STATE OF IOWA BEFORE THE IOWA UTILITIES BOARD

)	
IN RE:)	
)	DOCKET NO. RPU-2019-0001
INTERSTATE POWER AND LIGHT)	
COMPANY)	

DIRECT TESTIMONY OF UDAY VARADARAJAN

On Behalf of

Environmental Law & Policy Center and Iowa Environmental Council

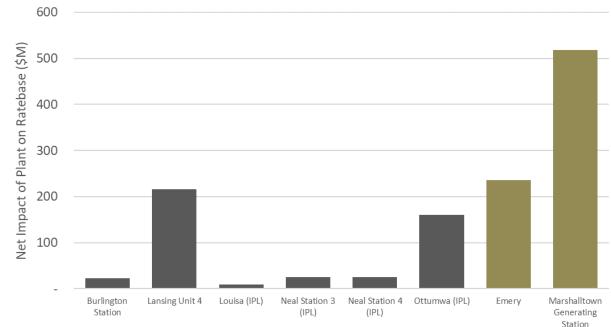
August 1, 2019

1	Q.	Please state your name and business address for the record.
2	A.	My name is Uday Varadarajan. My business address is 1111 Broadway, Oakland, CA
3		94607.
4	Q.	By whom are you employed and in what capacity?
5	A.	I am a Principal at Rocky Mountain Institute's (RMI) Electricity Practice and a Precourt
6		Energy Scholar at Stanford's Sustainable Finance Initiative (SFI), where I conduct
7		financial, policy, and regulatory analysis to help drive a just transition to clean energy.
8	Q.	Please describe the Rocky Mountain Institute.
9	A.	RMI is an independent, nonpartisan nonprofit cofounded in 1982 by Amory Lovins,
10		RMI's chairman emeritus and chief scientist. RMI engages businesses, communities,
11		institutions, and entrepreneurs to accelerate the adoption of market-based solutions that
12		cost-effectively shift from fossil fuels to efficiency and renewables.
13	Q.	Please summarize your professional and educational qualifications.
14	A.	Before joining RMI and Stanford, I was a Principal at Climate Policy Initiative Energy
15		Finance (CPI-EF), where I managed CPI-EF's San Francisco team. At CPI, I led the
16		development of financial, regulatory, and policy data analytics and tools to help
17		consumers, utilities, and communities in states across the United States (including New
18		York, Colorado, Missouri, Minnesota, and Utah) realize the benefits from a just and
19		equitable transition from uneconomic dirty resources to clean energy – with a focus in the
20		last few years in particular on the potential benefits of financial tools such as ratepayer-
21		backed bond securitization. Prior to my role at CPI, I served as a program examiner in the
22		U.S. White House Office of Management and Budget (OMB), where I oversaw the
23		budget for U.S. Department of Energy (DOE) energy efficiency and renewable energy

1		programs and the cost assessment and approval of the first \$8 billion in DOE loans to
2		automakers, including loans to Tesla and Nissan to build electric vehicles. Before joining
3		OMB, I was an AAAS Science and Technology Policy Fellow at the Department of
4		Energy and then on detail to the staff of the U.S. House of Representatives,
5		Appropriations Committee. Prior to my time in Washington, DC, I was a postdoctoral
6		fellow in theoretical physics in the Weinberg Theory Group at the University of Texas at
7		Austin. I received an AB in Physics from Princeton University and an MA and Ph.D. in
8		Physics from the University of California, Berkeley.
9	Q.	Have you previously filed testimony in a regulatory proceeding?
10	A.	Yes. I have previously filed testimony in regulatory proceedings focused on depreciation
11		rates and financial mechanisms in the states of South Carolina (Docket Nos. 2017-370-E;
12		2017-305-E; 2017-207-E – V.C. Summer nuclear plant cost recovery, on behalf of the
13		South Carolina Coastal Conservation League and the Southern Alliance for Clean
14		Energy), Colorado (16A-0231A – depreciation rate revision, on behalf of Western
15		Resource Advocates), Minnesota (E015/GR-16-664 – rate case, on behalf of several
16		Minnesota Clean Energy Organizations), and New York (15-E-0302 – large scale
17		renewables program, on behalf of NYSERDA).
18	Q.	On whose behalf are you testifying in this proceeding?
19	A.	I am testifying on behalf of the Environmental Law & Policy Center and the Iowa
20		Environmental Council, collectively "ELPC/IEC."
21	Q.	What is the purpose of your direct testimony?
22	A.	My testimony and exhibits support the position of the Environmental Law & Policy
23		Center and the Iowa Environmental Council that Interstate Power and Light (IPL or "the

1		Company") could accelerate its plans to add low-cost renewable resources while reducing
2		rates – rather than increasing them – by accelerating the retirement of the Company's
3		increasingly uneconomic fossil generating assets.
4	Q.	Please summarize IPL's request for a rate increase and its relationship to IPL's coal
5		and gas generators.
6	A.	IPL's application to the Board in the docket states that the company is requesting "an
7		increase in annual revenues of \$203.6 million, to recover the costs associated with those
8		valuable grid improvements, cleaner generation, and other system improvements."1 IPL
9		goes on to note specifically that one justification for this increase is that the company has
10		made over \$2 billion in investments since its 2016 test year rate case, including in 1000
11		MW of wind farms, including English Farms and Upland Prairie (470 MW – currently in
12		service), Whispering Willow North, Richland, and Golden Plains (530 MW – expected to
13		be in service during TY 2020).
14		However, IPL also notes that it has made investments in environmental controls at its
15		Ottumwa plant and Lansing Unit 4 – and has invested significantly over the last decade in
16		its gas and coal plants. In fact, as shown in Figure 1 below, the eight largest of its fossil
17		generators represent 2.5GW of capacity, currently account for \$1.2 billion of IPL's rate
18		base and generate over 11 TWh annually.

¹ IPL Application at 2.



1 Figure 1: The estimated net impact of IPL's eight large generators on ratebase.² 2 3 Q. How does IPL's revenue requirement relate to IPL's coal and gas generators? 4 A. The majority of IPL's fossil generation revenue requirement comes from the fuel, 5 operating and maintenance (O&M) expenses. I estimate that these eight generators account for nearly \$494 million in annual revenues required, roughly \$200 million to 6 7 cover capital costs and \$294 million to cover anticipated fuel, operating, and maintenance 8 expenses. See Figure 2 below. For comparison purposes, note that wind assets do not 9 have fuel costs and their impact on revenue requirements are primarily to cover capital 10 costs. IPL estimates that the 470 MW of capacity at the English Farms and Upland Prairie 11 wind farms have annualized O&M expenses of \$9.8 million, for roughly 1.2 TWh of annual generation.³ 12

² RMI analysis of IPL's 2018 FERC Form 1 filing of depreciation data at the plant and account level.

³ IPL Ashenfelter Direct Exhibit 6 (Interim)(E), WP B-5(a):11-12

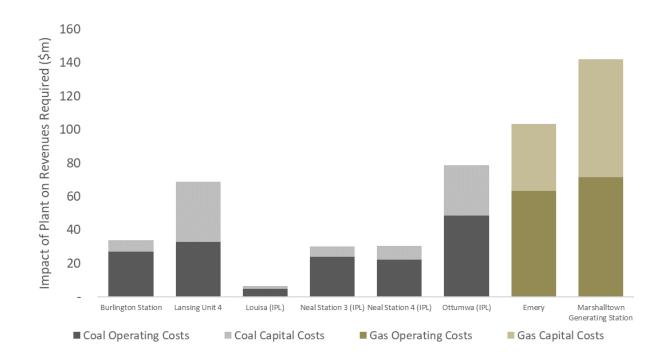




Figure 2: Estimated impact of IPL's eight large generators on revenues required in 2020.⁴

4 Q. Summarize the methodology of your analysis.

5 A. I performed comparative financial and economic analyses of continued operation of each

- 6 of the Company's large generators relative to various options for early retirement and
- 7 replacement of each generator's capabilities.

8 Q. Please summarize key conclusions and recommendations.

- 9 A. My analysis found that:
- Replacing the energy and grid services delivered by IPL's share of each of the
- 11 company's large generators (Burlington Station, Emery, Neal 3, Neal 4, Louisa,
- 12 Lansing, Marshalltown Generating Station (MGS), and Ottumwa) with a combination
- 13 of services purchased from MISO and new wind (with the full production tax credit,

⁴RMI analysis of IPL's 2018 FERC Form 1 filings, table f1_steam, and table f1_edcfu_epda, *available at:* <u>ftp://eforms1.ferc.gov/f1allyears/f1_2018.zip</u>

1		such as IPL's 1000 MW of new wind currently in operation or under development
2		and construction, or in most cases even with a phased-down tax credit if in operation
3		between 2021-2023) – could reduce future costs for ratepayers.
4		• Factoring down each of these assets and replacing the services they deliver with clean
5		energy could benefit ratepayers – and that early retirement and replacement of each of
6		these assets could be in the long-term interest of customers.
7		• The immediate retirement of Burlington and the IPL share of Neal 3 and Neal 4 with
8		10-year accelerated cost recovery and replacement of the full market value of the
9		services they delivered to MISO through utility-owned wind with the full PTC could
10		actually lower rates in 2020 by \$16 million.
11		• For remaining large assets there may be one or more potential regulatory options –
12		such as reducing the allowed return on regulatory assets – as well as refinancing
13		options – such as ratepayer-backed bond securitization (if the Iowa legislature was to
14		authorize the board's use of the latter tool) – that could better align both near-term
15		and long-term ratepayer and utility shareholder interests with the retirement and
16		replacement of these assets.
17	I.	Overview of analysis and results
18	Q.	How have you analyzed the economics of each of the Company's large generators?
	_	
19	A.	I analyzed the economics of these generators in three phases.
20	Q.	What was the first phase of the analysis?
21	А.	First, I assessed the current cost to ratepayers of each of IPL's solely and jointly owned
22		large generators (Burlington Station, Emery, Lansing Unit 4, Louisa, Neal 3, Neal 4,
23		MGS, and Ottumwa). Specifically, I used publicly-available capital and operating cost

1data from the IPL's submissions to FERC (Form 1), EIA (Forms 860 and 923), and the2Board (2017 depreciation study)⁵ to estimate the impact of each of IPL's large generators3on the revenues required in a 2020 test year. This analysis assessed both the revenues4required to recover operating expenses as well as to allow for recovery of and on any5undepreciated capital invested in the generator at IPL's currently authorized depreciation6rates and rate of return respectively.

7

Q. What was the second phase of the analysis?

8 Second, I compared the total cost to ratepayers of each of these assets with the hourly A. 9 market value of the energy, capacity, and ancillary services each of them have provided 10 over the last five years. To assess the value of these services, I relied on publicly 11 available hourly historical market data over the last five years made available by the 12 Midcontinent Independent System Operator (MISO) including nodal Day-Ahead 13 Locational Marginal Prices (LMPs), Market Clearing Prices (MCP) in the MISO 14 Ancillary Services Market (ASM), annual capacity auction clearing prices, data on dayahead cleared offers, and historical wind production across MISO.⁶ I also used this data 15 16 to compare the historical market value of these services with potential alternatives to their 17 continued operation such as marginal purchases of energy, capacity, and ancillary 18 services from the market as well as substitution of wind generation to deliver these 19 services.

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Q. What was the third phase of the analysis?

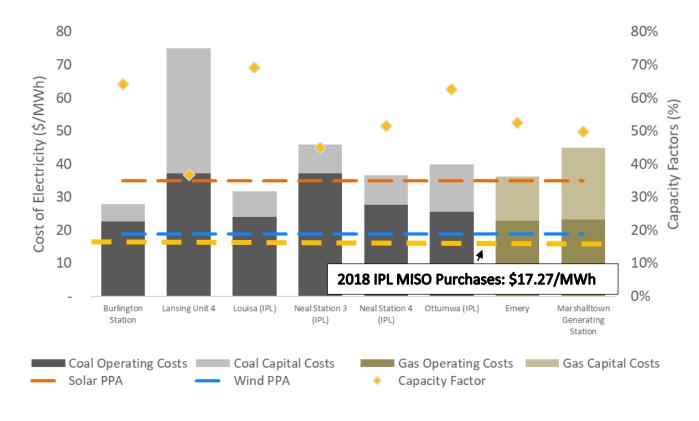
⁵ IPL response to OCA-DR-5, filed as ELPC/IEC Varadarajan Direct Exhibit 1 ⁶ MISO. Market Reports, *available at:* <u>https://www.misoenergy.org/markets-and-operations/real-time--market-data/market-reports</u>

1	A.	Third, I analyzed the financial feasibility and ratepayer impacts of retiring assets
2		identified as uneconomic and replacing each of them with wind. To do this, I began by
3		identifying uneconomic assets that could immediately be retired and replaced using the
4		cost recovery tools already available to the Board and result in a net benefit to ratepayers
5		while providing timely cost recovery and reinvestment opportunities for the utility. Then,
6		I turn to assessing options for refinancing cost recovery obligations – such as ratepayer-
7		backed bond securitization – that could be employed in the future to facilitate the
8		transition from the remaining uneconomic assets with larger cost recovery challenges due
9		to recent investments in a way that aligns the interests of ratepayers with that of the
10		utility's investors.
10 11	Q.	utility's investors. Could you summarize the results of the first phase of your economic analysis
	Q.	
11	Q. A.	Could you summarize the results of the first phase of your economic analysis
11 12	-	Could you summarize the results of the first phase of your economic analysis regarding the current cost of IPL's large generation assets to ratepayers?
11 12 13	-	Could you summarize the results of the first phase of your economic analysis regarding the current cost of IPL's large generation assets to ratepayers? As shown in Figure 3 below, just the operating costs alone of each of the eight large
11 12 13 14	-	Could you summarize the results of the first phase of your economic analysis regarding the current cost of IPL's large generation assets to ratepayers? As shown in Figure 3 below, just the operating costs alone of each of the eight large generators considered (the darker bars) exceed the average price paid by IPL for power
 11 12 13 14 15 	-	Could you summarize the results of the first phase of your economic analysis regarding the current cost of IPL's large generation assets to ratepayers? As shown in Figure 3 below, just the operating costs alone of each of the eight large generators considered (the darker bars) exceed the average price paid by IPL for power purchased from MISO in 2018 as reported on FERC Form 1 ⁷ – \$17.27/MWh – as well as

⁷ RMI analysis of consolidated FERC Form 1 data from <u>ftp://eforms1.ferc.gov/f1allyears/f1_2018.zip</u>, table f1_purchased_pwr.
⁸ U.S. Department of Energy. 2017. Wind Technologies Market Report. Office of Energy Efficiency and Renewable Energy, *available at:* https://emp.lbl.gov/sites/default/files/2017_wind_technologies_market_report.pdf, p. 51

built Turtle Creek Wind farm sold its power at a price of \$17.10/MWh – and that power
 is under contract for 15 years with IPL.⁹

If we also consider the capital costs that are expected to be recovered through rates for each of these assets (the lighter bars in Figure X), we find that six of the eight assets cost **more than double market prices and prevalent wind PPA prices.** This suggests that replacing the energy generated by each of these assets with purchased power from MISO or through long-term procurement or ownership of wind generators could significantly reduce ratepayer costs.



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10Figure 3: Summary of a cost analysis of IPL's generation assets as compared to11prevalent market prices and long-term renewable contract prices.

⁹ *Id*.

¹⁰ IPL 2018 FERC Form 1, f1_steam table, f1_purchased_pwr table, and f1_edcfu_epda table); EIA 923; DOE 2017 Wind Technologies Market Report.

Q. What does your analysis imply about the economic viability of the Company's generation fleet?

Our analysis suggests that the company could factor down its operations at each of its 3 A. 4 generation facilities, replacing the energy generated either with purchased power (either 5 through MISO or long-term PPAs, particularly in the near term to capture wind with 6 production tax credits) or with new owned generation (again, wind is quite attractive) and 7 thereby save ratepayers money. As costs for solar and electrical energy storage drop 8 further, and with their continued eligibility for the full investment tax credit for projects 9 that start construction by the end of 2019 and are built by 2023, the same may soon be 10 true for replacement with these technologies as well.

11 Q. But what about the other services beyond total energy that those plants provide?

12 A. Coal and gas facilities do provide a broader range of grid services that go beyond the 13 kWh of energy they produce and deliver. The timing of the delivery of energy and its role 14 in providing reliability services – such as regulation and spinning reserves – also have 15 value. For example, a plant that is flexible and able to operate to serve peak demand may 16 be more valuable than an inflexible plant. As IPL operates within MISO's service territory, and since MISO operates day-ahead and real-time markets that value these 17 18 services, the benefits and costs associated with the delivery of these additional services as 19 well as the hourly variation in the value of the energy delivered should be reflected in 20 market prices.

As the operating characteristics of coal and gas facilities are different, the ancillary services these two classes of generation provide should be assessed independently, and valued based on system need. For example, as gas facilities tend to have more flexibility

in their operations, plants like Emery and Marshalltown may be better able to serve peak
 demand than the coal plants included in the study.

- Figure 4 below shows the impact on revenue requirements arising from each of IPL's larger generators from their average operating costs over the last five years as well as due to their current capital costs. Further, the yellow triangles indicate the estimated market value of the services they delivered to MISO including energy, capacity, and ancillary services, calculated based on historically cleared offer, LMP, and MCP data over the last five years that account for the timing and price of each of these services to MISO (along with capacity value).
- Finally, much of RMI's research has shown that clean energy technologies, including
 battery energy storage¹¹ and distributed energy efficiency and demand response¹² can
- 12 provide regulation, spinning reserves, and other essential grid services, often at a lower
- 13 cost than conventional power plants.

Q. What does your analysis of the value of the grid services provided by IPL's plants imply about whether the plants are economic for ratepayers?

- 16 A. Figure 4 shows that the average operating costs alone of Lansing Unit 4, Neal Station 3,
- 17 and Ottumwa exceed the total value of the grid services provided by those units over the

¹¹ "The Economics of Battery Energy Storage," Rocky Mountain Institute (2015), *available at:* <u>https://rmi.org/wp-content/uploads/2017/05/RMI_Document_Repository_Public-Reprts_RMI-TheEconomicsOfBatteryEnergyStorage-ExecutiveSummary.pdf</u>

¹² "The Economics of Clean Energy Portfolios," Rocky Mountain Institute, last visited July 31, 2019, *available at:* <u>https://rmi.org/insight/the-economics-of-clean-energy-portfolios/; "Pushing the Limit: How Demand Flexibility Can Grow the Market for Renewable Energy," Rocky Mountain Institute, last visited July 31, 2019, available at https://rmi.org/demand-flexibility-can-grow-market-renewable-energy/.</u>

last five years. That is, they do not provide value commensurate to even the operating
 costs passed through to ratepayers – and thus, should not continue to operate.

Further, the figure also makes clear that the total cost paid in rates for every one of the

assets exceeds the value of the grid services provided – often by a very large margin.

That is, ratepayers are paying in some cases double the price that they could be paying to get the same suite of grid services from MISO.

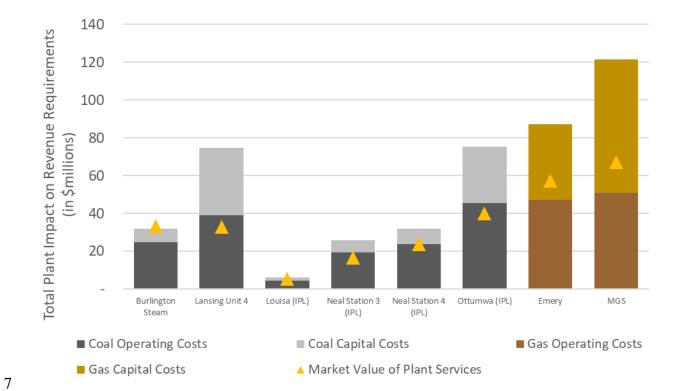


Figure 4: The revenue requirement impacts of IPL's large generators including
 operating expenses¹³ and capital costs¹⁴ compared to the average market value of
 the energy, capacity, and ancillary services delivered by each asset based on MISO
 historical data from 2013-2018.

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¹³ Calculated based on the average operating expenses reported for each facility reported on IPL's 2013-2018 FERC Form 1, f1_steam submissions

¹⁴ Calculated for the 2020 test year based on depreciation data at the plant and account level filed on FERC Form 1, f1_edcfu_epda

1 Q. Are unrecovered balances an issue for the generating units you examined?

A. See Figure 5 below for a summary of the balance of unrecovered costs (including costs
anticipated to be recovered for decommissioning costs net of salvage value) for each of
the generating units we analyzed. Four of the units we analyzed – Louisa, Burlington
Station, Neal Station 3, and Neil Station 4 – have unrecovered balances and net salvage
decommissioning costs well below \$100 million each.

7 However, Lansing Unit 4 and Ottumwa both have seen significant recent investment

8 (largely pollution control equipment arising from a settlement with EPA in 2015) and
9 have substantial costs yet to be recovered, while the two combined-cycle facilities are

10 relatively new and have yet to see their original construction costs fully recovered.

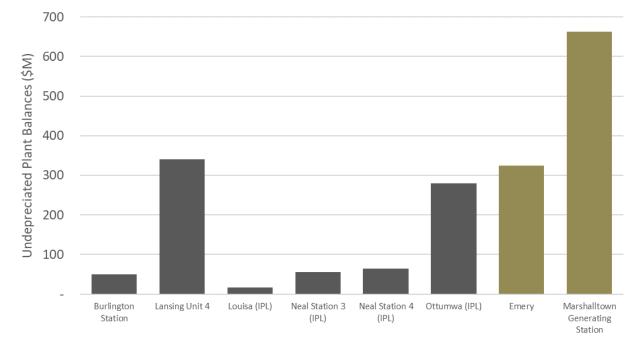




Figure 5: Unrecovered balances for each of the analyzed generators in 2020¹⁵

¹⁵ Calculated using IPL's 2018 FERC Form 1 depreciation data at the plant and account level reported in f1_edcfu_epda.

Q. Based on your analysis, which of the units could be retired now and benefit ratepayers immediately even with accelerated cost recovery?

3 My analysis suggests that the immediate retirement of Burlington and the IPL share of A. 4 Neal 3 and Neal 4 with 10-year accelerated cost recovery and replacement of the full 5 market value of the services they delivered to MISO through utility-owned wind with the 6 full PTC could actually lower rates in 2020 by \$16 million - see Figure 6 below. Note 7 that this analysis accounts for the fact that the market value of a kWh of wind energy 8 produced by the wind facility may be lower than that of the facility it replaces. It does so 9 by requiring that more wind is built than would be needed to replace the energy generated 10 by the old facility – so as to provide enough value to procure both the replacement energy 11 as well as any replacement capacity and ancillary services required to match the full 12 value of the services that were being provided by the retired asset.

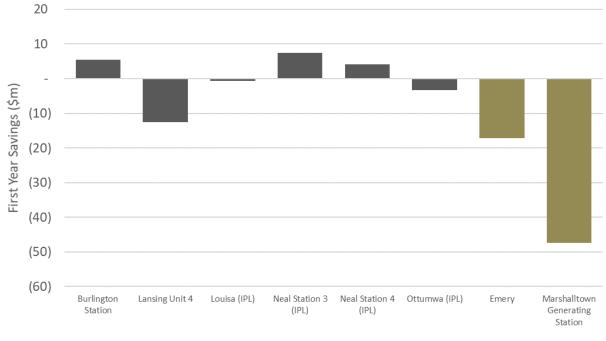
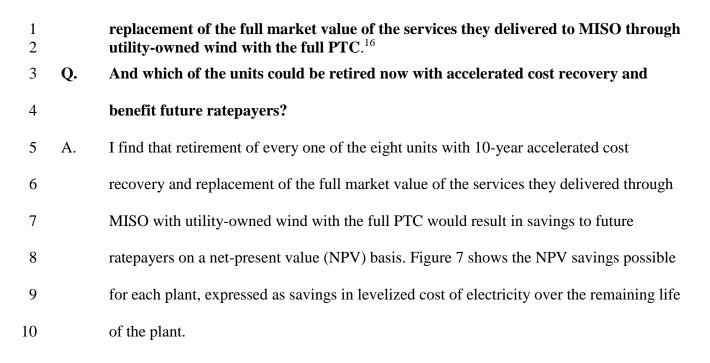


Figure 6: First-year savings from the immediate retirement of Burlington and the
 IPL share of Neal 3 and Neal 4 with 10-year accelerated cost recovery and



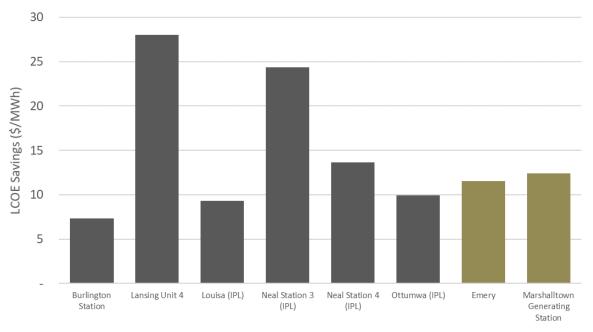


Figure 7: The savings in levelized cost of electricity possible if each of IPL's
 generators were retired, their costs recovered over ten years, and replaced with
 wind with full PTC.¹⁷

¹⁶ RMI analysis based on 2018 EIA 923, 2018 EIA 860, IPL 2013-2018 FERC Form 1, MISO Market Reports from 2013-2018

¹⁷ RMI analysis based on 2018 EIA 923; 2018 EIA 860; IPL 2013-2018 FERC Form 1; MISO Market Reports from 2013-2018

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Q. Can you elaborate on why Burlington and the Neal Units could be retired and provide savings to ratepayers in the near term?

4	А.	Yes. Let's consider the example of Burlington Station. This asset is expected to have an
5		unrecovered balance of approximately \$24 million in 2020, and \$26 million in
6		decommissioning costs net of salvage value, for a total of about \$49 million in costs yet
7		to be recovered if it is retired early in 2020 (ten years before full cost recovery). ¹⁸ The
8		Board could choose to allow accelerated recovery of those costs over ten years and allow
9		the utility to either procure or invest in replacement resources. If we assume that the
10		replacement energy and grid service value is procured through wind with the full PTC (in
11		this case, this would require 1.4 TWh of wind with full PTC, which would correspond to
12		a little over the 1.2 TWh anticipated to be generated by the first 470 MW of the 1000
13		MW of full PTC wind already being built by IPL), then the savings from wind could be
14		large enough to result in immediate savings to ratepayers as well as over the long term.
15		See, for example, Figure 8 below. Thus, customers would, in this case, see a benefit from
16		early retirement in spite of the outstanding plant balance.

¹⁸ Based on RMI analysis of IPL's 2018 FERC Form 1 submission, f1_edcfu_epda table.

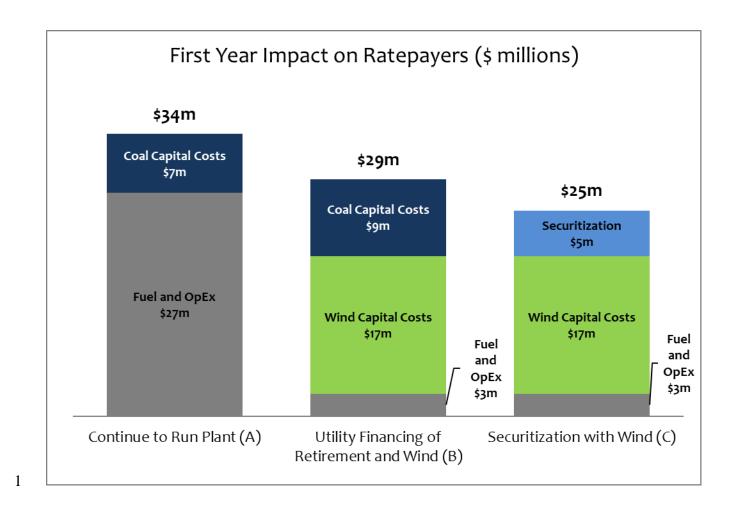
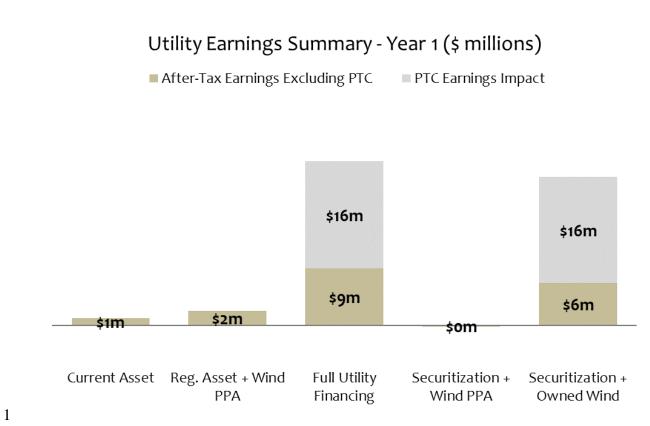


Figure 8: First year rate impact of early retirement of Burlington Station and replacement with utility-owned wind.¹⁹

Further, from the utility shareholder perspective, as the asset is nearing full cost recovery, there is little capital deployed in the asset. In fact, early retirement can actually pull forward decommissioning costs, which, if capitalized as a regulatory asset can actually allow for an **increase** in anticipated future earnings associated with asset retirement, even if the asset is replaced by purchased power. See Figure 9 below. For utility investors, the possibility of owning replacement generation could provide a meaningful potential upside on top of that increase.

¹⁹ RMI analysis based on 2018 EIA 923; 2018 EIA 860; IPL 2013-2018 FERC Form 1; MISO Market Reports from 2013-2018.



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Figure 9: Utility earnings impact of the retirement of Burlington Station and
 replacement with either a wind PPA or utility-owned wind (Full Utility Financing).²⁰

4 Q. Would there still be benefits from retirement and replacement by new wind with the

5 phased-down PTC?

6	A.	The phase-out of the PTC – down to 80% of its current value for plants that began

- 7 construction by the end of 2017 and are in operation by the end of 2021, to 60% if in
- 8 operation by 2022, and 40% if by 2023 would negatively impact the relative economics
- 9 of new wind, particularly in the near term. I find that with accelerated cost recovery and
- 10 80% of the PTC, only retirement and replacement of Neal 3 still provides immediate
- 11 savings (see Figure 10). However, savings in the long-term persist for all plants with

 $^{^{20}}$ 2018 EIA 923, 2018 EIA 860, IPL 2013-2018 FERC Form 1, MISO Market Reports from 2013-2018

replacement by wind with 80% PTC (see Figure 11), and all the generators except for
 Burlington station with 60% of the PTC (see Figure 12).

- 3 Thus, my analysis suggests that there is some urgency to procuring potential replacement
- 4 resources while the PTC is still at least 80% in effect in order to lock in the greatest

10 (10)First Year Savings (\$m) (20) (30) (40)(50)(60) (70) (80) Lansing Unit 4 Louisa (IPL) Neal Station 3 Neal Station 4 Ottumwa (IPL) Burlington Emerv Marshalltown Station (IPL) (IPL) Generating

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benefits to ratepayers.

Figure 10: The first-year savings possible if each of IPL's generators were retired, their costs recovered over 10 years, and replaced with wind with 80% PTC.²¹

Station

²¹ RMI analysis based on 2018 EIA 923; 2018 EIA 860; IPL 2013-2018 FERC Form 1; MISO Market Reports from 2013-2018.

