BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of Union Electric Company d/b/a Ameren Missouri's 3rd Filing to Implement Regulatory Changes in Furtherance of Energy Efficiency as Allowed by MEEIA.	))))	File No. EO-2018-0211

NOTICE OF
DEMAND RESPONSE REPORT

COMES NOW Union Electric Company d/b/a Ameren Missouri ("Ameren Missouri" or "Company") and, pursuant to Paragraph 8 of its *Stipulation and Agreement* ("*Stipulation*") submitted in this docket, submits its *Demand Response Long-Term Collaborative Report* ("*Report*"):

1. On October 25, 2018, several parties to this proceeding submitted the *Stipulation* for the Commission's approval. The Missouri Public Service Commission ("Commission") approved the *Stipulation* on December 5, 2018. Among the programs enumerated in the *Stipulation* and approved by the Commission are new demand response programs.

2. With regard to demand response programming, paragraph 8 of the *Stipulation* states:

> Demand Response. The Signatories will engage in collaborative discussions to explore how to keep demand response implemented in the market for the long-term. The collaborative effort will explore topics such as engaging in long-term agreements (with specific off-ramps) for certain budget levels as well as standardized earnings opportunity and throughput disincentives [footnote omitted]. The Company will host at least three collaborative meetings on this topic and, within 12 months of a Commission order approving this *Stipulation*, the Company will file in this docket a report summarizing the issues explored in these collaborative meetings and potential recommendations, including any rule revisions identified as necessary.

3. In accordance with this settlement term, Ameren Missouri convened three collaborative meetings with stakeholders, on March 27, May 6, and November 8, 2019. The Company composed the *Report* and its appendices, attached hereto, and circulated it among the

stakeholders for input. Receiving no comments, Ameren Missouri now files the *Report* with the Commission, consistent with the terms of the *Stipulation.*

Respectfully submitted,

/s/ Paula N. Johnson

Paula N. Johnson, #68963
Senior Corporate Counsel
1901 Chouteau Avenue
St. Louis, MO 63103
(314) 554-3533 (phone)
(314) 554-4014 (fax)
AmerenMOService@ameren.com

ATTORNEY FOR UNION ELECTRIC COMPANY d/b/a AMEREN MISSOURI

CERTIFICATE OF SERVICE

The undersigned certifies that true and correct copies of the foregoing have been e-mailed to counsel of record in this case on this 4th day of December, 2019.

/s/ Paula N. Johnson
Paula N. Johnson

Demand Response Long-Term Collaborative Report

Collaborative Overview

The Company's MEEIA 2019-21 Stipulation and Agreement[1] included a commitment to form a collaborative and explore how to keep demand response implemented in the market for the long-term. During 2019, the Company hosted three meetings where the collaborative group discussed 1) different methods in which demand could be altered and whether those methods would be considered demand response and 2) structural considerations regarding program approval, price signals to participants, and exit ramp options to approved programs. Collaborative presentations and supporting documentation can be found in Appendix A, B, C.

Demand Response

The kick-off meeting for the collaborative group covered what qualifies as demand response. This discussion was foundational and aided in the group's understanding of a demand response program. Currently the company has a residential direct control smart thermostat demand response program and a medium/large commercial/industrial aggregator-style demand response program. These two program structures were thoroughly explored during the review of the Company's MEEIA 2019-21 plan and were ultimately approved by the Commission. Table 1 is a list of various methods to impact customer demands and a high-level summary of the discussions about whether the methods were demand response under Missouri definitions. Two key takeaways from the discussion, without highlighting a particular method, are it must be cost effective and demand reductions during peak periods must be observable through a baseline analysis. The collaborative did not delve into details for each method regarding the determination of cost effectiveness. With regard to observable demand reductions during peak periods, that was described as being dispatchable. For this purpose dispatchable means that the method to control demand is under some type of control and when needed the resource would be called upon, or dispatched. As examples, consider the current residential smart thermostat program, during system peak conditions, an event is called and participants thermostats are automatically adjusted for a few hours then afterwards returned to normal operations. In contrast, consider customer-owned baseload generation replacing typical utility supply. For this example, assume the generation is running most hours of the year at full capacity; now during periods of system peak demand that customer-owned generation would be running as normal and would not result in an incremental change in the customer's demand. Figure 1 below illustrates this example. Without recapping the entire collaborative discussion, it is apparent that there are numerous strategies customers or the utility could employ to accomplish reductions in demand during peak times. Appendix A contains the entire set of methods that were discussed.

[1] File No. EO-2018-0211

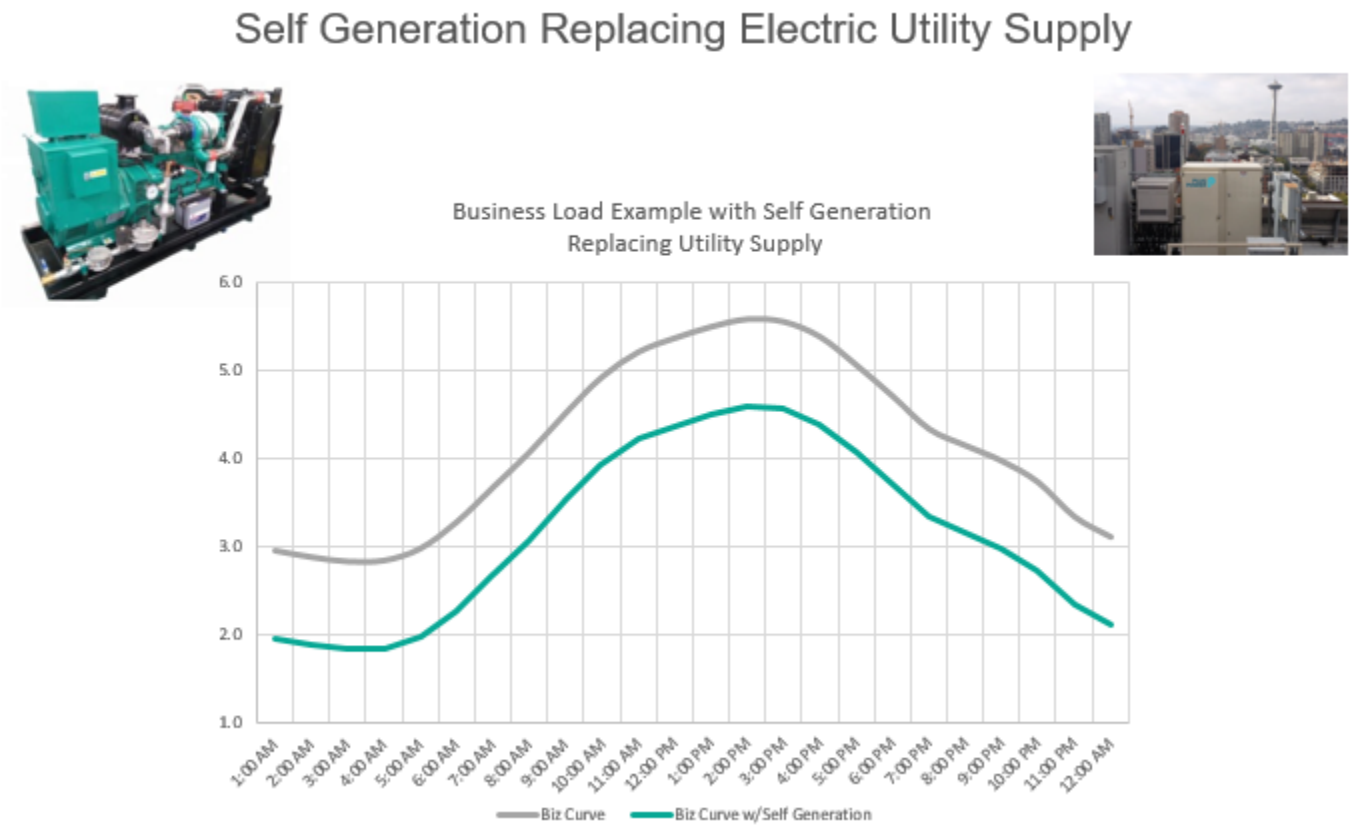
Demand Response Long-Term Collaborative Report

