

**BEFORE THE  
PUBLIC SERVICE COMMISSION  
OF WISCONSIN**

Application of Wisconsin Power and  
Light Company for Authority to Adjust  
Electric and Natural Gas Rates  
For 2022 and 2023 Test Years

Docket No. 6680-UR-123

**PRE-FILED DIRECT TESTIMONY OF**

**METIN CELEBI**

**FOR**

**WISCONSIN POWER AND LIGHT COMPANY**

May 27, 2021

1 **Q1. Please state your name and business address.**

2 A. My name is Metin Celebi. My business address is One Beacon  
3 Street, Boston, Massachusetts 02108.

4 **Q2. By whom are you employed and in what capacity?**

5 A. I am a Principal of The Brattle Group, an economic and management  
6 consulting firm with offices in Boston, Massachusetts; Washington,  
7 DC; San Francisco, California; New York, New York; Chicago,  
8 Illinois; Toronto, Canada; London, England; Rome, Italy; Madrid,  
9 Spain; Sydney, Australia; and Brussels, Belgium.

1 **Q3. On whose behalf are you testifying?**

2 A. I am testifying on behalf of Wisconsin Power and Light Company  
3 (WPL or the Company).

4 **Q4. Please state your educational background.**

5 A. I hold a Ph.D. in Economics from Boston College, where my  
6 dissertation was on transmission investment, pricing, and power  
7 system modeling, a Masters in Economics from Bilkent University in  
8 Ankara, Turkey, and a Bachelor of Science in Industrial Engineering  
9 from Middle East Technical University (METU) in Ankara, Turkey.  
10 Further details regarding my background, publications, and prior  
11 expert testimony are provided in my résumé, which is included as  
12 Ex.-WPL-Celebi-1.

13 **Q5. Please describe your work experience in the utility industry.**

14 A. For more than twenty years, I have been employed as a consultant  
15 in the electric power industry. My expertise includes assessing the  
16 economic viability of coal plants, forecasting of wholesale energy and  
17 capacity prices, resource planning, and analysis of environmental  
18 and climate policy. I have provided expert testimony in cases before  
19 the Federal Energy Regulatory Commission (FERC), U.S. District  
20 Court Eastern District of Missouri, Public Service Commission of  
21 Wisconsin, Pennsylvania Public Utilities Commission, Public Service  
22 Commission of Kentucky, Public Utilities Commission of Texas, and  
23 Superior Court of the State of Arizona on topics including economics

1 of coal plant retirements and their impact on wholesale energy prices  
2 in the Midcontinent Independent System Operator (MISO), locational  
3 marginal price (LMP) spikes in the Pennsylvania-Jersey-Maryland  
4 (PJM) regional transmission organization (RTO), allocation of certain  
5 ancillary services costs among market participants in the Electric  
6 Reliability Council of Texas (ERCOT), and wholesale power prices  
7 in Arizona.

8 **Q6. Have you testified in previous cases before the Public Service  
9 Commission of Wisconsin (Commission)?**

10 A. Yes, I have testified on behalf of Wisconsin Public Service  
11 Corporation in 2012 and 2013 regarding the impacts of pending coal  
12 plant retirements and environmental retrofits on energy and capacity  
13 prices in the MISO region.

14 **Q7. What is the purpose of your testimony?**

15 A. The purpose of my testimony is to provide an opinion regarding the  
16 appropriateness of WPL continuing to recover as a regulatory asset<sup>1</sup>  
17 the remaining net book value at Edgewater Generating Station Unit  
18 5 (Edgewater 5), a coal-fired generating unit, from its customers after  
19 the unit's proposed retirement in 2022. My testimony provides my  
20 findings and opinions on the following:

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<sup>1</sup> WPL witness Neil Michek discusses in greater detail WPL's proposal to recover the remaining net book value of Edgewater 5 as a regulatory asset. See Direct-WPL-Michek-29 to 31.

- 1           • Prudence of major capital investment decisions at Edgewater
- 2           5 over the last 10 years, based on the then-projected cost
- 3           savings of those investments relative to retiring the unit and
- 4           replacing it with other resources;
- 5           • Historical net revenues from operating Edgewater 5 in the
- 6           MISO wholesale markets during the last 10 years; and
- 7           • Reasonableness of the modeling approach and results in
- 8           WPL’s Clean Energy Blueprint resource plan (Blueprint)
- 9           analysis to evaluate the expected cost savings of the
- 10          retirement of Edgewater 5 and replacement with a mix of
- 11          renewables.

12   **Q8. Are you sponsoring any exhibits?**

13   A. Yes, I am sponsoring the following exhibits:

- 14           • Ex.-WPL-Celebi-1: Resume of Metin Celebi
- 15           • Ex.-WPL-Celebi-2: Examples of State Regulatory Decisions
- 16           Regarding Cost Recovery Treatment for Retiring Coal Plants

17   **Q9. What are your summary conclusions and findings?**

18   A. Based on my review of the Commission’s prior decisions, WPL’s

19   previous and current planning analyses, and publicly available

20   information on Edgewater 5, I conclude that:

21           *First*, over the last ten years, WPL demonstrated that investing

22   capital for the continued operation of Edgewater 5 would result in

23   substantial cost savings for ratepayers relative to other options,

1 including alternative investments and early retirement of the plant.  
2 These findings are well documented in WPL's filings and  
3 Commission orders over this time period. The major capital  
4 expenditures include the installation of Selective Catalytic Reduction  
5 (SCR) pollution controls in 2011; the purchase of Wisconsin Electric  
6 Power Company's (WEPCO) 25 percent ownership share of  
7 Edgewater 5 in 2011; the installation of the Dry Flue Gas  
8 Desulfurization with fabric filter (DFGD/FF) pollution controls in 2016;  
9 and the conversion of the unit's bottom ash handling system to dry  
10 ash handling in 2018. The Commission approved each of these  
11 capital investments, and the pollution control investments account for  
12 the majority (█ percent) of the current total undepreciated  
13 investments (i.e., net book value) of \$525 million at Edgewater 5 as  
14 of December 2020.<sup>2</sup>

15 *Second*, over the last ten years, Edgewater 5 provided nearly  
16 \$118 million cost savings (i.e., energy and ancillary services margins,  
17 or "E&AS Margins") to WPL's customers as a result of bringing more  
18 revenues from the sale of energy and ancillary services into the  
19 MISO market, relative to its variable operating costs (fuel and  
20 variable operating & maintenance, or O&M). The unit's annual E&AS

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<sup>2</sup> As discussed by WPL witness Michek, the estimated remaining net book value for Edgewater 5 at the unit's currently forecasted September 2022 retirement date is \$482 million. At that point in time, the pollution control investments I describe above are forecast to account for approximately █ percent of the unit's remaining net book value.

1 margins decreased in the last two years as a result of decreasing  
2 energy prices in MISO and the increasing variable operating costs at  
3 Edgewater 5.

4 *Third*, due to major and persistent unexpected shifts in market  
5 fundamentals (lower gas price forecasts, lower load growth, and  
6 substantial decrease in cost of new renewable resources), current  
7 expectations for the future economic performance of Edgewater 5  
8 are worse, relative to the cost of procuring power from replacement  
9 resources. In addition, the recent economic performance of  
10 Edgewater 5 does not reflect a temporary downturn, but rather  
11 mirrors larger market trends in which forces beyond WPL's control  
12 will make it increasingly compelling to retire the plant.

13 *Fourth*, based on my review of the modeling approach,  
14 planning scenarios, and key assumptions in WPL's Blueprint  
15 analysis, I conclude that retirement of Edgewater 5 would reduce the  
16 present value cost of meeting the future needs of WPL's customers  
17 compared to continuing to operate Edgewater 5 until 2045. WPL's  
18 modeling shows that retiring Edgewater 5 avoids a substantial  
19 amount of fuel, variable, and fixed O&M costs, and these avoided  
20 costs more than offset the cost of installing new renewable resources  
21 to replace the retired plant, resulting in a net benefit to customers.  
22 Retiring Edgewater 5 and replacing it with renewable energy  
23 resources is also consistent with the Company's plan to transition

1 away from coal by 2040 and to achieve its aspirational goal of net-  
2 zero carbon dioxide (CO<sub>2</sub>) emissions by 2050. The proposal also  
3 brings WPL closer to meeting Wisconsin's goal to achieve 100  
4 percent carbon-free electricity by 2050.<sup>3</sup>

5 *Fifth*, longstanding and economically well-justified principles  
6 and standards in the utility industry strongly indicate that prudent  
7 investments should be fully recoverable from customers, even if they  
8 eventually prove less economic than initially projected.

9 *Sixth*, the Commission has previously applied the foregoing  
10 principles and standards in the context of asset retirement, deeming  
11 it reasonable for WPL to recover undepreciated investments at  
12 Edgewater Units 3 and 4 and Nelson Dewey Units 1 and 2. In  
13 addition, it would be consistent with rulings from state regulatory  
14 commissions around the country to allow WPL to recover prudently  
15 incurred investments in plants that are no longer economic, relative  
16 to alternative resources, because of shifting market forces and/or  
17 new regulatory mandates.

18 *Seventh*, and finally, it would be just and reasonable for WPL  
19 to continue recovering the remaining net book value of Edgewater 5  
20 through a return of and on those investments at WPL's authorized  
21 weighted-average cost of capital (WACC) because: (i) the

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<sup>3</sup> See Executive Order 38, Relating to Clean Energy in Wisconsin (August 16, 2019), available at <https://evers.wi.gov/Documents/EO%20038%20Clean%20Energy.pdf>.

1 Commission approved WPL's past major capital investments at  
2 Edgewater 5, which WPL demonstrated were more beneficial than  
3 early retirement and/or other alternative resources (and which  
4 resulted in the plant continuing to operate and generate actual  
5 savings for the customers through positive margins against the  
6 wholesale market prices over the last 10 years), and (ii) WPL is  
7 proposing a retirement strategy as part of its system-wide resource  
8 plan that benefits customers by avoiding costs that WPL would  
9 otherwise incur if it continued to operate Edgewater 5 in the future.  
10 Because of these economic findings, and because of the norms of  
11 the traditional and long-established regulatory compact between a  
12 utility, its regulators, and its customers, it would be appropriate for  
13 WPL to continue recovering the remaining net book value of  
14 Edgewater 5 in retail rates at its authorized WACC.

