolio, which can make the overall wind portfolio more beneficial as a resource.

9
10 The intermittency or variability of certain renewable resources can be mitigated to some
11 extent by spreading out those resources geographically. Additional information provided
12 by MidAmerican helps illustrate this point with a basic example. MidAmerican provided
13 its aggregate wind energy output for each hour of a year (8760 hours) as well as that wind
14 energy output broken out by the primary county where each individual wind farm is
15 located. MidAmerican Response to Environmental Intervenors Data Request 17 filed as
16 Exhibit EI-4 (Confidential). The average hourly output for the year was 945 MWh. To
17 make comparison among counties more straightforward, I rounded up and sorted to find
18 the five hours during the year where aggregate wind generation was 1,000 MWh. The
19 amount of generation contributed by wind farms in each county varies for each of these
20 five hours, yet the total from all counties for each of the five hours adds up to the same
21 1,000 MWh. Some counties, like Adair and Cass, provided █████ of the amount in one
22 hour but █████ in another. Pocahontas County and Pottawattamie County also illustrate
23 this point when compared to each other. Pocahontas is in northwest Iowa while

1 Pottawattamie is in southwest Iowa. In two hours where Pocahontas had lower
2 production ([REDACTED]), Pottawattamie had higher production. Conversely,
3 Pocahontas had higher production on two other hours ([REDACTED]).
4 Production during the hour for [REDACTED] was almost identical in both counties. This
5 information illustrates how the wind resource can vary to some extent across Iowa on a
6 given day or hour. Adding wind farms in counties across the state has helped ensure that
7 MidAmerican can access wind generation on a more regular basis by accessing wind
8 when and where it is available throughout the state – e.g., northwest Iowa one hour or
9 day, southwest Iowa the next hour or next day.

10

[REDACTED]

[REDACTED]

[REDACTED]

11 This example helps illustrate how MidAmerican already has geographic diversity in its
12 portfolio of wind generation. Wind XI will enhance this diversity. Wind XI sites are
13 likely to be in new counties and potentially in new parts of the state for MidAmerican

1 wind generation. As I discussed above relative to economic benefits, MidAmerican has
2 identified a number of sites that are in counties where little or no wind generation already
3 exists in Iowa. I also compared the [REDACTED] counties identified as having potential Wind XI
4 sites with a map of current (before Wind XI) MidAmerican wind projects.²³

5 MidAmerican does not appear to have wind projects in [REDACTED] of the [REDACTED] counties it is exploring
6 for Wind XI sites. [REDACTED]

7 [REDACTED] By adding
8 more counties and more geographic areas of Iowa to its portfolio, MidAmerican can
9 expect less variability and intermittency and rely on wind from somewhere in the state for
10 more hours in a given year. As more data is gathered from geographically distributed
11 wind projects in Iowa, more insights will be available on the benefits from geographic
12 diversity.

13
14 **Q. What is your response to MidAmerican's fuel diversity given Wind XI?**

15 **A.** Wind XI increases the share of MidAmerican's capacity and generation from wind over
16 time, but MidAmerican still projects capacity and generation from variety of resources.
17 Witness Hammer's testimony includes MidAmerican's nameplate and creditable
18 capacity by energy type with and without Wind XI and indicates a mix of resources
19 contribute to MidAmerican's portfolio. The same is true for annual energy generation.
20 See MidAmerican Response to Environmental Intervenors Data Request 4 and
21 Confidential Attachment EI 4-2 attached as Exhibit EI-5 (Confidential). MidAmerican
22 uses its three economic modeling approaches, ABB, PIRA, and HIS, to project the

²³ MidAmerican Energy, *Wind Projects Owned by MidAmerican Energy Company Before Wind XI* at https://www.midamericanenergy.com/content/pdf/iowa_wind_farm_locations.pdf.

1 contribution of Wind XI to overall generation. Wind XI allows MidAmerican to increase
2 wind generation so that it is the largest single source of energy generation in two of the
3 three scenarios (it would have been the largest single source in both ABB scenarios).
4 However, in all three scenarios, wind generation does not reach 50% of total generation
5 in 2030. Wind XI increases the prominence of wind generation in MidAmerican's
6 portfolio and can allow MidAmerican to reduce reliance on imported fossil fuels,
7 particularly coal. MidAmerican reported in its 2015 Annual Electric Report that fuel
8 costs to support fossil steam generation total over \$235 million in 2015 alone.²⁴ Wind has
9 no fuel cost and is an important resource to continue to add given the dominant role that
10 coal generation has in MidAmerican's portfolio.