Table 1

List of DR Considerations	Qualify Yes/No
Current Residential and Business Programs	Yes
Back Up Customer Generation *Must meet program rules and applicable state, local or federal operational requirements	Yes*
Combined Heat and Power *Continuously operates, no change in baseline, non dispatchable so no decrease or shift of demand **May qualify if demonstrated capacity is dispatchable and meets program rules	No*,**
Self-Generation Replacing Electric Utility Supply *If continuously operates, no change in baseline, non dispatchable so no decrease or shift of demand	No*
Energy Storage – Battery/Ice Storage *If capacity is dispatchable and meets program rules **Net consumption of electricity increases on customers side	Yes*,**
Wind/Solar *Unpredictable availability, not dispatchable, does not qualify under current program	No*
Wind/Solar Battery Storage Package *If capacity is dispatchable and meets program rules	Yes*

Demand Response Long-Term Collaborative Report

Figure 1



Structural Considerations

After discussing what methods may qualify as demand response, the last collaborative meeting covered structural considerations regarding program approval, price signals to participants, and exit ramp options to approved programs.

With regard to discussions about program approval options; the collaborative discussed a "staggered term length approvals" concept. Appendix B include a diagram of the concept that was discussed in the meeting. Some key elements around the concept that were discussed included: 1) an initial demand respond building phase for any given approval plus a multiyear maintenance period whereby the demand response resource built during any given approval cycle could continue with approved budgets; 2) after a demand response resource is approved, during a subsequent approval cycle there is also approval for the continuation of the previous amount of demand response; and 3) performance targets would be cumulative and therefore reflect the need to potentially add new demand response capacity but also maintain participation is previously approved demand response programs. Discussions around this type of concept also helped highlight how approvals for demand response could be different than approvals for energy efficiency given the differences. Such a concept also demonstrates value for customers as there is more line of sight to ongoing program availability which may allow customers to make investments in order to maximize demand reduction capabilities.

Demand Response Long-Term Collaborative Report

With regard to price signals to participants, two primary concepts were discussed. The two pricing concepts discussed were floating payments to customers and locational payments to customers. The discussion regarding floating payments to customers centered on whether there should be a component of the price that reflects short-term capacity market prices. The concept of locational payments to customers supported a discussion about the option to reflect the value of local deferred investments in grid infrastructure. Charts demonstrating these two concepts are included in Appendix B.

Potential Off-Ramps

The discussion about potential off-ramps highlighted opportunities to manage risk with regard to locking-in demand response resources. Fundamentally, there are opportunities through the MEEIA rules that allow opportunities to revisit prior decisions whether that is through the normal cadence of multiyear approvals or an ad hoc request to modify a previously approved portfolio. Further, the discussion covered the pros and cons around decisions of whether make event calls during peak seasons as a means to mitigate costs for approved demand response programs. Lastly the discussion covered concepts around program/contract terms that could provide further risk mitigation and cost controlling capabilities. Along with these discussions of off-ramps, as well as pricing option, there was also robust discussion about the potential impacts to customer participation when it comes to program complexity, uncertainty about pricing, and instability in program availability.

MEEIA 2019

Demand Response Collaboration Journey

Agenda

- Introductions
- Demand Response Collaborative Team Goal
- Steps to Achieve DR Goal
- Defining Characteristics of Demand Response Program
  - Current Business and Residential Programs
  - Demand Response Alternatives
- Identify/Develop DR Programs Based on Characteristic

Demand Response Team Goal

How to keep demand response implemented in the market for the long-term

- We are committed - How can we improve Demand Response to be more effective for all
- Explore: Long Term Agreement(s); Budgets; Off Ramps; Regulatory/Rules; EO/TD; and more
- Report to Commission

Steps to Achieving Team's Goal

Goals and Demand Response Characteristics – **Today's Meeting**

- Current DR Programs; Alternatives – Characteristics/Criteria
- Investigate/Develop DR Programs Based on Characteristic

Exploration – **Midterm Meeting 2**

- Regulatory Structures and Designs
- Pros and Cons of Structures - 3 year versus Long-Term
- Throughput Disincentives, Recovery, and Earning Opportunity

Results – **Oct 2019 Meeting 3**

- Summary of Issues Explored
- Recommended DR Structure, Regulatory Structure, Rule Modifications, Etc
- Report for Commissioners
- Steps beyond the Report

Demand Response Characteristics/Criteria

- Decrease peak demand or shift demand to off-peak period
- Modify the net consumption of electricity on the retail customer's side of electric meter
- Benefit Cost Test
  - o Energy and Capacity Avoided Cost
  - o Transmission and Distribution
- Other considerations: Response, Backup vs Self Generation, Intermittence, Customer Baseline

Demand Response Considerations

- Current Residential and Business Programs
- Back Up Customer Generation
- Combined Heat and Power
- Self Generation Replacing Electric Utility Supply
- Energy Storage – Battery/Ice Storage
- Wind/Solar
- Wind/Solar Battery Storage Package
- Time of Use Tariff

Peak Time Savings Program
Residential Demand Response
MEEIA 2019-21

- Available to customers with qualifying smart thermostats, both existing and new purchases.
- Program uses understanding of home energy use, weather, and customer settings to achieve demand savings through Events and energy savings on non-event days.
- Targeting approx. 25,000 cumulative participants.
- Sign-up bonus of $50 and annual incentive of $25.

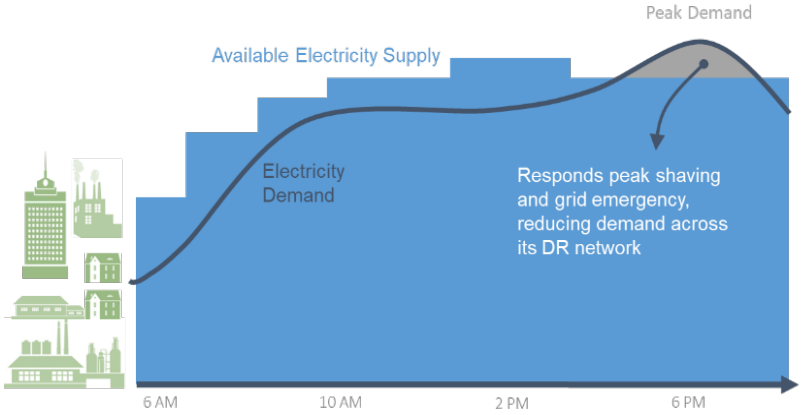
Residential MEEIA 2019-21 Demand Response Program Characteristics