15 I understand that WPL has entered into a settlement  
16 agreement (Settlement) under which it would recover the remaining  
17 net book value of Edgewater 5 on a levelized cost recovery basis at  
18 a WACC reflecting a premised return on equity (ROE) of 9.8  
19 percent.<sup>4</sup> Although this results in WPL earning a return on the

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<sup>4</sup> As discussed in the direct testimony of WPL witness Neil Michek, levelized cost recovery results in WPL earning an effective ROE of 9.2 percent on the plant's remaining net book value between its expected retirement date (September 2022) and the end of its current depreciable life (June 2045). See Direct-WPL-Michek-31 to 34. Mr. Michek also notes that levelized cost recovery would only apply to WPL's recovery of its original cost investment in the plant (Life NBV), rather than costs of removal. As part of the Settlement, WPL is also increasing its financial common equity ratio to 52.5 percent.



1 Edgewater 5 Life NBV at less than its authorized WACC, it  
2 nonetheless reflects a reasonable compromise that adequately  
3 balances the interests of WPL's customers with the Company's need  
4 to recover the cost of past prudent investments in the unit.

5 **Q10. How is your testimony organized?**

6 A. In Section I, I describe the sources and amounts of major capital  
7 investments at Edgewater 5 in the previous decade, as well as the  
8 circumstances that necessitated those investments. I find WPL's  
9 investment decisions to be reasonable and prudent. In Section II, I  
10 review historical operations at Edgewater 5 over the last ten years  
11 and show that the plant's revenues from the MISO energy and  
12 ancillary services markets exceeded its variable costs in all years,  
13 leading to significant actual savings to WPL's customers. In Section  
14 III, I review the reasonableness of the modeling approach WPL used  
15 to develop the Blueprint resource plan and explain the basis for cost  
16 savings from the retirement of Edgewater 5 and replacement with  
17 new renewable resources. In Section IV, I provide recommendations  
18 on the appropriate treatment of the remaining net book value of  
19 Edgewater 5, based on standard regulatory and economic principles  
20 and examples of similar cases of cost recovery for retiring plants  
21 owned by utilities in other jurisdictions. This review and analysis lead  
22 me to conclude in Section V that the cost recovery mechanism WPL

1 is seeking for Edgewater 5 in the Settlement is just, reasonable, and  
2 appropriate.

I. **PAST CAPITAL INVESTMENTS AT EDGEWATER 5**

3 **Q11. Please summarize your understanding of the undepreciated**  
4 **investments that WPL is proposing to recover after the**  
5 **retirement of Edgewater 5.**

6 A. Over the last ten years, WPL has incurred several major capital  
7 expenditures to maintain and operate Edgewater 5 in good working  
8 condition and in accordance with applicable regulatory requirements.

9 These include<sup>5</sup>:

- 10 a. \$145 million in 2011 for the installation of SCR to reduce NOx  
11 emissions to comply with Wisconsin environmental  
12 regulations;
- 13 b. \$38 million in 2011 for the purchase of WEPCO's 25 percent  
14 ownership share in the unit;
- 15 c. \$231 million in 2016 for a dry flue gas desulfurization (DFGD)  
16 system with a fabric filter (FF) to comply with a federal consent  
17 decree and meet future and pending sulfur dioxide (SO<sub>2</sub>)  
18 emission reduction requirements; and
- 19 d. \$22 million in 2018 for the replacement of the existing bottom  
20 ash handling system, which had reached the end of its normal

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<sup>5</sup> Note that the costs referenced here reflect the actual, installed cost of each investment, whereas the costs in Figure 1 reflects the Commission-authorized cost for each project. As I discuss later, the actual cost for each investment is less than the authorized cost.

1 operating life, with a dry handling system, to comply with the  
2 new and stricter environmental regulations on the wastewater  
3 effluent from the plant.

4 Figure 1 below summarizes the major investments at  
5 Edgewater 5 in the past decade. The Commission reviewed and  
6 approved each of these major investments, based on the then-  
7 projected cost savings relative to other alternatives, including  
8 retirement. As discussed in the direct testimony of WPL witness  
9 Michek,<sup>6</sup> WPL is proposing to transfer the plant's remaining net book  
10 value to a regulatory asset account and to continue recovering a  
11 return of and on the undepreciated assets over the plant's current  
12 remaining depreciable life (i.e., through 2045) on the terms  
13 embodied in the Settlement.

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<sup>6</sup> Direct-WPL-Michek-29 to 34.

**Figure 1: Major Investments at Edgewater 5 between 2010-2020**

Investment	Reason	Authorized Capital Cost	Projected Cost Savings	Commission ruling
SCR (2011)	To meet WI RACT requirements	\$154 million	More than \$500 million over 30 years compared to retirement in 2012	Approval in May 2010 (Docket 5-CE-137, PSC REF#: 132485)
Purchase of WEPCO's share (2011)	WPL needed new energy supply	\$39 million	\$303-\$729 million in cost savings compared to retirement at the end of 2012	Approval in November 2010 (Docket 5-BS-184, PSC REF#: 141858)
DFGD and Baghouse Installation (2016)	To comply with federal Consent Decree and Cross State Air Pollution Rule	\$414 million	\$139 million in cost savings under reference scenario (and in the range of -8.7 million to \$289 million across scenarios) compared to retirement at the end of 2016	Approval in June 2013 (Docket 6680-CE-174, PSC REF#: 185811)
Replacement of bottom ash handling system (2018)	To meet regulations on wastewater effluents	\$24 million	N/A	Approval in 2016 (Docket 6680-CE-178, PSC REF#: 287184)

1                    Figure 2 below depicts the composition of the current net book  
2                    value of Edgewater 5 (as of December 2020) by vintage year of  
3                    capital expenditures. Together, the major investments related to  
4                    pollution control equipment I listed above account for █ percent, or  
5                    a majority of the total undepreciated investment (i.e. net book value)  
6                    of \$525 million at Edgewater 5 as of December 2020.<sup>7</sup>

<sup>7</sup> As noted earlier, the estimated remaining net book value for Edgewater 5 at the unit's currently forecasted September 2022 retirement date is \$482 million. At that point in time, the pollution control investments I describe above are forecast to account for approximately █ percent of the unit's remaining net book value.

**Figure 2: Net Book Value at Edgewater 5 by Vintage Year**  
**(as of December 2020) (Confidential) <sup>8</sup>**



1 **Q12. Did the Commission authorize the initial installation of**  
2 **Edgewater 5?**

3 A. Yes. In 1980, the Commission authorized WPL to construct  
4 Edgewater 5 to maintain adequate reserve margins, improve the  
5 reliability of power supply, and to meet the future power needs of  
6 WPL and other utilities in eastern Wisconsin.<sup>9</sup> It is noteworthy that,  
7 at that time, the United States Environmental Protection Agency  
8 (EPA) and Wisconsin Department of Natural Resources (WDNR)  
9 determined that that FGD pollution control equipment was not  
10 needed for Edgewater 5 to meet environmental regulations and,

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<sup>8</sup> Data from WPL for net book value as of December 2020.

<sup>9</sup> See generally *In Re Application of Wis. Power and Light Co.*, Docket No. 6680-CE-3, 64 Wis. PSC 11, 1980 WL 642595, *Findings of Fact, Certificate, and Order* (Jan. 18, 1980). WEPCO subsequently purchased an ownership stake in the unit.

1 therefore, did not require its installation.<sup>10</sup> In fact, it was this  
2 determination that led the Commission to authorize construction of  
3 the plant in 1980, rather than at a later point in time.<sup>11</sup> As I describe  
4 below, a federal consent decree and additional developments in  
5 environmental regulations in the early part of the last decade resulted  
6 in the need to install an FGD system at Edgewater in 2016, resulting  
7 in a significant portion of the FGD capital costs (\$222 million)  
8 remaining in the plant's undepreciated investment balance as of the  
9 end of 2020.

10 **Q13. Please summarize the conditions that necessitated the**  
11 **installation of SCR on Edgewater 5 in 2011.**

12 A. Located in an ozone non-attainment area, Edgewater 5 had to  
13 reduce its NOx emissions to meet Wisconsin's Reasonably Available  
14 Control Technology (RACT) requirements and to support compliance  
15 with the Environmental Protection Agency's Cross-State Air Pollution  
16 Rule (CSAPR).<sup>12</sup> An engineering study concluded that, in order to  
17 comply with RACT requirements, WPL could either install SCR  
18 equipment at Edgewater 5 at a cost of about \$154 million or retire  
19 the unit. Results from WPL's modeling indicated that, compared to

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<sup>10</sup> *Id.* at 16.

<sup>11</sup> *Id.* at 18-19.

<sup>12</sup> *In Re Application of Wis. Power and Light Co. and Wis. Electric Power Co.*, Docket No. 05-CE-137, *Certificate and Order*, at 3-4 (May 27, 2010) (PSC REF#: 132485) [*"Edgewater 5 SCR Order"*]; see also *id.*, *Certificate of Authority Application: Edgewater Generating Station Unit 5 NOx Reduction Project*, at 16-20 (Dec. 15, 2008) (PSC REF#: 105618) [*"Edgewater 5 SCR CA Application"*].

1 retiring the unit in 2012, adding SCR equipment would save more  
2 than \$500 million in present value costs for WPL over 30 years, and  
3 the payback period was about six years.<sup>13</sup> Although the projected  
4 savings would be lower in scenarios with carbon prices, lower natural  
5 gas prices, higher coal prices, and higher SCR capital costs, the  
6 projected savings in those scenarios were still substantial, exceeding  
7 \$400 million on a present value basis.<sup>14</sup>

8 In May 2010, the Commission approved WPL's proposal to  
9 install SCR at Edgewater 5 the following year.<sup>15</sup>

10 **Q14. What were the circumstances surrounding WPL's decision to**  
11 **purchase WEPCO's share of Edgewater 5 in 2011?**

12 A. When the Commission approved the installation of SCR at  
13 Edgewater 5 in 2008, WEPCO owned a 25 percent ownership stake  
14 in the unit. WEPCO's economic analysis in that proceeding indicated  
15 that installing the SCR would be more expensive to WEPCO's  
16 customers on a net present value revenue requirement (PVRR)  
17 basis than abandoning its share of the unit.<sup>16</sup> However, the  
18 Commission had recently determined that WPL needed to develop  
19 new energy supplies.<sup>17</sup> WPL's economic analysis also showed that

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<sup>13</sup> *Edgewater 5 SCR CA Application*, at 26-28.

<sup>14</sup> *Edgewater 5 SCR CA Application*, at 52.