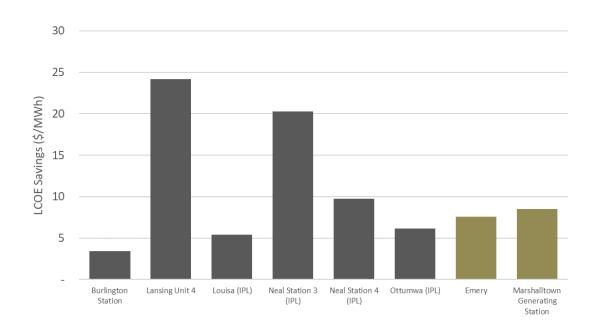
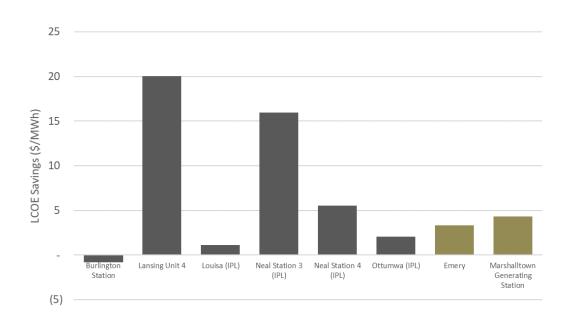


Figure 11: The savings in levelized cost of electricity possible if each of IPL's generators were retired, their costs recovered over 10 years, and replaced with wind with 80% PTC²²



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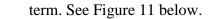
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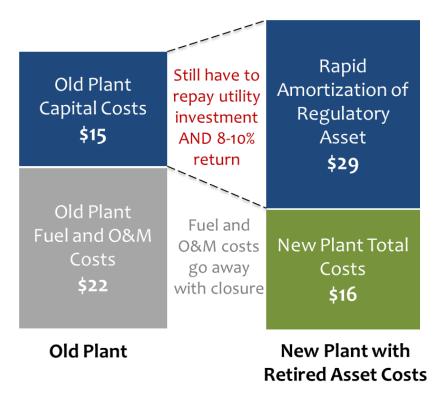
Figure 12: The savings in levelized cost of electricity possible if each of IPL's
 generators were retired, their costs recovered over 10 years, and replaced with wind
 with 60% PTC.²³

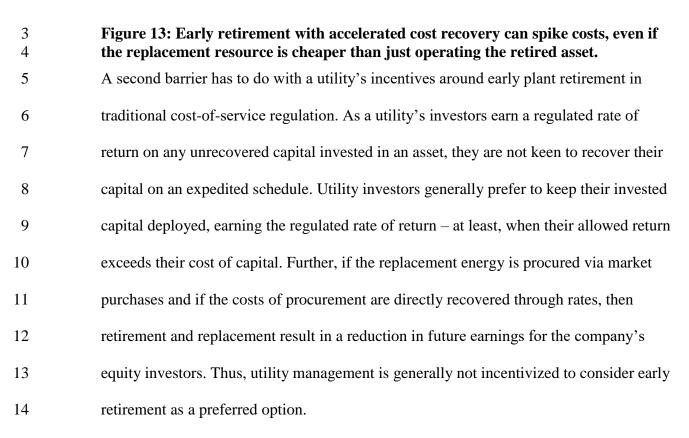
²² RMI analysis based on 2018 EIA 923; 2018 EIA 860; IPL 2013-2018 FERC Form 1; MISO Market Reports from 2013-2018

- 1Q.Are there barriers to retiring these assets and realizing significant ratepayer2savings?
- A. Yes, but only for a subset of plants with significant unrecovered recent investment costs.
 One particularly important issue that can significantly reduce the attractiveness of retiring
 any facility early is the challenge of dealing with unrecovered costs.
- 6 In general, when a plant is retired early, a utility has usually not yet fully recovered its 7 historical investment in the facility through rates. If those historical costs are still found 8 by a regulator to have been prudently incurred for a facility that was used and useful, then 9 a utility is generally able to argue for timely recovery of those costs through rates, even in 10 the event of early retirement. If that is the case, then early retirement still leaves future 11 ratepayers on the hook to continue paying the capital costs for the retired assets – even if 12 those ratepayers no longer receive any services from the assets – along with the costs for 13 the replacement generation. Often, this motivates regulators to accelerate the recovery of 14 costs for early retirement, resulting in increased capital costs for current ratepayers that 15 can sometimes wipe out any benefit from early retirement and replacement in the near

²³ RMI analysis based on 2018 EIA 923; 2018 EIA 860; IPL 2013-2018 FERC Form 1; MISO Market Reports from 2013-2018





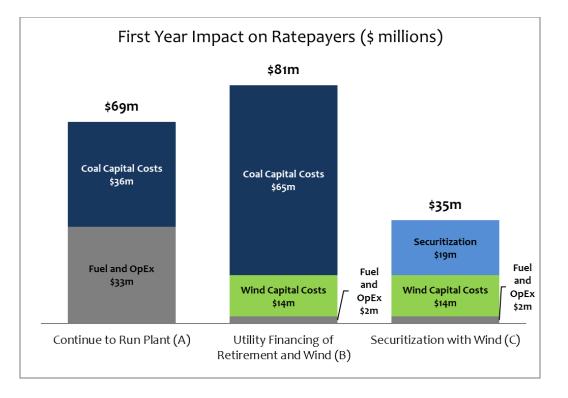


1	Q.	Are there any financial or regulatory tools that could help with the large
2		outstanding balances in the Company's other generating facilities?
3	A.	Yes. In particular, two of the most uneconomic units – Lansing Unit 4 and Ottumwa –
4		would both benefit from a well-planned retirement that uses financial and regulatory tools
5		to align the interest of ratepayers with that of the utility's investors.
6		A tool recently used in Michigan and Florida to finance cost recovery for early asset
7		retirement – that has recently been approved for use in addressing early generation asset
8		retirement in Colorado, New Mexico, and Montana – could be a promising approach.
9		Since the early 1990s, over twenty states have passed legislation to encourage their public
10		utility commissions to authorize a financial vehicle for cost recovery known as
11		"ratepayer-backed bond securitization." This financial vehicle can both reduce the cost to
12		ratepayers of early retirement and provide the utility with immediate cost recovery for
13		any remaining net asset balances.
14	Q.	What is the process for securitization?
15	A.	With such appropriate legislative support in place, a public utility commission would
16		execute ratepayer-backed bond securitization by taking the following basic steps:
17		1. Set up a company to issue a bond and repay bondholders – The commission
18		would authorize the formation of a stand-alone company called a special purpose
19		vehicle (SPV) whose sole asset is the rights to a dedicated stream of customer
20		revenues that will be used to pay interest and principal on the bond the SPV issues.
21		The company could be a public benefit corporation set up by the commission (and
22		operated by the utility) as allowed by the authorizing statute or wholly-owned by the
23		utility specifically for this purpose.

1	2.	Create a dedicated customer revenue stream to pay bondholders – The
2		commission would set up a dedicated line item on customer's bills whose sole
3		purpose is to pay interest and principal on the bond issued by the SPV. The amount
4		on the line item must be automatically adjusted each month to meet the required
5		interest and principal payments. The rights to the revenues from this line item would
6		be owned by the SPV.
7	3.	Issue a long-term (15-30 year) bond whose proceeds are used to provide
8		immediate cost recovery to the utility – The bond's proceeds are used to provide
9		the utility with immediate cost recovery. For example, if this were done in 2020 for
10		the \$350 million in expected unrecovered plant balances and expected
11		decommissioning costs net of salvage expected from the early retirement of Lansing
12		Unit 4, a bond of the same size would be issued by the SPV, and the proceeds
13		immediately transferred to the Company. The SPV and revenue line item can be
14		structured to have no impact (or even a positive impact) on the utility's credit rating.
15	4.	Pay interest and principal on the bond over 15-30 years through dedicated
16		customer revenues – The dedicated customer revenues are then used by the SPV to
17		pay interest on the bond and repay principal. Since the interest rate can be quite low,
18		and the principal repaid over 15-30 years, the financing costs of securitization can be
19		much lower than paying off a regulatory asset. Specifically, the credit rating agencies
20		(Moody's, S&P) provide detailed criteria for the structuring of the authorizing
21		legislation, the SPV, the revenue line item, and the bond so as to achieve the highest
22		achievable bond credit rating. In today's low interest rate environment, such a highly-
23		rated (AAA) bond can result in a 15-30 year bond with a yield of 3-4%.

1 Q. What are the results of using securitization?

- 2 A. As a result of this securitization, instead of the customers paying the company nearly 9-
- 3 12% in authorized financing costs on a pre-tax basis each year on any outstanding
- 4 unrecovered balances in assets retired early over an extended period of time, they will
- 5 instead pay a much lower 3-4% interest annually over 15-30 years.



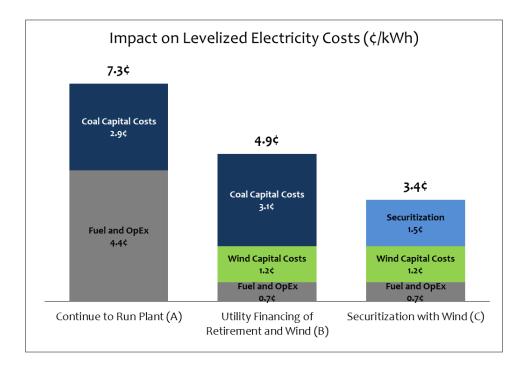


Figure 14: The current and long-term rate impact of Lansing 4 compared to scenarios involving early retirement and replacement with wind.²⁴

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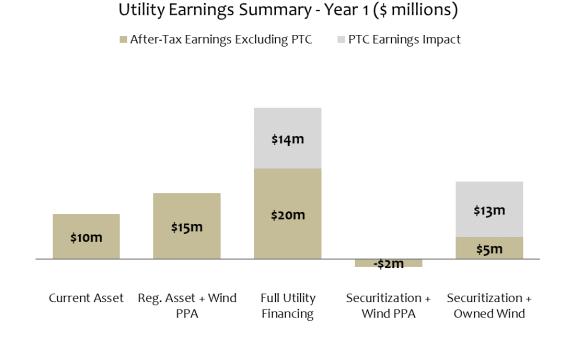
4 For IPL, this approach to dealing with the risk of early retirement provides the utility with 5 the flexibility to recycle their invested capital to take advantage of increasingly attractive 6 future clean energy opportunities. That is, it gives them the option to eliminate 7 underperforming assets when they find it economic to do so without losing their invested 8 capital and with significantly reduced ratepayer impacts, thereby allowing them to 9 potentially redeploy that capital (and more) in more economical alternative assets as the 10 opportunity arises. The value of this option could be more attractive on a risk-adjusted basis in its impact on the long-term growth prospects for the Company than the riskier bet 11 12 they are making around the continued operation of uneconomic facilities. That is,

²⁴ RMI analysis based on 2018 EIA 923; 2018 EIA 860; IPL 2013-2018 FERC Form 1; MISO Market Reports from 2013-2018.

securitization with capital recycling into new wind by the utility could be a win-win-win
 for customers, IPL, and the environment.

3 Q. How does securitization compare with accelerated depreciation for the Company's 4 generators? Does is make sense here?

5 A. We have attached the results of a detailed analysis of the ratepayer and utility earnings 6 impacts of each of the eight generating facilities as Appendix A to this testimony. As an 7 example of how securitization could work for the Company, consider the potential early 8 retirement of Lansing Unit 4. If accelerated cost recovery is implemented, as shown in 9 Figure 14 above, early retirement and accelerated depreciation could increase rates by 10 \$12 million in the first year alone. If accelerated cost recovery is not required – or a 11 refinancing tool like securitization is used – these hypothetical increases could be avoided, instead providing near term cost savings of \$34 million from early plant 12 13 retirement and replacement. And for the utility, securitization paired with the potential 14 upside of ownership of the replacement generating facility could boost future earnings by 15 over 30%. See Figure 15 below.



1	

2 Figure 15: Utility earnings impacts for early retirement and replacement of Lansing Unit 4.²⁵ 3 4 The use of securitization, in particular, paired with allowing the utility to invest in 5 replacement wind, can reduce electricity costs for ratepayers not only today but also into the future. See Figure 14 above. 6 7 We see similar results for all the other large generating assets, as shown in Appendix A of my testimony.²⁶ 8 9 Q. What are the limits and challenges with using securitization? 10 There are several challenges that are worth mentioning. First, securitization needs to be A. 11 enabled by legislation – as it has been in the other states that the tool has been used. 12 Therefore, it is not currently available for use in the state of Iowa. However, 13 securitization can be used after a retirement decision is made to refinance regulatory

²⁵ RMI analysis based on 2018 EIA 923; 2018 EIA 860; IPL 2013-2018 FERC Form 1; MISO Market Reports from 2013-2018.

²⁶ Input assumptions for each plant are also provided for reference in Appendix B.

1 assets remaining after early retirement, even retrospectively. Therefore, if a retirement 2 decision is made today, the option remains open for legislators and the Board to use the tool in the future to mitigate the costs of that decision. 3 4 Further, securitization is just an example of a mechanism to refinance cost recovery with 5 lower-cost bonds. It is possible that such a refinancing could be accomplished without 6 legislative authority and through corporate bond financing. However, I am not aware of 7 any precedent for the use of such an approach so far to deal with cost recovery. 8 Second, we note that securitization does have limits. While Moody's, S&P, and Fitch's 9 general guidance on securitization suggests that the tool is credit neutral or mildly credit 10 positive for most utilities, that assessment has limits. As a rule of thumb, the tool 11 generally cannot result in securitization charges that exceed roughly 20% of total bills 12 before leading to negative credit implications. 13 Q. What options besides securitization can be implemented now? 14 A. While securitization still likely represents the most economic option to address cost

recovery, there are other financial and regulatory tools that can address this issue and reduce ratepayer costs and risks while aligning the Company's interests with that of transitioning its assets more rapidly to reflect cleaner, cheaper generation options that could result in cost savings for both current and future ratepayers.

State regulators across the country have applied a number of financial and regulatory
tools to address cost recovery in early retirement, with varying impacts on the utility and
ratepayers in the short and long term. These tools include disallowance of some or all the

22 costs for uneconomic plants, reduction in the allowed return on unrecovered costs for

1 assets retired early (ranging from debt cost to the weighted average cost of capital, or 2 WACC), accelerated cost recovery, and full cost recovery without acceleration. 3 As described in Figure 16 below, each of these tools has drawbacks for customers, and in 4 the absence of any opportunity for a utility to reinvest its capital, is generally unattractive 5 for the utility – with the exception of full utility cost recovery without acceleration. For 6 example, a reduction in the allowed return for costs remaining to be recovered after early 7 plant retirement can help mitigate near-term rate impacts for customers. However, for the 8 utility's equity investors, the presence of a long-term asset on the utility's balance sheet 9 with a return too low to provide earnings commensurate with the cost of their equity 10 capital is unattractive - and for their debt investors, the reduced cash flows mean reduced 11 margins of safety on debt repayments. This, in turn, can result in lower potential future 12 credit ratings, and a higher long-term cost of capital that can negatively impact future 13 ratepayers.

However, as shown in the second chart in Figure 16, if some of these tools are
accompanied by "capital recycling," allowing the utility to reinvest its capital or
otherwise replenish the future cash flows or earnings lost to the utility as a result of early
retirement, some of these options become more attractive. For the above example of a
reduced allowed return, the potential negative credit and future ratepayer impacts are
alleviated if the utility can reinvest recovered capital and replenish its earnings and cash
flows over time.

Further, the use of any one of these tools would not preclude the future use of
securitization if the Iowa legislature chooses to make it available to the Board.

1	Q.	Is the consideration of financial tools similar to securitization consistent with
2		legislative direction and prior decision-making by the Board?
3	A.	I would point to the following guidance from the general assembly, indicating that the
4		utility board will not "be limited to traditional ratemaking principles or traditional
5		recovery mechanisms." ²⁷ Furthermore, the code stresses that the board may seek these
6		alternative recovery mechanisms to provide "reasonable restrictions upon the ability of
7		the public utility to seek a general increase in electric rates." ²⁸
8		This opens the door for alternative refinancing mechanisms like securitization and for the
9		commission to explore disallowance – especially in situations where those mechanisms
10		can be shown to prevent customer rate increases or to actually decrease those rates over
11		time.
12		In its final Decision and Order in MidAmerican's Wind XII Docket, the Board has
13		indicated an openness to the possibility of disallowing some or all asset-related costs it
14		deems as "imprudent and unreasonable" "should a rate-regulated utility continue to
15		utilize an uneconomic facility." ²⁹
16		Given that the utility is operating coal assets that are not reasonable and prudent
17		investments and given that the ensuing high operational and fuel costs are being
18		completely borne by the ratepayer – the Board should pursue a method to share the risk
19		burden for those costs or disallow them completely.

²⁷ IOWA CODE § 476.53(3a)"2"(b) (2019).
²⁸ *Id.*²⁹ IUB Docket No. RPU-2018-0003, Final Decision & Order, Page 34.

	Impacts o	on UTILITY	Impacts on	CUSTOMER
NO Capital Recycling	Credit	Equity	Short-Term	Long-Term
Disallowance (from 0-100%)	ХХ	ХХ	$\checkmark\checkmark$	
Vary Allowed Return (from Debt Only to WACC)	х	х	\checkmark	
Accelerate Depreciation (to 4-10 Years)			XX	
Full Utility Finance (Full WACC, No Accel)	\checkmark	\checkmark	Х	X
Securitization		х	\checkmark	\checkmark

1		Impacts on UTILITY		Impacts on CUSTOMER	
	with Capital Recycling	Credit	Equity	Short-Term	Long-Term
	Disallowance (from 0-100%)	х	х	$\checkmark\checkmark$	
	Vary Allowed Return (from Debt Only to WACC)			\checkmark	
	Accelerate Depreciation (to 4-10 Years)	\checkmark	\checkmark	XX	
	Full Utility Finance (Full WACC, No Accel)	$\checkmark\checkmark$	$\checkmark\checkmark$	Х	Х
	Securitization	✓	\checkmark	\checkmark	\checkmark

1

2 3

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Figure 16: The impacts of various options for addressing cost recovery compared, both with and without capital reinvestment ("capital recycling"). The "X" and "XX" in Figure 16 above indicate negative consequences, while check marks and double checkmarks indicate potential positive consequences.

6 7

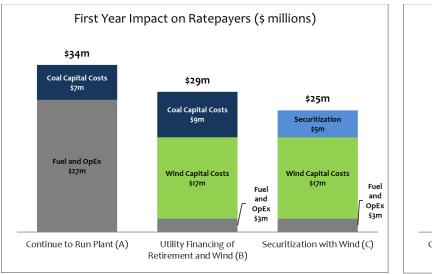
8 Q. What else should the Board consider doing?

9 A. In other jurisdictions, risk-sharing mechanisms exist wherein utilities may be mandated to
10 sell some or all of their power into wholesale markets and purchase replacement power to
11 cover demand. By invoking a risk-sharing mechanism, the utilities bear a portion of the

1		risk associated with selling (potentially more expensive) power into the market and
2		purchasing replacement power at a loss, incentivizing them to lower the generating costs
3		of existing assets to reduce this loss.
4		In order to incorporate market signals into utility operations, the Board should consider
5		establishing a risk-sharing mechanism. In this scenario, the utility only passes on a
6		portion of its losses from selling uneconomic power into the market and must internalize
7		the remainder. This has the benefit of incentivizing the utility to strive to lower its
8		operating costs to minimize these losses, which also lowers costs for ratepayers.
9	Q.	What do you recommend that the Board do at this time?
10	A.	My analysis has shown that three of IPL's units could be retired with accelerated cost
11		recovery and replaced with sufficient wind generation to replace the full value of the grid
12		services they provide, while still achieving \$16 million in savings in rates in the 2020 test
13		year.
14		As a result, I recommend that the Board move forward immediately with disallowing the
15		operating costs of Neal 3, Neal 4, and Burlington in rates and instruct IPL to move
16		forward with retiring those plants early, recovering their costs using ten-year accelerated
17		cost recovery.
18		I also recommend that the Board instruct IPL to build on its plan to acquire 1000MW of
19		wind by soliciting for additional cost-effective, clean generation (particularly wind with
20		full or partial production tax credits, and solar and storage while their investment tax
21		credits are still available) that could cost-effectively replace the services provided by

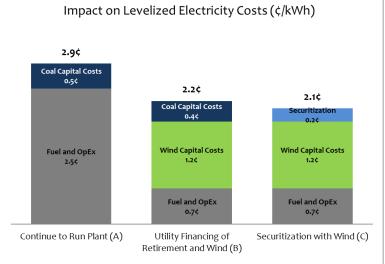
1		Further, I recommend that the Board require IPL to explore accelerating its acquisition of
2		additional wind (as well as solar power and storage) to take maximal advantage of
3		expiring federal tax credits to reduce ratepayers costs by:
4		1) fully replacing the services that Neal 3, Neal 4, and Burlington currently provide, and
5		2) reducing IPL's reliance on the uneconomic energy and grid services provided by
6		IPL's other large coal units (Lousia, Lansing 4 and Ottumwa) and combined-cycle
7		gas unity (Emery and MGS).
8	Q.	What else should the Board consider doing?
8 9	Q. A.	What else should the Board consider doing? Finally, for the remaining five units, the board should consider exploring alternative
9		Finally, for the remaining five units, the board should consider exploring alternative
9 10		Finally, for the remaining five units, the board should consider exploring alternative approaches to refinancing cost recovery akin to securitization. While securitization is
9 10 11		Finally, for the remaining five units, the board should consider exploring alternative approaches to refinancing cost recovery akin to securitization. While securitization is likely the most efficient tool to use to address cost recovery, there are other mechanisms
9 10 11 12		Finally, for the remaining five units, the board should consider exploring alternative approaches to refinancing cost recovery akin to securitization. While securitization is likely the most efficient tool to use to address cost recovery, there are other mechanisms that can be deployed, both with and without the option of allowing the utility the

15 A. Yes.

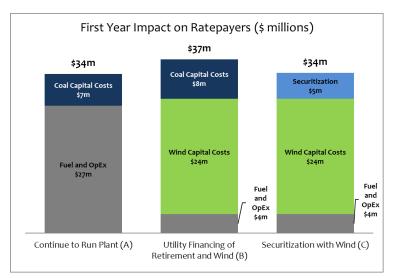


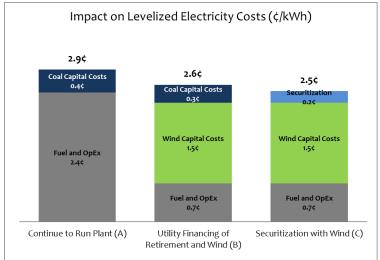


Effect on Revenue Requirement and LCOE – Full PTC

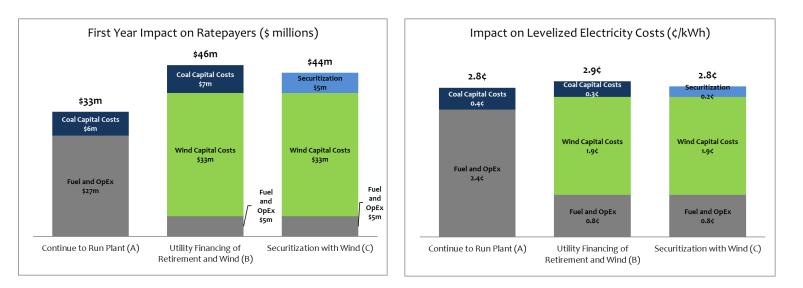


Effect on Revenue Requirement and LCOE – 80% PTC

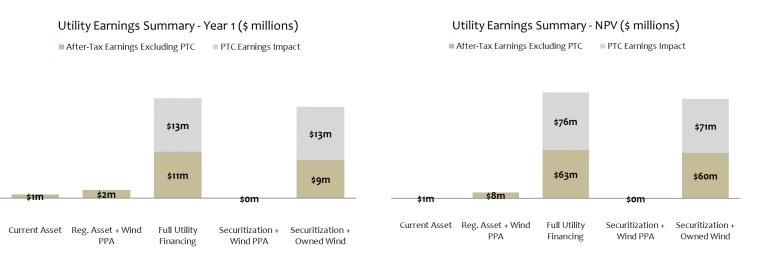




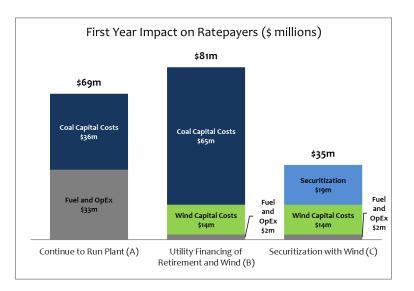
Effect on Revenue Requirement and LCOE – 60% PTC

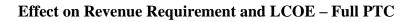


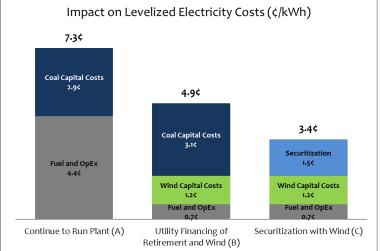
Effect on Utility Earnings – 80% PTC

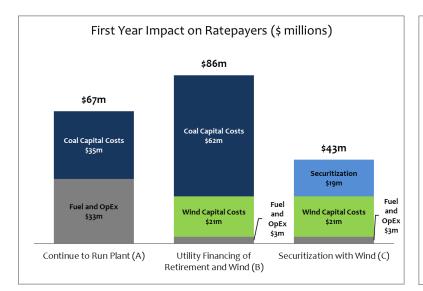


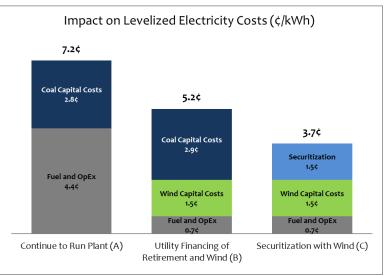
Lansing Unit 4



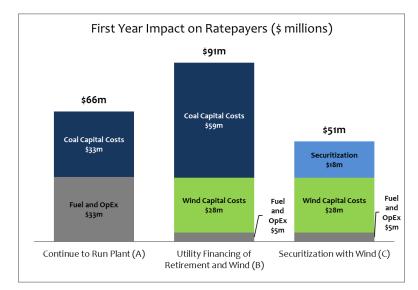


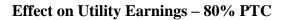


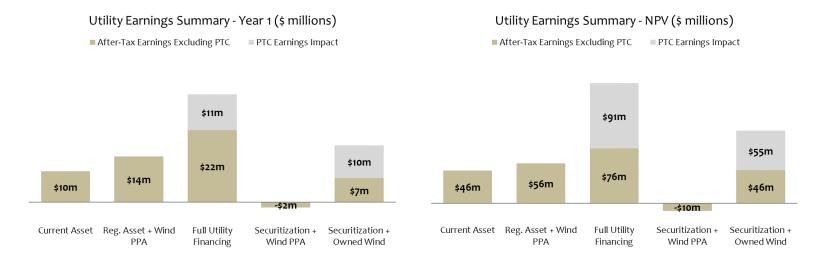




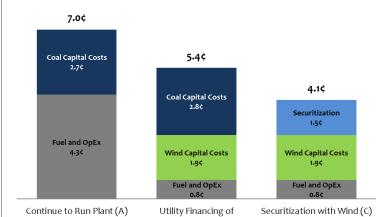
Effect on Revenue Requirement and LCOE – 60% PTC







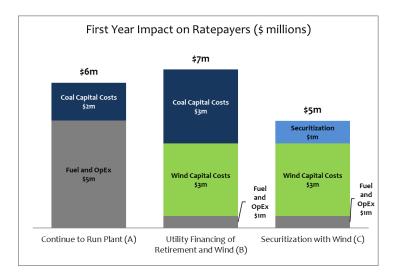
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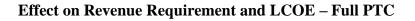


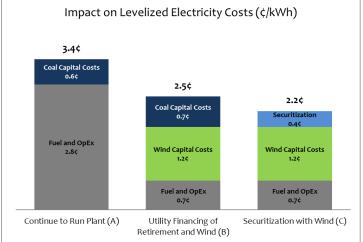
Retirement and Wind (B)

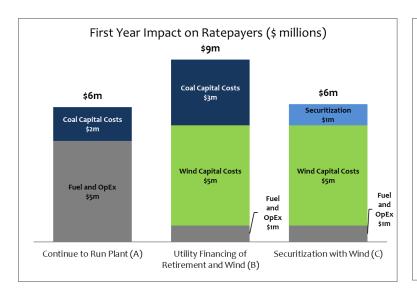
Impact on Levelized Electricity Costs (¢/kWh)

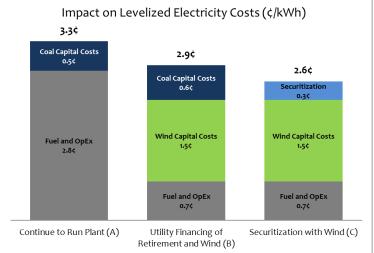
Louisa (IPL)



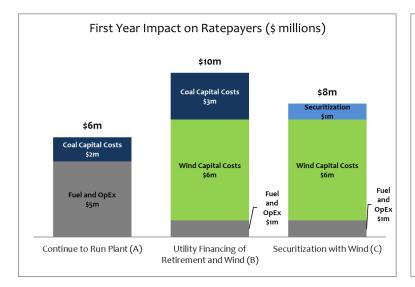


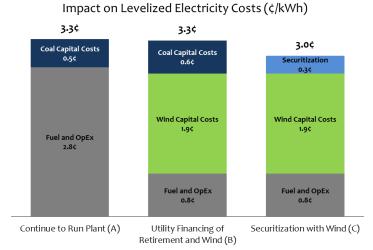




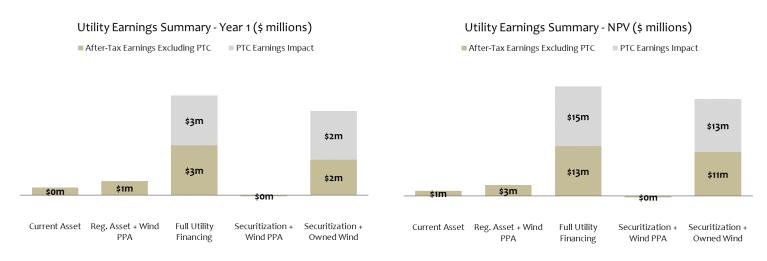


Effect on Revenue Requirement and LCOE – 60% PTC

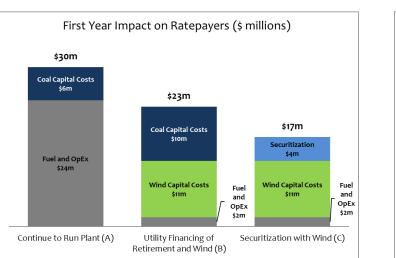




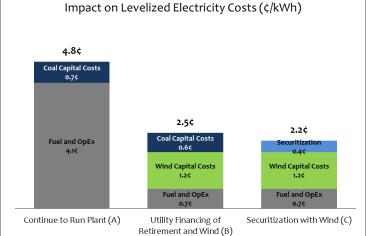
Effect on Utility Earnings – 80% PTC

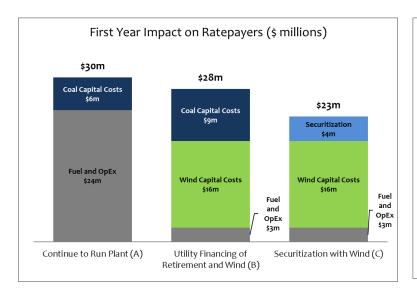


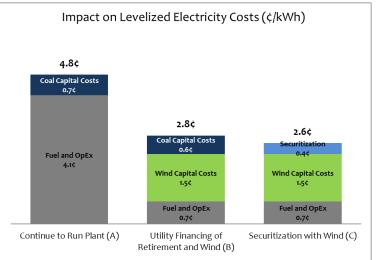
Neal Station 3



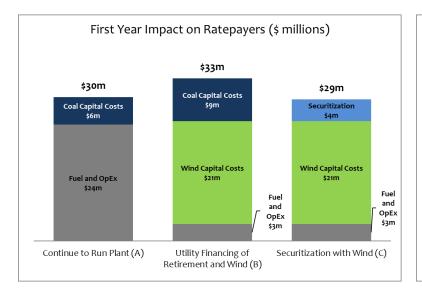
Effect on Revenue Requirement and LCOE – Full PTC

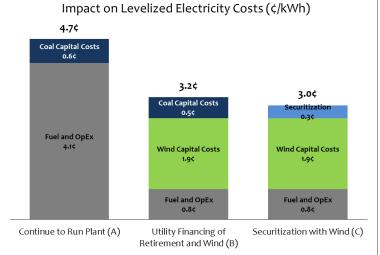




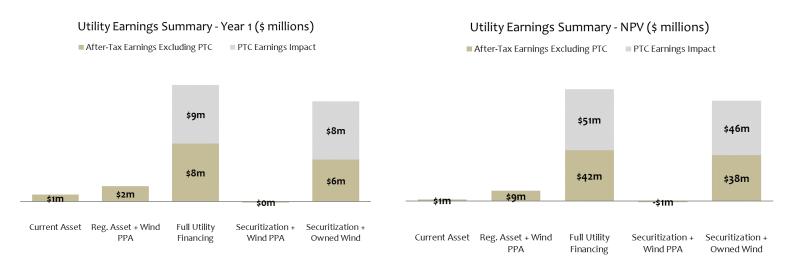


Effect on Revenue Requirement and LCOE – 60% PTC

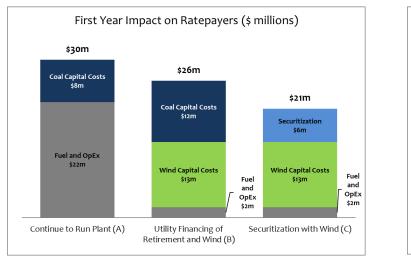


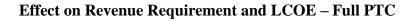


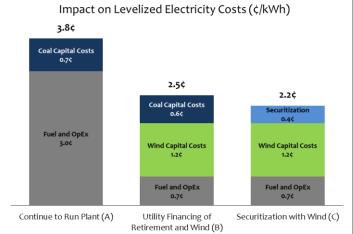
Effect on Utility Earnings - 80% PTC

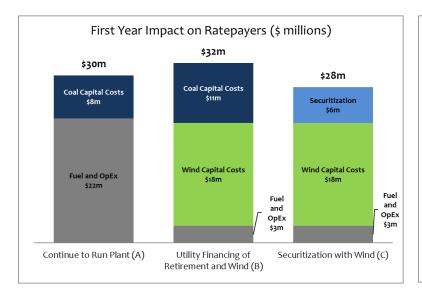


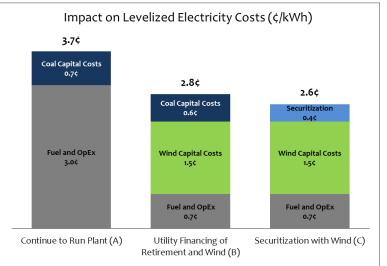
Neal Station 4



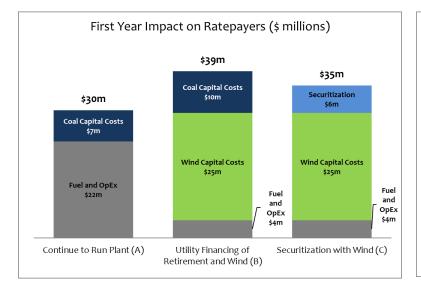


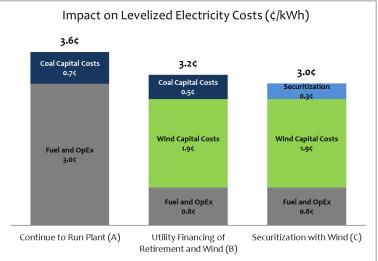




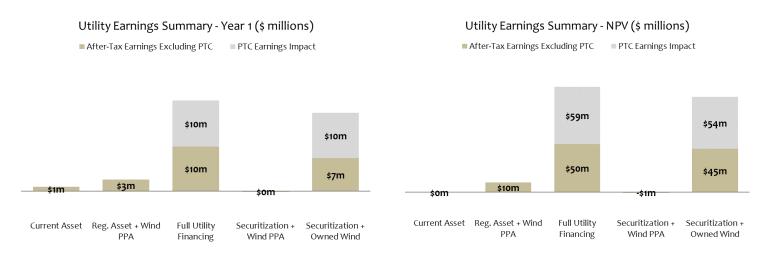


Effect on Revenue Requirement and LCOE – 60% PTC

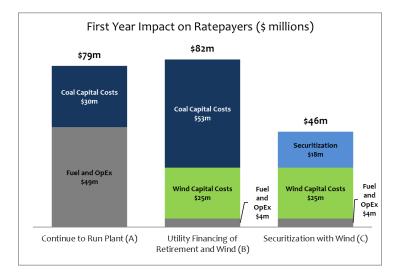




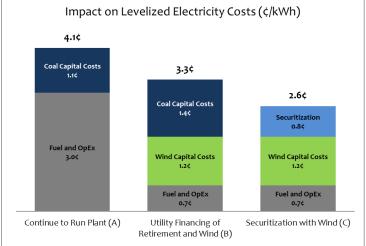
Effect on Utility Earnings – 80% PTC

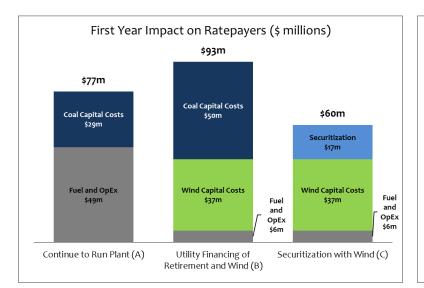


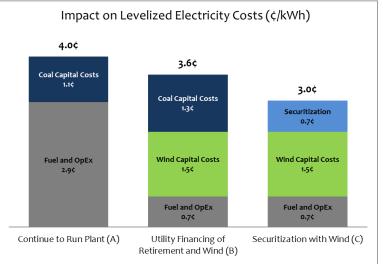
Ottumwa (IPL)



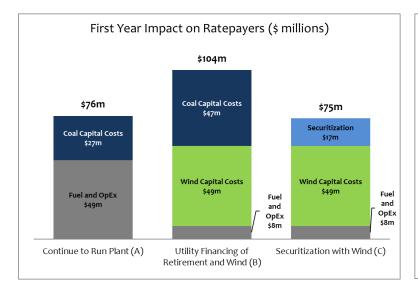




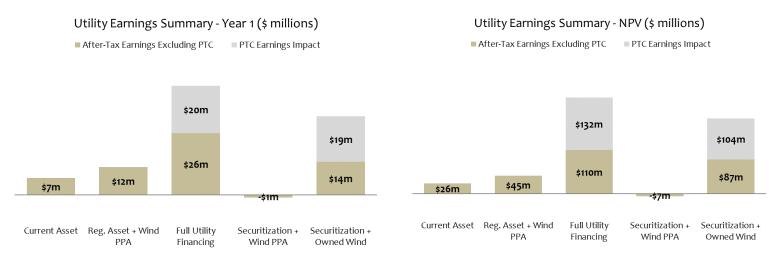




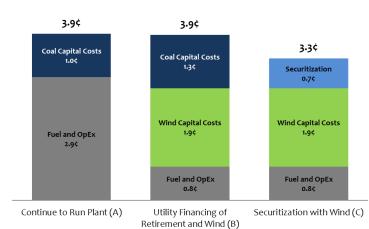
Effect on Revenue Requirement and LCOE – 60% PTC





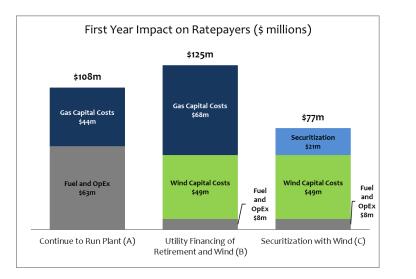


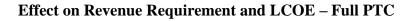
Source: RMI analysis based on 2018 EIA 923; 2018 EIA 860; IPL 2013-2018 FERC Form 1; MISO Market Reports from 2013-2018.