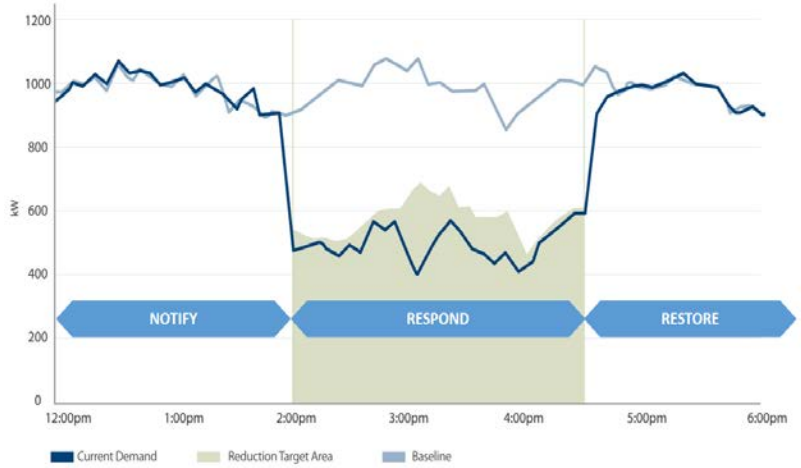
	Yes/No
Decrease Peak Demand or Shift Demand to Off-Peak Period	Yes
Modify Net Consumption of Electricity on Customer's Side	Yes*
Dispatchable	Yes
Benefit Cost Test	Yes

* Actual net energy savings being determined through EM&V

Business Demand Response Program
MEEIA 2019-21

- Event Period May 1st through Sept 30th
- 1 to 4 hour events, up to 10 per year
- Design energy reduction plan based on business' energy assets and operations
  - Common Reductions – Lighting, Processes, HVAC, Pumps, Freezers, Backup Generation
- Earnings, Operational Reliability, Strengthen Grid, Least Cost Demand Option





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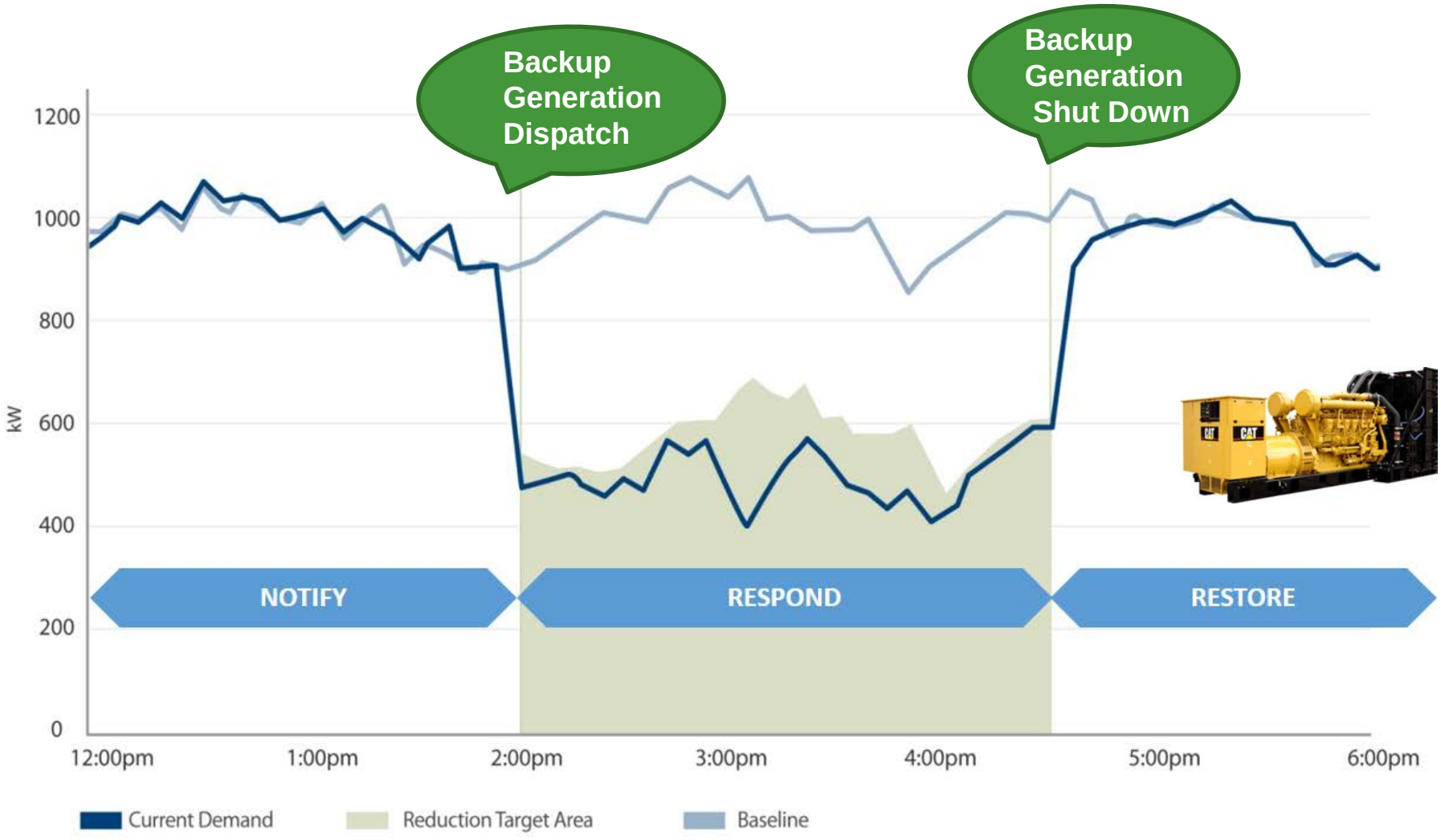
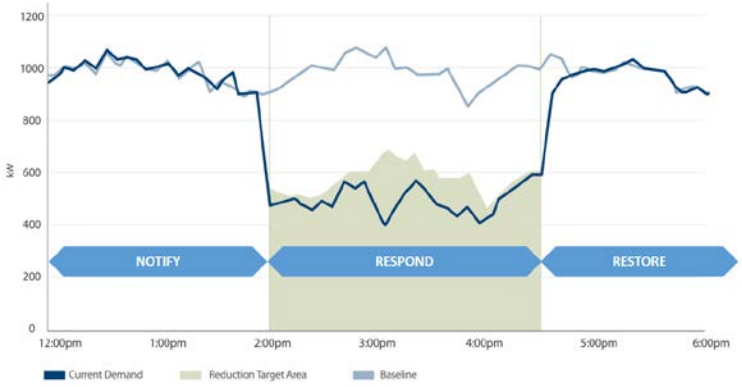
Business MEEIA 2019-21
Demand Response Program
Characteristics

	Yes/No
Decrease Peak Demand or Shift Demand to Off-Peak Period	Yes
Modify Net Consumption of Electricity on Customer's Side	Yes
Dispatchable	Yes
Benefit Cost Test	Yes