<sup>15</sup> See generally *Edgewater 5 SCR Order*.

<sup>16</sup> See *In Re Joint Application of Wis. Power and Light Co. and Wis. Electric Power Co.*, Docket No. 05-BS-184, *Final Decision*, at 3 (Nov. 30, 2010) (PSC REF#: 141858) [hereinafter, "*Edgewater 5 Acquisition Order*"].

<sup>17</sup> See *In Re Application of Wis. Power and Light Co.*, Docket No. 6680-CE-170, *Final Decision*, at 4 (Dec. 12, 2008) (PSC REF#: 105588).

1 continuing to operate the unit with SCR equipment would be cost  
2 effective for its customers, regardless of whether it owned 75 percent  
3 or 100 percent of the unit. Specifically, WPL's analysis showed that,  
4 compared to retiring Edgewater 5 in 2012, purchasing WEPCO's  
5 share and installing SCR equipment would lead to present value cost  
6 savings for WPL customers of \$303 million to \$729 million across  
7 three different future scenarios. Further, WPL demonstrated that  
8 100 percent ownership of Edgewater 5 would save its customers \$6  
9 million to \$98 million relative to the status quo (owning 75 percent of  
10 the plant). WPL also estimated that, from 2005 to 2009, the historical  
11 value of Edgewater 5 (market revenues minus operating costs)  
12 exceeded \$70 million.<sup>18</sup>

13 The Commission approved the transaction in November  
14 2010, noting that WPL's analyses "strongly support WPL's  
15 acquisition of WEPCO's interest in Edgewater Unit 5."<sup>19</sup> The  
16 Commission also noted that, at \$411/kW, the purchase price would  
17 be lower than the estimated construction cost of a new gas-fired  
18 generation plant, as well as investments in energy conservation and  
19 efficiency.<sup>20</sup>

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<sup>18</sup> *Edgewater 5 Acquisition Order*, at 3-6; see also *See In Re Joint Application of Wis. Power and Light Co. and Wis. Electric Power Co.*, Docket No. 05-BS-184, *Application*, at 3-7 (Nov. 30, 2010) (PSC REF#: 131196).

<sup>19</sup> *Edgewater 5 Acquisition Order*, at 3.

<sup>20</sup> *Id.* at 6.



1 **Q15. Please summarize WPL’s application to the Commission to**  
2 **install a DFGD and baghouse system at Edgewater 5 in 2016.**

3 A. In 2009 and 2010, the EPA and Sierra Club alleged that WPL  
4 violated the Clean Air Act’s Prevention of Significant Deterioration  
5 program, the Edgewater 5 Title V operating permit, and the  
6 Wisconsin State Implementation Plan. In 2012, those parties  
7 entered into a consent decree in federal court, which required WPL  
8 to install an FGD system on Edgewater 5 to meet more stringent SO<sub>2</sub>  
9 emissions requirements. To comply with the Consent Decree and  
10 CSAPR, WPL filed an application with the Commission to install a  
11 DFGD and baghouse system at Edgewater 5.<sup>21</sup> With the proposed  
12 system installed, WPL projected that SO<sub>2</sub> emissions from WPL coal  
13 units would decrease by about 90 percent. In addition to helping  
14 WPL meet future and pending SO<sub>2</sub> emission reduction requirements,  
15 the new control system would also provide co-benefits by capturing  
16 fine particulate matter and acid gases.<sup>22</sup>

17 WPL estimated that the new system would have a capital cost  
18 of about \$414 million. Compared to the alternative of retirement of  
19 Edgewater 5 in 2016, continuing to operate the unit with the DFGD  
20 system in place would reduce customer costs in 19 out of 20  
21 scenarios, with \$139 million PVRR savings under reference case

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<sup>21</sup> See *In Re Application of Wis. Power and Light Co.*, Docket No. 6680-CE-174, *Final Decision* (Jul. 4, 2013) (PSC REF#: 185811) [*“Edgewater 5 FGD Order”*].

<sup>22</sup> *Id.* at 40.

1 and ranging from \$58 million to \$289 million in those 19 scenarios.  
2 No party to that proceeding contested the need for the project or  
3 otherwise contested WPL's economic analysis, and the Commission  
4 approved WPL's application in 2013.<sup>23</sup>

5 **Q16. Please explain WPL's capital project to install a new bottom ash**  
6 **handling system in 2018.**

7 A. In March 2016, WPL applied to replace the existing bottom ash  
8 handling system at Edgewater 5 with a dry ash handling system.<sup>24</sup>  
9 Initially installed in 1985, the old wet ash handling system was aged  
10 beyond its normal 30-year operating life and needed significant  
11 repairs or complete replacement. The new ash handling system  
12 would also bring WPL into compliance with the new and stricter  
13 environmental regulations on wastewater effluents (including arsenic  
14 limits) and keep the plant in good operating condition. With an  
15 estimated cost of \$24 million, the proposed dry ash handling system  
16 had comparable lifecycle costs (on a 30-year PVRR basis) to the  
17 other two technology alternatives.<sup>25</sup> The Commission approved the  
18 proposed project in 2016.<sup>26</sup>

19 **Q17. Do you believe that past investments at Edgewater 5 were the**  
20 **result of prudent planning?**

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<sup>23</sup> *Id.* at 7-9.

<sup>24</sup> *In Re Application of Wis. Power and Light Co.*, Docket No. 6680-CE-178, *Final Decision* (Jun. 14, 2016).

<sup>25</sup> Certificate of Authority Application Edgewater Unit 5 Bottom Ash System Replacement Project, page 8 (March 11, 2016)

<sup>26</sup> *Id.* at 5-9.

1 A. Yes, I do. My opinion is based on the following observations. First,  
2 the Commission already reviewed and approved each of the large  
3 capital expenditures I discussed above, which represent more than  
4 [REDACTED] percent of Edgewater 5's net book value as of December 2020.  
5 In approving WPL's requests to include these expenditures in rate  
6 base and to recover them from customers, the Commission found  
7 that these investments at Edgewater 5 were prudent and useful.  
8 Prior to each major capital expenditure, WPL demonstrated through  
9 detailed system analyses that continuing to operate Edgewater 5  
10 would lead to cost savings for WPL's customers across multiple  
11 future scenarios relative to other options, including early retirement  
12 of the unit.

13 Second, I note that the actual costs for these major  
14 investments were lower than the amount that the Commission  
15 approved. For example, at \$231 million, the actual capital cost of the  
16 DFGD equipment was 44 percent lower than what the Commission  
17 initially authorized.<sup>27</sup> Similarly, the SCR system cost was nearly \$20  
18 million lower,<sup>28</sup> the acquisition of WEPCO's share in the unit was \$1

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<sup>27</sup> Compare *Edgewater 5 FGD Order*, at 13 (authorizing the FGD project at an estimated cost of approximately \$414 million) to *In Re Application of Wis. Power and Light Co.*, Docket No. 6680-CE-174, *Final Progress Report and Cost Report*, at 3 (Jul. 28, 2017) (PSC REF#: 328724) (noting total actual project cost of approximately \$231 million).

<sup>28</sup> Compare *Edgewater 5 SCR Order*, at 1 (authorizing SCR project at an estimated cost of approximately \$153.9 million) to *In Re Joint Application of Wisconsin Power and Light Co.*, Docket No. 05-CE-137, *Final Cost Report*, at 1 (Jan. 30, 2014) (PSC REF#: 198062) (noting total actual project cost of approximately \$136.4 million).

1 million lower<sup>29</sup>; and the bottom ash handling system was \$2 million  
2 lower than what the Commission initially authorized.<sup>30</sup>

3 Third, long-term industry outlooks for key factors of the  
4 economics of retaining and investing in coal plants were generally  
5 favorable until recently, when unexpected shifts in market outlook  
6 began to emerge.

7 **Q18. Please elaborate on these shifts in industry outlook in recent**  
8 **years.**

9 A. Over the past decade or so, unexpected changes in natural gas  
10 prices, load growth, and costs of new renewable generation  
11 dramatically affected the market outlook for coal-fired power plants  
12 across the country. Prior to the Great Recession in 2007-2008, high  
13 natural gas prices buoyed wholesale electricity prices. Load growth  
14 was steady, and wind and solar energy technologies had not made  
15 significant inroads for cost reductions. Emission control technologies  
16 were available and cost effective to help coal plants comply with new  
17 environmental regulations promulgated by the EPA, though they

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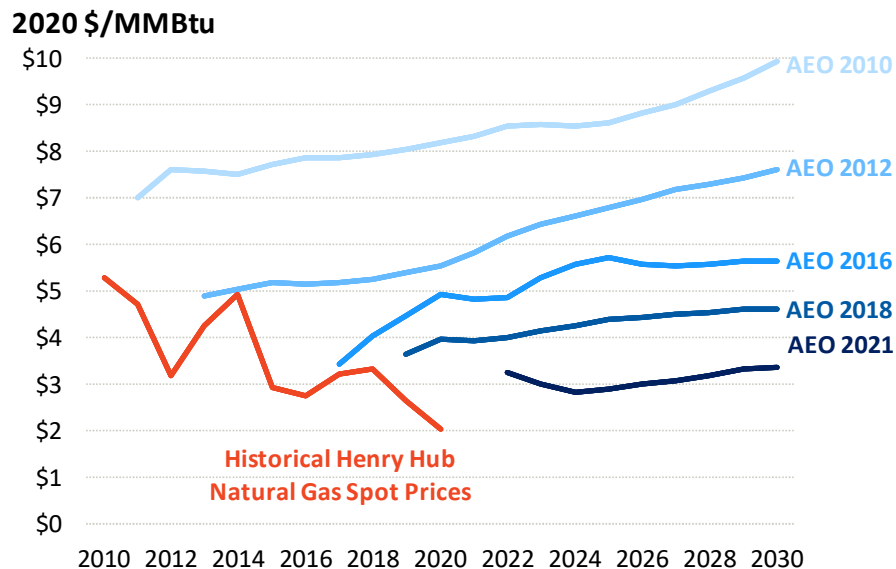
<sup>29</sup> Compare *Edgewater 5 WEPCO Share Purchase Order*, at 1 (authorizing WP&L to purchase a partial ownership in Edgewater from WEPCO at an estimated cost of approximately \$39.1 million) to *In Re Joint Application of Wisconsin Power and Light Co.*, Docket 5-BS-184, *Final Cost Report*, at 2 (Mar. 30, 2011) (PSC REF#: 146734) (noting total actual cost of \$38.3 million).