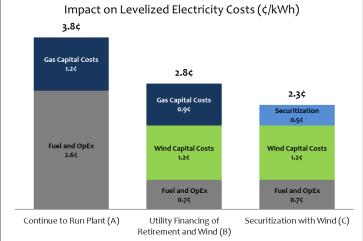


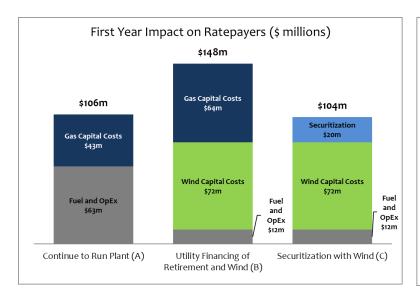
Impact on Levelized Electricity Costs (¢/kWh)

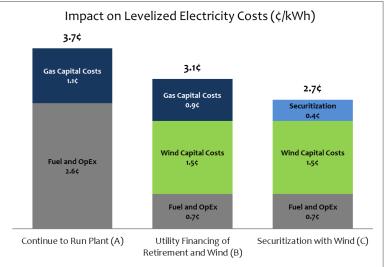
Emery (IPL)



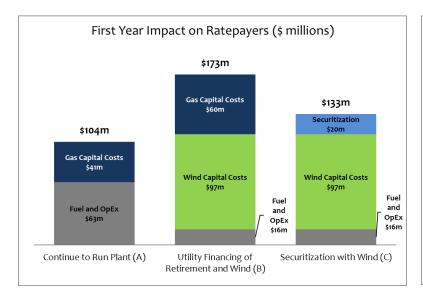


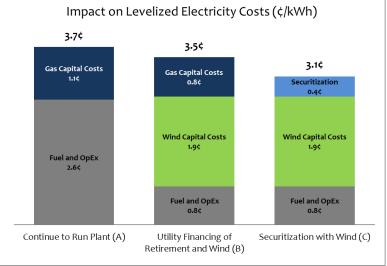




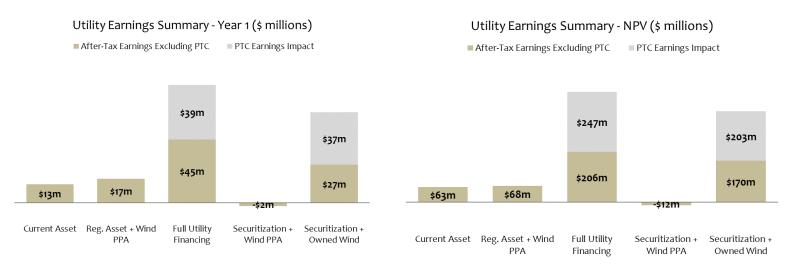


Effect on Revenue Requirement and LCOE – 60% PTC

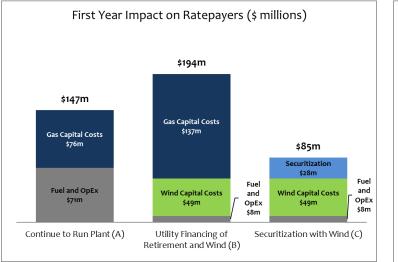


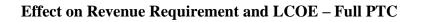


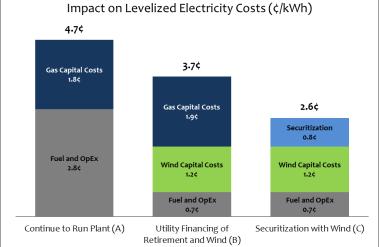
Effect on Utility Earnings - 80% PTC

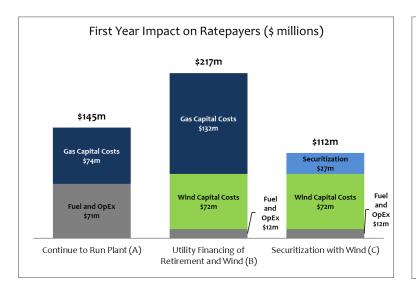


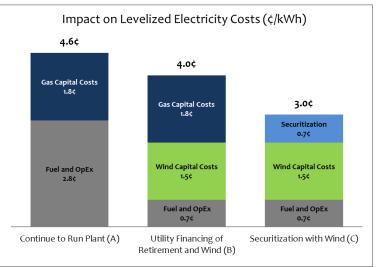
Marshalltown Generating Station











4.4¢

Gas Capital Costs

Wind Capital Costs

1**.**9¢

Fuel and OpEx

0.8¢

Utility Financing of

Retirement and Wind (B)

3.4¢

Securitization

0.7¢

Wind Capital Costs

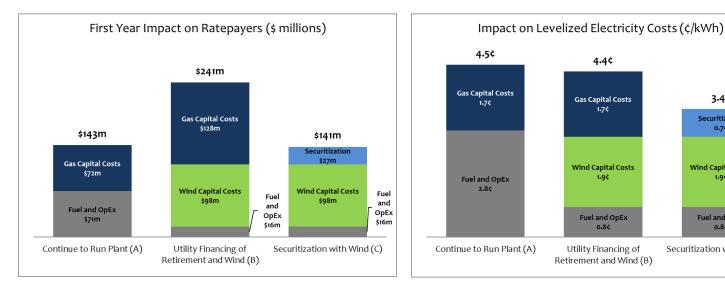
1.9¢

Fuel and OpEx

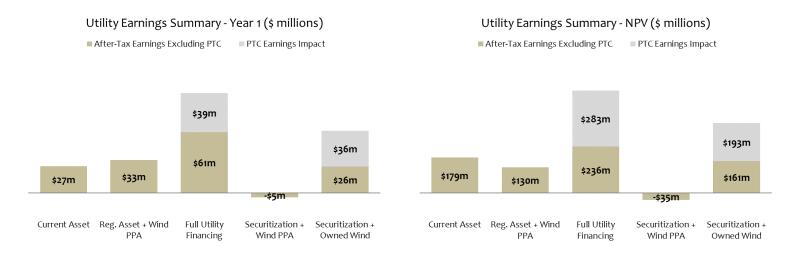
0.8ċ

Securitization with Wind (C)

Effect on Revenue Requirement and LCOE – 60% PTC



Effect on Utility Earnings – 80% PTC



APPENDIX B

Generator Input Assumptions

Burlington Station	Unit Name
Existing Brown Plant Snapshot:	
Plant Type Current Net Plant Balance (\$)	Conventional Steam Coal \$21.003.422
Current Total Retirement Cost (\$)	\$44,802,222
Net Capacity (MW) Assumed Year of Early Retirement	211.95
Current Remaining Life (Yrs)	9
Amortization Period of Regulatory Asset with Early Retirement	10
Capacity Factor (%) Net Generation (MWh)	64.06% 1,189,433
NPV Brown Plant Generation at Utility ROE Discount Rate (MWh)	6,960,253
Operating Costs (\$/MWh) Fuel Portion of Coal MCOE	\$22.63
Fuel Hedge Adder	0%
Securitization and Green Bond Assumptions:	
Securitization and Green Bond Assumptions:	3.10%
Securitization Bond Tenor	9
Green Bond Assumed Interest Rate Green Bond Tenor	3.75%
Share of Securitization Savings For Transition Assistance	15%
Include Transition Assistance in Regulatory Asset Case?	Yes
Calculate Savings Relative to Regulatory Asset Case or BAU Case? Does the green bond affect the utility's allowed ROR?	BAU Case
Is the utility recycling the proceeds from securitization or green bond?	Yes
Is the capital structure of the new facility different from the utility's? If yes, input the new facility's debt ratio here:	No 50.00%
Does the new facility's capital structure impact the utility's allowed ROR?	No
	•
Other Financial Metrics/Ratios: Ratepayer Discount Rate	7.00%
Shareholder Discount Rate	9.60%
Utility's Allowed ROR (%)	7.30%
Utility's Allowed ROR used (accounting for deductability of interest) Plant Allowed ROR used (accounting for deductability of interest)	6.51%
Wind Allowed ROR used (accounting for deductability of interest)	7.19%
Solar Allowed ROR used (accounting for deductability of interest)	6.51%
Equity Ratio (%) Utility's Allowed ROE (%)	9.60%
Existing Plant Allowed ROE (%)	9.60%
Wind Allowed ROE (%) Solar Allowed ROE (%)	9.60%
Assumed Allowed Preferred Equity Ratio	0.00%
Assumed Allowed Return on Preferred Equity (ROPE)	0.00%
Implied Debt Ratio Implied Cost of Debt	51.00%
Cost of Debt (%)	3.75%
Federal Corporate Tax Rate Utility's Blended Tax Rate (%)	21.00% 30.48%
Brown Plant Assumed Starting Book-Tax Disparity	50.00%
Macro Inflation	2.0%
O&M and Fuel Escalator	2.5%
Line of the data of the second s	
Utility-Owned Wind Metrics:	
Wind Services Value as Percentage of Brown Plant Services Value	88%
	88% 1,351,628 47%
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (NWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%)	1,351,628 47% 47%
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Reg'd Reglacement Wind Capacity (MW)	1,351,628
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Reg'd Replacement Wind Capacity (NW) Wind Hant Useful Life (Yrs) Capital Cost of Wind (S/NW)	1,351,628 47% 47% 328
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Regrid Replacement Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capital Cost of Wind (\$/AWH) Transmission Costs (\$/AWH)	1,351,628 47% 328 328 30 \$1,350,000 \$1,350,000
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Req'd Replacement Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capital Cost of Wind (S/MW) Transmission Costs (S/MW) Transmission Costs (S/MW)	1,351,628 47% 47% 328 30 51,350,000 5443,189,146
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity (MW) Wind Capacity Factor (%) Req'd Replacement Wind Capacity (MW) Wind Fant Useful Life (rts) Capital Cost of Wind (S/AWH) Transmission Costs (S/AWH) Total Capital Cost of Ultity-Owned Wind (S) NPV MACRS (%) NPV Wind Generation at Ultity ROE Discount Rate (MWh)	1,351,628 47% 47% 328 30 \$1,350,000 \$443,189,146 0,78 13,179,407
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor (N) Reg'd Reglacement Wind Capacity (NW) Wind Plant Useful Life (Vrs) Capital Cost of Wind (S/NW) Transmission Costs (S/NW) Total Capital Cost of Utility-Owned Wind (S) NVP WACRS (%) NPV Wind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (S)	1,351,628 47% 47% 328 330 51,350,000 543,189,164 0.78 31,179,407 5463,106,15
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity (MW) Wind Capacity Factor (%) Req'd Replacement Wind Capacity (MW) Wind Fant Useful Life (rts) Capital Cost of Wind (S/AWH) Transmission Costs (S/AWH) Total Capital Cost of Ultity-Owned Wind (S) NPV MACRS (%) NPV Wind Generation at Ultity ROE Discount Rate (MWh)	1,351,628 47% 47% 328 30 \$1,350,000 \$443,189,146 0,78 13,179,407
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity (ATOR in the Region (%) Bred Beglacement Wind Capacity (MW) Wind Capacity Factor (%) Capital Cost of Wind (\$/MW) Transmission Costs (\$/MW) Total Capital Cost of Wind (\$) NPV MACKS (%) NPV Wind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (\$) PTC Price (\$/MWh) NPV Value (\$) Impact on RVP Keenoue Required of Capital Costs Net PTC (\$)	1,351,628 47% 47% 328 30 51,550,000 543,189,146 0,78 13,179,407 5486,310,615 523,429,968 5233,429,968 5233,429,968
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor (NW) Wed Value as Percentage (WW) Wind Plant Useful Life (Vrs) Capital Cost of Wind (S/NW) Transmission Costs (S/NW) Total Capital Cost of Utility-Owned Wind (S) NPV MACR5 (%) Impact of Capital Cost on NPV Revenue Required (S) PTC Frice (S/NWh) PTO Frice (S/NWh)	1,351,628 47% 278% 328 30 \$1,350,000 \$443,189,146 0.78 13,179,407 \$445,310,615 543,310,615 \$232,32429,968
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor (%) Reg'd Replacement Wind Capacity (NW) Wind Capacity Factor (%) Exercit Assessment Wind Capacity (NW) Wind Plant Useful Life (trs) Capital Cost of Wind (S/NW) Total Capital Cost of Utility-Owned Wind (5) NPV MACKS (%) NPV Wind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (5) PTC Frite (S/NWh) NPV PTC Value (5) Impact on NPV Revenue Required of Capital Costs Net PTC (5) Wind O&M Expense (S/NWh) Wind OPAM Expense (S/NWh)	1,351,638 47% 47% 328 30 51,350,000 5443,189,146 0,78 13,179,407 \$486,310,615 520,23,289,646 \$232,289,646 \$7,00
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity (NW) Reid Replacement Wind Capacity (NW) Grant Development Wind Capacity (NW) Grant Capacity Factor (%) Assumed Wind Capacity (NW) Capital Cost of Wind (5 MW) Total Capital Cost of Utility-Owned Wind (5) NPV MACES (%) PUT Order Capaticy Capacity Cost on NPV Revenue Required (5) PIC Price (5/MWh) NPV VInd Generation at Utility ROE Discount Rate (MWh) NPV VING Keeneat Required of Capital Costs Net PTC (5) Wind PAA Metrics: Impact on NPV Revenue Required of Capital Costs Net PTC (5) Wind PAA Metrics:	1,351,628 47% 47% 328 30 5,1,550,000 543,189,146 0,78 31,759,07 5436,310,615 5232,880,646 5232,880,646 5232,880,646
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor (%) Reg'd Replacement Wind Capacity (NW) Wind Capacity Factor (%) Exercit Assessment Wind Capacity (NW) Wind Tear Useful Life (trs) Capital Cost of Wind (S/NW) Total Capital Cost of Utility-Owned Wind (5) NPV MACKS (%) NPV Wind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (5) PTC Frite (S/NWh) NPV PTC Value (5) Impact on NPV Revenue Required of Capital Costs Net PTC (5) Wind O&M Experime (S/NWh) Wind OPAM Experime (S/NWh)	1,351,638 47% 47% 328 30 51,350,000 5443,189,146 0,78 13,179,407 \$486,310,615 520,23,289,646 \$232,289,646 \$7,00
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity (MW) Wind Capacity Factor (%) Assumed Wind Capacity (MW) Wind The Capacity Factor (%) Edged Replacement Wind Capacity (MW) Wind The Capacity Factor (%) Edged Replacement Wind Capacity (MW) Transmission Costs (S/MW) Total Capital Cost of Utility-Owned Wind (\$) NPV MACRS (%) PV Vind Generation at Utility ROE Discount Rate (MWh) Impact on NPV Revenue Required of Capital Costs Net PTC (\$) Wind O&M Expense (S/MWh) Wind O&M Expense (S/MWh) Wind OBM Expense (S/MWh) Wind OBM Expense (S/MWh) Wind Generation (MWh) NPV Wind Generation (MWh)	1,351,628 47% 47% 328 30 51,350,000 5443,189,146 5443,189,146 5443,189,146 31,379,407 \$446,310,615 520,31 \$232,288,646 \$232,288,646 \$232,288,646 12,238,402 11,238,402 11,238,402 11,238,402
Wind Service: Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Sassmed Wind Capacity (MW) Mind Capacity Factor in the Region (%) Service Method (%) Reg & Replacement Wind Capacity (MW) Wind Plant Uselu Uife (Yrs) Capital Cost of Utility-Owned Wind (\$) NPV MACDS (\$/MW) Total Capital Cost of Utility-Owned Wind (\$) NPV MACDS (\$) NPV Wind Generation at Utility ROE Discount Rate (MWh) MPV Discours (\$/MWh) Total Capital Costs on NPV Revenue Required (\$) PTC Price (\$/MWh) NPV PTC Value (\$) Impact on NPV Revenue Required of Capital Costs Net PTC (\$) Wind OBA Espense (\$/MWh) Wind PPA Metrics: Impact on NPV Revenue Required of Capital Costs Net PTC (\$) NPV Wind Generation at Utility Shareholder DR (MWh) NPV PTW Uid Generation at Utility Shareholder DR (MWh) Wind PPA Price (\$/MWh)	1,351,628 47% 47% 238 30 \$1,350,000 \$433,189,146 0,78 3,17,99,07 \$445,310,815 \$2,02,31 \$2,22,280,646 \$2,222,280,646 \$2,232,880,646 \$2,232,280,646 \$2,232,280,646 \$2,234,05,245 \$2,234,055 \$2,245 \$2,245 \$2,245,055 \$2,245 \$2,255 \$2,255 \$2,255 \$2,255 \$2,255 \$2,255 \$2,255
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity (MW) Wind Capacity Factor (%) Assumed Wind Capacity (MW) Wind The Capacity Factor (%) Edged Replacement Wind Capacity (MW) Wind The Capacity Factor (%) Edged Replacement Wind Capacity (MW) Transmission Costs (S/MW) Total Capital Cost of Utility-Owned Wind (\$) NPV MACRS (%) PV Vind Generation at Utility ROE Discount Rate (MWh) Impact on NPV Revenue Required of Capital Costs Net PTC (\$) Wind O&M Expense (S/MWh) Wind O&M Expense (S/MWh) Wind OBM Expense (S/MWh) Wind OBM Expense (S/MWh) Wind Generation (MWh) NPV Wind Generation (MWh)	1,351,628 47% 47% 328 30 51,350,000 5443,189,146 5443,189,146 5443,189,146 31,379,407 \$446,310,615 520,31 \$232,288,646 \$232,288,646 \$232,288,646 12,238,402 11,238,402 11,238,402 11,238,402
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Reg (Equation (MWh) Wind Plant Useful Life (Yrs) Capital Cost of Wind (S/MW) Transmission Costs (S/MW) Total Capital Cost of Utility-Owned Wind (S) NPV MACRS (%) NPV Wind Generation at Utility ROE Discount Rate (MWh) NPV PV Wind Generation at Utility ROE Discount Rate (MWh) NPV PV Vind Generation at Utility ROE Discount Rate (MWh) NPV VT Value (S) To Trice (S/MWh) NPV PV Value (S) Impact on NPV Revenue Required of Capital Costs Net PTC (5) Wind O&M Expense (S/MWh) Wind PAA Netrics: Impact on NPV Revenue Required of Capital Costs Net PTC (5) NPV Wind Generation (MWh) NPV PTC (S) NPV Wind Generation (MWh) Wind PPA Assumed WACC Wind PPA Assumed WACC Wind PPA Areid (Yrs) Post-PPA Period O&M Increase	1,351,628 47% 47% 288 300 51,350,000 5443,189,146 0,5443,189,146 0,5443,189,146 13,179,407 5486,310,615 5232,2880,646 5232,2880,646 12,338,402 11,828,465 12,338,402 11,828,405 23,441 9,0% 20
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Req d Replacement Wind Capacity (MW) Mind Plant Used Ulfer (Yns) Capital Cost of Wind (ShMW) Total Capital Cost of Utility-Owned Wind (\$) NPV Mind Generation at Utility ROE Discount Rate (MWh) Inspact of Capital Costs on NPV Revenue Required (\$) PTC Price (ShNWh) Tri Chice (ShNWh) Tri Chice (ShNWh) Tri Chice (ShNWh) MPV ATCS (S) MPV MCRS (S) Wind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (\$) PTC Price (ShNWh) Wind PAR Metrics: Impact on NPV Revenue Required of Capital Costs Net PTC (\$) Wind Generation at Utility Shareholder DR (MWh) NPV Wind Generation at Utility Shareholder DR (MWh) Wind PPA Price (ShNWh) Wind PPA Price (ShNWh) Wind PPA Price (ShWh) Wind PPA Price (ShWh) Wind PPA Price (ShWh)	1,351,628 47% 47% 288 300 51,350,000 5443,189,146 0,5443,189,146 0,5443,189,146 13,179,407 5486,310,615 5232,2880,646 5232,2880,646 12,338,402 11,828,465 12,338,402 11,828,405 12,338,402 11,828,405 23,441 9,0% 20
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Reg d Replacement Wind Capacity (MW) Of Mark Development (MW) Capital Cost of Wind (S/MW) Tradi Capital Cost of Utility-Owned Wind (S) NPV Wind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (S) PTC Price (S/MWh) MV VFC Value (S) Wind GMA Expense (S/MWh) Unipact on VPV Revenue Required of Capital Costs Net PTC (S) Wind GMA Expense (S/MWh) Wind PPA Metrics: Impact on NPV Revenue Required of Capital Costs Net PTC (S) Wind GMA Expense (S/MWh) Wind PPA Assumed VACC Wind PPA Price (S/MWh) Wind PPA Prices Dest-PPA Preiod QMA Increase Utility-Owned Solar Metrics: Beg (& Replacement Solar Capacity (WH) Solar Capital Factor (%)	1,351,628 47% 47% 328 300 \$1,350,000 \$443,189,146 0.78 31,379,407 \$446,310,615 \$232,289,646 \$232,289,646 \$232,289,646 \$232,289,646 12,338,027 \$232,880,646 12,338,027 \$232,880,646 12,338,027 \$232,880,646 12,338,027 \$232,880,646 \$232,289,646 \$234,20 \$200 \$2
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity (MW) Wind Capacity Factor (%) Reg & Beglacement Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capital Cost of Wind (\$/MW) Transmission Costs (\$/MW) Total Capital Cost of Utility-Owned Wind (\$) NPV MACKS (%) NPV Wind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (\$) PTC Trice (\$/MWh) NPV Wind Generation at Utility ROE Discount Rate (MWh) Impact on Capital Costs on NPV Revenue Required (\$) PTC Trice (\$/MWh) Wind PA Metrics: Impact on NPV Revenue Required of Capital Costs Net PTC (\$) NPW Wind Generation at Utility Shareholder DR (MWh) Wind PA Assumed WACC Wind PA Assumed WACC Wind PA Area (tris): Reg d Replacement Solar Capacity (MW) Solar Plant Useful Life (Y%) Solar Plant Useful Life (Y%) Solar Plant Useful Life (Y%)	1,351,628 47% 47% 228 30 51,350,000 5443,189,146 0 5443,189,146 5443,189,146 5486,310,615 5486,310,615 5223,2880,646 5223,2880,646 12,338,402 11,828,465 5232,880,646 12,338,402 11,828,405 12,338,402 11,828,405 12,338,402 11,828,405 12,338,402 14,828,405 14,
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Req & Replacement Wind Capacity (MW) Capital Cost of Wind (S/MW) Transmission Cost S/S/MW) Trail Capital Cost of Utility-Owned Wind (\$) NPV Mind Sent Services (S/MW) Trail Capital Cost of Utility-Owned Wind (\$) NPV Mind Generation at Utility ROE Discount Rate (MWh) NPV Mind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (\$) PTC Price (\$/MWh) NPV PTC Value (\$) Impact on NPV Revenue Required of Capital Costs Net PTC (\$) Wind OBM Experse (\$/MWh) Wind PPA Metrics: Impact on NPV Revenue Required of Capital Costs Net PTC (\$) NPV Wind Generation at Utility Shareholder DR (MWh) NPV Wind Generation at Utility Shareholder DR (MWh) Wind PPA Price (\$/MWh) Wind PPA Price (\$/MWh) Wind PPA Price (\$/MWh) Wind PPA Perced Cost Increase Utility-Owned Solar Metrics: Reg'd Replacement Solar Capacity (MW) Solar Plant Usehol Uffer (Yrs) Capital Cost (\$/MW)	1,351,628 47% 47% 328 300 \$1,350,000 \$443,189,146 0.78 31,379,407 \$446,310,615 \$232,289,646 \$232,289,646 \$232,289,646 \$232,289,646 12,338,027 \$232,880,646 12,338,027 \$232,880,646 12,338,027 \$232,880,646 12,338,027 \$232,880,646 \$232,289,646 \$234,20 \$200 \$2
Wind Service: Value as Perentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Req (1 Replacement Wind Capacity (MW) Gapital Cost of Wind (§/MW) Transmission Costs (§/MW) Total Capital Cost of Utility-Owned Wind (\$) NPV Mind Generation at Utility ROE Discount Rate (MWh) NPV Mind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on PVP Revenue Required (\$) PTC Price (§/MWh) Transit Costs (S/MW) Transit Costs on PVP Revenue Required (S) PTC Price (§/MWh) NPV PTC Value (\$) Impact on NPV Revenue Required of Capital Costs Net PTC (\$) Wind OBM Expense (§/MWh) Wind PPA Review (§/MWh) Wind PPA Price (§/MWh) Wind PPA Price (S/MWh) Wind PPA Price (S/MWh) Solar Plat Useful Ufer(rs) Capital Cost of O&M Increase Ditity-Owned Solar Metrics: Reg (d Replacement Solar Capital Costs (S/MW) Solar Plat Useful Ufer(rs) Capital Cost of U(IVP) Solar Plat Useful Ufer(rs) Capital Cost of Capital (Solar (§/S) Solar Plat Useful Ufer(rs) Capital Cost of Capital Costs (S/MW) Transmission Costs (§/MW)	1,351,628 47% 47% 228 30 51,350,000 5443,189,146 0,78 13,179,407 5465,106,15 5223,2880,646 5232,2880,646 12,338,402 11,828,465 5232,880,646 12,338,402 11,828,465 5232,880,646 12,338,402 11,828,455 5232,880,646 12,338,402 11,828,455 5232,880,646 12,338,402 11,828,455 5232,880,646 12,338,402 11,828,455 5232,880,646 12,338,402 11,828,455 5232,880,646 12,338,402 11,828,455 5232,880,646 12,338,402 13,84,002 5232,880,646 13,338,402 14,828,455 14,858,455 14,858,455 14,858,455 14,858,455 14,858,4558 14,858,4558 14,858,4558 14,858,4588 14,858,4588 14,8588,45888 14,8588,45888 14,858888 14,8588888 14,858
Wind Service: Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Req & Replacement Wind Capacity (NW) Wind Papati Used Life (Yrs) Capital Cost of Wind (\$/MW) Transmission Costs (\$/MWh) NPV Wind Generation at Utility ROE Discount Rate (MWh) Impact on RVP Revenue Required (\$) PT Critics (\$/MWh) NPV PT Value (\$) Impact on RVP Revenue Required of Capital Costs Net PTC (\$) Wind O&M Expense (\$/MWh) Wind PPA Metrics: Impact on RVP Revenue Required of Capital Costs Net PTC (\$) NPV Wind Generation at Utility Shareholder DR (MWh) NY MTC Value (\$/MWh) Wind PPA Price (\$/MWh) Wind PPA Price (\$/MWh) Wind PPA Price (\$/MWh) Wind PPA Price (\$/MWh) Solar Capacity Factor (%) Solar Plant Used Metrics: Reg d' Replacement Solar Capacity (MW) Solar Capacity Factor (%) Solar Plant Used (Iffer) Capital Cost (\$/MWH)	1,351,628 47% 47% 228 30 51,350,000 5443,189,146 0 5443,189,146 0 5486,310,615 5486,310,615 5223,2880,646 5232,2880,646 12,338,402 11,828,405 5232,880,646 12,338,402 11,828,405 12,338,402 11,828,405 12,338,402 11,828,405 12,338,402 14,828,405 12,338,402 14,828,405 14
Wind Service: Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Req (Legalacty Factor in the Region (%) Service Market Urile (Yrs) Capital Cost of Wind (5/MW) Transmission Costs (5/MW) Transmission Costs (5/MW) Transmission Costs (5/MW) Transmission Costs (5/MW) Transmission Costs (7/MWh) NPV Wind Generation at Utility ROE Discount Rate (MWh) MPV And Capital Costs on NPV Revenue Required (5) PT Crice (5/MWh) NPV PC Value (5) Impact on NPV Revenue Required of Capital Costs Net PTC (5) Wind OBM Expense (5/WWh) Wind PPA Metrics: Impact on NPV Revenue Required of Capital Costs Net PTC (5) NPV Wind Generation at Utility Shareholder DR (MWh) NW PPA Metrics: Impact on NPV Revenue Required of Capital Costs Net PTC (5) NPV Wind Generation at Utility Shareholder DR (MWh) Wind PPA Serice (5/MWh) Wind PPA Price (5/MWh) Wind PPA Price (5/MWh) Solar Capacity Factor (%) Solar Opacity Factor (%) Solar Opacity Factor (%) Solar Opacity Factor (%) Solar Capacity Factor (%) Solar Opacity Factor (%) Solar Capacity Factor (%) Solar Capacity Factor (%) NPV Solar Generation at Utility Rote Discount Rate (MWh) NPV Solar Generation at Utility Rote Discount Rate (MWh) NPV Solar Capacity Factor (%) Solar Opacity Factor (%) NPV Solar Generation at Utility Rote Discount Rate (MWh) NPV Solar Generation at Utility Rote Discount Rate (MWh) NPV Solar Generation at Utility Rote Discount Rate (MWh) NPV Solar Opacity Factor (%) Solar Opacity Factor (%) Solar Obacity (S/MW)	1,351,638 47% 47% 238 30 51,350,000 5443,189,146 0,543,189,146 0,543,189,146 13,179,407 5486,310,615 520,31 5253,429,968 5222,880,646 5222,880,646 5223,880,646 12,338,402 11,828,465 523,415,415 523,41
Wind Service: Value as Perentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity (MW) Reg (1 Replacement Wind Capacity (MW) Capital Cost of Wind (§/MW) Transmission Costs (§/MW) Transfer (§) NPV Mind Generation at Utility ROE Discount Rate (MWh) NPV Mind Generation at Utility ROE Discount Rate (MWh) NPV Mind Generation at Utility ROE Discount Rate (MWh) NPV PTC Value (§) NPV PTC Value (§) NPV PTC Value (§) Mind OBM Expense (§/MWH) Transfer (§ MWH) Mind Generation at Utility Shareholder DR (MWh) NPV PTC Value (§) NPV Wind Generation at Utility Shareholder DR (MWh) NPV Wind Generation (MWh) NPV Wind Generation at Utility Shareholder DR (MWh) Nimd PAP Arice (§/MWh) Wind PAP Arice (§/MWh) Wind PAP Arice (S/MWh) Wind PAP Arice (S/MWH) Wind PAP Arice (S/MWH) Solar Plat Useful (Frs) Solar Plat Useful (Frs) Solar Plat Useful (Frs) Solar Plat Useful (Frs) Capital Cost of Solar (S/S) Solar Solar (S) Solar (Spacity Factor (%) Solar Solar (S) Solar (Spacity Solar (S) NPV Solar Generation at Utility ROE Discount Rate (MWh) NPT Solar (Spacity (MW) Solar Solar (S) NPV Solar (Spacity (MW) Solar Solar (S) NPV Solar Generation at Utility ROE Discount Rate (MWh) NPV Solar Generation at Utility ROE Discount Rate (MWh) NPC Solar Generation at Utility ROE Discount Rate (MWh)	1,351,628 47% 47% 47% 288 30 \$1,350,000 \$443,189,146 0,78 13,179,407 \$463,106,15 \$223,2880,646 \$232,2880,646 \$232,880,646 \$1,33,402 \$1,88,402 \$232,880,646 \$1,33,402 \$1,88,402 \$232,880,646 \$1,33,8402 \$1,88,402 \$232,880,646 \$1,33,8402 \$1,88,402 \$232,880,646 \$1,338,402 \$1,88,402 \$233,41 \$233,41 \$233,41 \$233,41 \$233,41 \$233,41 \$233,41 \$233,41 \$243,51 \$253,421,518 \$1,597,878 \$30,66
Wind Service: Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Req (Legalacty Factor in the Region (%) Service Market Urile (Yrs) Capital Cost of Wind (5/MW) Transmission Casts (5/MW) Transmission Casts (5/MW) Transmission Casts (5/MW) Transmission Casts (5/MW) Transmission Casts (7/MWh) NPV Wind Generation at Utility ROE Discount Rate (MWh) MPV And Capital Cost on NPV Revenue Required (5) PT Crice (5/MWh) NPV FV Value (5) Impact on NPV Revenue Required of Capital Costs Net PTC (5) Wind OBM Expense (5/WWh) Wind PPA Metrics: Impact on NPV Revenue Required of Capital Costs Net PTC (5) NPV Wind Generation at Utility Shareholder DR (MWh) NW PPA Metrics: Impact on NPV Revenue Required of Capital Costs Net PTC (5) NPV Wind Generation at Utility Shareholder DR (MWh) Wind PPA Serice (5/MWh) Wind PPA Price (5/MWh) Wind PPA Price (5/MWh) Solar Capacity Factor (%) Solar Opacity Factor (%) Solar Opacity Factor (%) Solar Opacity Factor (%) Solar Capacity Factor (%) Solar Opacity Factor (%) Solar Capacity Factor (%) Solar Capacity Factor (%) NPV Solar Generation at Utility Rote Discount Rate (MWh) NPV Solar Generation at Utility Rote Discount Rate (MWh) NPV Solar Generation at Utility Rote Discount Rate (MWh) NPV Solar Capacity Factor (%) Solar Opacity Factor (%) Solar Opacity Factor (%) Solar Opacity Factor (%) Solar Opacity Factor (%) NPV Solar Generation at Utility Rote Discount Rate (MWh) NPV Solar Generation At Utility Rote Discount Rate (MWh)	1,351,638 47% 47% 47% 328 30 51,350,000 5443,189,146 0.78 13,179,407 5463,00,615 5223,2880,646 5232,2880,646 12,338,402 14,828,465 5232,880,646 12,338,402 14,828,465 523,280,646 12,338,402 14,828,465 523,280,646 12,338,402 14,828,465 523,280,646 12,338,402 14,828,465 523,41,908 200 100% 485 28% 300 51,100,000 533,421,518 11,597,878 30% 53,320 100%
Wind Service: Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Req & Replacement Wind Capacity (MW) Wind Capacity Factor (%) Capital Cost of Wind (5/MW) Total Capital Cost of Utility-Owned Wind (5) NPV MACS (%) NPV Wind Generation at Utility ROE Discount Rate (MWh) MPV VIC Value (5) Impact on NPV Revenue Required of Capital Costs Net PTC (5) Wind QBM Expense (5/MWh) Wind PPA Metrics: MPV Wind Generation at Utility Shareholder DR (MWh) Wind PPA Price (5/MWh) Wind PPA Price (5/MWh) Wind PPA Price (5/MWh) Solar Pharto Rotor (%) Solar Ota of Utility-Owned Solar (5) Solar Ota of Utility-Owned Solar (5) NPV Solar Generation at Utility RoE Discount Rate (MWh) MPI Solar Generation At Utility ROE Discount Rate (MWh) Mind PPA Pericel (5/MWh) Solar Date Solar Metrics: Beg'd Beglacement Solar Capacity (MW) Solar Capacity (5/MW) Total Cost of Utility-Owned Solar (5) NPV Solar Generation at Utility ROE Discount Rate (MWh) MPC Solar OPA Price (5/MWh) Total Cost of Cost (5/MWh) Total Cost of Cost (5/MWh) Total Cost of Solar (5/MWh) Post-PPA Period O&M Increase Solar PPA Netice (5/MWh)	1,351,628 47% 47% 47% 47% 47% 47% 47% 47%
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Reg & Beglacement Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capital Cost of Wind (\$/MW) Transmission Costs (\$/MW) Total Capital Cost of Utility-Owned Wind (\$) NPV Wind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (\$) PT C Trice (\$/MWh) NPV PT Value (\$) Impact on NPV Revenue Required of Capital Costs Net PTC (\$) Wind O&M Expense (\$/MWh) NPV PTC Value (\$) Impact on NPV Revenue Required of Capital Costs Net PTC (\$) Wind O&M Expense (\$/MWh) NPV Wind Generation (MWh) NPV PTC Value (\$) Impact on NPV Revenue Required of Capital Costs Net PTC (\$) Wind O&M Expense (\$/MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) Solar Capacity Factor (%) Solar PA Assumed WACC Wind PPA Areice (\$/MWh) Solar Capacity Factor (%) Solar Plant Useful Life (Yrs) Capatal Cost of Utility-Owned Solar (\$) NPV Solar Generation at Utility RDE Discount Rate (MWh) NPV Solar Generation at Utility RDE Discount Rate (MWh) NPS Solar Generation at Utility RDE Discount Rate (MWh) NPV Solar Generation at Utility RDE Discount Rate (MWh) NPV Solar Generation at Utility RDE Discount Rate (MWh) NPV Solar Generation at Utility RDE Discount Rate (MWh) NPS Solar Dent Usefur Rate (\$/MWh) NPV Solar Generation at Utility RDE Discount Rate (MWh) NPV Solar Generation at Utility RDE Discount Rate (MWh) NPV Solar Generation at Utility RDE Discount Rate (MWh) NPV Solar Camata Rate (\$/MWh) NPV Solar Generation (\$/MWh) NPV Solar Generation (\$/MWh)	1,351,638 47% 47% 228 30 51,350,000 5443,189,146 0,78 11,179,407 5465,106,15 5222,2880,646 5222,2880,646 5222,2880,646 12,338,402 14,828,405 5223,2880,646 12,338,402 14,828,405 5232,880,646 12,338,402 14,828,405 5232,880,646 12,338,402 14,528,80 5232,880,646 12,338,402 14,528,80 5232,880,646 12,338,402 14,528,80 5232,880,646 12,338,402 11,529,878 30 53,320 10,597,878 30 53,320 10,597,878 30 53,320 10,597,878 30 53,320 10,597,878 30 53,320 10,597,878 30 53,320 10,597,878 30 53,320 10,597,878 30 53,320 10,597,878 30 53,320 10,597,878 30,597 10,597,878 30,597 10,597,878 30,597 10,597,878 30,597 10,597,878 30,597 10,597,878 30,597 10,597,878 30,597 10,597,878 30,597 10,597,878 30,597 10,597,878 30,597 30,5
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Req & Beglacement Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capital Cost of Wind (\$/MW) Transmission Costs (\$/MW) Total Capital Cost of Utility-Owned Wind (\$) NPV Wind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (\$) PT C Trice (\$/MWh) NPV PT Value (\$) Impact on NPV Revenue Required of Capital Costs Net PTC (\$) Wind O&M Expense (\$/MWh) NPV PTC Value (\$) Impact on NPV Revenue Required of Capital Costs Net PTC (\$) Wind O&M Expense (\$/MWh) NPV Wind Generation (MWh) NPV PTC Value (\$) Impact on NPV Revenue Required of Capital Costs Net PTC (\$) Wind O&M Expense (\$/MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) NPV PA Assumed WACC Wind PPA Areice (\$/MWh) Solar Capacity Factor (%) Solar PA Revinde Solar Metrics: Reg (A Replacement Solar Capacity (MW) Solar Capacity Factor (%) Solar Plant Linet Solar (\$/MWh) Tratal Cost of Utility-Owned Solar (\$) NPV Solar Generation at Utility Rote Discount Rate (MWh) NPC Solar Generation at Utility Rote Discount Rate (MWh) Trot Cost of Utility-Owned Solar (\$) NPS Solar Sense (\$/MWH) Trot Cost of Utility-Owned Solar (\$) NPY Solar Generation at Utility Rote Discount Rate (MWh) Trot Solar Generation at Utility Shareholder DR (MWh) NPY Solar Generation at Utility Shareholder DR (MWh) NPY Solar Generation	1,351,628 47% 47% 47% 47% 47% 47% 47% 47%
Wind Service: Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Req & Replacement Wind Capacity (MW) Wind Plant Uselu Ulife (Yrs) Capital Cost of Wind (5/MW) Total Capital Cost of Utility-Owned Wind (5) NPV MACBS (%) NPV MACBS (%) NPV Wind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (5) PT Chrie (5/MWh) NPV Prive Revenue Required of Capital Costs Net PTC (5) Wind ORAL Expense (5) NPV Wind Generation at Utility Shareholder DR (MWh) Wind PPA Netrics: Impact on NPV Revenue Required of Capital Costs Net PTC (5) NPV Wind Generation at Utility Shareholder DR (MWh) Wind PPA Price (5) Mind ORAL Expense (5) Solar PA Pricel Capital Capating (WM) Solar Expense (5) Solar PLA Pricel (5) NPV Side Generation at Utility Shareholder DR (MWh) NPT APA Pricel Shar Metrics: Degla Englacement Solar Capacity (NW) Solar Capatity Factor (8) Solar Ota of Utility-Owned Solar (5) NPV Solar Generation at Utility Rob Discount Rate (MWh) NPT Solar Generation at Utility Rob Discount Rate (MWh) TC Solar Ota Expense (5/MWh) TC Solar Ota Expense (5/MWh) NPV Solar Generation at Utility Shareholder DR (MWh) NPV Solar Generation At Utility Shareholder DR (MWh)	1,351,628 47% 47% 47% 47% 47% 47% 47% 47%
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Req & Replacement Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capital Cost of Wind (S/MW) Transmission Costs (S/MW) Transmission Costs (S/MW) Trata Capital Cost of Utility-Owned Wind (S) NPV MACKS (%) NPV Wind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (S) PT Critics (S/MWh) NV PVC Value (S) Impact on NPV Revenue Required of Capital Costs Net PTC (S) Wind O&M Expense (S/MWh) NPV PTC Value (S) Impact on NPV Revenue Required of Capital Costs Net PTC (S) Wind O&M Expense (S/MWh) NPV PTC Value (S) Impact on NPV Revenue Required of Capital Costs Net PTC (S) NPV Wind Generation at Utility Sareholder DR (MWh) Nind PPA Metrics: Impact on NPV Revenue Required of Capital Costs Net PTC (S) NPV Wind Generation (TMH) Nind PPA Assumed WACC Wind PPA Assumed WACC Wind PPA Revenue Solar Capacity (MW) Solar Capacity Factor (%) Solar Plant Losts (S/MW) Total Cost of Utility-Owned Solar (S) NPV Solar Generation at Utility Robe Discount Rate (MWh) NPV Solar Generation at Utility Robe Discount Rate (MWh) NPV Solar Costs (S/MW) Total Cost of Solar (S/MWH) Total Cost of Utility-Owned Solar (S) NPV Solar Generation at Utility Robe Discount Rate (MWh) Post-PPA Period O&M Increase Solar PPA Metrics: Solar PPA Metrics:	1,351,628 47% 47% 47% 328 30 51,350,000 5443,389,146 0.78 13,179,407 5445,316,315 523,280,646 523,280,646 12,338,402 11,238,402 11,238,402 11,238,402 11,238,402 100% 20 100% 5533,421,518 5533,421,518 11,597,878 30% 51,100,000 5533,421,518 100% 51,100,000 533,421,159,7878 30% 51,100,000 533,421,100% 100% 533,421,100,0870 100% 533,421,100,0870 10,008,70 11,2,600,870 11,0,000,870 10,009,700
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Req & Replacement Wind Capacity (MW) Wind Plant Used Life (Yrs) Capital Cost of Wind (\$/MWH) Transmission Costs (\$/MW) Transmission Costs (\$/MWH) Total Capital Cost of Utility-Owned Wind (\$) NPV MACKS (%) NPV Wind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (\$) PT Critics (\$/MWhh) NPV PT Value (\$) Impact on NPV Revenue Required of Capital Costs Net PTC (\$) Wind O&M Expense (\$/MWh) NPV PTC Value (\$) Impact on NPV Revenue Required of Capital Costs Net PTC (\$) Wind O&M Expense (\$/MWh) NPV PTC Value (\$) Impact on NPV Revenue Required of Capital Costs Net PTC (\$) NPV Wind Generation at Utility Sareholder DR (MWh) Nim PPA Price (\$/MWh) Wind PPA Price (\$/MWh) Wind PPA Price (\$/MWh) Solar Capacity Factor (%) Solar Opacity Factor (%) Solar Plant User Solar Metrics: Reg'd Replacement Solar Capacity (MW) Solar Capacity Factor (%) Solar Capacity Factor (%) Solar Opacity Factor (%) Solar Capacity Factor (%) Solar Opacity (S/MWh) NPV Solar Generation at Utility Rote Discount Rate (MWh) NPV Solar Generation at Utility Shareholder DR (MWh) NPV Solar Generation	1,351,628 47% 47% 47% 328 30 51,350,000 5443,389,146 0.78 13,179,407 5445,316,315 523,280,646 523,280,646 12,338,402 11,238,402 11,238,402 11,238,402 11,238,402 100% 20 100% 5533,421,518 5533,421,518 11,597,878 30% 51,100,000 5533,421,518 100% 51,100,000 533,421,159,7878 30% 51,100,000 533,421,100% 100% 533,421,100,0870 100% 533,421,100,0870 10,008,70 11,2,600,870 11,0,000,870 10,009,700
Wind Service: Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Reg & Replacement Wind Capacity (MW) Sind Plant Used Ulfer (Ys) Capital Cost of Wind (5/MW) Total Capital Cost of Utility-Owned Wind (5) NPV Mind Generation at Utility ROE Discount Rate (MWh) MPV Wind Generation at Utility ROE Discount Rate (MWh) MPV PM Capital Costs on NPV Revenue Required (5) PTC hries (5/MWh) MPV MPN Capital Costs on NPV Revenue Required (5) MPV Wind Generation at Utility Shareholder DR (MWh) MPV PM Revenue Required of Capital Costs Net PTC (5) MPV Wind Generation at Utility Shareholder DR (MWh) Wind PPA Astice (5/MWh) Wind PPA Price (5/MWh) Wind PPA Price (5/MWh) Solar Plant Useful Ulfer (Ys) Capital Cost of Solar Metrics: Reg & Replacement Solar Capacity (MW) Solar Apacity Fator (%) Solar Plant Useful Ulfer (Ys) Capital Cost of Solar (5) NPV Solar Generation at Utility Shareholder DR (MWh) Trammission Costs (5/MW) Total Cost of Ulfity-Owned Solar (5) NPV Solar Generation at Utility Shareholder DR MPD Solar Generation at Utility Shareholder DR MPD Solar Generation at Utility Shareholder DR MPD Solar Generation at Utility Shareholder DR MPT Solar Generation at Utility Shareholder DR (MWh) NPV Solar Generation at Utility Shareholder DR (MWh) NPV Solar Generation at Utility Shareholder DR (MWh) Solar PAP A Reid (Ys) Solar PAP A Assumed WACC Solar PAP A Metrics: Assumed Cost Of Debt Assumed Cost Of Debt	1,351,628 47% 47% 47% 47% 47% 47% 47% 328 300 51,350,000 5443,189,146 0.78 13,179,407 5463,106,15 523,22,880,646 12,338,402 5232,280,646 11,323,462 523,280,646 12,338,402 11,323,462 523,242,968 12,338,402 11,323,462 233,412 300 11,024,455 523,411 100% 100% 100% 100% 100% 533,421,518 30% 533,421,518 11,597,878 30% 533,521,518 12,600,870 10,409,949 20 10,409,949 20 20 <t< td=""></t<>
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity (NW) Wind Capacity Factor (%) Saymed Wind Capacity (NW) United Capacity Factor (%) Capital Cost of Wind (\$/MW) Capital Cost of Wind (\$/MW) Taramission Costs (\$/MW) Total Capital Cost of Utility-Owned Wind (\$) NPV MacKS (%) PUP Vind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (\$) PTC Price (\$/MWh) NPV Wind Generation at Utility ROE Discount Rate (MWh) Impact on NPV Revenue Required of Capital Costs Net PTC (\$) Wind PA Metrics: Impact on NPV Revenue Required of Capital Costs Net PTC (\$) NPV Wind Generation At Utility Shareholder DR (MWh) Wind PA Precein (\$/MWh) Solar PA Precein (\$/MWh) Solar PA Precein (\$/MWh) Diar Cost of Utility-Own	1,351,628 47% 47% 47% 328 30 51,350,000 5443,351,46 13,179,46 30 5232,880,646 5232,880,646 11,238,402 11,238,402 11,238,402 11,238,402 11,238,402 11,238,402 11,238,402 11,238,402 11,828,465 523,341 9,0% 511,00,000 5533,421,518 11,597,878 11,007 533,421,518 11,00,007 12,000,870 12,000,870 12,000,870 200 533,451,518 12,000,870 12,000,870 200 200 200 200 533,451,518 533,451,518 533,451,518 512,600,870 200 <
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity (NW) Wind Capacity Factor (%) Sasumed Wind Capacity (NW) Wind Capacity Factor (%) Capital Cost of Wind (\$/MW) Taramission Costs (\$/MW) Total Capital Cost of Utility-Owned Wind (\$) NPV MacKS (%) PV Wind Generation at Utility ROE Discount Rate (MWh) Impact on RVP Keenue Required of Capital Costs Net PTC (\$) Wind PAM Netrols Impact on RVP Keenue Required of Capital Costs Net PTC (\$) Wind OBM Expense (\$/MWh) Wind PA Metrics: Impact on RVP Keenue Required of Capital Costs Net PTC (\$) NPV Wind Generation At Utility Shareholder DR (MWh) Wind PA PA incel (\$/MWh) Wind PA PA extentos: Red Replacement Solar Capacity (MW) Solar Plant Used Metros: Red Replacement Solar Capacity (MW) Solar Plant Used Solar Metrics: Red Replacement Solar Capacity (MW) Solar Plant Used Metrics: Solar Plant Used Metrics: Solar Plant Used Metrics: Solar Plant Uset (\$/MWh) PV Solar	1,351,628 47% 47% 47% 328 30 51,350,000 5443,351,46 13,179,46 30 5232,880,646 5232,880,646 12,338,402 11,238,402 11,238,402 11,238,402 11,238,402 11,238,402 11,238,402 11,238,402 11,238,402 11,238,402 11,828,465 233,41 9,004 30 10005 5533,421,518 11,597,878 31,100,000 533,421,518 11,0000 533,421,518 11,007,000 533,421,518 11,007,000 533,421,518 12,600,870 12,600,870 12,600,870 200 5,09% 5,09% 5,09% 5,09%
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity (NW) Wind Plant Uselu Life (Yrs) Capital Cost of Wind (5/MW) Trata Capital Cost of Utility-Owned Wind (5) NPV Mind Seneration at Utility ROE Discount Rate (MWh) Ming Plant Usel Life (Yrs) Capital Cost of Utility-Owned Wind (5) NPV Mind Seneration at Utility ROE Discount Rate (MWh) Ming Plant Usel (5) NPV Wind Generation at Utility ROE Discount Rate (MWh) Ming Plant Usel (5) NPV Wind Generation at Utility ROE Discount Rate (MWh) Ming Plant Assumed Wind (5) NPV Wind Generation at Utility ROE Discount Rate (MWh) Ming Plant (5) Ming Plant Sense (5/MWh) Wind PPA Metrics: Impact on NPV Revenue Required of Capital Costs Net PTC (5) NPV Wind Generation (MWh) NPV PM Revenue Required of Capital Costs Net PTC (5) NPV Wind Generation at Utility Shareholder DR (MWh) Wind PPA Assumed WACC Wind PPA Price (5/MWh) Wind PPA Price (5/MWh) Solar Plant Useful Life (Yrs) Capital Cost of Solar Metrics: Reg d Replacement Solar Capacity (MW) Solar Capital Costs (5/MW) Transmission Costs (5/MW) Transmission Costs (5/MWh) Post-PPA Period O&M Increase Solar Capacity Factor (%) Solar Solar (5/MWh) NPV Solar Generation at Utility Shareholder DR (MWh) NPV Solar Generation at Utility Shareholder DR NPV Solar Generation Solar (5) NPV Solar Generation (WhN) NPV Solar Generation at Utility Shareholder DR NPV Solar Generation at Utility Shareholder DR Net Hatte-Indexed Solar PPA Assumed WACC	1,351,628 47% 47% 47% 47% 47% 30 51,350,000 51,350,000 5443,189,146 0.78 13,179,407 5463,01615 5232,2880,646 12,338,402 11,828,465 5232,880,646 12,338,402 11,828,465 12,338,402 11,828,465 12,338,402 11,828,465 12,338,402 11,828,465 12,338,402 11,828,465 12,300,400 533,421,518 3300 51,100,000 533,421,518 330% 533,421,518 30% 533,421,518 30% 533,421,518 30% 533,421,518 30% 533,421,518 30% 533,421,518 30% <
Wind Service: Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Required Generation (MWN) Service Market Value (%) Capital Cost of Quark (%) Capital Cost of Quark (%) Capital Cost of Vinity (SMW) Transmission Cost (S/MW) Transmission Cost (S/MW) Thy Vinit Generation at Utility ROE Discount Rate (MWh) MVP VTC Value (S) Impact on NVP Revenue Required of Capital Costs Net PTC (S) Wind OBM Expense (S/MWh) Wind PPA Metrics: Impact on NVP Revenue Required of Capital Costs Net PTC (S) NPV Wind Generation at Utility Shareholder DR (MWh) Wind PPA Astrics: Impact on NVP Revenue Required of Capital Costs Net PTC (S) NPV Wind Generation at Utility Shareholder DR (MWh) Wind PPA Price (S/MWh) Wind PPA Price (S/MWh) Solar Capacity Factor (%) Solar Plant Used Metrics: Regid Replacement Solar Capacity (MW) Solar Capacity Factor (%) Solar Plant Used Utility Cost Solar (S) NPV Solar Generation at Utility Robe Discount Rate (MWh) NPV Solar Generation at Utility Robe Discount Rate (MWh) Solar PPA Period Solar PPA Per	1,351,628 47% 47% 47% 328 30 51,350,000 5443,351,46 13,179,46 30 5232,880,646 5232,880,646 12,338,402 11,238,402 11,238,402 11,238,402 11,238,402 11,238,402 11,238,402 11,238,402 11,238,402 11,238,402 11,828,465 233,41 9,004 30 10005 5533,421,518 11,597,878 31,100,000 533,421,518 11,0000 533,421,518 11,007,000 533,421,518 11,007,000 533,421,518 12,600,870 12,600,870 12,600,870 200 5,09% 5,09% 5,09% 5,09%