Back Up Customer Generation



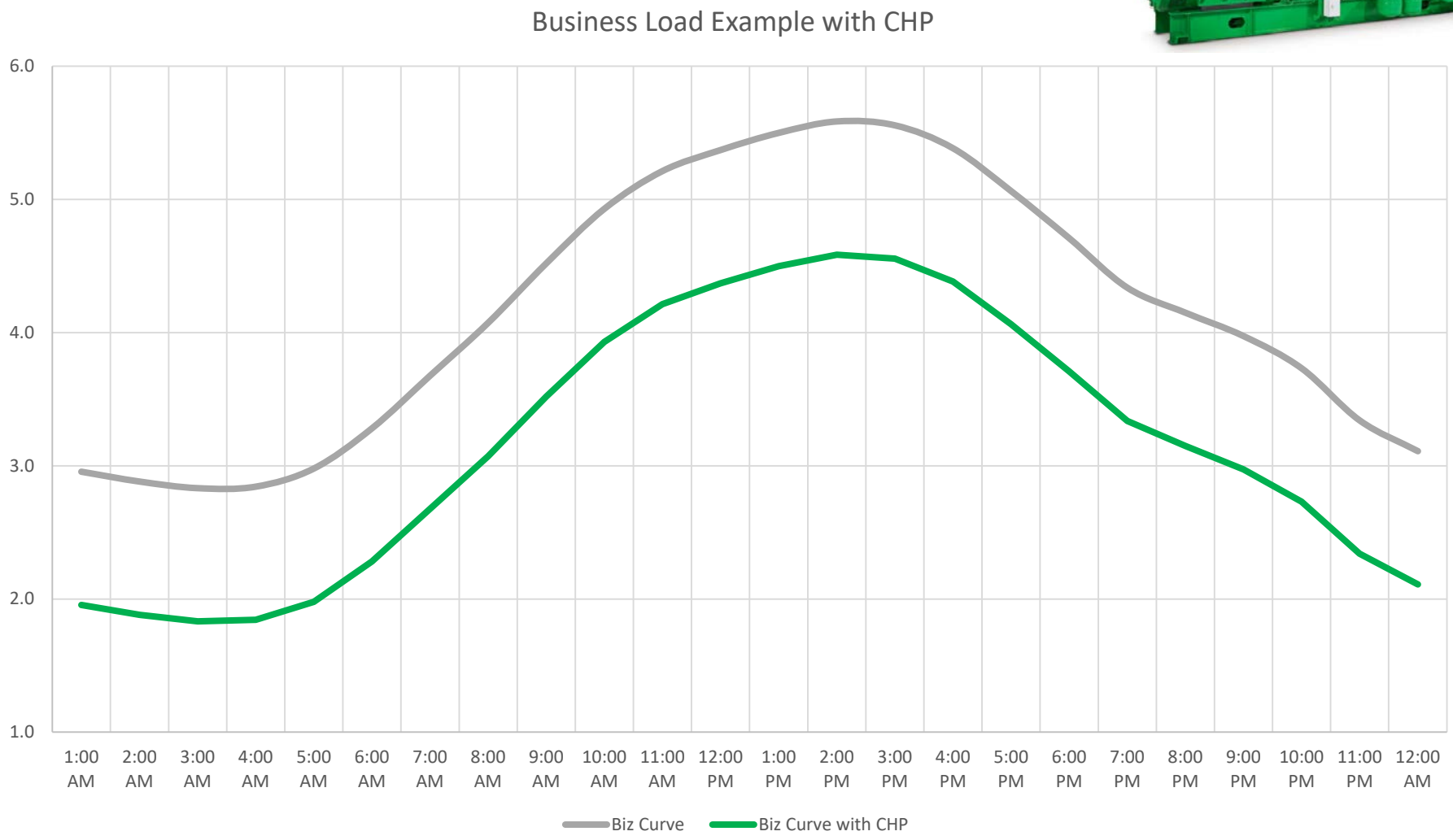
Back Up Customer Generation Demand Response Program Characteristics



	Yes/No
Decrease Peak Demand or Shift Demand to Off-Peak Period	
Modify Net Consumption of Electricity on Customer's Side	
Dispatchable	
Benefit Cost Test	TBD

Appendix A

Combined Heat and Power



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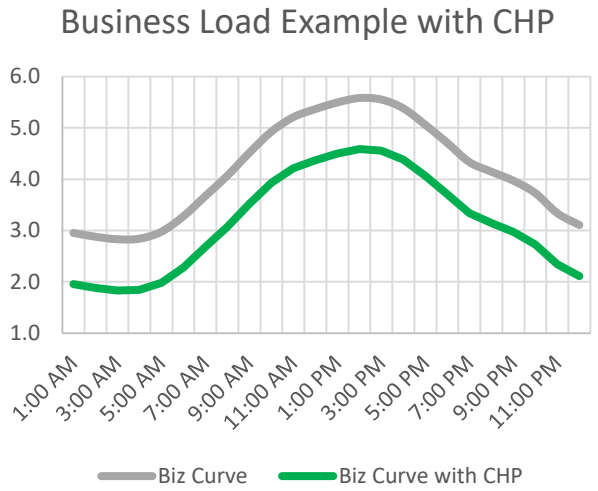
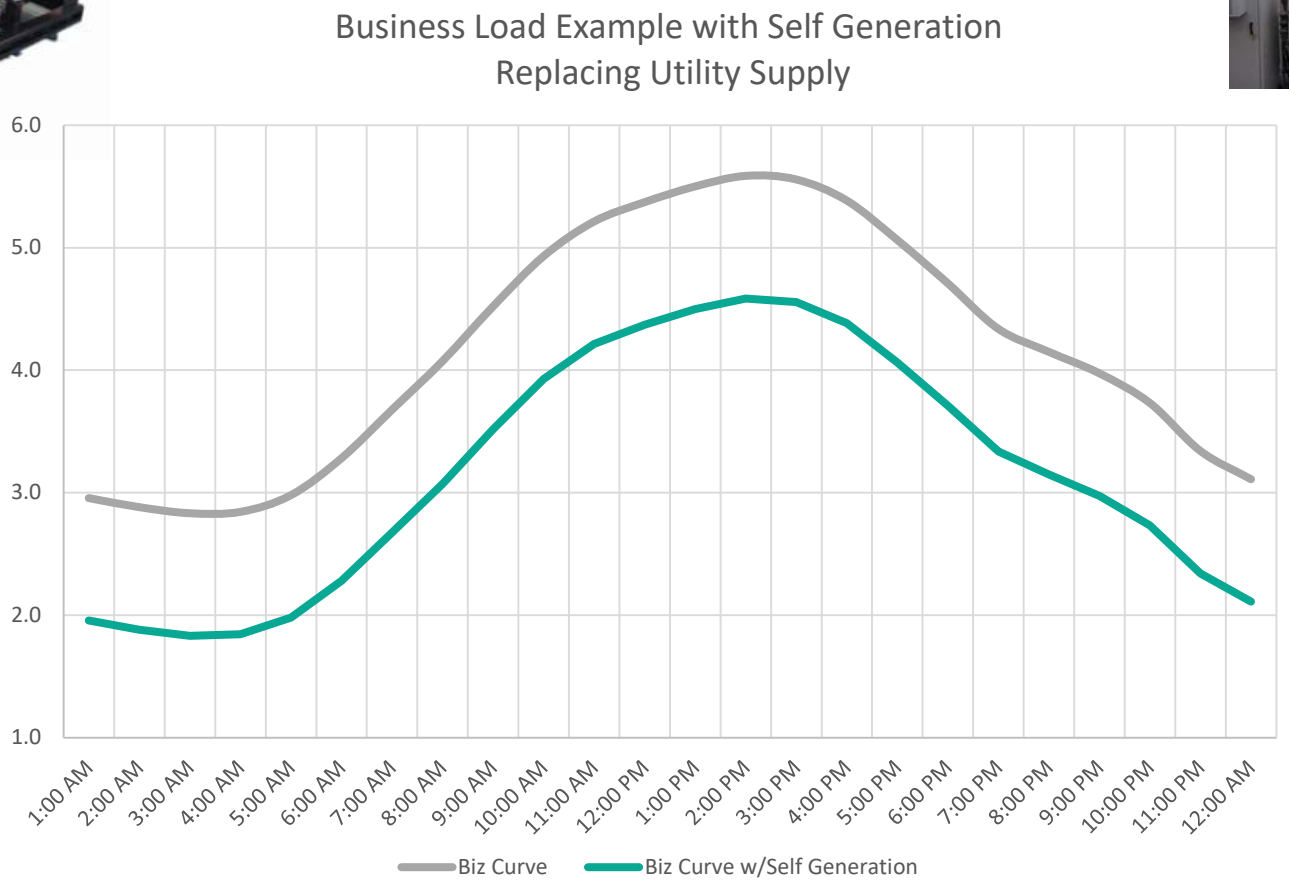
Combined Heat and Power Demand Response Program Characteristics