<sup>30</sup> Compare *Edgewater 5 Bottom Ash Handling System Order*, at 1 (authorizing the bottom ash handling system project at an estimated cost of approximately \$24.4 million) to *In Re Joint Application of Wisconsin Power and Light Co.*, Docket 6680-CE-178, *Final Cost Report*, at 2 (Oct. 31, 2019) (PSC REF#: 378890) (noting total actual project cost of approximately \$22.2 million).

1 would add some additional O&M costs. But since around 2010,  
 2 many of these trends began to reverse.

3 Natural gas spot prices fell from their peak levels of nearly  
 4 \$13/MMBtu in June 2008 to less than \$3/MMBtu in 2016, and to  
 5 about \$2/MMBtu in 2020 (in nominal dollars). Industry expectations  
 6 of higher future gas prices were not realized, even until today. For  
 7 example, according to 2010 Annual Energy Outlook (AEO) from the  
 8 U.S. Energy Information Administration (EIA), long-term gas price  
 9 projections for year 2020 were \$8.20/MMBtu, which decreased to  
 10 \$4.95/MMBtu in the 2016 AEO, while the actual gas price in 2020  
 11 was much lower at \$2.03/MMBtu (in 2020\$; see Figure 3 below).

**Figure 3: Historical and Forecasted Henry Hub Gas Prices<sup>31</sup>**



<sup>31</sup> See U.S. EIA AEO 2010, 2012, 2016, 2018, and 2021; S&P Global Market Intelligence.

1           Similarly, total demand for electricity decreased in the  
2           aftermath of the Great Recession and has not recovered. Annual  
3           retail electricity consumption remained about the same between  
4           2010 and 2020.<sup>32</sup> U.S. retail sales in 2009 was 3.6 terawatt hours  
5           (TWh),<sup>33</sup> increasing to 3.7 TWh in 2015,<sup>34</sup> and declining again to 3.6  
6           TWh by 2020.<sup>35</sup> Forecasts for retail sales in 2030 also decreased  
7           from 4.5 TWh in AEO 2010<sup>36</sup> to 4.1 TWh in AEO 2016<sup>37</sup> and 4 TWh  
8           in AEO 2021.<sup>38</sup> At the same time, generation from renewable energy  
9           resources grew substantially, owing in part to state renewable  
10          portfolio standards and declining technology costs. The growth of  
11          these zero-marginal cost resources increased surplus generation  
12          during certain periods and contributed to low power prices. The  
13          declining technology costs for renewable resources reduced the  
14          replacement cost of retiring coal plants. These worsening market  
15          outlook trends for coal plants continued after the EPA issued the

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<sup>32</sup> See U.S. EIA, *Electricity Data Browser, Retail Sales of Electricity* (Apr 5, 2021), available at <https://www.eia.gov/electricity/data.php>.

<sup>33</sup> See U.S. EIA, *Annual Energy Outlook 2010: U.S. Electricity Demand Growth Forecast* (Table 85) (May 11, 2010), available at <https://www.eia.gov/outlooks/archive/aeo10/electricity.html>.

<sup>34</sup> See U.S. EIA, *Annual Energy Outlook 2016: U.S. Electricity Demand Growth Forecast* (Table 55) (Sep. 15, 2016), available at <https://www.eia.gov/outlooks/archive/aeo10/electricity.html>.

<sup>35</sup> See U.S. EIA, *Annual Energy Outlook 2021: U.S. Electricity Demand Growth Forecast* (Table 54) (Feb. 3, 2021), available at [https://www.eia.gov/outlooks/aeo/tables\\_ref.php](https://www.eia.gov/outlooks/aeo/tables_ref.php).

<sup>36</sup> See U.S. EIA, *Annual Energy Outlook 2010: U.S. Electricity Demand Growth Forecast* (Table 85) (May 11, 2010), available at <https://www.eia.gov/outlooks/archive/aeo10/electricity.html>

<sup>37</sup> See U.S. EIA, *Annual Energy Outlook 2016: U.S. Electricity Demand Growth Forecast* (Table 55) (Sep. 15, 2016), available at <https://www.eia.gov/outlooks/archive/aeo10/electricity.html>.

<sup>38</sup> See U.S. EIA, *Annual Energy Outlook 2021: U.S. Electricity Demand Growth Forecast* (Table 54) (Feb. 3, 2021), available at [https://www.eia.gov/outlooks/aeo/tables\\_ref.php](https://www.eia.gov/outlooks/aeo/tables_ref.php).

1 Mercury and Air Toxics Rule in February 2012, presenting many coal  
2 plants with a choice between undertaking significant pollution control  
3 investments or retiring by 2015.

4 **II. HISTORICAL OPERATIONAL AND MARKET PERFORMANCE**

5 **Q19. Please summarize the operating performance of Edgewater 5**  
6 **over the last ten years.**

7 A. Edgewater 5 generated about 2.1 million megawatt-hours (MWh) of  
8 energy per year during the period 2011-2020, running at 59 percent  
9 capacity factor on average. The unit also provided more than  
10 400 MW of capacity for WPL to meet the resource adequacy needs  
11 of its customers.

12 **Q20. Over the last ten years, has the operation of Edgewater 5**  
13 **resulted in cost savings for WPL's customers?**

14 A. Yes. Edgewater 5 provided about \$118 million in variable cost  
15 savings to WPL's customers over the last ten years in the MISO  
16 energy and ancillary services markets.<sup>39</sup> In all years, the plant's  
17 revenues from the market exceeded its variable operating costs (fuel  
18 and variable O&M), and hence, resulted in positive energy and  
19 ancillary services (E&AS) margins (see Figure 4 below). During the  
20 first eight years of this period, the plant operated with comfortable

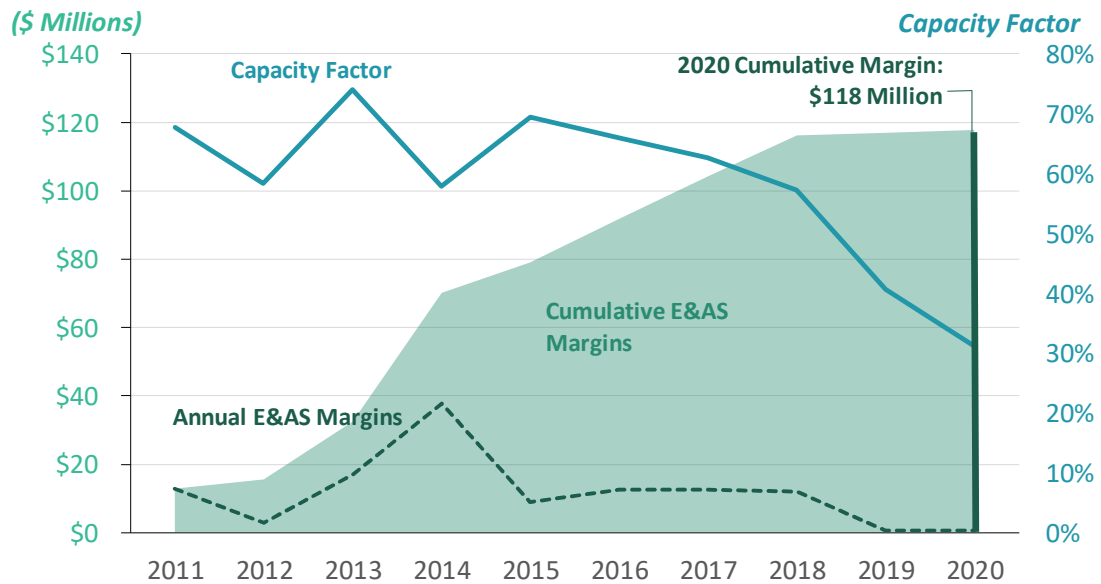
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<sup>39</sup> This figure conservatively excludes the additional value Edgewater 5 provides as a capacity resource in MISO's annual planning resource auction and for meeting MISO's resource adequacy requirements.

1 E&AS margins of about \$15 million per year. But in 2019 and 2020,  
 2 the plant's E&AS margins decreased significantly, with the annual  
 3 variable operating costs approximately the same as the market  
 4 revenues (though the margins remained positive for these years).

5 The reduction in the plant's E&AS margins was largely due to  
 6 reductions in MISO energy prices during this period. Historical data  
 7 shows that the locational marginal price (LMP) received by  
 8 Edgewater 5 during the 2016-2020 period was \$3.70/MWh lower on  
 9 average than the LMPs during the 2011-2015 period. The  
 10 Edgewater 5 capacity factor was also reduced during this period,  
 11 consistent with the reduction in energy prices (see Figure 4 below).

**Figure 4: 2011-2020 Edgewater 5 E&AS Margins in MISO Markets (\$ million)<sup>40</sup>**



<sup>40</sup> Based on historical cost and revenue data from WPL (in nominal dollars).



1 **Q21. Should WPL have retired Edgewater 5 in any of the years when**  
2 **its operating margin was about zero?**

3 A. No. It is not prudent to retire a plant the moment it appears  
4 uneconomic. As I explained above, it had been the industry's  
5 viewpoint for the better half of the last decade that, while there might  
6 be some short-term fluctuations, long-run prices for natural gas  
7 would increase, load growth would remain steady, and costs of  
8 renewables would continue to be high. Prudent planning requires  
9 filtering out the short-term noise from the long-term signal, and not  
10 reacting to every twist and turn in the market.

11 **Q22. If Edgewater 5 has had positive E&AS margins over the last**  
12 **decade, is it still prudent for WPL to retire the unit in 2022?**

13 A. Yes. Generally speaking, coal units like Edgewater 5 incur variable  
14 costs (such as fuel), which vary directly with the unit's generation  
15 output, and fixed capital and fixed O&M costs, which are not directly  
16 tied to the unit's output. The fact that Edgewater 5 has produced  
17 variable cost savings for customers indicates that it has been able to  
18 generate revenues sufficient to cover its fuel and variable O&M  
19 costs, with any revenues in excess of those costs offsetting the unit's  
20 fixed capital and fixed O&M costs. While Edgewater 5's EA&S  
21 margins have remained positive over the last ten years, they have  
22 been lower over the last three years and generally in decline since

1 2014, indicating that the unit is generating less revenue to offset its  
2 fixed capital and fixed O&M costs.