Lansing Unit 4	
	Unit Name
Existing Brown Plant Snapshot:	
Plant Type Current Net Plant Balance (\$)	Conventional Steam Coal \$237,787,822
Current Total Retirement Cost (\$)	\$237,787,822 \$325,549,672
Net Capacity (MW)	274.50
Assumed Year of Early Retirement Current Remaining Life (Yrs)	2021
Amortization Period of Regulatory Asset with Early Retirement Capacity Factor (%)	10
Capacity Factor (%) Net Generation (MWh)	36.73%
NPV Brown Plant Generation at Utility ROE Discount Rate (MWh)	7,857,486
Operating Costs (\$/MWh)	\$37.26
Fuel Portion of Coal MCOE Fuel Hedge Adder	75%
	0.0
Securitization and Green Bond Assumptions:	3.10%
Securitization Assumed Interest Rate Securitization Bond Tenor	3.10%
Green Bond Assumed Interest Rate	3.75%
Green Bond Tenor Share of Securitization Savings For Transition Assistance	21
Include Transition Assistance in Regulatory Asset Case?	Yes
Calculate Savings Relative to Regulatory Asset Case or BAU Case? Does the green bond affect the utility's allowed ROR?	BAU Case
Does the green bond affect the utility's allowed ROR? Is the utility recycling the proceeds from securitization or green bond?	No Yes
Is the capital structure of the new facility different from the utility's?	No
If yes, input the new facility's debt ratio here:	50.00%
Does the new facility's capital structure impact the utility's allowed ROR?	No
Other Financial Metrics/Ratios:	
Ratepayer Discount Rate	7.00% 9.60%
Shareholder Discount Rate Utility's Allowed ROR (%)	7.30%
Utility's Allowed ROR used (accounting for deductability of interest)	6.51%
Plant Allowed ROR used (accounting for deductability of interest) Wind Allowed ROR used (accounting for deductability of interest)	6.51%
Solar Allowed ROR used (accounting for deductability of interest)	6.51%
Equity Ratio (%) Utility's Allowed ROE (%)	49.00%
Utility's Allowed ROE (%) Existing Plant Allowed ROE (%)	9.60%
Wind Allowed ROE (%)	11.00%
Solar Allowed ROE (%) Assumed Allowed Preferred Equity Ratio	9.60%
Assumed Allowed Preferred Equity Ratio Assumed Allowed Return on Preferred Equity (ROPE)	0.00%
Implied Debt Ratio	51.00%
Implied Cost of Debt Cost of Debt (%)	3.75%
Federal Corporate Tax Rate	21.00%
Utility's Blended Tax Rate (%) Brown Plant Assumed Starting Book-Tax Disparity	30.48% 50.00%
Macro Inflation	2.0%
O&M and Fuel Escalator	2.5%
Utility-Owned Wind Metrics:	
Wind Services Value as Percentage of Brown Plant Services Value	77%
Required Generation (MWh)	1,146,944
Required Generation (MWh) Wind Capacity Factor (%)	
Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Reg'd Replacement Wind Capacity (MW)	1,146,944 47% 47% 279
Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Reg'd Replacement Wind Capacity (MW) Wind Plant Useful Life (Yrs)	1,146,944 47% 47% 279 30
Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Reg'd Replacement Wind Capacity (MW) Wind Plant Useful Life (Ys) Capital Cost of Wind (S/MW) Transmission Costs (S/MW)	1,146,944 47% 279 30 \$1,350,000 \$1,350,000
Required Generation (MWh) Wind Capacity Factor in the Region (%) Assumed Wind Capacity Factor in the Region (%) Req'd Replacement Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capital Cost of Wind (S/MW) Transmission Costs (S/MW) Transmission Costs (S/MW) Transmission Cost of Wind (S)	1,146,944 47% 47% 279 30 \$1,350,000 \$376,074,665
Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor (%) Regid Replacement Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capati Cost of Wind (S/MW) Transmission Costs (S/MW) Total Capital Cost of Utility-Owned Wind (\$) Ney MACRS (\$0)	1,146,944 47% 47% 279 30 51,350,000 50 5376,074,665 0.78
Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor (%) Regid Replacement Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capatal Cost of Wind (S/MW) Transmission Costs (S/MW) Total Capital Cost of Utility-Rowned Wind (\$) NPV MLCRS (\$) NPV MIG Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revue Required (\$)	1,146,944 47% 47% 279 50 51,350,000 535,074,655 0.78 11,183,57% 5412,666,021
Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor (%) Req'd Replacement Wind Capacity (MW) Wind Plant Uselu Life (Ys) Capital Cost of Wind (S/MW) Transmission Costs (S/MW) Total Capital Cost of Utility-Owned Wind (\$) NPV MACRS (%) NPV MACRS (%) PT VMACRS (%) PT Price (S/MWh)	1,146,944 47% 47% 30 5,1350,000 5376,074,655 30,078 11,183,579 5412,666,011 520,31
Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor (%) Begrid Beglacement Wind Capacity (MW) Wind Phant Useful Life (Yrs) Capital Cost of Wind (S/MW) Trasmission Costs (S/MW) Total Capital Cost of Utility-Owned Wind (S) NPV Wind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Cost on NPV Revenue Required (S) PTC Price (S/MWh)	1,146,944 47% 47% 279 50 51,350,000 535,074,655 0.78 11,183,57% 5412,666,021
Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Reg // Replacement Wind Capacity (AWW) Gaptal Cost of Wind (S/MW) Transmission Costs (S/MW) Transmission Costs (S/MW) Total Capital Cost of Utility-Powned Wind (\$) NPV WACRS (%) NPU More Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (\$) PT C Price (S/MWh) NPV WRCR (Y)	1,146,944 47% 47% 279 50 51,350,000 535,074,65 0,78 11,183,57% 5412,666,021 5215,051,725
Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor (h) Reg dapacement Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capital Cost of Wind (S/MW) Transmission Costs (S/MW) Total Capital Cost of Utility-Powned Wind (\$) NPV WACR8 (%) Intramission Cost (S/MW) Total Capital Cost of Utility-ROE Discount Rate (MWh) Impact of Capital Cost on NPV Revenue Required (\$) PTC Price (S/MWh) NPV WINCR8 (\$) NPV PRV Revenue Required of Capital Costs Net PTC (\$) Wind O&M Expense (\$/MWh)	1,146,944 47% 47% 30 5,1550,000 5,074,657 0,78 1,11,88,579 5,013 5,021,014,266 5,021 5,031,014,266 5,031 5,014,266 5,017,014,266
Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Reg'd Replacement Wind Capacity (MW) Wind Plant Useful Life (frys) Capital Cost of Work (SMW) Transmission Costs (SMW) Total Capital Cost of Utility-Owned Wind (S) MFV Wind Cest (%) MFV Wind Generation at Utility ROE Discount Rate (MWh) Minpact of Capital Costs on NPV Revenue Required (S) PTC Prince (S/MWh) MFV PTC Value (S/MWh) Wind O&ME Spreeme (S/MWh) Wind O&ME Spreeme (S/MWh) Wind O&ME Spreeme (S/MWh)	1,146,944 47% 47% 30 5,1550,000 5,074,657 0,78 1,11,88,579 5,013 5,021,014,266 5,021 5,031,014,266 5,031 5,014,266 5,017,014,266
Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Begid Replacement Wind Capacity (MW) Wind Plant Useful Life (frs) Capital Cost of Wind (S/MW) Transmission Costs (S/MW) Tratal Capital Cost of Utility-Owned Wind (S) NPV MACRS (%) NPV MACRS (%) NPV Wind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (S) TC Price (S/MWh) NPV VFIC Value (Sots on NPV Revenue Required (S) Impact on NPV Revenue Required of Capital Costs Net PTC (S) Wind O&M Expense (S/MWh)	1,146,944 47% 47% 279 300 \$1350,000 \$376,074,655 0,78 \$11,183,579 \$412,666,021 \$250,51,725 \$197,612,96 \$27,514,296 \$10,666,932 \$10,666,946 \$10,666,932 \$10,666,946 \$10,666
Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor (%) Assumed Wind Capacity Factor (%) Gapida Rocerement Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capital Cost of Wind (\$/MW) Toral Capital Cost of Utility-Owned Wind (\$) NPV Wind Generation at Utility ROE Discount Rate (MWh) Minpact of Capital Costs on NPV Revenue Required (\$) PTC Price (\$/MWh) NPV VTC Value (\$) Mind O& Expense (\$/MWh) Wind PAPA Metrics: Mind Generation at Utility Shareholder DR (MWh) NPV Wind Generation at Utility Note	1,146;94 47% 47% 279 30 \$1,350,000 \$1,350,000 \$1,350,000 \$1,350,000 \$1,350,000 \$1,350,000 \$1,350,000 \$1,350,000 \$1,250,0000 \$1,250,0000 \$1,250,0000 \$1,250,0000 \$1,250,0000 \$1,250,0000 \$1,250,0000 \$1,250,0000 \$1,250,0000 \$1,250,00000 \$1,250,00000 \$1,250,000000 \$1,250,0000000000000000000000000000000000
Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor (%) Assumed Wind Capacity Factor (%) Begid Replacement Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capital Cost of Wind (\$/MW) Total Capital Cost of Utility-Owned Wind (\$) NPV Wind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (\$) PTC Price (\$/MWh) Wind PPA Assume (\$/MWh) Wind PPA Netrics: Impact on Capital Costs Net PTC (\$) Wind Generation at Utility Shareholder DR (MWh) Wind PPA Price (\$/MWh) Wind PPA Price (\$/MWh)	1,146,944 4,7% 47% 279 30 5,1350,000 5,1350,000 5,1350,000 5,1350,000 5,1350,000 5,1350,000 5,1350,1725 5,137,614,296 5,145,296 5,145,2
Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Regid Reglacement Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capital Cost of Wind (S/MW) Transmission Costs (S/MW) Total Capital Cost of Ullity-Owned Wind (\$) NPV MACES (%) NPV Wind Generation at Utility ROE Discourt Rate (MWh) impact of Capital Costs on NPV Revenue Required (\$) PTC Price (S/MWh) Wind O&M Expense (S/MWh) Wind O&M Expense (S/MWh) Wind O&M Expense (S/MWh) Wind OPA Tercia (NWH) NPV Wind Generation (MWh) NPV Wind Generation (Wh) NPV White Generation (Wh) NPV White Generation (Wh) NPV White Generation (Wh) NPV NPTC Gene	1,146,944
Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Regid Reglacement Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capital Cost of Wind (S/MW) Transmission Costs (S/MW) Total Capital Cost of Ullity-Owned Wind (\$) NPV MACES (%) NPV Wind Generation at Utility ROE Discourt Rate (MWh) impact of Capital Costs on NPV Revenue Required (\$) PTC Price (S/MWh) Wind O&M Expense (S/MWh) Wind O&M Expense (S/MWh) Wind O&M Expense (S/MWh) Wind OPA Tercia (NWH) NPV Wind Generation (MWh) NPV Wind Generation (Wh) NPV White Generation (Wh) NPV White Generation (Wh) NPV White Generation (Wh) NPV NPTC Gene	1,146,944 4,7% 47% 279 30 5,1350,000 5,1350,000 5,1350,000 5,1350,000 5,1350,000 5,1350,000 5,1350,1725 5,137,614,296 5,145,296 5,145,2
Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor (%) Reg'd Beplacement Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capital Cost of Wind (S/MW) Total Capital Cost of Utility-Owned Wind (S) NPV Wind Generation at Utility ROE Discount Rate (MWh) NPV VIC Value (S) Mind PAA Maxies (S/MWh) NPV Wind Generation (MWh) NPV Wind Generation at Utility Shareholder DR (MWh) NPV Wind Generation AU Willy Shareholder DR (MWh) Wind PPA Arsong WACC Wind PPA Period (Yrs) Post-PAP Period (SM Mincrease Utility-Owned Solar Metrics:	1,146,944 47% 47% 279 300 51,350,000 530,000 530,000 530,000 530,000 530,000 530,000 530,000 530,000 510,050,000 510,050,000 510,050,920 5197,614,296 51
Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Reg'd Replacement Wind Capacity (MW) Wind Plant Useful Life (trys) Capatial Cast of Wind (S/MW) Transmission Costs (S/MW) Transmission Costs (S/MW) NPV Mind Generation at Utility NGE Discourt Rate (MWh) Impact of Capital Costs on NPV Revenue Required (S) PT Price (S/MWL) NPV PTC Value (S) Impact on NPV Revenue Required of Capital Costs Net PTC (S) Wind OBAE Superior (S/MWH) Wind PPA Reinci (S/M	1,146,944 , 47% , 57% , 47% , 57% , 57%
Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Regid Reglacement Wind Capacity (MW) Wind Plant Useful Life (trys) Capital Cost of Wind (S/MW) Transmission Costs (S/MW) Transmission Costs (S/MW) NPV MACSE (%) NPV Wind Generation at Utility ROE Discourt Rate (MWh) impact of Capital Costs on NPV Revenue Required (S) PTC Price (S/MWh) Tot Virtic Value (S) Wind OBAE Speese (S/MWh) Wind OBAE Speese (S/MWh) Wind OBAE Speese (S/MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) Wind PPA Price (S/MWh) Wind PPA Price (S/MWh) Sim Pac Dascent Solar Capacity (MW) Solar Capacity Factor (%) Solar Pant Useful Life (trys)	1,146,944 , 47% , 57% , 57%
Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Regid Reglacement Wind Capacity (MW) Wind Plant Useful Life (trys) Capital Cost of Wind (S/MW) Transmission Costs (S/MW) Total Capital Cost of Willity-Owned Wind (S) NPV MACES (%) NPV Wind Generation at Utility ROE Discourt Rate (MWh) impact of Capital Costs on NPV Revenue Required (S) PTC Price (S/MWh) Total Capital Costs on NPV Revenue Required (S) Wind OBAE Speese (S/MWh) Wind OBAE Speese (S/MWh) Wind OBAE Speese (S/MWh) Wind OBAE Speese (S/MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) Wind PPA Price (S/MWh) Wind PPA Price (S/MWh) Sima Capacity Factor (%) Solar Pant Useful Life (trys) Solar Pant Useful Life (trys)	1,146,944 4799 4799 300 51,350,000 51,350,000 51,350,000 51,350,000 51,350,000 51,350,000 51,350,1725 5137,514,296 517,514,296 517,514,296 517,514,296 517,514,296 517,514,296 517,514,296 510,066,992 10,6
Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Reg'd Replacement Wind Capacity (MW) Wind Plant Useful Life (trys) Capital Cost of Wind (S/MW) Transmission Costs (S/MW) Transmission Costs (S/MW) MPV Wind Generation at Utility ROE Discourt Rate (MWh) Impact of Capital Costs on NPV Revenue Required (S) PTC Price (S/MWi) MIN O BAK Expense (S/MWh) Wind OBAK Expense (S/MWh) Wind PPA Frick (S/MWh) MWH Generation (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) Wind PPA Price (S/MWh) Wind PPA Price (S/MWh) Solar Dapacity Factor (%) Solar Plant Useful Life (trys) Capatit Cost of Solar (S/MWh) Solar Plant Costs (S/MWh) Capacity Factor (%) Solar Plant Useful Life (trys) Capital Cost of Solar (S/MWh)	1,146,944 , 47%
Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor (ht Region (%) Reg'd Replacement Wind Capacity (MW) Wind Plant Useful Life (trys) Capital Cast of Wind (S/MW) Transmission Costs (S/MW) Transmission Costs (S/MW) Transmission Costs (S/MW) Transmission Costs (S/MW) Transfact on XPV Revenue Required (S) PTV Mind (Semeration at Utility NGE Discourt Rate (MWh) Impact of Capital Costs on NPV Revenue Required (S) PTC Price (S/MWh) NPV Profile (S/MWh) Wind CBAE Expense (S/MWh) Wind CBAE Expense (S/MWh) Wind PPA Assumed WACC Wind PPA Revices: Impact on NPV Revenue Required of Capital Costs Net PTC (S) WWN Wind Generation (WMh) NPV Wind Generation (WMh) NPV Wind Generation (WMh) Wind PPA Assumed WACC Wind PPA Price (S/MWh) Solar Capacity Factor (Si Solar Pant Useful Life (trys) Capital Cost of Solar (S/MW) Total Cost of Utility-Owned Solar (S) NPV Solar Generation at Utility Shareholder DR (Solar Pant Useful Life (trys) Capital Cost of Solar (S/MW) Transmission Costs (S/MW) Transmission Costs (S/MW) Transmission Costs (S/MC) Net Solar Capacity Factor (Si Net Solar Osciar (S/MW) Transmission Costs (S/MW) Transmission Costs (S/MC) Solar Capacity Factor (Si NPV Solar Generation at Utility Net Solar (S) NPV Solar Generation at Utility Net Solar (S) NPV Solar Capacity Factor (Si) Solar Net Useful Tife (Si) Solar Capacity Factor (Si) Solar Net Solar (S) NPV Solar Generation at Utility Net Solar (S) NPV Solar Capacity Factor (Si) Solar Net Solar (S) Solar Net Solar (S) NPV Solar Capacity Factor (Si) Solar Net Solar (S) NPV Solar Capacity Factor (Si) Solar Net Solar (S) NPV Solar Ca	1,146,944 47% 47% 779 300 51,350,000 51,350,000 53,350,07,465 30,78 51,350,07,455 537,617,465 537,512,266,021 537,512,266,021 537,512,266,021 537,512,266 537,014,296 537,512,295 10,666,932 10,669,932 10,669,932 10,669,932 10,669,932 10,669,932 10,669,932 10,669,932 10,669,932 10,669,932 10,669,932 10,669,932 10,669,932 10,669,932 10,669,932 10,669,932 10,067,932 30,000 30,000 10,000 360 360 360 360 360 360 360
Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Regid Regiacement Wind Capacity (MW) Wind Pant Useful Life (frs) Capital Cost of Work (SMW) Transmission Costs (SMW) Total Capital Cost on Utility ROE Discount Rate (MWh) MPV Wind Generation at Utility ROE Discount Rate (MWh) MPV VF (Calue Costs on NPV Revenue Required (S) PTC Price (SMWh) MIN VF VF Claue (Costs on NPV Revenue Required (S) MIN VF VF Claue (SMWh) Wind O&EM Expense (SMWh) Wind PA Price (SMWh) Wind PA Price (SMWh) Wind PA Price (SMWh) Wind PA Price (Trice (SMWh) Wind PA Price (SMWh) Wind PA Price (SMWh) Solar Palerid O&M Increase Utility-Owned Solar Metrics: Regid Reglacement Solar Capacity (MW) Solar Capacity Factor (%) Solar Capacity (SMW) Transmission Costs (S/MW) Transmission Costs (S/MW) Solar Solar (SMWH) Transmission Costs (S/MW) Transmission Costs (S/MW) Tr	1,146,944 47% 47% 779 300 51,350,000 5376,074,665 0,78 5412,666,011 5215,051,725 5377,612,4266 5377,612,4266 5377,612,4266 5377,612,4266 5377,612,4266 5370,612,4266 5370,612,426 5370,612,426 5370,612,426 10,063,932 10,063,932 10,037,218 5326,662,337 8,511,365 3306 5336,662,337 8,511,365 3306 5336,662,337 8,511,365 3306 5336,662,337 8,511,365 3306 5336,662,337 8,511,365 3306
Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Reg'd Replacement Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capalac Lost of Wind (S/MW) Transmission Costs (S/MW) Transmission Costs (S/MW) Transmission Costs (S/MW) Transmission Costs (S/MW) Transmission Costs (S/MWh) Transmission Costs (S/MWh) Mind Capatal Costs on NPV Revenue Required (S) PT Princ (S/MWh) NPV Wind Generation at Utility NoE Discourt Rate (MWh) Mind Capatal Costs on NPV Revenue Required (S) PT Princ (S/MWh) Wind Capatal Costs on NPV Revenue Required of Capital Costs Net PTC (S) Wind O&M Expense (S/MWh) Wind OBA Expense (S/MWh) NPV Wind Generation (WMh) NPV Wind Generation (WMh) Wind PPA Ancie (S/MWh) Wind PPA Princ (S/MWh) Solar Capacity Factor (%) Solar Capacity Factor (S) NPV Solar Consci (S/MW) Total Cost of Utility-Owned Solar (S) NPV Solar Commention at Utility RDE Discount Rate (MWh) TC Solar Owned Solar (S/MW)	1,146;94 (47%) (47
Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Reg'd Replacement Wind Capacity (MW) Wind Plant Useful Life (trys) Capatal Cast of Wind (S/MW) Transmission Costs (S/MW) Transmission Costs (S/MW) Transmission Costs (S/MW) Transmission Costs (S/MW) Transmission Costs (S/MW) Transmission Costs (S/MW) Wind Plant Plant (S) Wind	1,146,944 ,1,46,944 ,47% ,779 300 51,350,000 5376,074,655 11,183,579 5412,666,011 5412,666,011 5412,666,012 5175,142,966 10,037,218 5197,614,296 10,037,218 5197,614,296 10,037,218 5197,614,296 10,037,218 5197,614,296 32,341 30,037,218 5197,614,296 32,341 30,037,218 5197,614,296 31,00,000 51,00,000 30,0000 30,0000 30,0000 30,0000 30,0000 30,0000 30,00000 30,0000000000
Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Reg'd Replacement Wind Capacity (MW) Wind Pant Useful Life (frys) Capatial Cost of Work (SMW) Transmission Costs (SMW) Total Capatial Cost on Utility ROE Discount Rate (MWh) MPV Wind Generation at Utility ROE Discount Rate (MWh) Mingact of Capital Costs on WP Revenue Required (S) PTC Price (SMWh) MV PT CVaule (Costs on WP Revenue Required (S) PTC Price (SMWh) Wind O&ME Speene (S/MWh) Wind O&ME Speene (S/MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) Solar Alpant Useful Life (frys) Capacity Factor (%) Solar Capacity Factor (%) Solar Capacity Factor (%) Solar Capacity Factor (%) Transmission Costs (S/MW) Transmission Costs (S/MW) Transmission Costs (S/MW) Transmission Costs (S/MW) NPV Speene (S/MWH) NPV Speene (S/MWH) NPC Speene (S	1,146,944 ,1,46,944 ,47% ,279 ,279 ,300 ,51,350,000 ,5376,07,465 ,0,78 ,51,255 ,517,512,512 ,517,512 ,517,512 ,517,51
Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Regid Replacement Wind Capacity (MW) Wind Plant Useful Life (frys) Capatial Cost of Work (MW) Transmission Costs (S/MW) Transmission Costs (S/MW) Transmission Costs on IVP Revenue Required (S) NFV MACRS (%) NFV Wind Generation at Utility ROE Discount Rate (MWh) Mingact of Capital Costs on NFV Revenue Required (S) PTC Price (S/MWh) Wind OBAE Speceme (S/MWh) NFV Wind Generation (MWh) NFV Wind Generation (MWh) NFV Wind Generation (MWh) Wind PAP Arter(S) Big Costs on NFV Revenue Required of Capital Costs Net PTC (S) Wind PAP Arter(S) Big Costs on NFV Revenue Required of Capital Costs Net PTC (S) Wind PAP Arter(S) Big Costs on NFV Revenue Required of Capital Costs Net PTC (S) NFV Wind Generation (MWh) Solar Plant Useful Life (frs) Capital Cost of Solar Capacity (NW) Solar Capacity Factor (%) Solar Capacity Factor (%) Solar Capacity Factor (%) Transmission Costs (S/MWh) NFV Solar Generation at Utility Rob Discount Rate (MWh) NFC TC Solar OBAM Expense (S/MWh) NFV Solar Generation (MWh) Solar PAPA Price (S/MWh) NF	1,146,944 ,1,46,944 ,47% ,779 300 51,350,000 5376,074,655 11,183,579 5412,666,011 5412,666,011 5412,666,012 5175,142,966 10,037,218 5197,614,296 10,037,218 5197,614,296 10,037,218 5197,614,296 10,037,218 5197,614,296 32,341 30,037,218 5197,614,296 32,341 30,037,218 5197,614,296 31,00,000 51,00,000 30,0000 30,0000 30,0000 30,0000 30,0000 30,0000 30,00000 30,0000000000
Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Reg'd Replacement Wind Capacity (MW) Wind Plant Useful Life (trys) Capital Cast of Wind (S/MW) Transmission Costs (S/MW) NPV Mind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (S) PTP Critic (S/MWh) NPV MPV Revenue Required of Capital Costs Net PTC (S) Wind O&M Expense (S/MWh) Wind PA Merrics: Impact on NPV Revenue Required of Capital Costs Net PTC (S) Wind O&M Expense (S/MWh) Wind PA Merrics: Mapped to MPV Revenue Required of Capital Costs Net PTC (S) MVM ORF A Merrics: Mind PA Merrics: Solar Capacity Factor (%) Solar Capacity Factor (%) Mind PA Merrics: Solar PA Merrics: Solar PA Merrics: Solar PA Merrics: Solar PA Merrics: Solar PA Merrics: Solar PA Merrics: Mind PA Merrics: Solar PA Merrics: Mind PA Merrics: Solar PA Merrics: Mind PA Merr	1,146,944 (47%)
Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Reg'd Replacement Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capital Cost of Wolf (S/MW) Transmission Costs (S/MW) Transmission Costs (S/MW) Transmission Costs (S/MW) MPV Wind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (5) PTC Price (S/MWh) MV VINC (Signer (S/MWh) Wind DPA Inceres (S/MWh) Wind DPA Inceres (S/MWh) Wind DPA Netrics: Impact on NPV Revenue Required of Capital Costs Net PTC (5) Wind PPA Netrics: Impact on NPV Revenue Required of Capital Costs Net PTC (5) Wind DPA Netrics (S/MWh) NPV Wind Generation (MWh) Wind PPA Netric (S/MWh) Wind PPA Netric (S/MWh) Solar Capacity Factor (%) Solar Data Solar Affection: Reg'd Replacement Solar Capacity (MW) Solar Capacity Factor (%) Solar Obs Repense (S/MWh) NFV Solar Generation at Utility RDE Discount Rate (MWh) NFV Solar Generation at Utility RDE Discount Rate (MWh) NFV Solar Generation (Wh) NFV Solar	1,146,944 47% 47% 279 300 \$1,350,000 \$376,074,665 0,78 \$376,074,665 1,14,38,579 \$412,666,021 \$200,31 \$215,051,725 \$377,612,96 \$10,469,932 10,037,218 \$234,11 \$235,11 \$236,12 \$234,110 \$234,110000,11000000000000000000000
Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Regid Reglacement Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capatial Cost of Wolf) Transmission Costs (S/MW) Transmission Costs (S/MW) Transmission Costs (S/MW) NPV Wind Generation at Utility RCE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (5) PTC Price (S/MWh) Wind PXP Tr Value (S) Wind PXP Revenue Required of Capital Costs Net PTC (S) Wind O & Kar Speres (S/MWh) Wind O & Kar Speres (S/MWh) Wind PA Netrics: Impact on NPV Revenue Required of Capital Costs Net PTC (S) Wind PA Netrics: Impact on NPV Revenue Required of Capital Costs Net PTC (S) Wind PA Netrics (S/MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) Wind PA Netrics (S/MWh) Solar Capacity Factor (%) Solar Data Metrics: Regid Reglacement Solar Capacity (MW) Solar Capacity Factor (%) Solar Capacity Factor (%) Solar Capacity Factor (%) Solar Data Metrics: Solar PA Netrics: Solar PA Price (S/MWh) NPV Solar Generation at Utility Kate Discount Rate (MWh) NPC Solar Generation At Utility Kate Discount Rate (MWh) NPC Solar Generation (Wh) NPC So	1,146,944 47% 47% 279 300 \$1350,000 \$376,074,655 4376,074,655 307,074,655 307,074,655 307,074,657 307,074,075 307,075 307,0
Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Reg'd Replacement Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capatal Cast of Wind (S/MW) Transmission Cost (S/MW) NPV Mind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (S) PTP Critic (S/MWh) NPV MPV Revenue Required of Capital Costs Net PTC (S) Wind O&M Expense (S/MWh) Wind PA Merrics: Impact on NPV Revenue Required of Capital Costs Net PTC (S) Wind O&M Expense (S/MWh) Wind PA Merrics (S) Mind PA Merrics (S) Solar PA Merrics (S) Mind PA Merrics	1,146,944 479 479 479 300 51,350,000 51,350,000 51,350,000 51,350,000 51,350,000 51,350,000 51,350,000 51,350,725 51,37,514,296 51,37,514,296 51,37,514,296 51,300,000 51,300,000 51,310,000 51
Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor (%) Assumed Wind Capacity Factor (%) Assumed Wind Capacity Factor (%) Begid Replacement Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capital Cost of Unlity-Owned Wind (5) NPV Mind Schwell (19) NPV Wind Generation at Utility ROCE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (5) PTC Price (5) NPV PTC Value (5) Mind Dek Expense (5) NPV PTC Value (5) NPV Vind Generation (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWH) NPV Vind Generation (MWH) NPV Vind Generation (MWH) NPV Solar Capacity FActor (%) Solar Capacity (FACTOR) NPV Solar Generation at Utility RDE Discount Rate (MWh) NPV Solar Generation (MWH	1,146,944 47% 47% 279 300 \$1350,000 \$376,074,655 4376,074,655 307,074,655 307,074,655 307,074,650 307,074,075 307,075 307,
Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Reg deplacement Wind Capacity (MW) Wind Plant Useful Life (trys) Capital Cost of Wind (5/MW) Transmission Costs (5/MW) Transmission Costs (5/MWh) MPV Wind Generation at Utility NGE Discourt Rate (MWh) Impact of Capital Costs on NPV Revenue Required (5) PTV PTC Value (5/MWh) MIN OB KE Speese (5/MWh) Wind OBK Expense (5/MWh) Wind OBK Expense (5/MWh) Wind OBK Expense (5/MWh) Wind OBK Expense (5/MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) Solar Capacity Factor (%) Solar PAP A Retice (5/MWh) Capital Cost of Solar (5/MWh) Solar Capacity Factor (%) Solar Pant Solar (5/MWh) Transmission Costs (5/MWh) Transmission Costs (5/MWh) Solar Capacity Factor (%) Solar OBA Expense (5/MWh) Solar Capacity Factor (%) Solar PAP Aretice (5/MWh) Solar Capacity Factor (%) Solar PAP Aretice (5/MWh) Transmission Costs (5/MWh) Transmission Costs (5/MWh) Solar Capacity Factor (%) Solar OBA Herices Solar PPA Aretice (5/MWh) NPV Solar Generation at Utility RDE Discourt Rate (MWh) NPV Solar Generation at Utility Shareholder DR (MWh) NP	1,146,944 ,1,46,944 ,47% ,779 300 51350,000 5376,074,655 301,11,83,579 5412,666,021 5412,66
Required Generation (MWh) Wind Capacity Factor in the Region (%) Regid Replacement Wind Capacity (MW) Wind Pant Useful Life (trys) Capacity Factor in the Region (%) Regid Replacement Wind Capacity (MW) Wind Pant Useful Life (trys) Capacity Capacity Capacity (MW) Transmission Costs (S/MW) Transmission Costs (S/MW) Transmission Costs (S/MW) Mind Generation at Utility ROE Discount Rate (MWh) Mind Capacity Capacity Capacity Capacity Capacity Wind Generation at Utility ROE Discount Rate (MWh) Mind Capacity Capacity Capacity Capacity Capacity Capacity Wind Generation at Utility ROE Discount Rate (MWh) Mind Capacity Capacity Capacity Capacity Capacity Capacity Mind Capacity Ca	1,146,944 4,795 4799 300 51,350,000 51,350,000 51,350,000 51,350,000 51,350,000 51,350,000 51,350,000 51,350,725 51,751,256 51,751,256 51,751,256 51,751,256 51,751,256 51,751,256 51,751,256 51,000 51,000,000 51,00
Required Generation (MWh) Wind Capacity Factor (%) Resumed Wind Capacity Factor (%) Resumed Wind Capacity Factor (%) Reg'd Replacement Wind Capacity (MW) Wind Plant Useful Life (trys) Capatal Cost of Wind (S/MW) Transmission Costs (S/MW) Transmission Cost (S/MW) Wind Plant Reveal Required of Capital Costs Net PTC (S) Wind O&M Expense (S/MWh) Wind Plant Price (S/MWh) Wind Plant Price (S/MWh) Wind Plant Costs (S/MW) Wind Generation AU Utility Shareholder DR (MWh) Wind Plant Costs (S/MW) Wind Plant Costs (S/MW) Cost Cost (S/MWh) Wind Plant Costs (S/MWH) Wind Cost Cost Plant Cost (S/MWH) Wind Cost Cost (S/MWH) Wind Cost Cost Plant Cost (S/MWH) Wind Cost Cost (S/MWH) Wind Cost Cost Plant Cost (S/MWH	1,146,944 ,1,46,944 ,47% ,779 300 51350,000 5376,074,655 301,11,83,579 5412,666,021 5412,66
Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Reg deplacement Wind Capacity (MW) Wind Plant Useful Life (trys) Capital Cost of Work) NPV Mind Generation at Utility ROEE Discount Rate (MWh) Mind Staff (S) NPV Wind Generation at Utility ROEE Discount Rate (MWh) Mind Capacity Factor (%) Mind Capacity Factor (%) Mind Capacity Factor (%) Mind Capacity Factor (%) Wind PPA Network (%) Wind PPA Network (%) NPV Wind Generation (MWh) NPV Wind Generation (MWh) Solar Capacity Factor (%) Solar Pant Useful Life (Yrs) Capital Cost of Solar (S/MWh) Total Cost of Solar (S/MWh) NPV Solar Generation at Utility ROE Discount Rate (MWh) NPV Solar Generation at Utility ROE Discount Rate (MWh) NPV Solar Generation at Utility ROE Discount Rate (MWh) NPV Solar Generation (MWH) NPV Solar	1,146,944 ,1,46,944 ,47% ,279 300 \$1350,000 \$1350,074,655 1,183,579 \$12,66,021 \$20,04,055 \$10,045,932 \$10,045,932 \$10,045,932 \$10,045,932 \$10,045,932 \$10,045,932 \$10,045,932 \$10,045,932 \$10,045,932 \$10,045,932 \$10,045,932 \$10,057,142,96 \$10,045,932 \$10,057,015 \$23,341 \$53,341 \$0,057 \$10,005 \$300 \$300 \$300 \$300 \$300 \$31,00,000 \$33,355 \$300 \$300 \$300 \$300 \$31,000,000 \$33,355 \$33,550 \$300

