Chairman Hoops,

On behalf of PJM, we would like to thank you and your fellow committee members for the opportunity to provide some insight into the work PJM is doing every day to deliver reliable, cost-effective energy to Ohioans.

During our testimony, we received three questions that we promised to follow-up with committee members regarding.

The first question asked that we provide more insight into the MOPR process and specifically the CONE/ACR/ and unit specific exemption processes. As Ms. Robinson stated in her testimony, our MOPR filing and our methodology for calculating CONE/ACR numbers has not yet been accepted by the FERC. That filing is pending.

On page 53 of our recently submitted MOPR filing, PJM details how we arrive at our Gross CONE values. CONE, or cost of new entry, estimates are based on publicly available sources (the EIA) for each resource. Per our filing, each resource has unique costs associated with bringing a new model online and thus has a unique CONE value. Our MOPR filing can be found here: https://pjm.com/directory/etariff/FercDockets/4443/20200318-er18-1314-003.pdf

I am also attaching a copy of a March 2020 Brattle Group presentation to demonstrate the most up to date Gross CONE/ACR numbers for plants in the PJM footprint (default-mopr-gross…pdf).

The second question asked about resources that are subject to the MOPR. In FERC's MOPR order, the FERC determined that PJM must file a compliance filing which would have a minimum price floor for any "subsidized" resources that could (through bidding behavior out of line with true economics of the plants) distort wholesale market prices. However, the order provided significant exemptions to this requirement. We are attaching a few slides which may help to demonstrate how our – as filed and not yet accepted- compliance plan would treat resources (Ohio followup…pptx).

The final question asked about the costs of upgrading the transmission system to ensure reliability if the Davis-Besse and Perry plants were to retire. Based on a study conducted in 2018, PJM identified required transmission upgrades which would cost approximately $24 million. I would note that these costs were included in the nuclear retirement cost analysis which was attached to our testimony. A portion of those upgrades have gone into service, while the remaining upgrades were cancelled due to the nuclear units rescinding their deactivation notice (PJM Interconnection, LLC, Open Access Transmission Tariff, §VI., Schedule 12 - Appendix A - Required Transmission Enhancements , Pennsylvania Electric Company; p. 7, projects (b3017.1 - 3017.3); effective Jan. 31, 2019; PJM Transmission Cost Information Center, https://www.pjm.com/planning/project-construction (as of Apr. 4, 2019)).

Thank you again for the opportunity to address the committee and we hope to continue to be a resource to the policymakers of the state of Ohio as they look to craft energy policy.

Thank you,

Jack Keegan

Manager, State Government Policy

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Existing Generation Gross ACRs and Energy Efficiency Net CONE