3 As I mentioned earlier, prudent resource planning requires a  
4 utility to consider long-term market and operational trends. Natural  
5 gas prices and load growth have and are projected to remain low,  
6 and the costs of renewable technologies have declined. Taken  
7 together, these factors do not create a favorable environment for  
8 continued, long-term operation of coal units like Edgewater 5,  
9 compared to retiring and replacing with lower-cost resources.  
10 Moreover, as discussed in WPL witness Tyson Cook's testimony, to  
11 continue operating Edgewater 5 safely, reliably, and effectively, WPL  
12 would need to incur significant expenses at the unit over the next  
13 decade for future capital projects and ongoing O&M.<sup>41</sup> And as I  
14 discuss in further detail below (see, e.g., Figure 9), WPL's Blueprint  
15 analysis indicates that retiring the unit and replacing it with new solar  
16 generation will avoid hundreds of millions of dollars in expenses,  
17 resulting in \$ [REDACTED] to \$ [REDACTED] in present value benefits for  
18 customers over the next 20 years.

19 In sum, while the unit has generated positive E&AS margins  
20 over the last 10 years, key market indicators show a negative long-  
21 term outlook for its future operation relative to cost of alternative  
22 resources. More importantly, WPL's robust Blueprint planning

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<sup>41</sup> See Direct-WPL-Cook-8 to 9.

1 analysis shows that, over the long-term, retiring the unit in 2022 and  
2 replacing it with new solar generation will generate hundreds of  
3 millions of dollars in present value savings for customers over the  
4 next 20 years.

**III. REASONABLENESS OF WPL's BLUEPRINT MODELING**  
**APPROACH AND RESULTS**

5 **Q23. Are you familiar with the resource planning analysis that WPL**  
6 **conducted in support of its Blueprint resource plan?**

7 A. Yes. My understanding is that, pursuant to that analysis, WPL is  
8 undertaking a resource plan whereby it will retire all remaining coal-  
9 fired generation by the end of 2024 and install (among other things)  
10 new solar resources to replace that retiring capacity. Direct-WPL-  
11 Cook discusses the scope and benefits of WPL's Blueprint in more  
12 detail.

13 **Q24. Do you consider WPL's analyses of avoided costs and its**  
14 **resulting decision to retire and replace Edgewater 5 as part of**  
15 **the Blueprint to be reasonable?**

16 A. Yes. WPL's modeling approach and techniques are comprehensive  
17 and consistent with standard industry practices. The modeling tool  
18 used, Aurora, is a reputable simulation software used also by others  
19 in the industry for resource planning and market forecasts. The key  
20 assumptions and uncertainty ranges related to future market  
21 fundamentals are comparable to industry expectations at the time

1 the study was developed. Across a range of scenarios, the Company  
2 finds substantial avoided costs associated with retiring Edgewater 5  
3 and replacing it with new renewable capacity. These results stand  
4 up under a range of different planning scenarios, where key  
5 assumptions were varied to capture potential uncertainty in future  
6 market conditions. The replacement resources are more economic  
7 than Edgewater 5 would have been, especially given the significant  
8 fuel, variable, and fixed O&M costs associated with operating  
9 Edgewater 5 into the future and the continuing decline in renewable  
10 resource costs. In addition, public and legislative pressure to shift  
11 away from fossil fuels will likely intensify in the future, and actions  
12 taken now can help ensure a gradual and orderly transition, without  
13 disruptive impacts to customers.

14 Many utilities both in Wisconsin and in other states have  
15 arrived at a similar conclusion in recent years—namely, that because  
16 of unexpected shifts in industry outlooks for market fundamentals, it  
17 is no longer attractive to retain coal plants in many parts of the  
18 country. For these reasons, I find WPL’s analyses to be both timely  
19 and credible.

20 **Q25. Please describe WPL’s approach in the Blueprint analysis to**  
21 **evaluate the potential avoided costs from early retirement of its**  
22 **coal plants.**

1 A. Using Aurora, a power system modeling software, WPL adopted a  
2 multi-stage approach to analyze how the Company's existing fleet  
3 and potential new resources would perform over time under different  
4 planning scenarios. First, WPL calibrated the model using historical  
5 information and the Company's internal forecasts to ensure that key  
6 parameters and assumptions are representative of conditions and  
7 performance found in the real world. Next, to evaluate the impact of  
8 varying future market conditions on the performance of its resource  
9 portfolio, WPL developed five different planning scenarios in which it  
10 eventually modeled various resource portfolio options:

- 11 • Continuing Industry Change: initial reference case, assuming  
12 trends of the past decade continue;
- 13 • New Regulation: a price on CO<sub>2</sub> emissions is instituted for the  
14 electric sector, with lower costs for renewable technologies  
15 and increases in natural gas prices;
- 16 • Market Stagnation: a decline in economic outlook leads to flat  
17 load growth, and reduced regulatory pressure results in fewer  
18 coal retirements;
- 19 • Advanced Customer Technology: reduced net demand for  
20 electricity driven by widespread deployment of distributed  
21 energy resources; and
- 22 • Electrification and Economy-Wide Carbon Limit: higher  
23 electric load due to electrification, and an economy-wide cap

1 on CO<sub>2</sub> emissions places an additional cost burden on  
2 carbon-emitting resources.

3 For each scenario, WPL developed inputs for load, carbon  
4 prices, natural gas prices, coal prices, and capital costs for new  
5 resource options that appropriately reflect the underpinning market  
6 dynamics. Based on WPL's current resource portfolio, the Company  
7 identified and evaluated a set of feasible resource portfolios that it  
8 could pursue, including continued operation of existing assets and  
9 retiring and replacing them with new resources.

10 **Q26. Is there a particular aspect of WPL's Blueprint analysis that you**  
11 **are focused on?**

12 A. Yes. My understanding is that there were multiple, iterative phases  
13 of analysis that WPL conducted before it selected its preferred  
14 resource plan. I focused on the first phase of WPL's analysis, which  
15 evaluated a variety of potential resource portfolios with varying  
16 retirement dates for WPL's existing coal-fired generating units and  
17 alternative resources to replace those units.<sup>42</sup> Specifically, I will  
18 discuss and compare the modeling results of "Portfolio 1", which  
19 assumed baseline retirement dates for all fossil units, including  
20 Edgewater 5 retiring in 2045, and "Portfolio 5", which assumed  
21 retirement of Edgewater 5 in 2023.<sup>43</sup> I focus on these two portfolio

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<sup>42</sup> See Ex.-WPL-Augustine-1, at 47, in Docket No. 6680-CE-182.

<sup>43</sup> WPL's current plan is to retire Edgewater 5 by the end of 2022, as opposed to 2023, which was the retirement date that WPL assumed in Portfolio 5.

1 options to isolate and evaluate the estimated savings from retirement  
2 of Edgewater 5.

3 **Q27. Please explain the difference between these two resource**  
4 **portfolios and WPL’s Blueprint resource plan, which is**  
5 **discussed in Direct-WPL-Cook.**

6 A. Since I am focused on two distinct resource portfolio options that  
7 WPL evaluated in Phase 1 of its planning analysis—one assuming  
8 baseline retirement dates for all WPL coal units, and another  
9 assuming Edgewater 5 retires in 2023—the figures and results I  
10 present here should not be confused with those discussed in the  
11 testimony of WPL witness Cook.<sup>44</sup> The modeling results that Mr.  
12 Cook presents in his testimony are associated with WPL’s Blueprint,  
13 which is WPL’s preferred resource plan for serving customers over  
14 the next 20 years. The preferred plan calls for retiring Edgewater 5  
15 by the end of 2022, Columbia 1 by the end of 2023, and Columbia 2  
16 by the end of 2024, and replacing those units with (among other  
17 things) approximately 1,089 MW of new solar generation.

18 By contrast, and as discussed above, I focus on two of the  
19 preliminary resource portfolio options that WPL studied in the first  
20 phase of its planning analysis. Although WPL did not ultimately  
21 select either portfolio as its preferred plan, comparing the results of  
22 WPL’s modeling of each portfolio is useful, in that it demonstrates

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<sup>44</sup> See Direct-WPL-Cook-16 to 19.

1 the prudence of WPL's decision to retire Edgewater 5 and replace it  
2 with new renewable resources.

3 **Q28. Please describe the Blueprint modeling inputs and**  
4 **assumptions and how they compare to contemporaneous**  
5 **industry expectations.**

6 A. As is appropriate for resource planning, WPL relied on reputable  
7 sources for key assumptions that were incorporated into its  
8 modeling. The Company also considered and incorporated into its  
9 modeling effort uncertainty in surrounding key factors such as load  
10 growth rates, fuel prices, carbon prices, and capital costs of  
11 replacement technologies to assess the expected benefits and  
12 associated risks of each of the alternative resource plans. I briefly  
13 discuss each of these below.

14 ***Load Forecast***

15 For the Blueprint analysis, WPL anticipated annual average load  
16 growth rates of -0.3 percent (in the Advanced Customer Technology  
17 scenario) to 2.5 percent (in the Electrification and Carbon Limit  
18 Scenario) over the 2019-2048 period.<sup>45</sup> These divergent  
19 assumptions about load growth rates in each scenario enabled WPL  
20 to capture how the portfolios it was studying would perform under a  
21 variety of future market conditions. And WPL's 0.7 percent annual  
22 average load growth assumption in the Continuing Industry Change

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<sup>45</sup> See Ex.-WPL-Augstine-1cr, 27, from Docket No. 6680-CE-182.



1 scenario was only marginally higher than the forecasts in 2019 AEO  
2 for the MISO West region and for the U.S. (see Figure 5 below).

**Figure 5: Comparison of Load Growth Forecasts (Confidential)<sup>46</sup>**



3

4 ***Natural Gas Prices***

5 Natural gas prices are one of the most important assumptions for a  
6 resource plan because gas-fired generation is often “on the margin”  
7 in power markets, including MISO. This means that gas-fired  
8 generation often sets the market price of energy.

9 Gas price outlooks can be obtained from commercial  
10 forecasting services, the EIA forecasts (such as the AEO), and

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<sup>46</sup> See *id.* (WPL load growth reflects Continuing Industry Change (CIC) scenario); U.S. EIA, *Annual Energy Outlook 2019: U.S. Electricity Demand Growth Forecast* (Tables 55 & 55.4) (Feb. 3, 2021), available at [https://www.eia.gov/outlooks/aeo/tables\\_ref.php](https://www.eia.gov/outlooks/aeo/tables_ref.php).