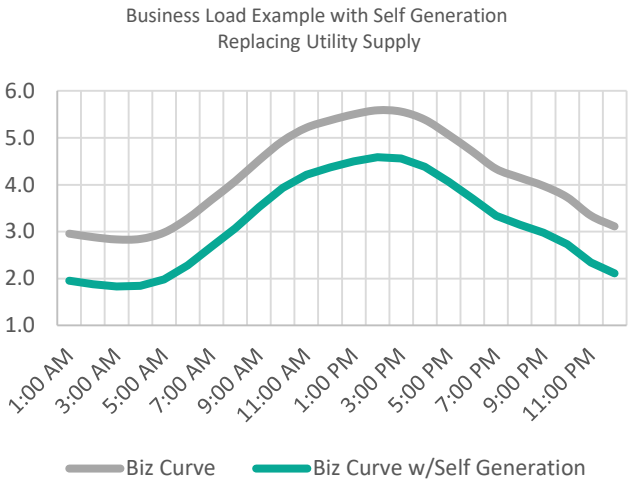


	Yes/No
Decrease Peak Demand or Shift Demand to Off-Peak Period	
Modify Net Consumption of Electricity on Customer's Side	
Dispatchable	
Benefit Cost Test	TBD

Self Generation Replacing Electric Utility Supply

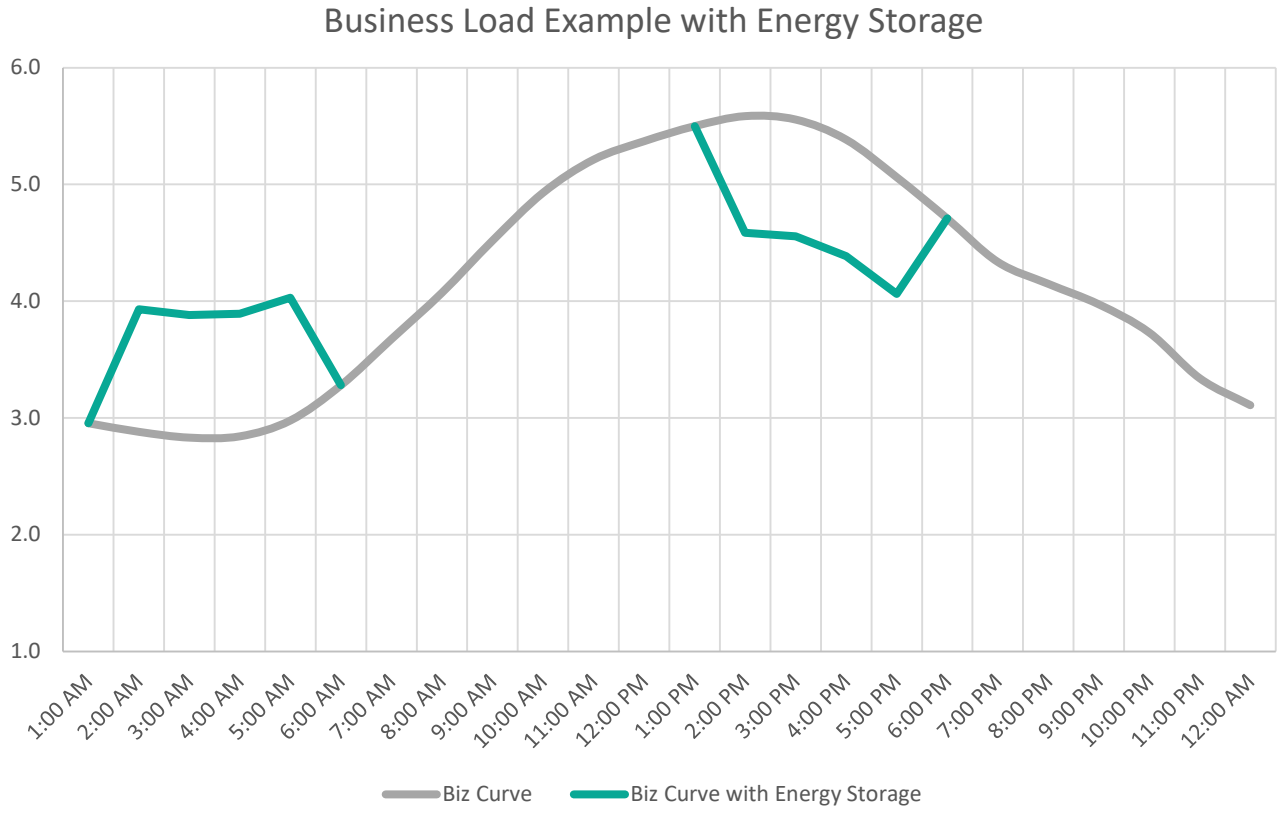


Self Generation Replacing Electric Utility Supply Demand Response Program Characteristics

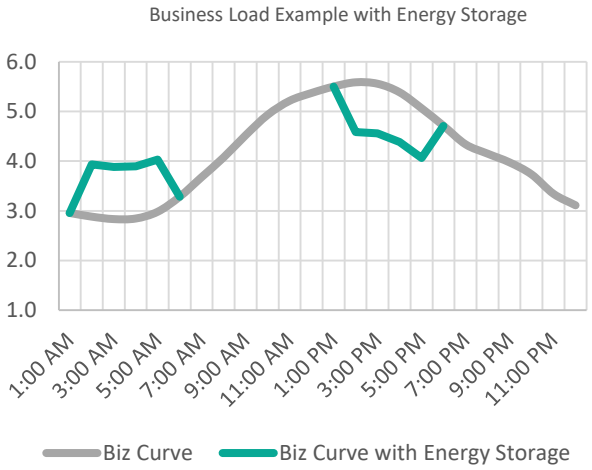


	Yes/No
Decrease Peak Demand or Shift Demand to Off-Peak Period	
Modify Net Consumption of Electricity on Customer's Side	
Dispatchable	
Benefit Cost Test	TBD