Louisa (IPL)	Unit Name
Existing Brown Plant Snapshot:	
Plant Type	Conventional Steam Coal
Current Net Plant Balance (\$)	\$9,528,470
Current Total Retirement Cost (\$) Net Capacity (MW)	\$16,451,920 32.48
Assumed Year of Early Retirement	2021
Current Remaining Life (Yrs)	20
Amortization Period of Regulatory Asset with Early Retirement Capacity Factor (%)	10 69.19%
Net Generation (MWh)	196,829
NPV Brown Plant Generation at Utility ROE Discount Rate (MWh)	1,722,504
Operating Costs (\$/MWh) Fuel Portion of Coal MCOE	\$23.92
Fuel Hedge Adder	0%
Securitization and Green Bond Assumptions:	
Securitization and Green bond Assumptions.	3.10%
Securitization Bond Tenor	20
Green Bond Assumed Interest Rate	3.75%
Green Bond Tenor Share of Securitization Savings For Transition Assistance	20
Include Transition Assistance in Regulatory Asset Case?	Yes
Calculate Savings Relative to Regulatory Asset Case or BAU Case?	BAU Case
Does the green bond affect the utility's allowed ROR? Is the utility recycling the proceeds from securitization or green bond?	No Yes
Is the capital structure of the new facility different from the utility's?	No
If yes, input the new facility's debt ratio here:	50.00%
Does the new facility's capital structure impact the utility's allowed ROR?	No
Other Financial Metrics/Ratios:	
Ratepayer Discount Rate	7.00%
Shareholder Discount Rate	9.60%
Utility's Allowed ROR (%)	7.30%
Utility's Allowed ROR used (accounting for deductability of interest) Plant Allowed ROR used (accounting for deductability of interest)	6.51%
Wind Allowed ROR used (accounting for deductability of interest)	7.19%
Solar Allowed ROR used (accounting for deductability of interest)	6.51%
Equity Ratio (%)	49.00%
Utility's Allowed ROE (%) Existing Plant Allowed ROE (%)	9.60%
Wind Allowed ROE (%)	11.00%
Solar Allowed ROE (%)	9.60%
Assumed Allowed Preferred Equity Ratio	0.00%
Assumed Allowed Return on Preferred Equity (ROPE) Implied Debt Ratio	51.00%
Implied Cost of Debt	5.09%
Cost of Debt (%)	3.75%
Federal Corporate Tax Rate Utility's Blended Tax Rate (%)	21.00%
Brown Plant Assumed Starting Book-Tax Disparity	50.00%
Macro Inflation	2.0%
O&M and Fuel Escalator	2.5%
	2.5%
	2.3%
Utility-Owned Wind Metrics: Wind Services Value as Percentage of Brown Plant Services Value	77%
Utility-Owned Wind Metrics: Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh)	77% 255,622
Utility-Owned Wind Metrics: Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%)	77% 255,622 47%
Utility-Owned Wind Metrics: Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor in the Region (%) Assumed Wind Capacity Factor in the Region (%)	77% 255,622
Utility-Owned Wind Metrics: Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Reg'd Replacement Wind Capacity (MW) Wind Plant Usefu Life (Yrs)	77% 255,622 47% 47% 62 30
Utility-Owned Wind Metrics: Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Reg'd Replacement Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capital Cost of Wind (\$/MW)	77% 255,622 47% 47% 62 300 51,150,000
Utility-Owned Wind Metrics: Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Regid Reglacement Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capital Cost of Wind (5/MW) Transmission Costs (5/MW)	77% 255,622 47% 642 62 30 51,350,000 50 50
Ullity-Owned Wind Metrics: Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWM) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Reg'd Replacement Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capital Cost of Wind (\$/MW)	77% 255,622 47% 47% 62 300 51,150,000
Uility-Owned Wind Metrics: Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Sasumed Wind Capacity Factor in the Region (%) Reg'd Replacement Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capital Cost of Wind (\$/MW) Total Capital Cost of Utility-Owned Wind (\$) NPV MACRS (%) NPV Wind Ceneration at Utility ROE Discount Rate (MWh)	77% 255,622 47% 62 30 51,350,000 \$83,816641 0,78 2,492,511
Utility-Owned Wind Metrics: Wind Services Value as Percentage of Brown Plant Services Value Required Generation (NWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Reg'd Reglacement Wind Capacity (NW) Wind Plant Useful Life (Yrs) Capatic Cast of Wind (S/NW) Transmission Casts (S/NW) Total Capital Cast of Utility-Owned Wind (S) NPV Wind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Casts on NPV Revue Required (S)	77% 255,622 47% 62 300 \$13,50,000 \$13,50,000 \$38,816,641 0.78 2,492,511 \$31,971,842
Utility-Owned Wind Metrics: Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Regid Reglacement Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capital Cost of Wind (S/MW) Transmission Costs (S/MW) Total Capital Cost of Utility-Owned Wind (S) NFV WARCR (%) NFV Wind Generation at Utility ROE Discount Rate (MWh) Mirpact of Capital Costs on NFV Revenue Required (S) PF Price (S/MWh)	77% 255,622 47% 662 30 51,350,000 \$83,816,641 0,78 2,492,511 551,971,842 520,31
Utility-Owned Wind Metrics: Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Beg'd Replacement Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capital Cost of Wind (S/MW) Transmission Costs (S/MW) Total Capital Cost of Utility-Owned Wind (S) NPV Wind Generation at Utility RGE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (S) PCP Price (S/MWh) NPV WRCRS(M)	77% 255,622 47% 47% 622 300 \$1,350,000 \$33,816,641 0,78 2,492,511 \$51,971,842 \$20,31 \$47,229,082 \$44,042,761
Utility-Owned Wind Metrics: Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor (%) Req'd Replacement Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capital Cost of Wind (5/MW) Transmission Costs (5/MW) Transmission Costs (5/MW) Transmission Costs (5/MW) NPV Mind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Cost on NPV Revenue Required (5) PTC Price (5/MWh) MV PT CValue (5)	77% 2255,622 47% 62 300 \$1330,000 \$838,16,641 0,51,350,000 \$838,16,641 0,51,351,862 2,492,511 \$51,971,842 530,371,842 \$20,313 \$437,329,082
Utility-Owned Wind Metrics: Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor in the Region (%) Reg'd Replacement Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capital Cost of Wini (S/MW) Total Capital Cost of Utility-Owned Wind (S) NPV Wind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on SNP Revenue Required (S) PTC Price (S/MWh) NPV PTC Value (S) MWH OKEN (S) MWH OKEN (S) MWH OKEN (S) MWH OKEN (S) MWH Revenue Required of Capital Costs Net PTC (S) Wind O&M Expense (S/MWh)	77% 255,622 47% 47% 622 300 \$1,350,000 \$33,816,641 0,78 2,492,511 \$51,971,842 \$20,31 \$47,229,082 \$44,042,761
Utility-Owned Wind Metrics: Wind Services Value as Percentage of Brown Plant Services Value Required Generation (NWM) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Req' Replacement Wind Capacity (MW) Wind Plant Usefu Life (Yrs) Capital Cost of Wind (5/NW) Transmission Costs (5/NW) Total Capital Cost of Utility-Owned Wind (5) NPV MACRS (%) NPV Wind Generation at Utility RGE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (5) PT Price (5/NWh) Mind O&M Expense (5/NWh) Wind O&M Expense (5/NWh) Wind O&M Expense (5/NWh) Wind O&M Expense (5/NWh)	77% 255,622 47% 622 300 \$1,330,000 \$33,816,641 0,78 2,492,511 591,971,842 50,31 \$47,229,082 \$44,042,761
Utility-Owned Wind Metrics: Wind Services Value as Percentage of Brown Plant Services Value Regurder Generation (NWM) Wind Capacity Factor (N) Assumed Wind Capacity Factor in the Region (%) Reg's Geplacement Wind Capacity (MW) Wind Plant Usefu Life (Yrs) Capital Cost of Wind (S/MW) Transmission Costs (S/MW) Total Capital Cost of Utility-Owned Wind (S) NPV MACS (%) NPV Wind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (S) PTC Frice (S/MWh) NPV FOR Capital Costs on NPV Revenue Required (S) PTC Frice (S/MWh) NPV MIND Generation at Utility ROE Discount Rate (MWh) Impact on NPV Revenue Required of Capital Costs Net PTC (S) Wind O&M Expense (S/MWh) Wind O&M Expense (S/MWh)	77% 255,622 47% 47% 62 30 \$1,350,000 \$33,816,641 0,78 2,492,511 \$31,971,842 \$1,971,842 \$44,042,761 \$44,042,761 2,333,458
Utility-Owned Wind Metrics: Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Reg'd Replacement Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capital Cost of Wind (5/MW) Transmission Costs (5/MW) Tratal Capital Cost Wind (5) NPV Mind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (5) PTC Price (5/MWh) MIND VINC (S) Wind ORM Expense (5/MWh) Wind ORM Expense (5/MWh) Wind ORM Expense (5/MWh) Wind ORM Expense (5/MWh) Wind Generation at Utility Shareholder DR (MWh) WPV Wind Generation at Utility Shareholder DR (MWh)	77% 255,622 47% 67% 67% 67% 67% 67% 78% 78% 78% 78% 78% 78% 78% 78% 78% 7
Uility-Owned Wind Metrics: Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor (%) Reg d Replacement Wind Capacity (MW) Wind Phart Useful Life (Yrs) Capital Cost of Wind (S/MW) Total Capital Cost of Wilhy-Owned Wind (S) NPV Wind Generation at Uility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (S) PTC Price (S/MWh) NPV WIND Costs (S/MW) Wind PA Netrics: Impact on Capital Costs on NPV Revenue Required of Capital Costs Net PTC (S) Wind PPA Metrics: Impact on NPV Revenue Required of Capital Costs Net PTC (S) Wind PPA Metrics: Impact on NPV Revenue Required of Capital Costs Net PTC (S) Wind PPA Metrics: Impact on NPV Revenue Required of Capital Costs Net PTC (S) Wind PA Netrics (S/MWh) Wind PPA Price (S/MWh)	77% 255,622 47% 47% 62 30 \$1,350,000 \$33,816,641 0,78 2,492,511 \$31,971,842 \$1,971,842 \$44,042,761 \$44,042,761 2,333,458
Utility-Owned Wind Metrics: Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor in the Region (%) Regrid Reglacement Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capatal Cost of Winty-Owned Wind (S) NPV Wind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (S) PTC Price (S/MWh) NPV PTC Value (S) Impact on RATE Costs on NPV Revenue Required (S) PTC Price (S/MWh) NPV PTC Value (S) Wind OPA Metrics: Wind Generation at Utility Shareholder DR (MWh) Wind PPA Revenue Required of Capital Costs Net PTC (S) NPV Wind Generation at Utility Shareholder DR (MWh) Wind PPA Revision at Utility Shareholder DR (MWh) Wind PPA Assumed WACC Wind OPA Keys	77% 255,622 47% 622 300 51,350,000 583,816,641 0,78 2,492,511 531,971,842 547,929,082 544,042,761 544,042,761 2,333,458 2,237,018 523,41 9,000 20
Utility-Owned Wind Metrics: Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor in the Region (%) Regrid Reglacement Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capatal Cost of Winty-Owned Wind (S) NPV Wind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (S) PTC Price (S/MWh) NPV PTC Value (S) Impact on RATE Costs on NPV Revenue Required (S) PTC Price (S/MWh) NPV PTC Value (S) Wind OPA Metrics: Wind Generation at Utility Shareholder DR (MWh) Wind PPA Revenue Required of Capital Costs Net PTC (S) NPV Wind Generation at Utility Shareholder DR (MWh) Wind PPA Revision at Utility Shareholder DR (MWh) Wind PPA Assumed WACC Wind OPA Keys	77% 255,622 47% 67% 67% 67% 67% 67% 78% 78% 78% 78% 78% 78% 78% 78% 78% 7
Utility-Owned Wind Metrics: Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor in the Region (%) Res'd Replacement Wind Capacity (MW) Wind Plant Usefu Life (Yrs) Capital Cost of Wind (S/MW) Transmission Costs (S/MW) Total Capital Cost of Utility-Owned Wind (S) MPV Wind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revence Required (S) PTC Price (S/MWh) MPV PTC Value (S) Impact on APV Revenue Required of Capital Costs Net PTC (S) Impact on NPV Revenue Required of Capital Costs Net PTC (S) Wind ORM Espense (S/MWh) Wind PPA Metrics: MPV Wind Generation at Utility Shareholder DR (MWh) NPV Wind Generation at Utility Shareholder DR (MWh) Wind PPA Arice (S/MWh) Wind PPA Assumed WACC Wind PPA Reviol (Yrs) Post-PPA Period O&M Increase	77% 255,622 47% 622 300 51,350,000 583,816,641 0,78 2,492,511 531,971,842 547,929,082 544,042,761 544,042,761 2,333,458 2,237,018 523,41 9,000 20
Utility-Owned Wind Metrics: Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (r6) Assumed Wind Capacity Factor in the Region (%) Req' Replacement Wind Capacity (MW) Wind Plant Useful Life (rrs) Capital Cost Of Wind (S/MW) Transmission Costs (S/MW) Total Capital Cost Of Utility-Owned Wind (5) NPV MACRS (r6) NPV Wind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (5) PTC Price (S/MWh) Wind ORM Expense (S/MWh) Wind PPA Aterics: Impact on NPV Revenue Required of Capital Costs Net PTC (5) Wind Generation IMWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) Wind PPA Assumed WACC Wind PPA Reidol (Yos) Post-PPA Period (ORM Increase Utilty-Owned Solar Metrics:	77% 255,622 47% 622 300 51,350,000 583,816,641 0,78 2,492,511 531,971,842 547,929,082 544,042,761 544,042,761 2,333,458 2,237,018 523,41 9,000 20
Utility-Owned Wind Metrics: Wind Services Value as Percentage of Brown Plant Services Value Required Generation (NWM) Mind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Req' Replacement Wind Capacity (MW) Wind Plant Usefu Life (Yrs) Capital Cost of Wind (5/NW) Transmission Costs (5/NW) Total Capital Cost of Utility-Owned Wind (5) NPV MACRS (%) NPV Wind Generation at Utility RCE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (5) PT Price (5/NWh) TO Price (5/NWh) Wind OBAL Expense (5/NWh) Wind PAP Artic (5/NWh) Wind PAP Ar	775% 255,622 47% 62 300 51,350,000 53,338,16,641 501,571,842 542,511 541,971,842 542,511 544,042,761 2,333,458 2,237,018 544,042,761 2,333,458 2,233,458 2,233,458 2,233,458 2,233,458 2,234,042,761 2,333,458 2,234,042,761 2,333,458 2,234,042,761 2,333,458 2,234,042,761 2,333,458 2,234,042,761 2,234,762,762 2,234,762,762,762,762,762,762,762,762,762,762
Utility-Owned Wind Metrics: Wind Services Value as Percentage of Brown Plant Services Value Required Generation (NWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Reg'd Replacement Wind Capacity (NW) Wind Plant Useful Life (Yrs) Capatal Cost of Wind (S/NW) Transmission Costs (S/NW) Tratal Capatit Cost of Willy-Owned Wind (S) NFV MACRS (%) NFV MACRS (%) NFV Wind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NFV Revenue Required (S) PTC Price (S/NWh) MI OR Keyenue (S) Wind ORE Repense (S/NWh) Wind ORE Repense (S/NWh) Wind ORE Repense (S/NWh) Wind Generation (Wh) NFV Wind Generation at Utility Shareholder DR (MWh) Wind PA Revision at Utility Shareholder DR (MWh) Wind PPA Price (S/NWh) Wind PPA Price (S/NWh) Wind PPA Priced OM Increase Utility-Owned Solar Metrics: Reg'd Replacement Solar Capacity (MW) Solar Capacity Factor (%) Solar Pant Liseful Life (Yrs) Solar Pant Liseful Life (Yrs)	77% 255.622 47% 622 300 513.50.000 583.816.641 0.78 2,492.511 591.971.842 544.042,761 544.042,761 2,333.458 2,237.018 523.01 90% 200 100%
Utility-Owned Wind Metrics: Wind Services Value as Percentage of Brown Plant Services Value Required Generation (NWM) Mind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Req' Replacement Wind Capacity (MW) Wind Plant Usefu Life (Yrs) Capital Cost of Utility-Owned Wind (5) NPV MACS (%) NPV Wind Generation at Utility RCE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (5) PF Crice (S/NWh) NPV PTC Value (5) Wind OBAL Expense (S/NWh) NPV PTC Value (5) Wind OBAL Expense (S/NWh) Wind PAP Artic (S/NWh) Wind P	775% 255,622 47% 62 300 51,350,000 53,338,16,641 501,571,842 542,511 541,971,842 542,511 544,042,761 2,333,458 2,237,018 544,042,761 2,333,458 2,233,458 2,233,458 2,233,458 2,233,458 2,234,042,761 2,333,458 2,234,042,761 2,333,458 2,234,042,761 2,333,458 2,234,042,761 2,333,458 2,234,042,761 2,234,762,762 2,234,762,762,762,762,762,762,762,762,762,762
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Ullity-Owned Wind Metrics: Wind Services Value as Percentage of Brown Plant Services Value Required Generation (NWM) Mind Capacity Factor (r6) Assumed Wind Capacity Factor (r6) Assumed Wind Capacity Factor (r6) Assumed Wind Capacity Factor (r6) Capacity Sector (r6) Assumed Wind Capacity Factor (r6) Capacit Cost of Wind (S/MW) Transmission Costs (S/MW) Total Capital Cost of Ullity-Owned Wind (S) NPV Wind Generation at Utility RCE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (S) PT C Fride (S/MWh) Wind O Xex Expense (S/MWh) Wind O Xex Expense (S/MWh) Wind O Xex Expense (S/MWh) Wind Generation At Utility Shareholder DR (MWh) Wind Generation (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) Wind PA Artic (S/MWh) Wind PA Artic (S/MWh) Wind PA Artic (G/MWh) Wind PA Artic (G/MWh) Wind PA Artic (G/MWh) Sidar Capacity Factor (%) Sidar Capacity Factor (%) Sidar Capacity Factor (%) <td>77% 255,622 47% 47% 62 330 51,50,000 53,3316,641 2,492,511 54,292,511 54,292,511 54,292,512 54,042,761 2,333,458 2,237,018 57,00 54,042,761 2,233,458 2,237,018 523,41 300 51,00,000 51,0000 53,326 300 53,326 1,922,542 2,005,210 53,325 2,085,210 1,722,504 2,095,210 1,722,504 1,915,210 1</td>	77% 255,622 47% 47% 62 330 51,50,000 53,3316,641 2,492,511 54,292,511 54,292,511 54,292,512 54,042,761 2,333,458 2,237,018 57,00 54,042,761 2,233,458 2,237,018 523,41 300 51,00,000 51,0000 53,326 300 53,326 1,922,542 2,005,210 53,325 2,085,210 1,722,504 2,095,210 1,722,504 1,915,210 1
Utility-Owned Wind Metrics: Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Vind Capacity Factor in the Region (%) Reg'd Replacement Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capatal Cost of Wind (5/MW) Transmission Costs (5/MW) Transmission Costs (5/MW) NPV Wind Generation at Utility RQE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (5) PTC Price (5/MWh) Wind Oken Expense (5/MWh) Wind Oken Expense (5/MWh) Wind Oken Expense (5/MWh) Wind Generation at Utility Shareholder DR (MWh) Wind Oken Expense (5/MWh) Wind PA Aretics: Impact on NPV Revenue Required of Capital Costs Net PTC (5) NPV Wind Generation at Utility Shareholder DR (MWh) Wind PA Aretics: Impact on NPV Revenue Required of Capital Costs Net PTC (5) NPV Wind Generation at Utility Shareholder DR (MWh) Wind PA Aretics: Impact on Share Capacity (MW) Solar Capacity Factor (%) Solar Capacity Factor (%) Solar Plant Legdit Life (Yrs) Capital Cost of Solar (5/MWH) Total Cost of Solar (5/MWH) Total Cost of Solar (5/MWH) NPV Solar Generation at Utility ROE Discount Rate (MWh) NPV Solar Generation at Utility Rote Discount Rate (MWh) NPV Solar Generation RATE (S) Solar PPA Apprece (S/NWH) NPV Solar Generation RATE (S) Solar PPA Apprece (S/NWH) NPV Solar Generation At Utility Rote Discount Rate (MWh) Solar Capacity At Cost of Debt Assumed Cost of Debt Assumed Cost of Debt Assumed Cost of Debt Assumed Cost of Deb	77% 255,622 47% 62 30 513,50,000 533,816,641 0,93 2,492,511 51,971,842 523,816,641 531,971,842 532,971,842 534,042,761 2,432,458 2,233,458 2,233,458 2,233,458 2,233,458 2,233,458 2,233,458 2,233,458 2,233,458 2,233,458 2,233,458 2,233,458 2,233,458 2,233,458 2,233,458 2,233,458 2,233,458 2,233,458 2,233,458 2,233,458 2,000 300 300 301000 800 3030 31,00,000 3030 31,000,000 3030 31,019,0233 300
Utility-Owned Wind Metrics: Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Req' Replacement Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capital Cost of Wind (5/MWH) Transmission Costs (5/MW) Transmission Cost (5/MWh) NPV Mind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (5) PIC Price (5/MWh) NPV VINC (Sile (5) Wind ORE Repense (5/MWh) Wind PAP Areind (MWh) Wind PAP Areind (MWh) Wind PAP Areind (Yrs) Post-PAP Areind Costs Interfers Brown of Cost (5/MWh) Wind PAP Areind (Yrs) Req' Replacement Solar Capacity (MW) Solar Capacity Factor (%) Solar Plant Useful (FYS) Capital Cost of Solar (5/MWh) WY Solar Generation at Utility ROE Discount Rate (MWh) Wind PAP Areind (Yrs) Post-PAP Areind Cost Interease Utility-Owned Solar Metrics: Req'd Replacement Solar Capacity (MW) Solar Plant Useful Life (Yrs) Capital Cost of Solar (5/MWh) WY Solar Generation at Utility ROE Discount Rate (MWh) NFY Solar Generation At Utility ROE Discount Rate (MWh)	77% 255,622
Utility-Owned Wind Metrics: Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Vind Capacity Factor in the Region (%) Assumed Vind Capacity Factor (%) Reg 'd Replacement Wind Capacity (MW) Wind Plant Usefu Life (Yrs) Capatial Cost of Utility-Owned Wind (5) NPV MACS (%) NPV Wind Generation at Utility RCE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (5) PTC Price (S/NWh) Wind Dex Express (S/NWh) Wind Obex Lespense (S/NWh) Wind Obex Lespense (S/NWh) Wind Obex Lespense (S/NWh) NPV Wind Generation at Utility Shareholder DR (MWh) Wind PPA Netrics: Impact on NPV Revenue Required of Capital Costs Net PTC (5) Wind Obex Lespense (S/NWh) Wind PPA Netrics: Impact on NPV Revenue Required of Capital Costs Net PTC (5) NPV Wind Generation (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) Solar Pant Useful (Frs) Prost-PAP Areirod Obe Increase Utility-Owned Solar Metrics: Reg 'd Replacement Solar Capacity (MW) Solar Capality Capacity (S/WM) Transmission Costs (S/MWh) Transmission Costs (S/MWh) NPV Solar Generation at Utility Shareholder DR (MWh) NPV Solar Generation at Utility Shareholder DR (MWh) Solar PPA Areics (S/MWh) Solar PPA Preiod Obe M (Kriss) Share PPA Areics (Shareholder DR (MWh) NPV Solar Generation at Utility Shareholder DR (MWh) Share PPA Areics (Shareholder DR (MWh) Share PPA Areics (Shareholder DR (MWh) NPV Solar Ge	77% 255,622 47% 662 300 51350,000 533,816,641 50,971,842 500,11 501,971,842 500,11 501,971,842 510,971,842 500,11 534,925,082 544,042,761 2,333,458 2,237,018 533,458 2,237,018 50,000 51,000,00 533,59 2,085,210 1,092,250 2,005,210 1,005,20 533,59 2,085,210 1,722,504 7,006 5,006 5,006 5,006 5,006 800 5,006 800 5,005 800 5,005 800 5,005 800 5,005 800 5,005 800 800 5,005 800 5,005 800 5,005 800 5,005 800 5,005 800 5,005 800 5,005 800 5,005 800 5,005 800 5,005 800 5,005 800 5,005 800 800 5,005 800 5,005 800 5,005 800 800 5,005 800 5,005 800 800 5,005 800 800 5,005 800 800 5,005 800 800 5,005 800 800 5,005 800 800 5,005 800 800 5,005 800 800 5,005 800 800 5,005 5,005 800 5,005 800 5,005 800 5,005 800 5,005 800 5,005 800 5,005 5,005 800 5,005 5,005 800 5,005 5,005 800 5,005 800 5,005 5,005 5,005 800 5,005 5,005 5,005 5,005 5,005 5