1 forward prices for gas at large trading hubs. WPL relied on gas price  
2 forecasts from Wood Mackenzie, a global energy research company.  
3 As seen in Figure 6 below, natural gas prices in the base case  
4 (WoodMac No Carbon) are lower than prices in the 2019 AEO  
5 reference case projections until about 2034. WPL's gas price  
6 forecasts are consistent with NYMEX gas futures (as of March 2019)  
7 in the near-term and the AEO 2019 reference case projections in the  
8 long term.

9 Figure 6 below shows that natural gas price projections have  
10 continued to fall since 2019. Lower future natural gas prices would  
11 decrease expected energy market revenues for Edgewater 5,  
12 increasing the savings of retiring the unit early.

**Figure 6: Comparison of Gas Price Outlooks (Confidential)<sup>47</sup>**



1        ***Carbon Prices***

2        In the reference scenario (Continuing Industry Change), WPL  
3        assumed no carbon price. In the New Regulation scenario, WPL  
4        applied a national carbon price beginning in 2028, increasing at an  
5        annual rate of ■ per short ton of CO<sub>2</sub>, reaching ■ per short ton by  
6        2040. These prices are reasonable, and conservatively lower than  
7        what other utilities in the region were using for their resource  
8        planning studies. For example, Xcel Energy's Upper Midwest  
9        Integrated Resource Plan projected a carbon price ranging from \$28

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<sup>47</sup> The 2021 NYMEX futures reflect a trading date of March 22, 2021, and the 2019 NYMEX futures reflect a trading date of March 1, 2019. All prices are adjusted to 2020 real dollars. Data from U.S. EIA AEO 2019 and 2021; S&P Global Market Intelligence; Ex.-WPL-Augustine-1, at 12, in Docket No. 6680-CE-182.

1 to \$60/ton from 2020 to 2040, while Minnesota Power projected  
2 carbon prices ranging from \$5 to \$25/ton starting in 2025.<sup>48</sup> WPL’s  
3 lower carbon price assumption relative to these recent utility  
4 projections is conservative since higher carbon prices would  
5 increase the cost savings from retirement of Edgewater 5.<sup>49</sup>

6 **Capital Costs**

7 WPL considered several types of new generation capacity in its  
8 Blueprint analysis, including solar photovoltaic (PV), onshore wind,  
9 battery storage, and natural gas combined cycle (CC) plants, among  
10 others. Capital cost assumptions for these technologies were based  
11 on a combination of Wood Mackenzie forecasts and other industry  
12 research. Figure 7 below shows that these cost assumptions are in  
13 line with industry estimates, based on comparison to the then  
14 projections from the National Renewable Energy Laboratory (NREL)  
15 and the EIA AEO.

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<sup>48</sup> See Excel Energy, *Upper Midwest Integrated Resource Plan, 2020-2034, Northern States Power Company* (Jul. 1, 2019), available at <https://www.xcelenergy.com/staticfiles/xeresponsive/Company/Rates%20&%20Regulations/The-Resource-Plan-No-Appendices.pdf>; Minnesota Power, *2021 Integrated Resource Plan* (Feb. 1, 2021), available at <https://www.mnpower.com/Environment/IntegratedResourcePlan2021>

<sup>49</sup> In Wisconsin, there is no established market value associated with CO<sub>2</sub> emissions, but some utilities in the U.S. include this as a surcharge to reflect actual or potential externalities and exigencies, such as level at which state or federal policies might penalize their emissions.

**Figure 7: Comparison of Capital Costs for New Generation Plants  
(Confidential)<sup>50</sup>**



1 **Q29. Based on your review, do you consider WPL’s approach and**  
2 **assumptions in the Blueprint analysis to be reasonable?**

3 A. Yes. WPL’s multi-step modeling and optimization approach to  
4 evaluate future portfolio alternatives was both thorough and  
5 comprehensive. The data sources in the study are reputable, and  
6 the major assumptions are consistent with industry expectations as  
7 of the time the analysis was conducted. In addition, Aurora is a  
8 standard simulation software that is widely used by others in the  
9 industry for resource planning and market forecasts, and WPL

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<sup>50</sup> AEO reports overnight capital costs, assuming a first available year of 2021 for gas CC and wind and 2020 for solar. NREL reports overnight capital costs, assuming a first available year of 2021 for gas CC, 2022 for wind, and 2021 for solar. WPL values assume capital costs, assuming resources come online in 2020. Data from U.S. EIA AEO 2019; 2018 NREL Annual Technology Baseline; Ex.-WPL-Augustine-1, Figure 3.4, at 22-24, in Docket No. 6680-CE-182

1 appropriately used the model to assess the economics of retiring  
2 Edgewater 5 and replacing it with solar capacity (and a mix of solar  
3 and storage in some scenarios) across a wide range of planning  
4 scenarios.

5 **Q30. How did WPL analyze the cost savings in the first phase of the**  
6 **Blueprint analysis?**

7 A. WPL measured long-term cost savings by comparing the net PVRR  
8 of different potential resource portfolios to meet retail customer loads  
9 over 2019-2040 and 2019-2053 time periods. The net PVRR  
10 consists of the costs of operating the system (including fuel and  
11 variable O&M costs, net contract purchases, and net market  
12 purchases), taxes, and earnings from return on and of the net  
13 (undepreciated) investment costs in the underlying assets. Put  
14 differently, this number reflects what customers will pay for using the  
15 system assets (if a particular portfolio is selected) over the planning  
16 period. The least-cost portfolio (i.e., the portfolio with the lowest net  
17 PVRR value) is generally the most attractive option, although there  
18 are other factors and risks to consider when selecting a preferred  
19 alternative.

20 Compared to a resource portfolio in which Edgewater 5  
21 continues to operate until 2045 (i.e., Portfolio 1), retiring Edgewater  
22 5 in 2023 and replacing it with new solar capacity reduces the net  
23 PVRR associated with WPL's resource portfolio by [REDACTED] (from

1 [REDACTED] to [REDACTED] over the 2019-2040 period in the  
2 base case (i.e., Continuing Industry Change scenario). These  
3 avoided costs increase to as much as [REDACTED] in the  
4 Electrification and Carbon Limit scenario over the same time period.  
5 The net PVRR cost savings under Portfolio 5 over the 35-year  
6 planning period (2019-2053) is even larger than the cost savings  
7 during the period 2019-2040 across all scenarios. Therefore, I will  
8 conservatively focus my discussion below on the lower PVRR  
9 savings during the 2019-2040 period.

10 **Q31. Did you review the detailed results of the Blueprint study to re-**  
11 **construct the benefits of retiring Edgewater 5?**

12 A. Yes. I used the detailed outputs from the Phase 1 Blueprint analysis  
13 to evaluate the benefits of retiring Edgewater 5 in 2023 relative to  
14 continuing to operate the plant until fully depreciated in 2045.  
15 Specifically, I estimated the difference in net present value cost of  
16 Portfolio 5 (retirement of Edgewater 5 in 2023 and replacement with  
17 new renewables) and Portfolio 1 (continue operating Edgewater 5  
18 until fully depreciated in 2045). Total portfolio cost includes operating  
19 costs of existing resources, which consists of ongoing capital  
20 expenditures, capital expenditures for new resources and related  
21 transmission projects, as well as net contract and market purchases.

22 Across all scenarios, Portfolio 5 has a lower net PVRR than  
23 Portfolio 1, resulting in savings ranging from [REDACTED] to [REDACTED] million

1 during the period 2019-2040 (see Figure 8 below). Savings are  
2 substantially higher in scenarios with new policies to decarbonize the  
3 power sector, either through a carbon price (as in the New  
4 Regulation scenario) or through an emissions cap (Electrification and  
5 Economy-Wide Carbon Limit). In these scenarios, retiring and  
6 replacing coal plants with less carbon-intensive resources would  
7 produce savings in the form of avoided carbon penalties. The  
8 modeling shows that the savings from retiring Edgewater 5 can be  
9 as high as [REDACTED] million with a modest carbon price in place, and [REDACTED]  
10 million with an economy-wide emissions cap.



**Figure 8: 2019-2040 NPVRR Savings from Retiring Edgewater 5  
Across Blueprint Planning Scenarios, Relative to Status Quo  
(Confidential)<sup>51</sup>**



- 1 **Q32. What are the key drivers of the [REDACTED] net PVRR savings**  
2 **from retiring Edgewater 5 in 2023 in the Continuing Industry**  
3 **Change scenario?**
- 4 A. Relative to operating Edgewater 5 until fully depreciated in 2045,  
5 retiring the unit in 2023 and replacing it with renewables would result  
6 in net PVRR savings of [REDACTED], the majority of which is driven  
7 by a reduction in total system O&M costs. Together, savings from  
8 avoided fuel and variable costs (\$ [REDACTED]) and avoided fixed O&M  
9 costs (\$ [REDACTED] more than offset the investments required for the  
10 new capacity, their fixed O&M costs, and WPL continuing to recover  
11 a return of and on the remaining net book value of Edgewater 5 at its

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<sup>51</sup> Note that, whereas I am reporting savings from the retirement of Edgewater 5 over the 2019-2040 planning period, WPL's current Blueprint resource plan (discussed in Direct-WPL-Cook) reports savings from retiring and replacing with new renewable capacity all of WPL's existing coal-fired generating units over the 2022-2055 planning period.

1 authorized WACC. These savings and cost components are  
2 illustrated in Figure 9 below.

**Figure 9: 2019-2040 Savings from Retiring Edgewater 5 in Base Scenario (\$ millions) (Confidential)**



3 **Q33. Do you expect the net avoided costs from retiring Edgewater 5**  
4 **in 2022 (as proposed by WPL based on its latest Blueprint**  
5 **study) would be similar to the net avoided costs from retiring**  
6 **the plant in 2023?**

7 A. Yes. As noted in Direct-WPL-Cook, one of the key findings from  
8 WPL's resource planning analysis is that advancing the retirement of  
9 its existing coal-fired generating units generates higher net avoided  
10 costs for customers, relative to resource portfolios that keep those

1 units in-service for longer periods of time. The initial phase of the  
2 Blueprint resource plan assumed a later retirement date for  
3 Edgewater 5 (2023) than the current Blueprint plan does (2022).  
4 Likewise, under the current Blueprint plan, the retirement dates for  
5 Columbia Units 1 and 2 (2023 and 2024, respectively) are earlier  
6 than the retirement date assumed in the first phase of the Blueprint  
7 analysis (2027). WPL's analysis shows that earlier retirement dates  
8 of these units do not have a material impact on the overall PVRR  
9 savings of the Blueprint plan. Indeed, based on my review of the  
10 annual revenue requirement projections from the initial phase of the  
11 Blueprint analysis, I would expect that accelerating the plant's  
12 retirement by one year would result in PVRR savings similar to the  
13 \$ [REDACTED] to \$ [REDACTED] savings estimated in the Phase 1 of the  
14 Blueprint analysis.