Updated Results

PRESENTED TO

Market Implementation Committee

PRESENTED BY

Brattle and S&L Project Teams

March 11, 2020

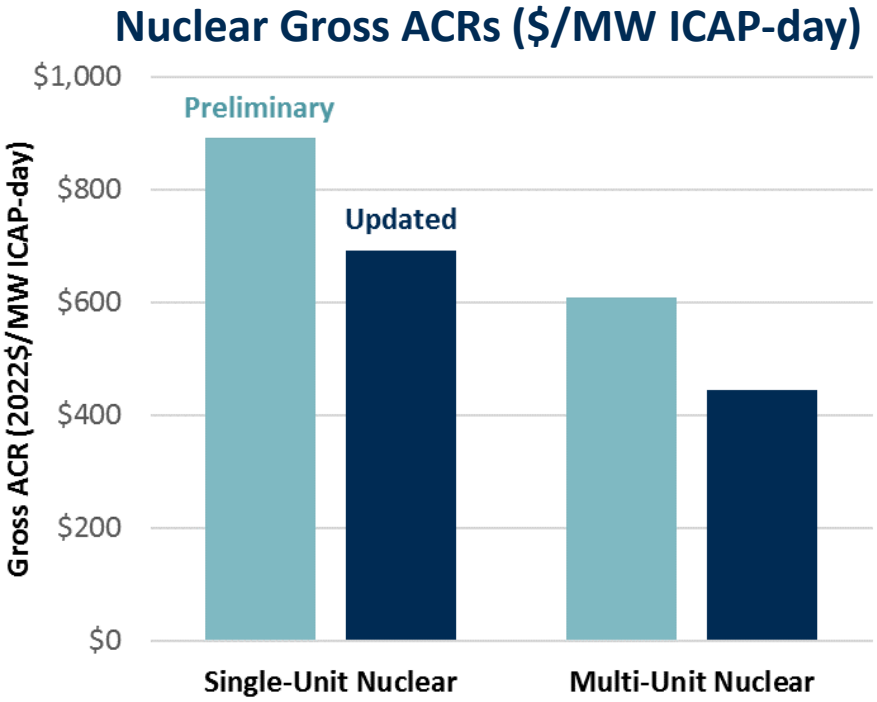
THE Brattle GROUP

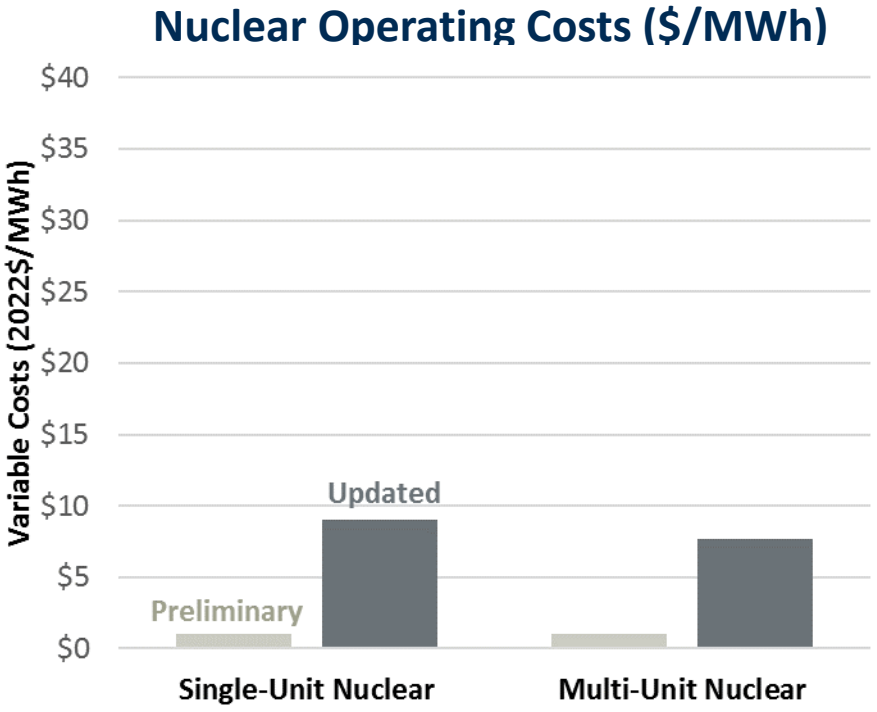
Modifications to Gross ACR Values

- We received additional guidance from PJM concerning the costs that are includable in the Gross ACR versus Variable Costs.
  - The combination of Gross ACR and Variable Costs should include all avoidable costs to operate the resource for another year.
  - Costs incurred infrequently to extend the asset's life or enhance its performance for over a year should not be included in either.
  - PJM's Tariff and Operating Agreement provide details on which costs are includable in Gross ACR.
- All maintenance costs *for systems* directly related to electric production can be included in the operating costs maintenance adder for cost-based energy offers, and thus are excluded from the ACRs.
- We modified our estimates for nuclear plants and coal plants to align with this interpretation of the tariff, which resulted in a shift in costs from the Gross ACRs to Variable Costs.

Updated Nuclear Gross ACRs

- Lower Gross ACR primarily due to shifts of fuel costs (-$112 for single-unit), sustaining capital costs (-$55), and materials & services operating costs (-$10) to Variable Costs
- Removed enhancement and capital spares costs (-$24), decreased fuel costs (-$18), and added property taxes (+$20) to the Gross ACR
- Total Costs included in Gross ACR & Operating Costs decreased by about $20/MW-day