11
12 **Q. MidAmerican has identified a goal to reach 100% of Iowa retail customers' annual**
13 **energy usage. What is your response?**

14 A. Meeting 100% of retail customer annual electricity needs is an obtainable goal and one
15 that can bring significant economic benefits to Iowa and to MidAmerican's customers.
16 As discussed above, Iowa's renewable resource potential is certainly large enough to
17 allow MidAmerican, as well as other Iowa utilities, to reach this goal. All Iowans deserve
18 access to renewable energy and utility-supplied renewable energy is a very important way
19 to provide that access. I would note that while the goal of meeting 100% of retail sales
20 with renewable energy is a key milestone that we strongly support, MidAmerican is not
21 proposing to transition to only renewable energy. Witness Hammer's testimony indicates
22 that MidAmerican will continue to operate significant coal and gas capacity in the

²⁴ MidAmerican Energy, *Annual Report: Rate Regulated Electric Utilities*, Form IE-1, Iowa Utilities Board Docket No. A-2015-0156.

1 coming years. Research supports the ability to transition to higher penetrations of
2 renewable energy, including 100% renewables,²⁵ and we welcome future opportunities to
3 continue increasing both MidAmerican and Iowa's use of renewable energy.

4
5 **Q. MidAmerican indicates that Wind XI allows it to meet 85% of customer electricity**
6 **needs with renewable energy. How can MidAmerican accomplish the final 15%?**

7 A. There are many options available to continue increasing renewable energy and meet the
8 100% target and to do so in a way that benefits both the company and its customers.

9
10 Additional wind projects are certainly one option given Iowa's wind resource. As I
11 indicated in my testimony in Wind X last year, adding solar PV would serve as a good
12 complement to both MidAmerican's wind energy resource and its load profile.
13 Community solar projects are one important way to add solar PV. MidAmerican
14 indicated in its filing that it is currently exploring this option at around 5 MW. A number
15 of smaller utilities in Iowa have either completed successful community solar projects or
16 are developing such projects. Cedar Falls Utilities recently energized the largest such
17 array in Iowa at 1.5 MW. Other cooperative and municipal utilities that have installed
18 community solar projects include Heartland REC, Farmers Electric Coop, and Western
19 Iowa Power Cooperative. Additional utility-owned solar projects are also moving
20 forward, such as including Central Iowa Power Cooperative's 5.5 MW project announced
21 earlier this year and Alliant Energy's 4 MW solar project announced last week. In
22 addition to community or utility owned solar, customer owned or customer sited solar has

²⁵ National Renewable Energy Lab, *Renewable Electricity Futures Study: Exploration of High-Penetration Renewable Electricity Futures* (2012); Jacobson et al, *100% clean and renewable wind, water, and sunlight (WWS) all-sector energy roadmaps for the 50 United States*, Energy & Environmental Science (2015).

1 significant potential in Iowa. An updated NREL analysis on the potential for rooftop solar
2 alone indicates that approximately 35% of annual generation can be met with rooftop
3 solar.²⁶ It is possible for customer-owned or customer-sited solar to contribute part of the
4 15% and do so in a way that benefits both MidAmerican Energy and all of its customers.
5 MidAmerican Response to Data Center Data Request 17 filed as Exhibit EI-6.

6 (Confidential) [REDACTED]

7 [REDACTED]
8 [REDACTED]
9 [REDACTED]). In

10 addition to increasing renewable resources, other strategies may be helpful to integrate
11 renewables and increase the value of renewables. Those strategies could include demand
12 response, energy efficiency, and storage.

13
14 **Q. What are your recommendation regarding MidAmerican’s Wind XI proposal?**

15 A. I support the timely approval and construction of Wind XI. Wind XI provides very
16 substantial economic and environmental benefits to MidAmerican customers and to the
17 state of Iowa as a whole, including compliance with the Clean Power Plan, use of the
18 federal PTC at its full value, reduced use of imported coal and other non-renewable fuels,
19 job creation and economic development and the addition of a low cost generating
20 resource. I support Wind XI and hope to see additional renewable energy proposals from
21 MidAmerican and other utilities in Iowa in the near future.

22

²⁶ National Renewable Energy Laboratory, *Rooftop Solar Photovoltaic Technical Potential in the United States: A Detailed Assessment* (January 2016) at 35.

1 **Q. Does this conclude your testimony?**

2 **A. Yes.**

3

4

STATE OF IOWA)
)
COUNTY OF POLK)

I, Nathaniel Baer, being first duly sworn, depose and state that the statements contained in the foregoing prepared direct testimony are true and correct to the best of my knowledge, information and belief, and that such prepared direct testimony constitutes my sworn statement in this proceeding.

/s/ Nathaniel Baer

Nathaniel Baer

Subscribed and sworn to before me this 21st day of June, 2016.

/s/Barb Garbes

Notary Public in and for the State of Iowa