15 **Q34. How if at all will the Settlement terms related to Edgewater 5**  
16 **affect the Blueprint's PVRR savings to customers?**

17 A. Although I have not conducted an analysis to quantify the  
18 Settlement's impact on the Blueprint analysis, it is reasonable to  
19 conclude that the Settlement would result in similar or potentially  
20 higher PVRR savings associated with retiring Edgewater 5 relative  
21 to WPL's Blueprint resource plan. As discussed in the direct  
22 testimony of WPL witness Michek, under the Settlement, WPL would  
23 earn a return on Edgewater 5's remaining net book value at a

1 premised ROE of 9.8 percent and an effective ROE of 9.2 percent.  
2 However, the Blueprint analysis assumes that WPL earns a return  
3 on its retired generating assets at its authorized ROE (10 percent).  
4 It is, therefore, reasonable to conclude that, all else being equal,  
5 applying a lower ROE to the remaining net book value of Edgewater  
6 5 will result in PVRR cost savings for customers from retiring  
7 Edgewater 5 that are similar to or potentially higher than what WPL  
8 initially calculated as part of its Blueprint analysis.

**IV. RECOMMENDATIONS FOR TREATMENT OF**  
**UNDEPRECIATED INVESTMENTS AT EDGEWATER UNIT 5**

9 **Q35. Based on your review, what are your recommendations for the**  
10 **treatment of undepreciated investments of Edgewater 5?**

11 A. As discussed in Sections II and III, it is clear that Edgewater 5 has  
12 provided significant value to WPL's customers since it initially went  
13 into service more than 35 years ago. WPL's initial decision to  
14 construct the plant was prudent. The same is true of its decision to  
15 invest in various pollution controls and equipment upgrades over the  
16 last decade, all of which the Commission approved in the face of  
17 WPL's robust economic analyses, which demonstrated that  
18 continued operation of the unit with those investments would benefit  
19 customers, relative to other alternatives or early retirement. After  
20 providing decades of value to customers, WPL's Blueprint analysis  
21 demonstrates that retiring the unit in 2022, as part of the Blueprint

1 resource plan, will generate hundreds of millions in long-term PVRR  
2 savings for customers.

3 For these reasons, it would be appropriate for WPL to  
4 continue recovering a return of and on the remaining net book value  
5 of Edgewater 5 at its authorized WACC, which I understand to be  
6 \$525 million as of December 2020, after the unit retires in 2022.<sup>52</sup>  
7 However, I understand that WPL has entered into a Settlement under  
8 which it will recover the remaining net book value of Edgewater 5 on  
9 a levelized cost recovery basis between the unit's currently planned  
10 retirement date (September 2022) and the end of its depreciable life  
11 (June 2045). As discussed below, although this arrangement will  
12 result in WPL recovering less than its authorized ROE on Edgewater  
13 5's remaining net book value, it nonetheless reflects a just and  
14 reasonable outcome. In other words, since it is appropriate for WPL  
15 to recover a return of and on Edgewater 5's remaining net book value  
16 at its authorized WACC, it necessarily follows that it is appropriate  
17 for WPL to recover the unit's remaining net book value at a lower rate  
18 of return. My recommendations are informed by my conclusion that  
19 WPL's past investments were prudent based on the information  
20 available at the time the decisions were made, the Commission's  
21 past decisions approving these investments, long-established

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<sup>52</sup> As noted at Direct-WPL-Michek-29, I understand that, at the time of the unit's expected retirement in September 2022, the remaining net book value is expected to be approximately \$482 million.

1 economic principles and standards for treatment of prudently  
2 incurred past costs, and treatments of similar assets in Wisconsin  
3 and in other states throughout the U.S.

4 **Q36. Please explain what you mean when you state that it would be**  
5 **appropriate for WPL to continue recovering a “return of and on”**  
6 **the remaining net book value of Edgewater 5 at its authorized**  
7 **WACC.**

8 A. This means that WPL would be permitted to recover the capital  
9 invested in the plant (“return of”), as well as a return on that invested  
10 capital at the Company’s authorized rate of return (“return on”). The  
11 authorized rate of return is the Company’s weighted average cost of  
12 capital, which reflects the composite weighted cost of various  
13 classes of capital (e.g., bonds, preferred stock, and common stock)  
14 used by the utility to finance its investments. Put differently, the  
15 weighted average cost of capital reflects the utility’s cost of debt and  
16 equity, with the weights reflecting the proportion of the total capital  
17 investment that each class of capital represents. This would include  
18 a fair return on equity (ROE).

19 **Q37. What is the economic rationale for permitting a utility to recover**  
20 **a return of and on undepreciated asset investments at its**  
21 **authorized WACC?**

22 A. A regulated utility’s prudently incurred investments should be fully  
23 recoverable from customers, even if circumstances beyond the

1 utility's control in the future make those investments less economic  
2 than what the utility initially projected. From the day it is planned, a  
3 prudent resource plan will necessarily be exposed to potentially  
4 lower future benefits or higher future costs than other alternatives in  
5 some (but less than the majority of) planning scenarios. This is  
6 because the scenarios in which utilities evaluate resource plans  
7 involve assets with useful lives of 30 to 40 years or longer, and the  
8 utility cannot precisely forecast, control, or predict the course of  
9 events over such a long-term planning horizon. From an economic  
10 standpoint, it is preferable for the utility to select investments that  
11 produce robust expected, but not guaranteed, cost savings or  
12 benefits. In other words, from its inception, a prudent investment will  
13 have a built-in modest risk of potentially higher future costs  
14 compared to other alternatives. Otherwise, the utility will select  
15 uneconomic, overly risk-averse investments and forego potentially  
16 significant savings to be lost—for example, by waiting too long or for  
17 too much certainty to build or retire a unit, or by selecting alternatives  
18 that have lower investment risk (e.g., purchased power) at higher  
19 expected cost to customers.

20 **Q38. How do you think this rationale should apply in the context of**  
21 **WPL's decision to retire Edgewater 5 in 2022?**

22 A. As I mentioned, over the last decade, WPL has made major  
23 investments in Edgewater 5 because its planning analyses—which

1 the Commission reviewed when it approved those investments—  
2 indicated that those investments would benefit customers. Since  
3 that time, market conditions have changed. Natural gas prices have  
4 remained low, and capital costs for renewable technologies have  
5 continued to fall. It just so happens that these adverse market  
6 conditions for Edgewater 5 also reflect some of the scenarios from  
7 WPL’s previous planning analyses in which its investments  
8 generated less benefits, or even net costs.

9 But simply because conditions changed unexpectedly does  
10 not mean that it would be appropriate to deny WPL a fair return of  
11 and on the remaining net book value of Edgewater 5. First, this  
12 would be an exercise in hindsight bias premised on a counterfactual  
13 that cannot possibly be proven: namely, that if WPL had forgone  
14 these investments and retired the plant early, it (and its customers)  
15 would be better off now. WPL’s planning analyses showed that its  
16 past investments were generally preferable to other alternatives and  
17 were sound at the time they were made. The Commission must  
18 judge WPL’s investment decisions based on the facts and  
19 circumstances *at the time they were made*—not based on hindsight.  
20 Second, WPL’s Blueprint planning analysis shows that its current  
21 decision to retire Edgewater 5 early and replace it with new  
22 renewable capacity will generate hundreds of millions of dollars in  
23 present value benefits over the long-term, *even with* WPL continuing



1 recovering the plant's remaining net book value through rates. In  
2 other words, even though the plant will not remain in service for as  
3 long as WPL expected when it made its prior investments, its  
4 retirement in 2022 still results in a net benefit to customers, even with  
5 WPL recovering the remaining net book value at its authorized rate  
6 of return.

7 **Q39. Please explain why a finding of prudence warrants full cost**  
8 **recovery and is consistent with the regulatory obligations and**  
9 **constraints under which a utility operates.**

10 A. The obligation to serve under cost-based regulation means that  
11 regulated utilities are unlike unregulated firms in a couple of  
12 meaningful ways with important implications on compensation for  
13 assets prudently incurred. First, unregulated companies can choose  
14 when and which market to enter at the scale that best suits their  
15 circumstances. If their business in a market is not profitable, they  
16 are free to exit that market. In contrast, utilities have the obligation  
17 to serve every customer within their service territory at reasonable  
18 cost. In return, customers bear the full costs of those choices while  
19 enjoying their full benefits.

20 Second, unregulated companies can price their products and  
21 services at levels that the market will bear, which can far exceed  
22 costs if they are desirable. Unregulated companies also keep the  
23 benefits for themselves when their investments are in-the-money,

1 and bear losses if they fail to commercialize their products and  
2 services. That risk of loss, of course, is balanced by the opportunity  
3 for large unregulated profits in well-chosen market niches. On the  
4 other hand, regulators must review and approve the prices that  
5 regulated utilities can charge for their services, hence determining  
6 their expected earnings. If a utility investment results in an  
7 unexpected gain, savings are generally passed on to customers and  
8 utilities do not get to keep the upside. It follows that utilities should  
9 not bear downside losses when assets happen to be out-of-the-  
10 money in the future. Otherwise, regulators would penalize utilities  
11 for factors that are beyond their control, creating a “heads I break  
12 even, tails I lose” set of outcomes. Moreover, depriving the utility of  
13 an opportunity to earn its expected cost of capital would harm its  
14 access to capital and undermine its ability to provide the requisite  
15 quality of service.

16 **Q40. But if a utility’s investment is no longer used and useful in**  
17 **servicing customers, why should the utility be permitted to**  
18 **continue recovering that investment from customers?**

19 A. There are situations in which it may be appropriate to deny full  
20 recovery of past investments. For example, if the utility did not  
21 demonstrate at the time of the investment decision that the proposed  
22 investment was needed or would result in robust benefits for its  
23 customers relative to other alternatives, then it would be appropriate

1 to deny recovery of the portion of investment costs that represent  
2 additional present value revenue requirements imposed on  
3 customers by the chosen investment relative to its next best  
4 alternative. Another example could be a utility abandoning an asset  
5 after operating it for a while, without demonstrating that the  
6 abandonment would result in robust future cost savings for its  
7 customers.