Energy Storage – Battery/Ice Storage

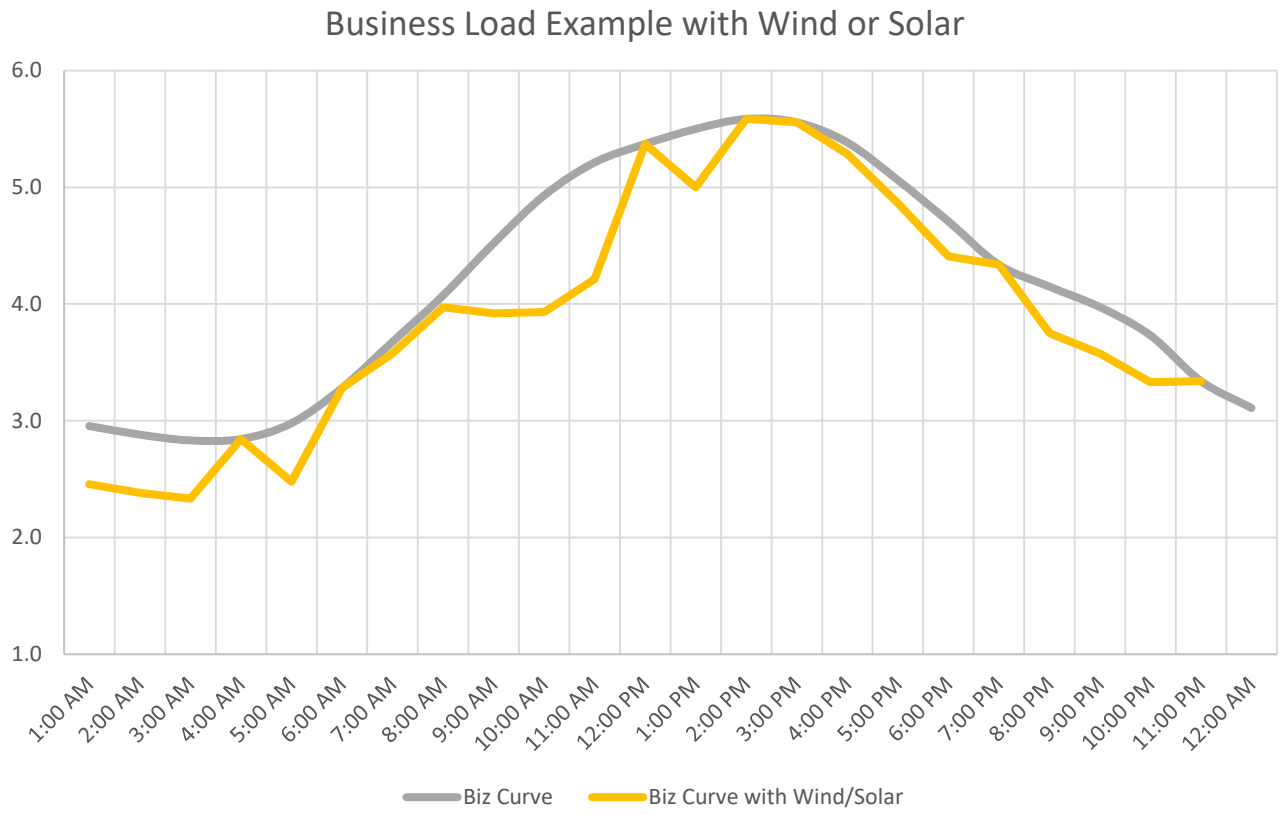


Energy Storage – Battery/Ice Storage Demand Response Program Characteristics

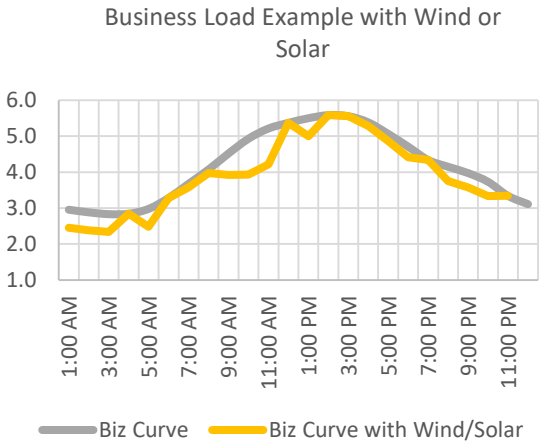


	Yes/No
Decrease Peak Demand or Shift Demand to Off-Peak Period	
Modify Net Consumption of Electricity on Customer's Side	
Dispatchable	
Benefit Cost Test	TBD

Wind/Solar

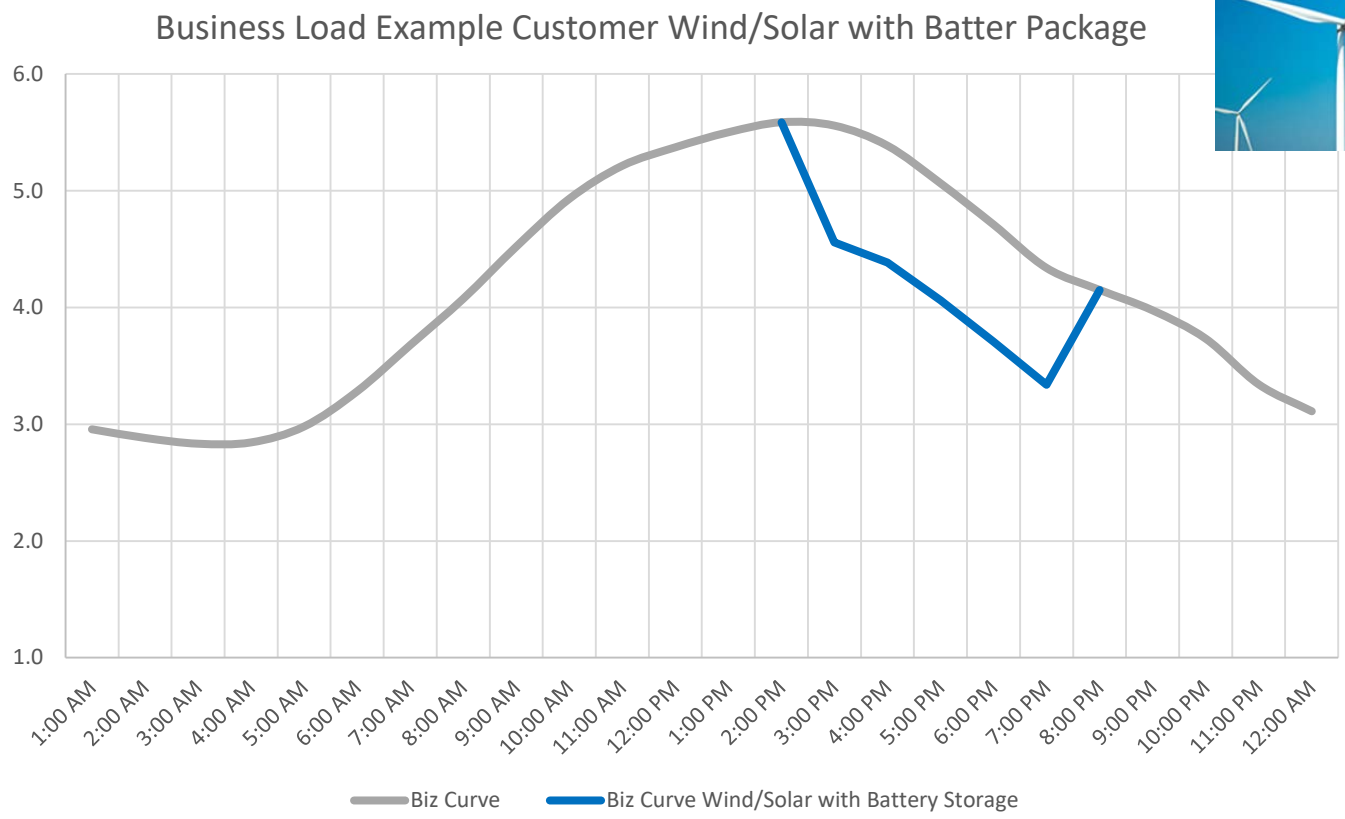

Business Load Example with Wind or Solar
6.0
5.0
4.0
3.0
2.0
1.0
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
12:00 AM
Biz Curve
Biz Curve with Wind/Solar