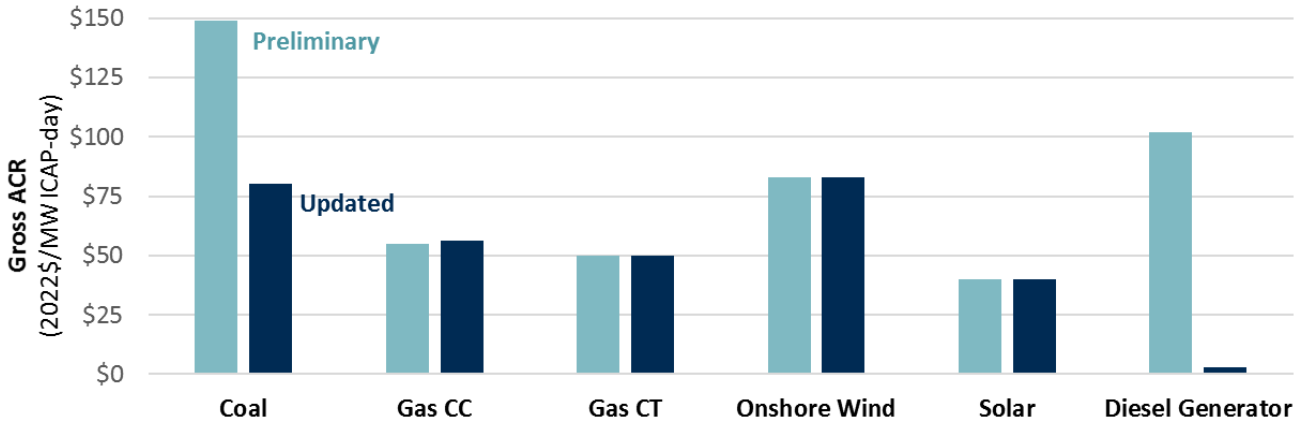




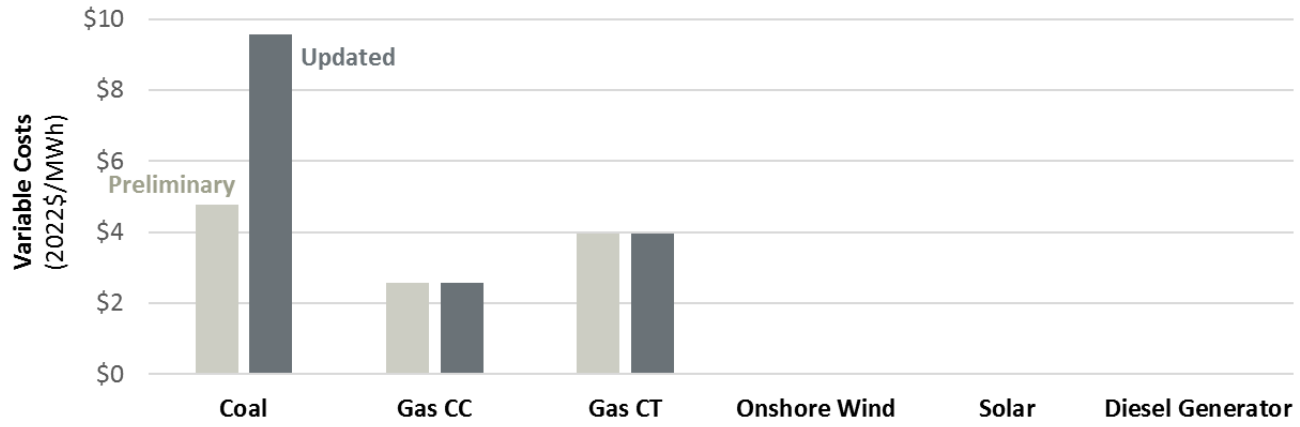
Updated Generation Gross ACRs

- **Coal**: Shifted necessary & routine expenditures to maintain performance from Gross ACR to Variable Costs
- **Diesel Generator**: Changed cost basis from a 12 MW wholesale resource to a 1 MW behind-the-meter resource at a commercial facility; updated Gross ACR only accounts for an annual maintenance contract

Existing Generation Gross ACRs ($/MW ICAP-day)



Existing Generation Variable Costs ($/MWh)



Existing Generation Gross ACRs Summary

Updated Existing Generation Gross ACRs (2022$/MW ICAP-day)

Technology	Representative-Low	Representative Plant	Representative-High
Single-Unit Nuclear		**$693**	
Multi-Unit Nuclear	$405	**$444**	$477
Coal	$74	**$80**	$166
Gas CC	$55	**$56**	$79
Gas CT	$42	**$50**	$65
Onshore Wind	$76	**$83**	$128
Solar PV	$29	**$40**	$60
Diesel Generator		**$3**	

Existing Generation Variable Cost Summary

Updated Existing Generation Variable Costs (2022$/MWh)

Technology	Representative-Low	Representative Plant	Representative-High
Single-Unit Nuclear	---	**$9.02**	---
Multi-Unit Nuclear	$7.56	**$7.66**	$9.14
Coal	$9.17	**$9.56**	$9.20
Gas CC	$2.24	**$2.57**	$2.53
Gas CT	$3.96	**$3.96**	$4.98
Onshore Wind	$0.00	**$0.00**	$0.00
Solar PV	$0.00	**$0.00**	$0.00
Diesel Generator	---	**$0.00**	---

Modifications to EE Net CONE

- The EE Net CONE value presented at the February 28 MIC meeting over-counted program incentive costs, and we have corrected that by relying directly on the Total Resource Cost (TRC) of each program.
- We continue to exclude programs listed in the EE program reports that do not participate in the capacity market, but now include all other programs, other than a single outlier (<1 MW) with much higher costs than the others.
- AEP, however, does not provide the TRC of its individual programs, so we excluded that utility from our sample.
- The resulting average EE programs costs thus decreased to $1,761/kW, from $2,179/kW in the prior version.

Net CONE for New Energy Efficiency

Updated New EE Net CONE

EE Impacts		
Customer Peak Savings	*Retail MW*	0.85
Losses Gross-Up	*%*	17.6%
Nominated EE Value	*MW ICAP*	1.00
Forecast Pool Requirement		1.087
UCAP Value of EE	*MW UCAP*	1.09
Annual Energy Savings	*MWh*	6,735
EE Costs and Benefits Assumptions		
Total Costs	*$/kW ICAP*	$1,761
Average Lifetime	*years*	11
PJM CONE ATWACC	*%*	8.2%
Energy Benefit	*$/MWh*	$29
Avoided T&D Costs	*$/kW-yr*	$41
Calculations		
Gross CONE	*$/kW ICAP-yr*	$230
Energy Savings	*$/kW ICAP-yr*	$178
T&D Savings	*$/kW ICAP-yr*	$35
Net CONE	***$/kW ICAP-yr***	**$17**
Net CONE	***$/MW ICAP-day***	**$46**
Net CONE	***$/MW UCAP-day***	**$42**

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