8 This case, however, does not present one of those situations.  
9 Edgewater 5 has provided valuable and reliable electric service to  
10 the state of Wisconsin since it was commissioned over 35 years ago.  
11 WPL has demonstrated prior to making its major capital investments  
12 at the plant that those investments would result in robust cost savings  
13 for its customers in the future based on the information available at  
14 the time. WPL is also not retiring the plant because the capacity and  
15 energy it provides is no longer needed. WPL is retiring the plant  
16 because a robust resource planning process—which WPL undertook  
17 on its own initiative and in collaboration with other stakeholders—has  
18 shown that procuring replacement capacity and energy from new  
19 renewable resources will, in the long-run, produce *hundreds of*  
20 *millions* of dollars in present value cost savings for customers, *even*  
21 *with* WPL continuing to recover the plant's undepreciated net book  
22 value in rates. Given the plant's historical value to the state and the  
23 long-term benefits WPL's Blueprint resource plan is expected to

1 generate for customers, it would be appropriate for WPL to continue  
2 earning a return of and on the plant's remaining net book value at its  
3 authorized WACC.

4 **Q41. Please describe the unintended adverse incentives that would**  
5 **arise from a regulatory policy of disallowing full recovery of an**  
6 **asset that was prudently chosen and subsequently prudently**  
7 **retired when it became out-of-the money.**

8 A. Disallowing full recovery of retired out-of-the-money assets that a  
9 utility prudently selected and its regulator approved would send the  
10 wrong signals and would create perverse incentives for resource  
11 planners and investors, which are ultimately not in customers' long-  
12 term interests. Such a disallowance would ignore the economic  
13 basis for why a plant was chosen and developed in the first place,  
14 the total benefits that the plant has produced throughout its life, and  
15 the advantages relative to the next best resource alternative based  
16 on the information known at the time the decisions were made.

17 More importantly, disallowance of prudently incurred past  
18 investment costs would imply that prior regulatory approvals cannot  
19 be relied upon, creating the expectation that prudent utility  
20 investments cannot be expected to recover a full return on and of  
21 their costs. Consequently, investors would hesitate to support the  
22 utility because they would only break even if the assets remain  
23 attractive but would incur losses if the assets lose part of their value

1 under unfavorable market conditions. Not allowing a utility to recover  
2 costs from assets that were prudently chosen would also have  
3 significant financial implications. Because there is always a  
4 possibility that an asset will be out-of-money under some future  
5 circumstances for reasons that are beyond the utility's control, a  
6 disallowance may heighten the perceived business risk, adversely  
7 affecting borrowing costs. WPL witness Bulkley explains this risk in  
8 more detail in her testimony.

9 In addition, disallowance in this case sets a "no good deed  
10 goes unpunished" precedent, where the utility saves customers  
11 money by retiring uneconomic assets but is penalized for doing so.  
12 Staying the course would then be preferable for the utility, even if it  
13 means that another option leads to a net savings for customers in  
14 the long run.

15 **Q42. Would permitting WPL to recover a fair return on and of the**  
16 **remaining net book value of Edgewater 5 be consistent with**  
17 **state energy policy in Wisconsin?**

18 A. In my opinion, yes. My understanding is that state law prioritizes the  
19 use of noncombustible renewable energy resources over all other  
20 supply-side alternatives to meet state energy demands, to the extent  
21 that those resources are cost-effective and technically feasible.<sup>53</sup> I  
22 also understand that Governor Evers recently signed an executive

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<sup>53</sup> See Wis. Stat. § 1.12.

1 order setting a goal of ensuring all electricity consumed in the state  
2 is 100 percent carbon-free by 2050.<sup>54</sup> Permitting WPL to fully  
3 recover the remaining net book value of Edgewater 5 after retirement  
4 would be consistent with these policies, because it creates a fair  
5 regulatory environment in which utilities can retire uneconomic coal  
6 facilities and transition to newer, lower cost renewable resources that  
7 could provide long-term customer benefits and support the state's  
8 overall energy policy.

9 **Q43. Please provide examples of how regulators in Wisconsin and**  
10 **other states have treated the recovery of undepreciated**  
11 **investment at retiring coal plants.**

12 A. In many recent decisions, state regulatory commissions have  
13 allowed utilities to fully recover prudently incurred past investment  
14 costs, when shifting economics and new regulatory mandates have  
15 driven early plant retirements. In Wisconsin, the Commission in 2014  
16 permitted WPL to fully recover the undepreciated book value of  
17 Edgewater Unit 3 and Nelson Dewey Units 1 and 2 after those units  
18 were retired.<sup>55</sup> The Commission confirmed full recovery of prudent  
19 investment costs was the proper treatment of undepreciated assets

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<sup>54</sup> See Executive Order 38, Relating to Clean Energy in Wisconsin (Aug. 16, 2019), available at <https://evers.wi.gov/Documents/EO%20038%20Clean%20Energy.pdf>.

<sup>55</sup> *In Re Application of Wis. Power and Light Co.*, Docket No. 6680-UR-119, *Final Decision* (Jul. 17, 2014) (PSC REF#: 210409).

1 in 2018, when it permitted WPL to recover the undepreciated book  
2 value on Edgewater Unit 4 after it was retired.<sup>56</sup>

3 Similarly, my review of past decisions indicates that other  
4 state regulators have often allowed utilities to recover prudently  
5 incurred, undepreciated past investment costs for retiring coal plants.  
6 (See Ex.-WPL-Celebi-2) For example, in 2011, the Alabama Public  
7 Service Commission issued an order authorizing Alabama Power  
8 Company to establish a regulatory asset, enabling it to recover the  
9 “unrecovered plant asset balance and the unrecovered costs  
10 associated with site removal and closure” for any coal-fired unit that  
11 must be retired (either in whole or in part) as a result of federal  
12 environmental mandates.<sup>57</sup> In 2014, the Public Utilities Commission  
13 of Nevada allowed Nevada Power Company to recover the net book  
14 value of the retiring Reid Gardner coal units 1-4 and the company’s  
15 share of Navajo coal plant through regulatory asset treatment. The  
16 Nevada legislature, through Senate Bill 123, mandated the early  
17 retirement of at least 800 MW of coal-fired generation capacity and  
18 replacement of that capacity with renewable or non-coal  
19 conventional generation.<sup>58</sup>

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<sup>56</sup> *In Re Application of Wis. Power and Light Co.*, Docket No. 6680-UR-121, *Final Decision* (Dec. 20, 2018) (PSC REF#: 355884).

<sup>57</sup> See *In Re Request for Certain Authorizations Related to the Effects of Pending Environmental Mandates*, Informal Docket No. U-5033, *Order* (Sept. 7, 2011, Ala. Pub. Serv. Comm’n).

<sup>58</sup> Public Utilities Commission of Nevada, Docket Nos. 14-05003 and 14-0602.

1 **Q44. How does the Settlement treat WPL's recovery of the remaining**  
2 **net book value of Edgewater 5 after the unit's expected**  
3 **retirement in 2022?**

4 A. Based on the terms of the Settlement, my understanding is that WPL  
5 will recover the remaining net book value of Edgewater 5 on a  
6 levelized cost recovery basis between the unit's expected retirement  
7 date (September 2022) and the currently scheduled end of its  
8 depreciable life (June 2045).<sup>59</sup> Although this approach would permit  
9 WPL to recover the capital it has previously invested in the plant  
10 (*return of the remaining net book value*), WPL would earn a *return*  
11 *on* that investment at less than its otherwise authorized rate of  
12 return. As discussed in the direct testimony of WPL witness Michek,  
13 the rate of return for Edgewater 5 under the Settlement would reflect  
14 WPL's full cost of debt, a premised ROE of 9.8 percent, and results  
15 in an effective ROE of 9.2 percent. This effective ROE is  
16 approximately eighty basis points less than the 10 percent ROE that  
17 the settling parties agreed would otherwise apply to WPL's rate base  
18 under the Settlement.

19 **Q45. Do you believe the Settlement terms related to Edgewater 5 are**  
20 **reasonable?**

21 A. Yes. As discussed earlier, given the prudence of WPL's past  
22 investments in Edgewater 5, the value the unit has provided to

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<sup>59</sup> See Direct-WPL-Michek-31 to 33; Ex.-WPL-Michek-5.



1 customers over the last three decades, and the fact that retiring the  
2 unit in 2022 will generate long-term customer benefits, I believe it  
3 would be appropriate for WPL to recover a return of and on the  
4 remaining net book value of Edgewater 5 at its authorized WACC.  
5 However, I also recognize that utilities like WPL often enter into  
6 settlements to manage risk on contested issues such as cost  
7 recovery for retiring generating assets. In my view, the Settlement  
8 terms related to Edgewater 5 reflect reasonable compromise  
9 between WPL and the other parties, which I understand they  
10 evaluated within the context of the Settlement as a whole. The  
11 Settlement terms related to cost recovery for Edgewater 5 will  
12 generate additional savings for WPL's customers, while authorizing  
13 WPL to earn a return on Edgewater 5's remaining net book value at  
14 less than its authorized rate of return. Since it would be appropriate  
15 for WPL to recover the plant's remaining net book value at its  
16 authorized rate of return, it necessarily follows that WPL should be  
17 permitted to recover the plant's remaining net book value at the rate  
18 of return reflected in the Settlement.

**V. CONCLUSION**

19 **Q46. Please summarize your conclusions.**

20 A. Edgewater 5 has provided reliable and valuable service to customers  
21 since it was commissioned, including within the last decade. A  
22 majority of the plant's remaining net book value is associated with

1 pollution controls and other investments that WPL prudently installed  
2 to ensure the plant could comply with its environmental obligations  
3 and to maintain the plant in good working order. Moreover, the  
4 robust analysis supporting WPL's Blueprint resource plan shows that  
5 retiring the plant and replacing it with new, low-cost renewable  
6 generation will generate hundreds of millions of dollars in present  
7 value long-term savings for customers, *even with* WPL continuing to  
8 recover the plant's remaining net book value through rates at its  
9 authorized WACC. Given these circumstances, it would be  
10 appropriate for WPL to continue recovering a return of and on its  
11 undepreciated investment in Edgewater 5 at its authorized WACC.  
12 Nonetheless, I believe that the Settlement terms related to  
13 Edgewater 5—which authorize WPL to recover its investment in  
14 Edgewater 5, as well as a return on that investment at a premised  
15 ROE of 9.8 percent—are reasonable and reflect a fair compromise  
16 between WPL and customers.

17 **Q47. Does this conclude your pre-filed direct testimony?**

18 A. Yes, it does.