Wind/Solar Demand Response Program Characteristics

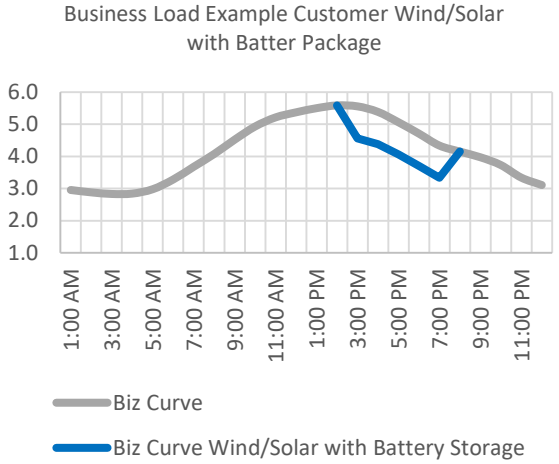


	Yes/No
Decrease Peak Demand or Shift Demand to Off-Peak Period	
Modify Net Consumption of Electricity on Customer's Side	
Dispatchable	
Benefit Cost Test	TBD

Wind/Solar Battery Storage Package



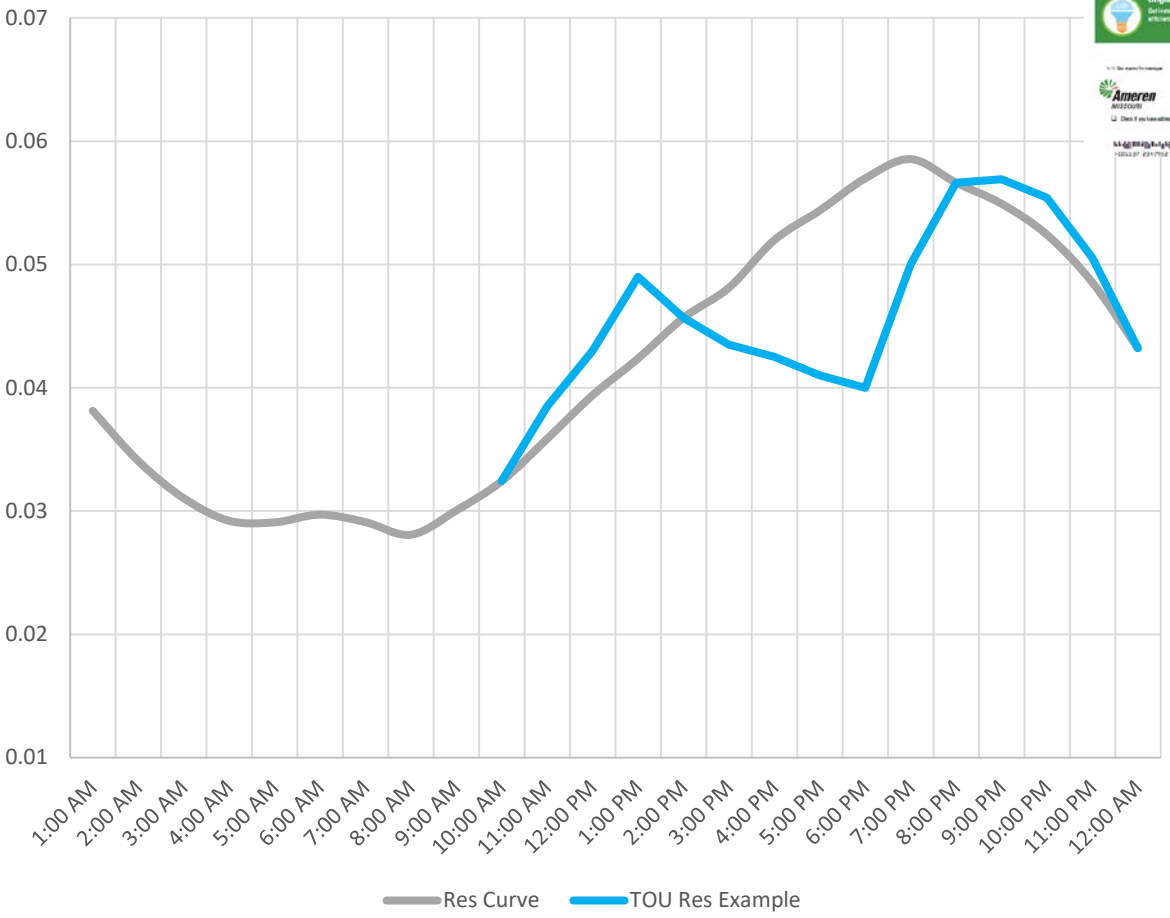
Wind/Solar Battery Storage Package Demand Response Program Characteristic



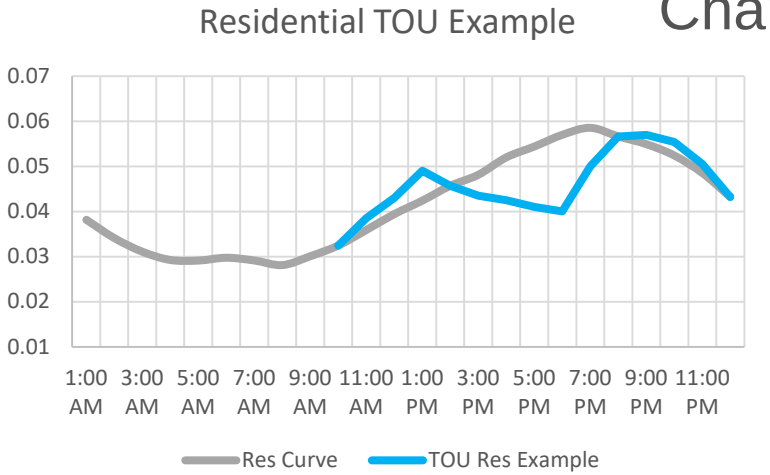
	Yes/No
Decrease Peak Demand or Shift Demand to Off-Peak Period	
Modify Net Consumption of Electricity on Customer's Side	
Dispatchable	
Benefit Cost Test	TBD

Time of Use Tariff

Residential TOU Example



Time of Use Tariff
Demand Response Program Characteristics



	Yes/No
Decrease Peak Demand or Shift Demand to Off-Peak Period	
Modify Net Consumption of Electricity on Customer's Side	
Dispatchable	
Benefit Cost Test	TBD

Demand Response Team Results

	Yes/No
Current Residential and Business Programs	
Combined Heat and Power	
Back Up Customer Generation	
Self Generation Replacing Electric Utility Supply	
Energy Storage – Battery/Ice Storage	
Wind/Solar	
Wind/Solar Battery Storage Package	
Time of Use Tariff	

Next Steps

Today's Action Items

Exploration – **Midterm Meeting 2**

- Regulatory Structures and Designs
- Pros and Cons of Structures - 3 year versus Long-Term
- Throughput Disincentives, Recovery, and Earning Opportunity