Neal Station 3 (IPL)	Unit Name
Existing Brown Plant Snapshot:	
Plant Type	Conventional Steam Coal
Current Net Plant Balance (\$)	\$24,990,205
Current Total Retirement Cost (\$) Net Capacity (MW)	\$51,222,705
Assumed Year of Early Retirement	2021
Current Remaining Life (Yrs) Amortization Period of Regulatory Asset with Early Retirement	13
Capacity Factor (%)	44.88%
Net Generation (MWh)	642,939
NPV Brown Plant Generation at Utility ROE Discount Rate (MWh)	4,663,233
Operating Costs (\$/MWh) Fuel Portion of Coal MCOE	\$37.13 75%
Fuel Hedge Adder	0%
Consulting the and Consult Assumptions	
Securitization and Green Bond Assumptions: Securitization Assumed Interest Rate	3.10%
Securitization Bond Tenor	13
Green Bond Assumed Interest Rate Green Bond Tenor	3.75%
Share of Securitization Savings For Transition Assistance	15%
Include Transition Assistance in Regulatory Asset Case?	Yes
Calculate Savings Relative to Regulatory Asset Case or BAU Case? Does the green bond affect the utility's allowed ROR?	BAU Case No
Is the utility recycling the proceeds from securitization or green bond?	Yes
Is the capital structure of the new facility different from the utility's?	No
If yes, input the new facility's debt ratio here:	50.00% No
Does the new facility's capital structure impact the utility's allowed ROR?	NO
Other Financial Metrics/Ratios:	
Ratepayer Discount Rate	7.00%
Shareholder Discount Rate Utility's Allowed ROR (%)	9.60%
Utility's Allowed ROR used (accounting for deductability of interest)	6.51%
Plant Allowed ROR used (accounting for deductability of interest)	6.51% 7.19%
Wind Allowed ROR used (accounting for deductability of interest) Solar Allowed ROR used (accounting for deductability of interest)	6.51%
Equity Ratio (%)	49.00%
Utility's Allowed ROE (%)	9.60%
Existing Plant Allowed ROE (%) Wind Allowed ROE (%)	9.60%
Solar Allowed ROE (%)	9.60%
Assumed Allowed Preferred Equity Ratio	0.00%
Assumed Allowed Return on Preferred Equity (ROPE) Implied Debt Ratio	0.00%
Implied Cost of Debt	5.09%
Cost of Debt (%)	3.75%
Federal Corporate Tax Rate Utility's Blended Tax Rate (%)	21.00% 30.48%
Brown Plant Assumed Starting Book-Tax Disparity	50.00%
Macro Inflation	2.0%
O&M and Fuel Escalator	2.5%
Utility-Owned Wind Metrics:	
Wind Services Value as Percentage of Brown Plant Services Value	74%
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh)	868,836
Wind Services Value as Percentage of Brown Plant Services Value	
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Reg'd Replacement Wind Capacity (MW)	868,836 47% 47% 211
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Reg'd Replacement Wind Capacity (MW)	868,836 47% 47% 211 30
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Reg d' Replacement Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capital Cost of Wind (5/MW) Transmission Costs (5/MW)	868,836 47% 47% 211
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Req'd Replacement Wind Capacity (MW) Wind Plant Useful Life (frs) Capital Cost of Wind (S/MW) Transmission Costs (S/MW) Total Capital Cost of Utility-Owned Wind (\$)	868,836 47%, 47%, 211 30 \$1,350,000 \$1,350,000 \$284,885,178
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Reg'd Replacement Wind Capacity (MW) Wind Plant Useful Life (Vrs) Capital Cost of Wind (5/MW) Transmission Costs (5/MW) Total Capital Cost of Utility-Owned Wind (\$) NV MACR5 (%)	868,836 47% 247% 211 30 51,350,000 \$284,885,178 0.78
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Req'd Replacement Wind Capacity (MW) Wind Plant Useful Life (frs) Capital Cost of Wind (S/MW) Transmission Costs (S/MW) Total Capital Cost of Utility-Owned Wind (\$)	868,836 47%, 47%, 211 30 \$1,350,000 \$1,350,000 \$284,885,178
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity (Attor in the Region (%) Reg'd Replacement Wind Capacity (MW) Wind Plant Useful Life (trs) Capital Cost of Wind (S/MW) Transmission Costs (S/MW) Transmission Costs (S/MW) NPV MACRS (%) NPV Wind Generation at Utility ROE Discount Rate (MWh) Impact O Capital Cost on NPV Revenue Required (\$) PT Critic (\$)/Why)	868,836 47% 47% 211 30 \$1,350,000 500 \$284,885,178 6,878 8,471,818 \$312,663,969 \$232,31
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Req'd Replacement Wind Capacity (MW) Wind Plant Useful Life (Vrs) Capital Cost of Wind (S/MW) Transmission Costs (S/MW) Total Capital Cost of Utility-Owned Wind (\$) NPV MACRS (%) Mippet of Capital Cost on NPV Revenue Required (\$) PTC Price (S/MWh) NPV WRC (S)	868,836 47%, 47%, 211 30 51,350,000 5284,885,178 0,78 8,477,818 5312,603,969 5312,603,966,511 5162,906,611
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Reg'd Replacement Wind Capacity (MW) Wind Plant Useful Life (Vrs) Capital Cost of Wind (5/MW) Transmission Costs (5/MW) Total Capital Cost of Utility-Owned Wind (\$) NPV WARGS (%) NPV Mind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (\$) PT Crice (5/MWh) NPV V WARCS (\$)	868,836 47% 47% 211 30 \$1,350,000 500 \$284,885,178 6,878 8,471,818 \$312,663,969 \$232,31
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Reg 'd Replacement Wind Capacity (MW) Wind Plant Useful Life (Vrs) Capital Cost of Wind (5/MW) Transmission Costs (5/MW) Total Capital Cost of Utility-Owned Wind (\$) NPV WACK (%) NPV MACK (%) NPV Wind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (\$) PT C Price (\$/MWh) NPV PY CIC (\$) Impact on NPV Revenue Required of Capital Costs Net PTC (\$) Wind QAM Expense (\$/NWh)	868336 47% 47% 211 30 \$1,350,000 \$284,885,178 0.78 8,471,818 \$312,603,969 520.31 \$142,906,611 \$142,907,359
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Sumed Wind Capacity Factor in the Region (%) Req' a Replacement Wind Capacity (MW) Wind Tapacity Factor (%) Req' a Replacement Wind Capacity (MW) Wind Tapacity Factor (%) Capital Cost of Wind (S/MW) Transmission Costs (S/MW) Total Capital Cost of Utility-Owned Wind (\$) NPV MACRS (%) PIC Price (S/MWh) PIC Price (S/MWh) NPV PTC Value (\$) Impact on NPV Revenue Required (\$) PIC Price (S/MWh) NPV PTC Value (\$) Impact on NPV Revenue Required Costs Net PTC (\$) Wind OBAL Expense (\$/MWh) Wind OPAL Metrics:	868,836 47% 47% 211 30 51,350,000 500 5284,885,178 8,471,818 \$312,603,905 512,203,81 5162,906,611 5162,906,611 5149,697,359 57,200
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Reg'd Replacement Wind Capacity (MW) Wind Plant Useful Life (Vrs) Capital Cost of Wind (5/MW) Transmission Costs (5/MW) Total Capital Cost of Utility-Owned Wind (5) NPV MACR (%) NPV MACR (%) Mind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (5) PTC Price (5/MWh) NPV PTC Value (5) Impact on NPV Revenue Required of Capital Costs Net PTC (5) Wind OPA Metrics: Impact Nor NPV Revenue Required of Capital Costs Net PTC (5)	868336 47% 47% 211 30 \$1,350,000 \$284,885,178 0.78 8,471,818 \$312,603,969 520.31 \$142,906,611 \$142,907,359
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity (RWV) Reg'd Replacement Wind Capacity (RWV) Wind Plant Useful Life (Vrs) Capital Cost of Wind (S/MW) Transmission Costs (S/MW) Total Capital Cost of Utility-Owned Wind (\$) NPV MACRS (%) NPV MACRS (%) PTC Price (S/MWh) PTC Price (S/MWh) NPV PTC Value (S) Impact on NPV Revenue Required (S) PTC Price (S/MWh) NPV PTC Value (S) Wind OBM Expense (S/MWh) Wind PPA Metrics: Impact NP Revenue Required of Capital Costs Net PTC (S) NPV Wind Generation at Utility Shareholder DR (MWh)	868,836 47% 47% 211 30 51,350,000 5284,885,178 0,78 8,471,818 5312,603,969 5312,603,969 5312,603,969 5312,903,6611 5,162,906,611 5,164,697,359 5,7000 5,7000 5,7000 5,70000000000
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Regrid Replacement Wind Capacity (MW) Wind Plant Useful Life (Vrs) Capital Cost of Wind (5/MW) Transmission Costs (5/MW) Total Capital Cost of Utility-Owned Wind (5) NPV MACRS (%) NPV Mind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revence Required (5) PTC Price (5/MWh) NPV PTC Value (5) Impact on Capital Costs on NPV Revence Required (5) PTC Price (5/MWh) Wind PPA Metrics: Impact on Capital Costs on NPV Revence Required of Capital Costs Net PTC (5) Wind PPA Metrics: Impact on Capital Costs ON Wh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) NPV Wind Generation (S/MWh)	86833 47% 47% 211 30 \$1,350,000 \$284,885,173 0.78 8,471,818 \$312,603,603 \$149,697,359 \$7,00 \$149,697,359 \$149,697,359 \$149,697,359 \$1,991,214 7,931,214 7,603,423 \$23,41
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Reg 'd Replacement Wind Capacity (MW) Wind Plant Useful Life (Vrs) Capital Cost of Wind (5/MW) Transmission Costs (5/MW) Total Capital Cost of Utility-Owned Wind (5) NPV WACK5(%) NPV Wind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (5) PTC Price (5/MWh) NPV PFC Value (5) Impact on NPV Revenue Required of Capital Costs Net PTC (5) Wind PPA Metrics: Impact on APV Revenue Required of Capital Costs Net PTC (5) NPV Wind Generation at Utility Sareholder DR (MWh) Wind PPA Arcice (5/MWh) NPV Wind Generation at Utility Sareholder DR (MWh) Wind PPA Arcice (5/MWh) Wind PPA Arcice (5/MWh)	868,836 47% 47% 211 30 51,350,000 5284,885,178 0,78 8,471,818 5312,603,969 5312,603,969 5312,603,969 5312,903,6611 5,162,906,611 5,164,697,359 5,7000 5,7000 5,7000 5,70000000000
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Reg 'd Replacement Wind Capacity (MW) Wind Plant Useful Life (Vrs) Capital Cost of Wind (5/MW) Transmission Costs (5/MW) Total Capital Cost of Utility-Owned Wind (5) NPV WACK5(%) NPV Wind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (5) PTC Price (5/MWh) NPV PFC Value (5) Impact on NPV Revenue Required of Capital Costs Net PTC (5) Wind PPA Metrics: Impact on APV Revenue Required of Capital Costs Net PTC (5) NPV Wind Generation at Utility Sareholder DR (MWh) Wind PPA Arcice (5/MWh) NPV Wind Generation at Utility Sareholder DR (MWh) Wind PPA Arcice (5/MWh) Wind PPA Arcice (5/MWh)	868,836 47% 47% 211 30 51,350,000 5284,885,178 0,7,8 8,471,818 5312,603,969 530,31 5162,906,611 5162,906,611 5162,906,611 5162,906,611 5162,906,611 5164,907,359 7,931,214 7,603,423 523,41 3,523,41 3,00%
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Reg'd Replacement Wind Capacity (MW) Wind Fant Useful Life (Vrs) Capital Cost of Wind (5/MW) Transmission Costs (5/MW) Total Capital Cost of Utility-Owned Wind (5) NPV MACRS (%) NPV MIG Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (5) PTC Price (5/MWh) NPV PTC Value (5) Impact to Capital Costs on NPV Revenue Required (5) Wind O&M Expense (5/MWh) Wind Generation at Utility RoE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (5) PTC Price (5/MWh) Wind O&M Expense (5/MWhh) Wind Generation (WMh) NPV Wind Generation at Utility Shareholder DR (MWh) NPV Wind Generation AUBIty Shareholder DR (MWh) NPV Wind Generation AUBIC Shareholder DR (MWh) Wind PAP Areid (rs) Wind PAP Areid (rs) Wind PAP Areid (rs) Post-PPA Period (rs) Post-PPA Period (Rs)	868336 47% 47% 211 30 \$1,350,000 \$284,885,178 8,471,818 \$312,603,969 520,31 \$149,697,359 \$7,00 \$149,697,359 \$150,607,607,607,607,607,607,607,607,607,60
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Reg'd Replacement Wind Capacity (MW) Wind Fant Useful Life (Vrs) Capital Cost of Wind (5/MW) Transmission Costs (5/MW) Total Capital Cost of Utility-Owned Wind (5) NPV MACRS (%) NPV MIG Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (5) PTC Price (5/MWh) NPV PTC Value (5) Impact to Capital Costs on NPV Revenue Required (5) Wind O&M Expense (5/MWh) Wind Generation at Utility RoE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (5) PTC Price (5/MWh) Wind O&M Expense (5/MWhh) Wind Generation (WMh) NPV Wind Generation at Utility Shareholder DR (MWh) NPV Wind Generation AUBIty Shareholder DR (MWh) NPV Wind Generation AUBIC Shareholder DR (MWh) Wind PAP Areid (rs) Wind PAP Areid (rs) Wind PAP Areid (rs) Post-PPA Period (rs) Post-PPA Period (Rs)	868,836 47% 47% 211 30 51,350,000 500 5284,885,173 6,350 5312,603,906 512,603,906 512,603,906 513,512,906,611 5149,697,359 7,931,214 7,603,423 523,41 523,41 9,00% 200
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Sumed Wind Capacity Factor in the Region (%) Assumed Wind Capacity Factor in the Region (%) Req' a Replacement Wind Capacity (MW) Wind Tapacity Factor (%) Capital Cost of Wind (S/MW) Transmission Costs (S/MW) Total Capital Cost of Utility-Owned Wind (\$) NPV MACRS (%) PV PW Mind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Cost on NPV Revenue Required (\$) PT Crize (S/MWh) NPV DTC Value (\$) Impact on NPV Revenue Required of Capital Costs Net PTC (\$) Wind OBAL Expense (\$/MWh) Wind OBAL Expense (\$/MWh) Wind Generation At Utility Shareholder DR (MWh) NPV Wind Generation (\$Wh) NPU PA Assumed WACC Wind PA Peried (\$S) SysterPA Peried (Yas) Post-Proid OBAL Increase	868,836 47% 47% 211 30 51,350,000 500 5228,485,173 8,471,818 5312,603,906 513 5149,697,359 57,00 5149,697,359 7,931,214 7,603,423 523,41 9,00% 20 100%
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Sumed Vind Capacity Factor in the Region (%) Req'd Replacement Wind Capacity (MW) Wind Tapacity Factor (%) Sumed Wind Capacity (RWV) Wind Vind (S/MW) Transmission Costs (S/MW) Total Capital Cost of Utility-Owned Wind (\$) NPV MACRS (%) NPV Wind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (\$) PTC Price (S/MWh) Wind O& Response (S/MWh) Wind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (\$) PTC Price (S/MWh) Wind O& Response (S/MWh) Wind O& Response (S/MWh) Wind OA Response (S/MWh) Wind Seneration at Utility Shareholder DR (MWh) NPV Wind Generation at Utility Shareholder DR (MWh) NPV Wind Generation at Utility Shareholder DR (MWh) NPV Wind Generation at Utility Shareholder DR (MWh) Wind PPA Asymed WACC Wind PPA Peried (S/MN) Wind PPA Peried (SMM Increase Utility-Owned Solar Metrics: Req'd Replacement Solar Capacity (MW)	86835 47% 47% 211 30 51,350,000 5288,485,178 8,471,818 5312,603,469 5149,697,359 5,149,697,359 7,931,214 7,603,423 5243,677,359 7,931,214 7,603,423 5244,07,359 2,5149,677,359 7,931,214 7,603,423 5244,0 200 100% 200 100% 202 30 202 202 30 202 30 30 30 30 30 30 30 30 30 30
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity (RWV) Wind Capacity Factor (%) Assumed Wind Capacity (RWV) Wind Yang Capacity Factor (%) Assumed Wind Capacity (RWV) Wind Yang Capacity Factor (%) Assumed Wind Capacity (RWV) Transmission Costs (S/MW) Total Capital Cost of Utility Owned Wind (\$) NPV MACRS (%) PV Vind Generation at Utility ROE Discount Rate (MWh) Impact on NPV Revenue Required (\$) PT Crice (S/MWh) NPV MMC DAM Expense (\$/NWh) Wind OAM Expense (\$/NWh) Wind Generation (MWh) NPV Wind Generation (Wh) NPV Wind Generation (Wh) NPV Wind Generation (Wh) NPV Wind Generation (Whi) Wind PA Assumed WACC Wind PA Paried (Yrs) Past Paried O&M Increase Utity-Owned Solar Metrics:	86835 47% 47% 211 30 \$1,350,000 \$284,885,173 \$471,818 \$312,603,669 \$20,319 \$149,697,359 \$149,697,359 \$149,697,359 \$149,697,359 \$149,697,359 \$149,697,359 \$23,41 3,00% \$23,41 3,00% \$23,41 3,00% \$23,41 3,00% \$23,41 3,00% \$23,41 3,00% \$23,41 3,00% \$23,41 3,00% \$24,419,627,359 \$23,41 3,00% \$24,00% \$23,41 3,00% \$23,41 3,00% \$23,41 3,00% \$23,41 3,00% \$24,00% \$23,41 3,00% \$24,00% \$23,41 3,00% \$24,00% \$25,21 \$35,200 \$35,100,000 \$35,100,000
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity (MW) Wind Capacity Factor (%) Assumed Wind Capacity (MW) Wind Capacity Factor (%) Assumed Wind Capacity (MW) Transmission Costs (S/MW) Total Capital Cost of Vinity Owned Wind (\$) NPV Mind Generation at Utility ROE Discount Rate (MWh) Impact on SVP Kerenue Required (\$) PT crice (S/MWh) NPV Wind Generation at Utility ROE Discount Rate (MWh) Impact on SVP Kerenue Required of Capital Costs Net PTC (\$) Wind O&M Expense (\$/MWh) NPV Wind Generation (MWh) NPV Wind Generation (\$/MWh) NPV Wind Generation (\$/MWh) NPV Wind Generation (\$/MWh) NPV Wind Generation (\$/MWh) Wind PA Partice (\$/MWh) Solar Capacity Factor (\$/s) Solar Capacity Factor (\$/s) Solar Capacity Factor (\$/s) Solar Capacity	86833 47% 47% 211 30 \$1,350,000 \$284,885,178 8,471,818 \$312,603,969 \$20,31 \$149,697,359 \$7,00 \$149,697,359 \$7,00 \$149,697,359 \$23,41 7,931,214 7,932
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Assumed Wind Capacity Factor in the Region (%) Req' Replacement Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capital Cost of Wind (S/MW) Transmission Costs (S/MW) Total Capital Cost of Utility-Owned Wind (§) NPV MACRS (%) NPV MACRS (%) NPV PIC Value (S) The Price (S/MWh) Owned Capital Costs on NPV Revenue Required (S) PTC Price (S/MWh) NPV PIC Value (S) Wind ORM Expense (S/MWh) Wind ORM Expense (S/MWh) NPV Wind Generation at Utility Share Index Set PTC (S) Wind ORM Expense (S/MWh) NPV PIC Value (S) Wind ORM Expense (S/MWh) NPV Wind Generation (MWh) NPV Mind Generation (MWh) NPM PA Price (S/MWh) Wind PA Artice Solar Space (S/MW) Solar Plant Useful Life (Yrs) Capital Cost of Jolar (S/MW) Total Cost of Utility-Owned Solar (S) NPV Solar Generation at Utility RoE Discount Rate (MWh) NPS Visol Generation (S/MW) Solar Plant Useful Life (Yrs) Capital Cost of Solar (S/MW) Total Cost of Utility RoE Discount Rate (MWh)	868,836 47% 47% 211 30 51,350,000 500 5284,885,178 6,379 5284,885,178 5324,603,906,511 5149,697,359 7,931,214 7,603,423 532,341 532,341 532,341 500% 200 50% 200 50% 200 50% 200 50% 200 50% 200 50% 200 50% 20% 20% 20% 20% 20% 20% 20% 20% 20% 2
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity (MW) Wind Capacity Factor (%) Assumed Wind Capacity (MW) Wind Plant Useful Life (trs) Capital Cost of Wind (S/MW) Transmission Costs (S/MW) Total Capital Cost of Villity Owned Wind (\$) NPV Mind Generation at Utility ROE Discount Rate (MWh) Impact on SVP Kevenue Required (\$) PT crice (S/MWh) NPV Wind Generation at Utility ROE Discount Rate (MWh) Impact on SVP Kevenue Required of Capital Costs Net PTC (\$) Wind O&M Expense (\$/MWh) NPV Wind Generation (MWh) Wind PPA Aretics Reg'd Replacement Solar Capacity (MW) Solar Capacity Factor (%) Solar C	86833 47% 47% 211 30 \$1,350,000 \$284,885,178 8,471,818 \$312,603,969 \$20,31 \$149,697,359 \$7,00 \$149,697,359 \$7,00 \$149,697,359 \$23,41 7,931,214 7,932
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Assumed Wind Capacity Factor in the Region (%) Req' a Replacement Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capital Cost 1 of Wind (S/MW) Transmission Costs (S/MW) Total Capital Cost of Utility-Owned Wind (\$) NPV MACRS (%) NPV Wind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (\$) PT Crice (S/MWh) NPV PTC Value (\$) Impact on NPV Revenue Required Cost Net PTC (\$) Wind O&M Expense (\$/MWh) NPV Wind Generation at Utility Shareholder DR (MWh) NPV PTC Value (\$) Impact on NPV Revenue Required of Capital Costs Net PTC (\$) Wind O&M Expense (\$/MWh) NPV Wind Generation (\$/MWh) Sider PPA Period (Yrs) Dist-PPA Period (Yrs) Osar Capacity Factor (\$) Solar Capacity Factor (\$) Solar Capacity (S/MW) Transmission Costs (\$/MW) Transmission Costs (\$/MW) Transmission Costs (\$/MW) Transmission Costs (\$/MW) Total Cost of Utility-Owned Solar (\$) NPV Solar Ceneration at Utility ROE Discount Rate (MWh) Transmission Costs (\$/MWh) Transmission Costs (\$/MWh)	86835 47% 47% 211 30 \$1,350,000 \$288,485,178 \$312,603,969 \$312,603,969 \$312,603,969 \$312,603,969 \$312,603,969 \$312,603,969 \$312,603,963 \$312,603,97359 7,931,214 7,603,423 7,931,214 7,603,423 20 100% \$288,316,962 \$288,336,962 \$288,366,962 \$288,366,962 \$2888,366,962 \$2886,366 \$2886,36
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Assumed Wind Capacity Factor in the Region (%) Req' Replacement Wind Capacity (MW) Wind Plant Useful Life (trs) Capital Cost of Wind (S/MW) Transmission Costs (S/MW) Total Capital Cost of Utility-Owned Wind (S) NPV MACRS (%) NPV Wind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Cost on NPV Revenue Required (S) PC Price (S/MWh) NPV PTC Value (S) Impact on NPV Revenue Required of Capital Costs Net PTC (S) Wind OBAL Expense (S/MWh) Wind OBAL Expense (S/MWh) NPV Wind Generation (MWh) NPV Solar Capacity (S/WW) Solar Pattor (S/S) Solar Jant Usefu (Sing Capacity (MW) Solar Capacity Fator (%) Solar	868,836 47% 47% 211 30 51,350,000 5228,485,173 63,471,618 5312,603,905 513,503 5149,697,359 7,931,214 7,603,423 5149,697,359 7,931,214 7,603,423 523,41 9,0% 20 100% 20 5149,697,359 7,931,214 7,603,423 523,41 9,0% 20 51,00000 51,00000 51,00000 5288,336,502 5288,336,502 5288,336,502 53,263 543 543 543 543 543 543 543 543 543 54
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Mind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Req' d Replacement Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capital Cost of Winity-Owned Wind (\$) NPV MACRS (%) NPV MACRS (%) Mind Capacity Costs on NPV Revenue Required (\$) PTC Price (\$/MWh) Wind OBeneration at Utility OCD Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (\$) PTC Price (\$/MWh) Wind OBE Resense (\$/MWh) Wind OBE Resense (\$/MWh) Wind OBE Resense (\$/MWh) Wind PA Metrics: Impact on NPV Revenue Required of Capital Costs Net PTC (\$) NPV Wind Generation (MWh) NPV Wind Generation (WMh) NPV Wind Generation (WMh) Wind PA Price (\$/MWh) Wind PA Price (\$/MWh) Wind PA Price (\$/MWh) Solar Plant Useful Life (Yrs) Capacity Factor (\$/N Solar Plant Useful Life (Yrs) Capacity Factor (\$/N Solar Plant Useful Life (Yrs) Capatity Factor (\$/N Solar Plant Useful Life (Yrs)	868,836 47% 47% 211 30 51,350,000 5228,485,173 63,471,618 5312,603,905 513,503 5149,697,359 7,931,214 7,603,423 5149,697,359 7,931,214 7,603,423 523,41 9,0% 20 100% 20 5149,697,359 7,931,214 7,603,423 523,41 9,0% 20 51,00000 51,00000 51,00000 5288,336,502 5288,336,502 5288,336,502 53,263 543 543 543 543 543 543 543 543 543 54
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Assumed Wind Capacity Factor in the Region (%) Req' Replacement Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capital Cost of Wind (S/MW) Transmission Costs (S/MW) Total Capital Cost of Utility POC Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (S) PTC Price (S/MWh) NPV PTC Value (S/MWh) Wind OBM Expense (S/MWh) Wind OBM Expense (S/MWh) NPV Wind Generation at Utility Share Discount Rate (MWh) NPV PTC Value (S/MWh) Wind OBM Expense (S/MWh) NPV Wind Generation at Utility Shareholder DR (MWh) NPV Wind Generation (MWH) NPV Subre Generation (MWh) Solar Plant Useful Life (Yrs) Solar Plant Plante (S/MWh) Prot Solar Generation at Utility Rob Discount Rate (MWh) NPV Solar Generation (Wh) NPV Solar Generation (MWh) Solar Plant Here (S/MWh) NPV Solar Generation (MWh) Solar Plant Plante (S/MWh) NPV Solar Generation (MWh) Solar Plante (S/MWh) NPV Solar Generation (S/MWh) NPV Solar Generation (S/MWh) NPV Solar Generation (S/MWh) NPV Solar Gene	868,836 47% 47% 211 30 51,350,000 5288,485,178 8,471,818 5312,003,669 5149,667,359 5149,667,359 5,149,677,359 7,931,214 7,603,423 5243,03,429 200 100% 2262 248,336,962 300 51,100,000 51,100,000 5,288,336,962 6,269,145 30% 5,33,00 5,33,00 5,33,00 5,33,59 6,811,305 1000 10
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Wind Capacity Factor (%) Assumed Wind Capacity (MW) Wind Plant Useful Life (trs) Capital Cost of Wind (S/MW) Transmission Costs (S/MW) Transmission Costs (S/MW) Total Capital Cost of Utility Owned Wind (\$) NPV MACRS (%) NPV Wind Generation at Utility ROE Discount Rate (MWh) Impact on RPV Revenue Required (\$) Pr Price (S/MWh) NPV PT Value (\$) Impact on RPV Revenue Required of Capital Costs Net PTC (\$) Wind O&M Expense (S/MWh) NPV Wind Generation (S/MWh) NPV PT Value (\$) Impact on NPV Revenue Required of Capital Costs Net PTC (\$) Wind O&M Expense (S/MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) Solar Capacity Factor (%) Solar Capacity Factor (%) Solar Capacity Factor (%) Solar Capacity (Firs) Capital Cost of (S/MW) Transmission Costs (S/MW) Transmission Costs (S/MW) Solar Capacity Factor (%) Solar Capacity Factor (%) Solar Capacity (Firs) Capital Cost of (S/MW) Transmission Costs (S/MW) Transmission Costs (S/MW) Transmission Costs (S/MW) Transmission Costs (S/MW) NPV Solar Generation at Utility Shareholder DR (MWh) NPV Solar Generation at Utility Shareholder DR NPV Solar Generation (MWh) NPV Solar Generation (MWh) NPV Solar Generation (MWh) NPV Solar Generation (MWh) NPV Solar Generation (MWh)	86835 300 300 311,350,000 312,350,000 312,350,300 312,603,965 312,603,965 312,603,965 312,603,965 312,603,965 312,603,965 312,603,965 312,603,965 312,603,965 312,603,962 313,005 3149,697,359 314
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Assumed Wind Capacity Factor in the Region (%) Req' Replacement Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capital Cost of Wind (S/MW) Transmission Costs (S/MW) Total Capital Cost of Utility POVE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (S) PTC Price (Capital Costs on NPV Revenue Required (S) PTC Price (S/MWh) Wind OBM Expense (S/MWh) Wind OBM Expense (S/MWh) Wind OBM Expense (S/MWh) NPV Wind Generation at Utility Shareholder DR (MWh) Mind OBM Expense (S/MWh) NPV Wind Generation at Utility Shareholder DR (MWh) NPV Wind Generation (MWh) NPV Stare Generation (MWh) Solar Plant Useful Life (Yrs) Capital Cost of Jolar (S/MW) Total Cost of Jolar (S/MW) Total Cost of JUlity-Owned Solar (S) NPV Solar Generation at Utility Shareholder DR (MWh) NPV Solar Generation at Utility Shareholder Cost Solar (S/MW) Total Cost of JUlity-Owned Solar (S) NPV Solar Generation At Utility Shareholder DR (MWh) NPV Solar Generation MWh) NPV Solar Generation (MWh) NPV Solar Generation	868,836 978 978 978 978 978 978 978 978
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Assumed Wind Capacity Factor in the Region (%) Req' a Replacement Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capital Cost 1 of Wind (S/MW) Transmission Costs (S/MW) Total Capital Cost of Utility-Owned Wind (\$) NPV MACRS (%) NPV Wind Generation at Utility Roc Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (\$) PT Price (S/MWh) NPV PTC Value (\$) Impact on NPV Revenue Required of Capital Costs Net PTC (\$) Wind O&M Expense (\$/NWH) Wind O&M Expense (\$/NWH) NPV Wind Generation (\$) NPV Wind Generation (\$) NPV Wind Generation (\$) NPV Wind Generation (\$) NPV Mind Generation (\$) NPV Wind Generation (\$) NPV Solar Generation (\$) NP	868,836 978 978 978 978 978 978 978 978
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Assumed Wind Capacity Factor in the Region (%) Req' deplacement Wind Capacity (MW) Wind Tapacity Factor (%) Assumed Wind Capacity (FW) Wind Capacity Factor (%) Assumed Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capital Cost of Vinity-Owned Wind (\$) NPV MACRS (%) NPV Wind Generation at Utility Owned Wind (\$) Mind Capacity (ES) Wind Capacity (ES) Wind Capacity (ES) Wind Capacity (ES) Wind CARS (%) Wind CARS (%) Wind CARS (%) Wind CAB Resense (S/MWh) Wind CAB Resense (S/MWh) Wind OR Resense (S/MWh) Wind OR Resense (S/MWh) Wind ORA Metrics: Impact on NPV Revenue Required of Capital Costs Net PTC (\$) NPV Wind Generation (WMh) NPV Wind Generation (WMh) Wind PA Price (S/MWh) Wind PA Period QM Increase Utility-Owned Solar Capacity (MW) Solar Plant Useful Life (Yrs) Capital Cost of Solar (S/MW)	868,836 47% 47% 211 30 \$1,350,000 \$288,485,178 \$312,003,969 \$312,003,969 \$312,003,969 \$312,003,969 \$312,003,969 \$312,003,969 \$312,003,969 \$312,003,973 \$1,403,697,359 7,931,214 7,603,423 \$2,007 \$2
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Assumed Wind Capacity Factor in the Region (%) Assumed Wind Capacity Factor in the Region (%) Req' Replacement Wind Capacity (MW) Wind Plant Useful Life (trs) Capital Cost of Wind (S/MW) Transmission Costs (S/MW) Total Capital Cost of Utility Owned Wind (\$) NPV MACRS (%) NPV Wind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Cost on NPV Revenue Required (\$) PC Price (S/MWh) NPV PTC Value (\$) Impact on NPV Revenue Required of Capital Costs Net PTC (\$) Wind O&M Expense (\$/MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWH) Solar Pattor (Yrs) Post-PPA Period CSM Increase Utility-Owned Solar (S) NPV Solar Capacity Fator (\$) Solar Capacity Fat	86835 6778 6778 6778 6778 6778 6778 6778 6778 6778 6778 6778 6778 6778 6778 67799 6779 6779 6779 6779 6779 6779 6779 6779 6779 6779
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Assumed Wind Capacity Factor in the Region (%) Req' deplacement Wind Capacity (MW) Wind Tapacity Factor (%) Assumed Wind Capacity (FW) Wind Capacity Factor (%) Assumed Wind Capacity (MW) Wind Plant Useful Life (Yrs) Capital Cost of Vinity-Owned Wind (\$) NPV MACRS (%) NPV Wind Generation at Utility Owned Wind (\$) Mind Capacity (ES) Wind Capacity (ES) Wind Capacity (ES) Wind Capacity (ES) Wind CARS (%) Wind CARS (%) Wind CARS (%) Wind CAB Resense (S/MWh) Wind CAB Resense (S/MWh) Wind OW Revenue Required of Capital Costs Net PTC (\$) Wind OW Revenue Required of Capital Costs Net PTC (\$) NPV Wind Generation (WMh) NPV Wind Generation (WMh) NPV Wind Generation (WMh) Wind PA Period QM Increase Utility-Owned Solar Capacity (MW) Solar Plant Useful Life (Yrs) Capital Cost of Solar (S/MW) Total Cost of Solar (S/MW) To	868,836 47% 47% 211 30 \$1,350,000 \$288,485,178 \$312,003,969 \$312,003,969 \$312,003,969 \$312,003,969 \$312,003,969 \$312,003,969 \$312,003,969 \$312,003,973 \$1,403,697,359 7,931,214 7,603,423 \$2,007 \$2
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Assumed Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Req' Replacement Wind Capacity (MW) Wind Tapacity Factor (%) Capital Cost of Wind (S/MW) Transmission Costs (S/MW) Total Capital Cost of Utility-Owned Wind (\$) NPV Mind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (\$) PTC Frice (S/MWh) Wind O&M Expens (S/MWh) Wind Generation at Utility Shareholder DR (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) Wind PA Freid Q&M Increase Utility-Owned Solar Metrics: Req'd Replacement Solar Capacity (WW) Solar Plant Useful Life (Yrs) Capital Cost of JUIIIty-Owned Solar (S) PW Solar Generation at Utility Shareholder DR (MWh) NPV Solar Gene	86835 47% 47% 211 30 51,350,000 5288,485,178 8,471,818 5312,003,69 54149,697,359 7,931,214 7,603,423 7,931,214 7,603,423 262 262 28% 300 51,000,00 500 500 500 500 500 500 5
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Mind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Req despacement Wind Capacity (MW) Wind Plant Useful Life (trs) Capital Cost of Wind (S/MW) Transmission Costs (S/MW) Transmission Costs (S/MW) Total Capital Cost of Utility Owned Wind (S) NPV MACRS (%) NPV Wind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Cost on NPV Revenue Required (S) PC Price (S/MWh) NPV PT Value (S) Impact on NPV Revenue Required of Capital Costs Net PTC (S) Wind O&M Expense (S/MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) Solar PAPA tector (%) Solar Plant Useful Life (Yrs) Capital Cost of Solar (S/MWH) Transmission Costs (S/MWH) Transmission Costs (S/MWh) Transmission Costs (S/MWh) NPV Solar Generation at Utility SOE Discount Rate (MWh) NPV Solar Generation (MWh) NPV Solar Generation (MWh) NPV Solar Generation (MWh) NPV Solar Generation at Utility SoE Discount Rate (MWh) Transmission Costs (S/MWH) Transmission Costs (S/MWH) Total Cost of Utility-Owned Solar (S) NPV Solar Generation at Utility SoE Discount Rate (MWh) NPV Solar Generation at Utility SoE Discount Rate (MWh) Solar PPA Assumed WACC Solar PPA Herice (S/MWh	86835 300 300 311,350,000 312,350,000 312,350,000 312,003,969 312,003,969 312,003,969 312,003,969 3149,697,359 3149,697,359 3149,697,359 3149,697,359 3149,697,359 3149,697,359 3149,697,359 323,41 3,050 3,100,000 3,200
Wind Services Value as Percentage of Brown Plant Services Value Required Generation (MWh) Assumed Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%) Req' Replacement Wind Capacity (MW) Wind Tapacity Factor (%) Capital Cost of Wind (S/MW) Transmission Costs (S/MW) Total Capital Cost of Utility-Owned Wind (\$) NPV Mind Generation at Utility ROE Discount Rate (MWh) Impact of Capital Costs on NPV Revenue Required (\$) PTC Frice (S/MWh) Wind O&M Expens (S/MWh) Wind Generation at Utility Shareholder DR (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) Wind PA Freid Q&M Increase Utility-Owned Solar Metrics: Req'd Replacement Solar Capacity (WW) Solar Plant Useful Life (Yrs) Capital Cost of JUIIIty-Owned Solar (S) PW Solar Generation at Utility Shareholder DR (MWh) NPV Solar Gene	86835 47% 47% 211 30 51,350,000 5288,485,178 8,471,818 5312,003,69 54149,697,359 7,931,214 7,603,423 7,931,214 7,603,423 262 262 28% 300 51,000,00 500 500 500 500 500 500 5

	Unit Name
Existing Brown Plant Snapshot:	
Plant Type	Conventional Steam Co
Current Net Plant Balance (\$)	\$23,362,4
Current Total Retirement Cost (\$) Net Capacity (MW)	\$57,916,3 178.8
Assumed Year of Early Retirement	20
urrent Remaining Life (Yrs)	
mortization Period of Regulatory Asset with Early Retirement	
apacity Factor (%)	51.45
let Generation (MWh)	806,08
VPV Brown Plant Generation at Utility ROE Discount Rate (MWh)	5,039,33
Operating Costs (\$/MWh)	\$27.
uel Portion of Coal MCOE	75
uel Hedge Adder	
ecuritization and Green Bond Assumptions:	
ecuritization Assumed Interest Rate	3.10
ecuritization Bond Tenor	
ireen Bond Assumed Interest Rate	3.75
ireen Bond Tenor	
hare of Securitization Savings For Transition Assistance	1
nclude Transition Assistance in Regulatory Asset Case? alculate Savings Relative to Regulatory Asset Case or BAU Case?	Y BAU Ca
Does the green bond affect the utility's allowed ROR?	BAUCA
s the utility recycling the proceeds from securitization or green bond?	Y
s the capital structure of the new facility different from the utility's?	
f yes, input the new facility's debt ratio here:	50.00
oes the new facility's capital structure impact the utility's allowed ROR?	
Other Financial Metrics/Ratios:	
latepayer Discount Rate	7.00
hareholder Discount Rate	9.60
Itility's Allowed ROR (%)	7.30
Julity's Allowed ROR used (accounting for deductability of interest)	6.5
Plant Allowed ROR used (accounting for deductability of interest)	6.5
Vind Allowed ROR used (accounting for deductability of interest) iolar Allowed ROR used (accounting for deductability of interest)	6.5
ouar Allowed ROR used (accounting for deductability of interest)	49.0
Jtility's Allowed ROE (%)	49.0
existing Plant Allowed ROE (%)	9.6
Vind Allowed ROE (%)	11.0
iolar Allowed ROE (%)	9.60
Assumed Allowed Preferred Equity Ratio	0.00
Assumed Allowed Return on Preferred Equity (ROPE)	0.00
mplied Debt Ratio	51.00
mplied Cost of Debt	5.09
Cost of Debt (%)	3.75
ederal Corporate Tax Rate	21.00
Jtility's Blended Tax Rate (%)	30.48
Brown Plant Assumed Starting Book-Tax Disparity	50.00
Macro Inflation D&M and Fuel Escalator	2.0
D&M and Fuel Escalator	2.:
Utility-Owned Wind Metrics:	
Wind Services Value as Percentage of Brown Plant Services Value	79
Required Generation (MWh)	1,020,36
Nind Capacity Factor (%)	47
Assumed Wind Capacity Factor in the Region (%)	47
Req'd Replacement Wind Capacity (MW)	24
Wind Plant Useful Life (Yrs)	3
Capital Cost of Wind (\$/MW)	\$1,350,0
Fransmission Costs (\$/MW)	
Fotal Capital Cost of Utility-Owned Wind (\$)	\$334,570,5
NPV MACRS (%)	0.7
NPV Wind Generation at Utility ROE Discount Rate (MWh)	9,949,34
Impact of Capital Costs on NPV Revenue Required (\$)	\$367,123,6
PTC Price (\$/MWh) NPV PTC Value (\$)	\$20. \$191,318,3
Impact on NPV Revenue Required of Capital Costs Net PTC (\$)	\$175,805,3
Wind O&M Expense (\$/MWh)	\$1/5,605,5
wind Oakw Expense (3/ wiwii)	375
Wind PPA Metrics:	
mpact on NPV Revenue Required of Capital Costs Net PTC (\$)	\$175,805,3
NPV Wind Generation (MWh)	9,314,45
NPV Wind Generation at Utility Shareholder DR (MWh)	8,929,49
Nind PPA Price (\$/MWh)	\$23.
Nind PPA Assumed WACC	9.0
Nind PPA Period (Yrs)	2
Post-PPA Period O&M Increase	100
SATTATENDO DAMINECISC	
Itility-Owned Solar Metrics:	
Jtility-Owned Solar Metrics: Reg'd Replacement Solar Capacity (MW)	
Jtility-Owned Solar Metrics: keg'd Replacement Solar Capacity (MW) iolar Capacity Factor (%)	21
Jtility-Owned Solar Metrics: tegʻd Replacement Solar Capacity (MW) olar Capacity Factor (%) clar Plant Usefi Life (Yrs)	21
Itility-Owned Solar Metrics: keq'd Replacement Solar Capacity (MW) olar Capacity Factor (%) olar Plant Usefu Life (Yrs) apital Cost of Solar (\$/MW)	21 5 \$1,100,0
Itility-Owned Solar Metrics: teq'd Replacement Solar Capacity (MW) olar Capacity Factor (%) alar Plant Usel (LI (Prs) 2apital Cost of Solar (S/MW) Tasmission Costs (S/MW)	21 5 \$1,100,0
Jtility-Owned Solar Metrics: keg & Replacement Solar Capacity (MW) olar Capacity Factor (%) olar Plant Usel (Life (Yrs) capital Cost of Solar (\$/MW) ramsmission Costs (\$/MW) calc Cost of Ullity-Cowned Solar (\$)	21 5 \$1,100,0 \$361,504,3
Itility-Owned Solar Metrics: legd Beglacement Solar Capacity (MW) olar Capacity Factor (%) olar Plant Useful Life (Yrs) aptial Cost of Solar (S/MW) rasmission Costs (S/MW) otal Cost of Utility-Owned Solar (5) WY Solar Generation at Utility RGD Discount Rate (MWh)	21 \$1,100,0 \$361,504,3 7,859,98
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Does the new facility's capital structure impact the utility's allowed RDR? 161 Chter Financial Metrics/Ratios: 2,005 Shareholder Discount Rate 2,005 Discount Rate 2,005 Shareholder Discount Rate 2,005 Distry Allowed ROR (b) 2,305 Distry Allowed ROR (b) 6,515 Distry Allowed ROR (b) 6,515 Salar Allowed ROR (b) 4,600 Salar Allowed ROR (b) 4,600 Utility A Indew ROR (b) 3,600 Salar Allowed ROE (b) 3,000 Salar Allowe	Is the capital structure of the new facility different from the utility's? If yes, input the new facility's debt ratio here:	
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Assumed Allowed Return on Preferred Equity (ROPE) 0.0005 Implied Debt Ratio 51.0057 Cost of Debt (S0) 3.7555 Sector Affattion 2.2005 Ulity Selended Tax Rate (S0) 3.04585 Source Inflation 2.055 ORM and Fuel Escalator 2.951 Wind Services Value as Presentage of Brown Plant Services Value 9.954 Required Generation (MWh) 2.030.156 Wind Capacity Factor Its In Region (%) 4.797 Assumed Wind Capacity Factor In the Region (%) 4.797 Assumed Wind Capacity Factor In the Region (%) 4.797 Assumed Wind Capacity Factor In the Region (%) 4.793 Capital Cost of Wind (SD) 5.030,000 Transinsion Costs on WP Revenue Required (S) 5.730,442,033 VI MACR (K) 0.02,331 NV Wind Generation at Utility ROE Discount Rate (MWh) 1.752,642,1332 Impact of Capital Costs Net PTC (S) 5349,788,431 Wind OAM Exeqnues (S/MWh) 5.030,534,623 <td></td> <td></td>		
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Solar Plant Useful Life (trs) 30 Solar Plant Useful Life (trs) \$11000,000 Transmission Costs (S/MW) \$50 Total Cost of Usifity Owned Solar (5) \$585,830,402 NPV Solar Generation at Utility ROE Discount Rate (MWh) 18,607,831 ITC 300, Solar O&M Expense (S/MWh) \$3,23 Post-PPA Period O&M Increase 1000% Solar PPA Price (S/MWh) \$3,23 Post-PPA Period O&M Increase 300 Solar PPA Price (S/MWh) \$3,23 NPV Solar Generation at Utility Shareholder DR (MWh) \$20,217,049 NPV Solar Generation at Utility Shareholder DR (MWh) \$20,217,049 NPV Solar Generation at Utility Shareholder DR (MWh) \$20,217,049 NPV Solar Generation at Utility Shareholder DR (MWh) \$20,217,049 NPV Solar Generation at Utility Shareholder DR (MWh) \$20,217,049 Solar PPA Period (Yrs) 20 Market.indexed Solar PPA Netrics: 20 Market.indexed Solar PPA Netrics: 20 Stare of Market.indexed Solar PPA Assumed WACC \$5,09% Stare of Market.indexed Solar PPA Assumed WACC \$1,000 <tr< td=""><td></td><td></td></tr<>		
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Total Cost of Utility-Owned Solar (5) S855380.462 NPV Solar Generation at Utility ROE Discount Rate (MWh) 18,607.831 TC 30% Solar O&M Expense (5/MWh) 53.30 Post-PAP. Period O&M Increase 100% Solar PA Metrics: 33 Solar Generation (MWh) \$33.30 PVS Solar Generation (MWh) \$33.30 PVS Solar Generation (MWh) \$33.30 PVP Solar Generation (MWh) \$33.30 PVP Solar Generation (MWh) \$0,217.049 NPV Solar Generation (MWh) 16,700,455 Solar PPA Andreics: 20 Solar PPA Andreid (Yrs) 20 Market-Indexed Solar PPA Metrics: 300 Assumed Cost of Debt 5,09% Assumed Cost of Debt 9,60% Assumed Cost of Debt (%) \$15,00% Size of Market-Indexed Solar PPA Ance (S/MWh) \$26.33 Market-Indexed Solar PPA Ance (S/MWh) \$26.33 Market-Indexed Solar PPA Ance (S/MWh) \$26.33 Market-Indexed Solar PPA Assumed WACC 6.51% Market-Indexed Solar PPA Assumed WACC 6.51%		
ITC 30% Solar O&M. Expense (S/MWh) 53.27 Post-PPA Net (S/MWh) 53.27 Solar PPA Netrics: 30% Solar PPA Netrics: 30% Solar PPA Netrics: 30% Solar PPA Netrics: 30% NPV Solar Generation at Utility Shareholder DR (MWh) 10,670.455 Solar PPA Netrics: 20 Solar PPA Netrics: 20 Market-Indexed Solar PPA Netrics: 20 Assumed Cost of Debt 5,09% Assumed Cost of Debt 5,09% Saured Cost of Debt 5,00% Saured Cost of Debt 5,00% Market-Indexed Solar PPA Netrics: 31,00% Market-Indexed Solar PPA Netrics: 31,00% Market-Indexed Solar PPA Netrics: 5,09% Market-Indexed Solar PPA Netrics: 31,00% Market-Indexed Solar PPA Netrics: 5,00% Market-Indexed Solar PPA Netrics: 31,00% Market-Indexed Solar PPA Assumed WACC 6,51% Market-Indexed Solar PPA Assumed WACC 6,51%	Total Cost of Utility-Owned Solar (\$)	\$855,830,492
Solar O&M Expense (5/MWh) 53.20 Post-PPA Period O&M Increase 100% Solar PPA Areid O&M Increase 100% Solar PPA Period O&M Increase 100% Solar PPA Areid O&M Increase 20,217,049 NIV Solar Generation at Utility Shareholder DR (MWh) 16,700,455 Solar PPA Areid Cost of Utility Shareholder DR (MWh) 16,700,455 Solar PPA Areid (Yrs) 20 Market-Indexed Solar PPA Metrics: 20 Assumed Cost of Debt 5,09% Assumed Cost of Debt (%) 51,00% State Of Market-Indexed Solar PPA Areid (Yrs) 51,00% State Of Market-Indexed Solar PPA Areid (Yrs) 51,00% Market-Indexed Solar PPA Areid (Yrs) 300 Market-Indexed Solar PPA Assumed WACC 6,51% Market-Indexed Solar PPA Assumed WACC 6,51%		
Pest-PPA Period 0&M Increase 100% Solar PPA Areis (SI/WM) 5333:90 Solar PPA Areis (SI/WM) 20,217,049 NPV Solar Generation (WWh) 10,200,457 Solar PPA Areis (SI/WM) 20,217,049 NPV Solar Generation at Utility Shareholder DR (MWh) 16,200,455 Solar PPA Areis (SI are PA Assumed WACC 7,00% Solar PPA Period (Yrs) 20 Market-Indexed Solar PPA Metrics: 3,00% Assumed Cost of Debt 5,09% Assumed Cost of Debt 5,00% Size of Market-Indexed Solar PPA Metrics: 9,50% Market-Indexed Solar PPA Areis (SJ/WMh) 51,00% Size of Market-Indexed Solar PPA Assumed WACC 6,51% Market-Indexed Solar PPA Assumed WACC 6,51% Market-Indexed Solar PPA Assumed WACC 6,51%		\$3.26
Solar PPA Price (S/MWh) \$33.369 NPV Solar Generation (MWh) 20.217.049 NPV Solar Generation At Utility Shareholder DR (MWh) 16,700,455 Solar PPA Assumed VACC 7.001 Solar PPA Assumed VACC 20 Market-Indexed Solar PPA Metrics: 20 Market-Indexed Solar PPA Metrics: 9.604 Assumed Cost of Debt 5.09% Assumed Cost of Debt (%) 9.605 State endexed Solar PPA Artics: 9.604 Market-Indexed Solar PPA Artice (S/MWh) 25.83 Market-Indexed Solar PPA Artice (S/MWh) 52.83 Market-Indexed Solar PPA Artice (S/MWh) 56.33 Market-Indexed Solar PPA Artice (S/MWh) 36.83 Market-Indexed Solar PPA Assumed WACC 6.51% Market-Indexed Solar PPA Assumed WACC 6.51%		100%
Solar PPA Price (S/MWh) \$33.369 NPV Solar Generation (MWh) 20.217.049 NPV Solar Generation At Utility Shareholder DR (MWh) 16,700,455 Solar PPA Assumed VACC 7.001 Solar PPA Assumed VACC 20 Market-Indexed Solar PPA Metrics: 20 Market-Indexed Solar PPA Metrics: 9.604 Assumed Cost of Debt 5.09% Assumed Cost of Debt (%) 9.605 State endexed Solar PPA Artics: 9.604 Market-Indexed Solar PPA Artice (S/MWh) 25.83 Market-Indexed Solar PPA Artice (S/MWh) 52.83 Market-Indexed Solar PPA Artice (S/MWh) 56.33 Market-Indexed Solar PPA Artice (S/MWh) 36.83 Market-Indexed Solar PPA Assumed WACC 6.51% Market-Indexed Solar PPA Assumed WACC 6.51%	Solar PPA Metrics:	
NPV Solar Generation at Ullity Shareholder DR (MWh) 16,700,455 Solar PPA Assumed WACC 7,001 Solar PPA Prior (Yrs) 20 Market-Indexed Solar PPA Metrics: 3 Assumed Cost of Debt 9,60% Starder Praction of Debt (%) 51,00% Starder Jacket Hold (Yrs) 708 Market-Indexed Solar PPA Assumed WACC 6,51% Market-Indexed Solar PPA Assumed WACC 6,51% Market-Indexed Solar PPA Assumed WACC 6,51%	Solar PPA Price (\$/MWh)	
Salar PPA Assumed WACC 7.00% Solar PPA Assumed Solar PPA Metrics: 20 Market-Indexed Solar PPA Metrics: 5.09% Assumed Cost of Debt 5.09% Assumed Cost of Debt 9.60% Assumed Factor OPbet (%) 9.60% Size of Market-Indexed Solar PPA Area (SJMWh) 51.00% Market-Indexed Solar PPA Assumed WACC 6.51% Market-Indexed Solar PPA Assumed WACC 6.51%		
Solar PPA Period (Yrs) 20 Market-Indexed Solar PPA Metrics: 5.09% Assumed Cost of Debt 5.09% Assumed Cost of Equity 9.60% Assumed Cost of Equity 9.60% Size of Market-Indexed PPA (MW) (max: 300 in UT) 51.00% Market-Indexed Solar PPA Price (5/MWh) 526.33 Market-Indexed Solar PPA Assumed WACC 6.51% Market-Indexed Solar PPA Assumed WACC 320	Solar PPA Assumed WACC	7.00%
Assumed Cost of Debt 5.09% Assumed Cost of Equity 9.60% Assumed Praction of Debt (%) 51.00% Size of Market-indexed PPA (NW) (max. 300 in UT) 778 Market-indexed Solar PPA Arcice (\$/MWh) 52.63 Market-indexed Solar PPA Assumed WACC 6.51% Market-indexed Solar PPA Arcice (\$/Y 3.00	Solar PPA Period (Yrs)	
Assumed Cost of Debt 5.09% Assumed Cost of Equity 9.60% Assumed Praction of Debt (%) 51.00% Size of Market-indexed PPA (NW) (max. 300 in UT) 778 Market-indexed Solar PPA Arcice (\$/MWh) 52.63 Market-indexed Solar PPA Assumed WACC 6.51% Market-indexed Solar PPA Arcice (\$/Y 3.00	Market-Indexed Solar PPA Metrics:	
Assumed Fraction of Debt (%) 51.00% Size of Market-Indexed PPA (MW) (max. 300 in UT) 778 Market-Indexed Solar PPA Price (\$/MWh) 526.33 Market-Indexed Solar PPA Assumed WACC 6.51% Market-Indexed Solar PPA Assumed WAC 6.51%	Assumed Cost of Debt	
Size of Market-Indexed PPA (MW) (max. 300 in UT) 778 Market-Indexed Solar PPA Price (S/MWh) \$256.33 Market-Indexed Solar PPA Asymet WACC 6.51% Market-Indexed Solar PPA Period (Yrs) 30		
Market-Indexed Solar PPA Assumed WACC 6.51% Market-Indexed Solar PPA Period (Yrs) 30	Size of Market-Indexed PPA (MW) (max. 300 in UT)	778
Market-Indexed Solar PPA Period (Yrs) 30	Market-Indexed Solar PPA Price (\$/MWh) Market-Indexed Solar PPA Assumed WACC	\$26.33
		E F 40/
	Market-Indexed Solar PPA Period (Yrs)	30