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MEEIA 2019

Demand Response Collaboration Journey

Agenda

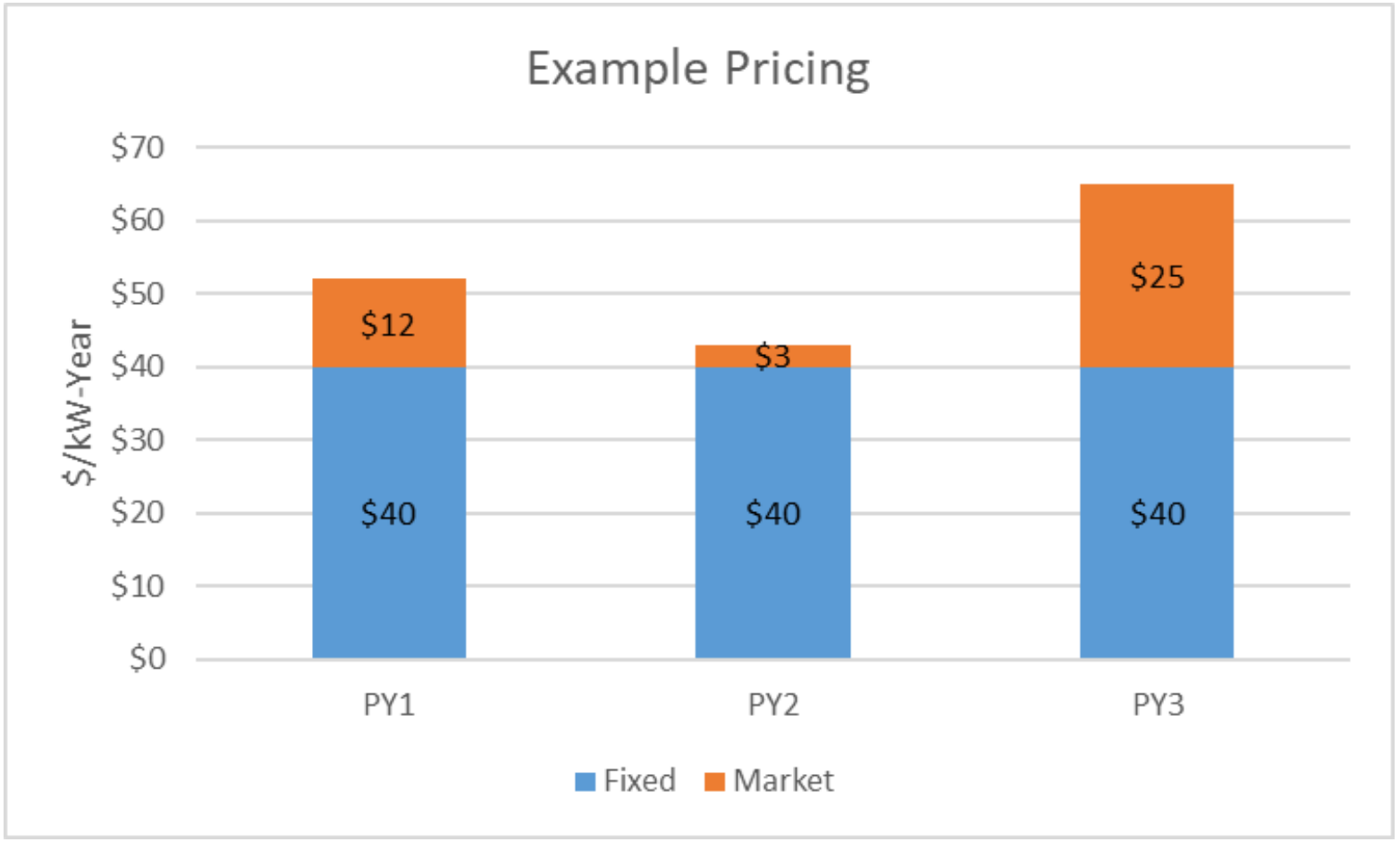
- Staggered Term Length Approvals
- Floating Payment to Customers
- Locational Demand Response
- Off Ramps

Appendix B

Staggered Term Length Approvals

	PY1	PY2	PY3	PY4	PY5	PY6	PY7	PY8	PY9	PY10	PY11	PY12
MEEIA 4	60MW			MEEIA 4 Approval - Maintenance Term			MEEIA 5 Approval - Maintenance Term			MEEIA 6 Approval - Maintenance Term		
		45MW		MEEIA 4 Approval - Maintenance Term			MEEIA 5 Approval - Maintenance Term			MEEIA 6 Approval - Maintenance Term		
			55MW	MEEIA 4 Approval - Maintenance Term			MEEIA 5 Approval - Maintenance Term			MEEIA 6 Approval - Maintenance Term		
	MEEIA 4 Earnings Paid			No Additional Earnings								
MEEIA 5				30MW			MEEIA 5 Approval - Maintenance Term			MEEIA 6 Approval - Maintenance Term		
					45MW		MEEIA 5 Approval - Maintenance Term			MEEIA 6 Approval - Maintenance Term		
						25MW	MEEIA 5 Approval - Maintenance Term			MEEIA 6 Approval - Maintenance Term		
				MEEIA 5 Earnings Paid			No Additional Earnings					
MEEIA 6							20MW			MEEIA 6 Approval - Maintenance Term		
								20MW		MEEIA 6 Approval - Maintenance Term		
									20MW	MEEIA 6 Approval - Maintenance Term		
							MEEIA 6 Earnings Paid			No Additional Earnings		
Performance Target	60	105	160	190	235	260	280	300	320	320	320	320

Floating Payment to Customers



Locational Demand Response

Off Ramps

- MEEIA Approval Requests to Add or Remove Capacity
- Ad Hoc Filing to Add/Remove
  - Force Majeure – economic downturn, large load change at a location, etc.
- Event Calls
  - Not calling events could limit incentive payments to customers
  - Annual decision-making on “Intent to Call” before each season
- Contract Terms – Customer and/or Contractor

Next Steps

- Share Draft Report
- File Draft Report – December 10

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The staggered term length approval structure is a concept based on a 3-year MEEIA approval cycle with the addition of a longer-term Demand Response (DR) element. The following describes the concepts associated with **each MEEIA approval**.

Illustrative demand response approval example (PY: Program Year):

- Utility files "MEEIA 4" (highlighted in yellow) which includes a 3 year approval (with associated budgets) to build a demand response resource (PY1, PY2, PY3) adding 160 total MW (60+45+55 and associated earnings opportunity) as well as approval to continue those 160 MW for a 3-year maintenance term throughout PY4, PY5, and PY6 (with associated budget).

- Utility subsequently files "MEEIA 5" (highlighted in green) which includes a 3 year approval (with associated budgets) to build a larger demand response resource (PY4, PY5, PY6) adding 100 total MW (30+45+25 and associated earnings opportunity) as well as approval to continue those 100 MW for a 3-year maintenance term throughout PY7, PY8, and PY9 (with associated budget).
    - Importantly in this MEEIA 5 approval the decision to add more demand response for PY4, PY5, and PY6 will be made at the same time as an explicit decision is made to continue MEEIA 4's 160 MW of demand response into PY7, PY8, and PY9. In addition, performance targets for MEEIA 5 in PY4, PY5, and PY6 are assessed on a cumulative basis whereby only the incremental savings beyond MEEIA 4 levels accrue earnings. This approach would enforce the maintenance of previously approved demand response savings before incremental earnings are allowed for MEEIA 5 demand response savings.

- Utility subsequently files "MEEIA 6" (highlighted in grey) which includes a 3 year approval (with associated budgets) to build a larger demand response resource (PY7, PY8, PY9) adding 60 total MW (20+20+20 and associated earnings opportunity) as well as approval to continue those 60 MW for a 3-year maintenance term throughout PY10, PY11, and PY12 (with associated budget).
- Importantly in this MEEIA 6 approval the decision to add more demand response for PY7, PY8, and PY9 will be made at the same time as an explicit decision is made to continue MEEIA 4's 160 MW of demand response into PY10, PY11, and PY12 plus MEEIA 5's 100 MW of demand response into PY10, PY11, and PY12. In addition, performance targets for MEEIA 6 in PY7, PY8, and PY9 are assessed on a cumulative basis whereby only the incremental savings beyond MEEIA 4 and MEEIA 5 levels accrue earnings. This approach would enforce the maintenance of previously approved demand response savings before incremental earnings are allowed for MEEIA 6 demand response savings.

This cycle continues and decisions are made in each new MEEIA approval regarding incremental changes to demand response savings/budgets at the same time as explicit decisions are made about the continuation of previously approved MEEIA demand response programs.