Existing Brown Plant Snapshot:	
Plant Type	Natural Gas Fired Combined Cyr
Current Net Plant Balance (\$)	\$257,110,9
urrent Total Retirement Cost (\$)	\$306,716,3
et Capacity (MW) ssumed Year of Early Retirement	602.8
urrent Remaining Life (Yrs)	20
mortization Period of Regulatory Asset with Early Retirement	
apacity Factor (%)	52.55
et Generation (MWh)	2,774,79
PV Brown Plant Generation at Utility ROE Discount Rate (MWh) perating Costs (\$/MWh)	22,820,24 \$22.
Jel Portion of Coal MCOE	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
uel Hedge Adder	
ecuritization and Green Bond Assumptions:	3.10
ecuritization Assumed Interest Rate ecuritization Bond Tenor	5.10
reen Bond Assumed Interest Rate	3.7
reen Bond Tenor	
hare of Securitization Savings For Transition Assistance	1
nclude Transition Assistance in Regulatory Asset Case? alculate Savings Relative to Regulatory Asset Case or BAU Case?	BAU Ca
loes the green bond affect the utility's allowed ROR?	BAUCA
s the utility recycling the proceeds from securitization or green bond?	
s the capital structure of the new facility different from the utility's?	
yes, input the new facility's debt ratio here:	50.0
oes the new facility's capital structure impact the utility's allowed ROR?	
than Einancial Matrice/Pation	
Dther Financial Metrics/Ratios: Latepayer Discount Rate	7.00
hareholder Discount Rate	9.60
Jtility's Allowed ROR (%)	7.30
tility's Allowed ROR used (accounting for deductability of interest)	6.5
lant Allowed ROR used (accounting for deductability of interest)	7.80
Vind Allowed ROR used (accounting for deductability of interest)	7.1
olar Allowed ROR used (accounting for deductability of interest) iquity Ratio (%)	6.5
Itility's Allowed ROE (%)	49.0
xisting Plant Allowed ROE (%)	12.2
Vind Allowed ROE (%)	11.0
iolar Allowed ROE (%)	9.6
Assumed Allowed Preferred Equity Ratio	0.0
ssumed Allowed Return on Preferred Equity (ROPE) mplied Debt Ratio	0.0
mplied Cost of Debt	5.0
lost of Debt (%)	3.7
ederal Corporate Tax Rate	21.0
Itility's Blended Tax Rate (%)	30.44
Brown Plant Assumed Starting Book-Tax Disparity	50.0
Macro Inflation D&M and Fuel Escalator	2.0
	Z.,
Utility-Owned Wind Metrics:	
Nind Services Value as Percentage of Brown Plant Services Value	70
Required Generation (MWh)	3,963,99
Nind Capacity Factor (%)	4
Assumed Wind Capacity Factor in the Region (%) Req'd Replacement Wind Capacity (MW)	4
Nind Plant Useful Life (Yrs)	
Capital Cost of Wind (\$/MW)	\$1,350,0
ransmission Costs (\$/MW)	
otal Capital Cost of Utility-Owned Wind (\$)	\$1,299,764,9
NPV MACRS (%)	0.7 38,651,96
NPV Wind Generation at Utility ROE Discount Rate (MWh) mpact of Capital Costs on NPV Revenue Required (\$)	\$1,426,229,5
PTC Price (\$/MWh)	\$1,420,225,5
NPV PTC Value (\$)	\$743,247,8
mpact on NPV Revenue Required of Capital Costs Net PTC (\$)	\$682,981,7
Vind O&M Expense (\$/MWh)	\$7.
Vind PPA Metrics: mpact on NPV Revenue Required of Capital Costs Net PTC (\$)	\$682,981,7
IPV Wind Generation (MWh)	36,185,50
IPV Wind Generation at Utility Shareholder DR (MWh)	34,689,98
Vind PPA Price (\$/MWh)	\$23.
Vind PPA Assumed WACC	9.0
Vind PPA Period (Yrs)	100
ost-PPA Period O&M Increase	10
Itility-Owned Solar Metrics:	
eq'd Replacement Solar Capacity (MW)	1,13
iolar Capacity Factor (%)	21
olar Plant Useful Life (Yrs)	
Capital Cost of Solar (\$/MW)	\$1,100,0
ransmission Costs (\$/MW) atal Cost of Utility/Owned Solar (\$)	\$1,244,404,5
otal Cost of Utility-Owned Solar (\$) IPV Solar Generation at Utility ROE Discount Rate (MWh)	\$1,244,404,5 27,056,3
	27,030,5
olar O&M Expense (\$/MWh)	\$3
ost-PPA Period O&M Increase	10
olar PPA Metrics:	
olar PPA Price (\$/MWh) IPV Solar Generation (MWh)	\$33. 29,396,22
IPV Solar Generation (WWN) IPV Solar Generation at Utility Shareholder DR (MWh)	29,596,22
olar PPA Assumed WACC	24,202,30
olar PPA Period (Yrs)	
Aarket-Indexed Solar PPA Metrics:	+
Assumed Cost of Debt	5.0
ssumed Cost of Equity ssumed Fraction of Debt (%)	9.60
asumen maciluli ul Deul (%)	51.0
ize of Market-Indexed PPA (MW) (max 300 in LIT)	1,1:
	\$26.
ize of Market-Indexed PPA (MW) (max. 300 in UT) Aarket-Indexed Solar PPA Price (\$/MWh) Aarket-Indexed Solar PPA Assumed WACC	
Size of Market-Indexed PPA (MW) (max. 300 in UT)	

Marshalltown Generating Station	Unit Name
Existing Brown Plant Snapshot:	
Plant Type	Natural Gas Fired Combined Cycle
Current Net Plant Balance (\$)	\$585,689,843
Current Total Retirement Cost (\$) Net Capacity (MW)	\$640,723,981 705.93
Assumed Year of Early Retirement	2021
Current Remaining Life (Yrs) Amortization Period of Regulatory Asset with Early Retirement	29
Capacity Factor (%)	49.86%
Net Generation (MWh)	3,083,292
NPV Brown Plant Generation at Utility ROE Discount Rate (MWh) Operating Costs (\$/MWh)	29,867,337 \$23,14
Fuel Portion of Coal MCOE	75%
Fuel Hedge Adder	0%
Securitization and Green Bond Assumptions:	
Securitization Assumed Interest Rate Securitization Bond Tenor	3.10%
Green Bond Assumed Interest Rate	29 3.75%
Green Bond Tenor	29
Share of Securitization Savings For Transition Assistance Include Transition Assistance in Regulatory Asset Case?	15% Yes
Calculate Savings Relative to Regulatory Asset Case or BAU Case?	BAU Case
Does the green bond affect the utility's allowed ROR?	No
Is the utility recycling the proceeds from securitization or green bond? Is the capital structure of the new facility different from the utility's?	Yes
If yes, input the new facility's debt ratio here:	50.00%
Does the new facility's capital structure impact the utility's allowed ROR?	No
Other Financial Metrics/Ratios:	
Ratepayer Discount Rate	7.00%
Shareholder Discount Rate Utility's Allowed ROR (%)	9.60%
Utility's Allowed ROR used (accounting for deductability of interest)	6.51%
Plant Allowed ROR used (accounting for deductability of interest)	7.19%
Wind Allowed ROR used (accounting for deductability of interest) Solar Allowed ROR used (accounting for deductability of interest)	7.19%
Equity Ratio (%)	49.00%
Utility's Allowed ROE (%) Existing Plant Allowed ROE (%)	9.60%
Wind Allowed ROE (%)	11.00%
Solar Allowed ROE (%)	9.60%
Assumed Allowed Preferred Equity Ratio Assumed Allowed Return on Preferred Equity (ROPE)	0.00%
Implied Debt Ratio	51.00%
Implied Cost of Debt	5.09%
Cost of Debt (%) Federal Corporate Tax Rate	21.00%
Utility's Blended Tax Rate (%)	30.48%
Brown Plant Assumed Starting Book-Tax Disparity Macro Inflation	50.00%
O&M and Fuel Escalator	2.5%
Utility-Owned Wind Metrics: Wind Services Value as Percentage of Brown Plant Services Value	77%
Required Generation (MWh)	4,004,275
Wind Capacity Factor (%) Assumed Wind Capacity Factor in the Region (%)	47%
Req'd Replacement Wind Capacity (MW)	973
Wind Plant Useful Life (Yrs)	30
Capital Cost of Wind (\$/MW) Transmission Costs (\$/MW)	\$1,350,000
Total Capital Cost of Utility-Owned Wind (\$)	\$1,312,972,659
NPV MACRS (%) NPV Wind Generation at Utility ROE Discount Rate (MWh)	
	0.78
Impact of Capital Costs on NPV Revenue Required (\$)	0.78 39,044,730 \$1,440,722,424
Impact of Capital Costs on NPV Revenue Required (\$) PTC Price (\$/MWh)	39,044,730 \$1,440,722,424 \$20.31
Impact of Capital Costs on NPV Revenue Required (\$) PTC Price (\$/MWh) NPV PTC Value (\$)	39,044,730 \$1,440,722,424 \$20.31 \$750,800,471
Impact of Capital Costs on NPV Revenue Required (\$) PTC Price (\$/MWh)	39,044,730 \$1,440,722,424 \$20.31
Impact of Capital Costs on NPV Revenue Required (\$) PTC Price (\$/MWh) NPV PTC Value (\$/MWh) Impact on NPV Revenue Required of Capital Costs Net PTC (\$) Wind O&M Expense (\$/MWh)	39,044,730 \$1,440,722,424 \$20,31 \$750,800,471 \$689,921,954
Impact of Capital Costs on NPV Revenue Required (\$) PTC Price (\$/MWh) NPV PTC Value (\$) Impact on NPV Revenue Required of Capital Costs Net PTC (\$)	39,044,730 \$1,440,722,424 \$20,31 \$750,800,471 \$689,921,954
Impact of Capital Costs on NPV Revenue Required (S) PT Price (S/MWh) NPV PTC Value (S) Impact on NPV Revenue Required of Capital Costs Net PTC (S) Wind O&M Expense (S/MWh) Wind OPA Metrics: Impact on NPV Revenue Required of Capital Costs Net PTC (S) NPV Wind Generation (MWh)	33,044,730 \$1,440,722,424 \$20,31 \$750,800,471 \$689,921,954 \$7.00 \$689,921,954 36,553,206
Impact of Capital Costs on NPV Revenue Required (S) PTC Price (S)AW(H) NPV PTC Value (S) Impact on NPV Revenue Required of Capital Costs Net PTC (S) Wind O&M Expense (S)/MW(H) Wind PA Metrics: Impact on NPV Revenue Required of Capital Costs Net PTC (S) NPV Wind Generation (XW(H) NPV Wind Generation at Utility Shareholder DR (MW(H)	33,044,730 51,440,722,424 5703,800,471 5750,800,471 5689,921,954 57,00 5689,921,954
Impact of Capital Costs on NPV Revenue Required (S) PTC Price (G/NWh) NPV PTC Value (S) Impact on NPV Revenue Required of Capital Costs Net PTC (S) Wind OBAL Expense (S/MWh) Wind OPA Metrics: Impact on NPV Revenue Required of Capital Costs Net PTC (S) NPV Wind Generation (MWh) NPV Wind Generation at Utility Shareholder DR (MWh) Wind PPA Arsumed WACC	33,044,730 51,440,722,424 520,31 5750,300,471 5689,921,954 5689,921,954 36,553,206 33,6,024,980 523,41 9,0%
Impact of Capital Costs on NPV Revenue Required (5) PT Princ (5/WMh) NPV PTC Value (5) Impact on NPV Revenue Required of Capital Costs Net PTC (5) Wind D&M Expense (5/MWh) Wind PPA Metrics: Impact on NPV Revenue Required of Capital Costs Net PTC (5) NPV Wind Generation (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) Wind PPA Assumed WACC Wind PPA Assumed WACC	33,044,730 \$1,440,722,424 \$703,300,471 \$669,922,954 \$750,800,471 \$669,922,954 \$5,00 \$689,921,954 36,553,206 35,042,490 \$23,41 \$,90% \$23,41 \$,90% \$23,41 \$,90% \$20 \$20
Impact of Capital Costs on NPV Revenue Required (S) PTC Price (G/NWh) NPV PTC Value (S) Impact on NPV Revenue Required of Capital Costs Net PTC (S) Wind OBAL Expense (S/MWh) Wind OPA Metrics: Impact on NPV Revenue Required of Capital Costs Net PTC (S) NPV Wind Generation (MWh) NPV Wind Generation at Utility Shareholder DR (MWh) Wind PPA Arsumed WACC	33,044,730 51,440,722,424 520,31 5750,300,471 5689,921,954 5689,921,954 36,553,206 33,6,024,980 523,41 9,0%
Impact of Capital Costs on NPV Revenue Required (S) PT Critice (S/MWh) NPV PTC Value (S) Impact on NPV Revenue Required of Capital Costs Net PTC (S) Wind OBA Expense (S/MWh) Wind OPA Metrics: Impact on NPV Revenue Required of Capital Costs Net PTC (S) NPV Wind Generation (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) Wind PPA Price (S/MWh) Wind PPA Assumed WACC Wind PPA Areid (YS) PGS+PPA Reid (YS) PGS+PPA Reid (YS) Utility-Owned Solar Metrics:	33,044,730 51,440,722,424 520,31 5750,300,471 5689,921,954 57,00 5689,921,954 36,659,921,954 36,653,206 35,042,490 55,34,206 35,042,490 52,341 9,0%
Impact of Capital Costs on NPV Revenue Required (5) PT Price (5)/WMh) NPV PTC Value (5) Impact on NPV Revenue Required of Capital Costs Net PTC (5) Wind D&M Expense (5/MWh) Wind PAR Metrics: Impact on NPV Revenue Required of Capital Costs Net PTC (5) NPV Wind Generation (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) Wind PPA Arice (5/MWh) Wind PPA Area (5/MWh) Wind PPA Price (5/MWh) Wind PPA Prices (5/MWh) Utility-Owned Solar Metrics: Reg'd Replacement Solar Capacity (MW)	33,044,730 51,44,722,424 5703,800,471 5750,800,471 5689,921,954 57,00 5689,921,954 35,553,206 35,024,900 523,41 9,0% 100%
Impact of Capital Costs on NPV Revenue Required (5) PT Price (5)/Whh) NPV PTC Value (5) Impact on NPV Revenue Required of Capital Costs Net PTC (5) Wind D&M Expense (5/MWh) Wind GPA Metrics: Impact on NPV Revenue Required of Capital Costs Net PTC (5) NPV Wind Generation (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) Wind PPA Areic (5/MWh) Wind PPA Areic (5/MWh) Wind PPA Areic (5/MWh) Wind PPA Areic (5/MWh) UMind PPA Areic (5/MWh) Solar Capacity, Factor (%) Solar Capacity, Factor (%)	33,044,730 51,44,722,424 5703,800,471 5750,800,471 5689,921,954 5689,921,954 35,553,206 35,024,940 523,41 9,075 700 100% 720 3,007,207 3,007,007 3,007,207,207 3,007,207,207,207,207 3,007,207,207,207,207,207,207,207,207,207
Impact of Capital Costs on NPV Revenue Required (S) PT Price (S/MWh) NPV PTC Value (S) Impact on NPV Revenue Required of Capital Costs Net PTC (S) Wind OBA Expense (S/MWh) Wind OPA Metrics: Impact on NPV Revenue Required of Capital Costs Net PTC (S) NPV Wind Generation (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) Wind PPA Assumed WACC Wind PPA Assumed WACC Wind PPA Assumed WACC Wind PPA Assumed WACC Wind PPA Assumed WACC Utility-Downed Solar Metrics: Red C Replacement Solar Capacity (MW) Solar Capacity Factor (%) Solar Capacity Factor (%) Solar Capacity Factor (%)	33,044,730 \$1,440,722,424 \$20,31 \$750,800,471 \$669,922,954 \$7,00 \$669,922,954 \$5,00 \$689,921,954 36,553,206 35,042,490 \$23,41 30,000 \$23,41 1,257 28% 30 \$3,00,000 \$3,1,00,000
Impact of Capital Costs on NPV Revenue Required (S) PT Price (S/MWh) NPV PTC Value (S) Impact on NPV Revenue Required of Capital Costs Net PTC (S) Wind OBA Expense (S/MWh) Wind OPA Metrics: Impact on NPV Revenue Required of Capital Costs Net PTC (S) NPV Wind Generation (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) Wind PPA Assumed WACC Wind PPA Assumed WACC Wind PPA Assumed WACC Wind PPA Assumed WACC Wind PPA Assumed WACC Sidar Panet Cost (S/MWh) Solar Jantu Stafe Capacity (MW) Solar Capacity Factor (%) Solar Capacity Factor (%) Solar Capacity Factor (%) Solar Solar (S/MW) Transmission Costs (S/MW) Transmission Costs (S/MW)	33,044,730 51,44,722,424 5703,800,471 5750,800,471 5689,921,954 5689,921,954 35,553,206 35,024,940 523,41 9,075 700 100% 720 3,007,207 3,007,007 3,007,207,207 3,007,207,207,207,207 3,007,207,207,207,207,207,207,207,207,207
Impact of Capital Costs on NPV Revenue Required (S) PTC Price (S/NWh) NPV PTC value (S) Impact on NPV Revenue Required of Capital Costs Net PTC (S) Wind OBM Expense (S/MWh) Wind OPA Metrics: Impact on NPV Revenue Required of Capital Costs Net PTC (S) NPV Wind Generation (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) Wind PPA Assumed WACC Wind PPA Areind (Yrs) Post-PPA Period (OAM Increase Post-PPA Period (OAM Increase Utility-Owned Solar Metrics: Req'd Replacement Solar Capacity (MW) Solar Capacity Factor (%) Solar Dant Useful Life (Yrs) Capital Cost of Solar (S/MW) Traimission Costs (S/MW) Total Cost of Utility-Owned Solar (S) NPV Solar Generation at Utility RQE Discount Rate (MWh)	33,044,730 51,44,722,424 52,031 5750,200,471 5689,921,954 5689,921,954 5689,921,954 36,553,206 35,024,900 35,024,900 3006 1,257 22,000 300 51,100,000 50 51,382,754,725 30,066,442 30,066,442
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Impact of Capital Costs on NPV Revenue Required (S) PT Price (S/MWh) NPV PTC Value (S) Impact on NPV Revenue Required of Capital Costs Net PTC (S) Wind OBM Expense (S/MWh) Wind OPA Metrics: Impact on NPV Revenue Required of Capital Costs Net PTC (S) NPV Wind Generation (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) Wind PPA Arsic (S/MWh) Wind PPA Assumed WACC Wind PPA Areid (S/MWh) Wind PPA reid Capacity (MW) Solar Plant Useful Life (Yrs) Capital Cost of Solar (S/MW) Transmission Costs (S/MW) Transmission Costs (S/MW) Transmission Costs (S/MW) Transmission Costs (S/MW) Transmission Costs (S/MW) NPV Solar Generation at Utility ROE Discount Rate (MWh) ITC Solar OBAM Expense (S/MWh) Post-PPA Period O&M Increase	33,044,730 51,44,722,424 52,031 5750,200,471 5689,921,954 5689,921,954 5689,921,954 36,553,206 35,022,490 35,022,490 30,022,490 100% 100% 1,257 2,28% 3,000 5,1,382,754,725 30,064,442 3,064,442 3,024,490 3,1,000,000 3,000,000 3,000,
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Impact of Capital Costs on NPV Revenue Required (5) PT Price (5)/Wh/h) NPV PTC Value (5) Impact on NPV Revenue Required of Capital Costs Net PTC (5) Wind D&M Expense (5/MWh) Wind PPA Metrics: Impact on NPV Revenue Required of Capital Costs Net PTC (5) NPV Wind Generation (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) Wind PPA Preice (5/MWh) Wind PPA Preice (5/MWh) Solar Capacity Factor (%) Solar Capital Cost of Solar (5) NPV Solar Generation at VIIIty Shoreholder DR (MWh) Solar Capacity Factor (%) Solar Generation at VIIIty Solar Costant (MWh) Total Cost of Utility-Owned Solar (5) NPV Solar Generation (5/MWh) Past-PPA Priced O&M Increase Solar OPA Expender Solar (5) NPV Solar Generation (5/MWh) Past-PPA Priced O&M Increase Solar PAP Artice (5/MWh) NPV Solar Generation (5/MW	33,044,730 33,044,730 35,40,072,2424 35750,800,471 35750,800,471 35689,921,954 35,553,206 35,054,490 200 100% 1,257 28% 30,054,420 30,05 31,00,000 35,1382,754,725 30,064,442 30,054,4425 32,054,435 32,054
Impact of Capital Costs on NPV Revenue Required (S) PT Price (S/MWh) NPV PTC Value (S) Impact on NPV Revenue Required of Capital Costs Net PTC (S) Wind OBM Expense (S/MWh) Wind OPA Metrics: Impact on NPV Revenue Required of Capital Costs Net PTC (S) NPV Wind Generation (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWH) Wind PPA Assumed WACC Wind PPA Assumed WACC Wind PPA Assumed WACC Wind PPA Assumed WACC Wind PPA Assumed WACC Solar SPAN Period O&M Increase Utility-Domed Solar Metrics: Red CapitaCost of Solar (S/MW) Solar Capita Cost of Solar (S/MW) Transmission Costs (S/MW) Trata Useful Life (Trys) Capital Cost of Usility-Owned Solar (S) NPV Solar Generation at Utility Rot Discount Rate (MWh) MTC Solar OPA Metrics: Solar PPA Preiod O&M Increase Solar PPA reio (S/MWN) NPV Solar Generation at Utility Shareholder DR (MWh) NPV Solar Generation at Utility Shareholder DR (MWh)	33,044,730 51,440,722,424 520,31 5750,300,471 5689,922,1954 5689,922,1954 5689,922,1954 5689,922,1954 5689,922,1954 5689,922,184 5689,922,184 5689,922,184 51,000 50,0000 50,000 50,0000 50,0000 50,000 50,0000 50,0000 50
Impact of Capital Costs on NPV Revenue Required (5) PT Price (5)/Wh/h) NPV PTC Value (5) Impact on NPV Revenue Required of Capital Costs Net PTC (5) Wind D&M Expense (5/MWh) Wind PPA Metrics: Impact on NPV Revenue Required of Capital Costs Net PTC (5) NPV Wind Generation (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) Wind PPA Preice (5/MWh) Wind PPA Preice (5/MWh) Solar Capacity Factor (%) Solar Capital Cost of Solar (5) NPV Solar Generation at VIIIty Shoreholder DR (MWh) Solar Capacity Factor (%) Solar Generation at VIIIty Solar Costant (MWh) Total Cost of Utility-Owned Solar (5) NPV Solar Generation (5/MWh) Past-PPA Priced O&M Increase Solar OPA Expender Solar (5) NPV Solar Generation (5/MWh) Past-PPA Priced O&M Increase Solar PAP Artice (5/MWh) NPV Solar Generation (5/MW	33,044,730 33,044,730 35,40,072,2424 35750,800,471 35750,800,471 35689,921,954 35,553,206 35,054,490 200 100% 1,257 28% 30,054,420 30,05 31,00,000 35,1382,754,725 30,064,442 30,054,4425 32,054,435 32,054
Impact of Capital Costs on NPV Revenue Required (S) PT Price (S)MWh) NPV PTC Value (S) Impact on NPV Revenue Required of Capital Costs Net PTC (S) Wind D&M Expense (S/MWh) Wind PA Netrics: Impact on NPV Revenue Required of Capital Costs Net PTC (S) NPV Wind Generation (MWh) NPV Wind Selar Metrics: Reg'd Replacement Solar Capacity (MW) Solar Capacity Factor (%) Solar Capacity Factor (%) Solar Capacity Factor (%) Solar Cost of Utility-Owned Solar (S) NPV Solar Generation at Utility RGE Discount Rate (MWh) TC Solar OPA Netrics: Solar PPA Netrics (S/MWh) NPV Solar Generation (MWh) NPV Solar Generation (MWH) Solar PAPA Asymetre (MWH) Sola	33,044,730 33,044,730 51,44,722,424 32,031 5750,800,471 5689,921,954 57,00 5689,921,954 36,553,206 35,024,980 30,054,2490 100% 1,257 2,00% 30,064,423 30,064,425 30,064,425 32,264,435 32,264,435 32,264,435 32,264,435 32,2682,718 7,00%
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Impact of Capital Costs on NPV Revenue Required (5) PT Price (5/WWh) NPV PTC Value (5) Impact on NPV Revenue Required of Capital Costs Net PTC (5) Wind OBA Expense (5/MWh) Wind OPA Metrics: Impact on NPV Revenue Required of Capital Costs Net PTC (5) NPV Wind Generation (MWh) NPV Wind Server (5/MWh) Wind PPA Price (5/MWh) Wind PPA Price (5/MWh) Solar Capacity Factor (%) Solar Capacity Factor (%) Solar Capacity Factor (%) Solar Generation at Utility Role Discount Rate (MWh) WTC Transmission Costs (5/MW) Traces Solar OBA Expense (5/MWh) NPV Solar Generation at Utility Role Discount Rate (MWh) NPV Solar Generation (MWh) NPV Sol	33,044,730 33,047,72424 35,750,200,471 35,750,200,471 35,689,921,954 36,89,921,954 36,89,921,954 36,953,206 35,042,490 35,042,490 35,042,490 35,042,490 35,042,490 35,042,490 30,042,442 30,064,443 30,064,435 32,664,435 30,664,435 32,664,435 34,664,455 34,664,455 34,664,455
Impact of Capital Costs on NPV Revenue Required (5) PTC Price (5/MWh) NPV PTC Value (5) Impact on NPV Revenue Required of Capital Costs Net PTC (5) Wind D&M Expense (5/MWh) Wind PA Netrics: mpact on NPV Revenue Required of Capital Costs Net PTC (5) NPV Wind Generation (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) NPV Wind Generation (MWh) Wind PPA Areic (5/MWh) Wind PPA Areic (5/MWh) Wind PPA Preiod O&M Increase Utility-Owned Solar Metrics: Reg'd Replacement Solar Capacity (MW) Solar Capacity Factor (%) Solar Plant Used Utility Note Solar Plant Used Utility Note Solar OBA User Solar (5) NPV Solar Generation at Utility ROE Discount Rate (MWh) TC Solar OBA Userses Solar PPA Metrics: Solar PPA Period O&M Increase Solar PPA Metrics: Solar PPA Metrics: Solar PPA Period D&M Increase Solar PPA Metrics: Solar PPA Period O&M Increase Solar PPA Metrics: Solar PPA Metrics: Solar PPA Period D&M Increase Solar PPA Metrics: Solar PPA Metrics: Solar PPA Metrics: Solar PPA Period D&M Increase Solar PPA Metrics: Solar PPA Metrics: Solar PPA Period D&M Increase Solar PPA Metrics: Solar PPA Period D&M Increase Solar PPA Metrics: Solar PPA Metrics: Solar PPA Period D&M Increase Solar PPA Metrics: Solar PPA Period D&M Increase Solar PPA Period D&M Increase Solar PPA Metrics: Solar PPA Period D&M Increase Solar PPA Metrics: Solar PPA Metrics: Solar PPA Period D&M Increase Solar PPA Metrics: Solar PPA Metrics Increase Solar PPA Me	33,044,730 33,044,730 53,440,722,424 32,030,471 5689,921,954 5689,921,954 36,553,206 33,502,490 33,024,990 30,00 100% 1,257 200 33,00 31,00,000 31,100,000 31,100,000 31,382,754,75 33,064,442 33,006,442 33,006,442 33,264,435 33,266,435 34,56 35,266,435 35,266,435 35,266,435 35,266,435 35,266,435 35,266,455 35,26
Impact of Capital Costs on NPV Revenue Required (5) PTC Price (5/MWh) NPV PTC Value (5) Impact on NPV Revenue Required of Capital Costs Net PTC (5) Wind ORM Expense (5/MWh) Wind ORM Expense (5/MWh) NPV Wind Generation (MWh) NPV Wind Set (5/MWh) Wind PPA Assumed WACC Wind PPA Area (5/MWh) Wind PPA Assumed WACC Solar Capacity Factor (%) Solar Capacity Factor (%) Solar Capacity Factor (%) Solar Capital Cost of Solar (%) Tratal Cost of Ullify Owned Solar (5/MW) Tratal Cost of Ullify Owned Solar (%) NPV Solar Generation at Utility RDE Discount Rate (MWh) TC Solar ORM Expense (5/MWh) NPV Solar Generation (Wh) NPV Solar Generation (MWh) NPV Solar Generation (Wh) NPV Solar	33,044,730 33,047,72424 35,750,200,471 35,750,200,471 35,689,921,954 36,89,921,954 36,89,921,954 36,953,206 35,042,490 35,042,490 35,042,490 35,042,490 35,042,490 35,042,490 30,042,442 30,064,443 30,064,435 32,664,435 30,664,435 32,664,435 34,664,455 34,664,455 34,664,455
Impact of Capital Costs on NPV Revenue Required (5) PTC Price (5/MWh) NPV PTC Value (5) Impact on NPV Revenue Required of Capital Costs Net PTC (5) Wind D&M Expense (5/MWh) Wind PA Metrics: Impact on NPV Revenue Required of Capital Costs Net PTC (5) NPV Wind Generation (MWh) NPV Wind PA PArice (5/MWh) Wind PPA Assumed WACC Wind PPA Preiod O&M Increase Utility-Owned Solar Metrics: Reg'd Replacement Solar Capacity (MW) Solar Capacity Factor (%) Solar Capacity Factor (%) Solar Capacity Factor (%) Solar Capacity Factor (%) Solar Capacity (MWW) Transmission Costs (5/MWH) Transmission Costs (5/MWH) Trace (5/MWh) NPV Solar Generation at Utility ROE Discount Rate (MWh) TTC Solar O&M Expense (5/MWh) NPV Solar Generation (MWh) NPV Solar Generation (MWh) Solar CAPA Assumed VACC Solar PPA Attriced Solar PPA Attrice (S/MWh) Market-Indexed Solar PPA Areu (VACC Solar PAN Cost (Solar PAN Cost (S) (WH) (max. Solo in UT) Market-Indexed Solar PPA Areu (VACC	33,044,730 33,044,730 35,40,072,2424 35,750,800,471 35,750,800,471 35,553,206 35,553,206 35,024,930 35,024,930 30,05 30,004,490 30,000 30,00
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STATE OF IOWA BEFORE THE IOWA UTILIITIES BOARD

IN RE:)	DOCKET NO. RPU	-2019-0001
INTERSTATE POWER AND LIGHT COMPANY)))		2017 0001

AFFIDAVIT OF UDAY VARADARAJAN

STATE OF CALIFORNIA)
COUNTY OF SAN MATEO)

I, Uday Varadarajan, being first duly sworn on oath, state that I am the same Uday Varadarajan identified in the testimony filed in this docket on August 1, 2019, that I have caused the testimony [and exhibits] to be prepared and am familiar with its contents, and that the testimony [and exhibits] is true and correct to the best of my knowledge and belief as of the date of this affidavit.

> <u>/s/_Uday Varadarajan</u> Uday Varadarajan August 1, 2019

Subscribed and sworn to me this 1st day of August, 2019.

<u>/s/ William Tsui</u> William Tsui Notary Public in and for the State of California