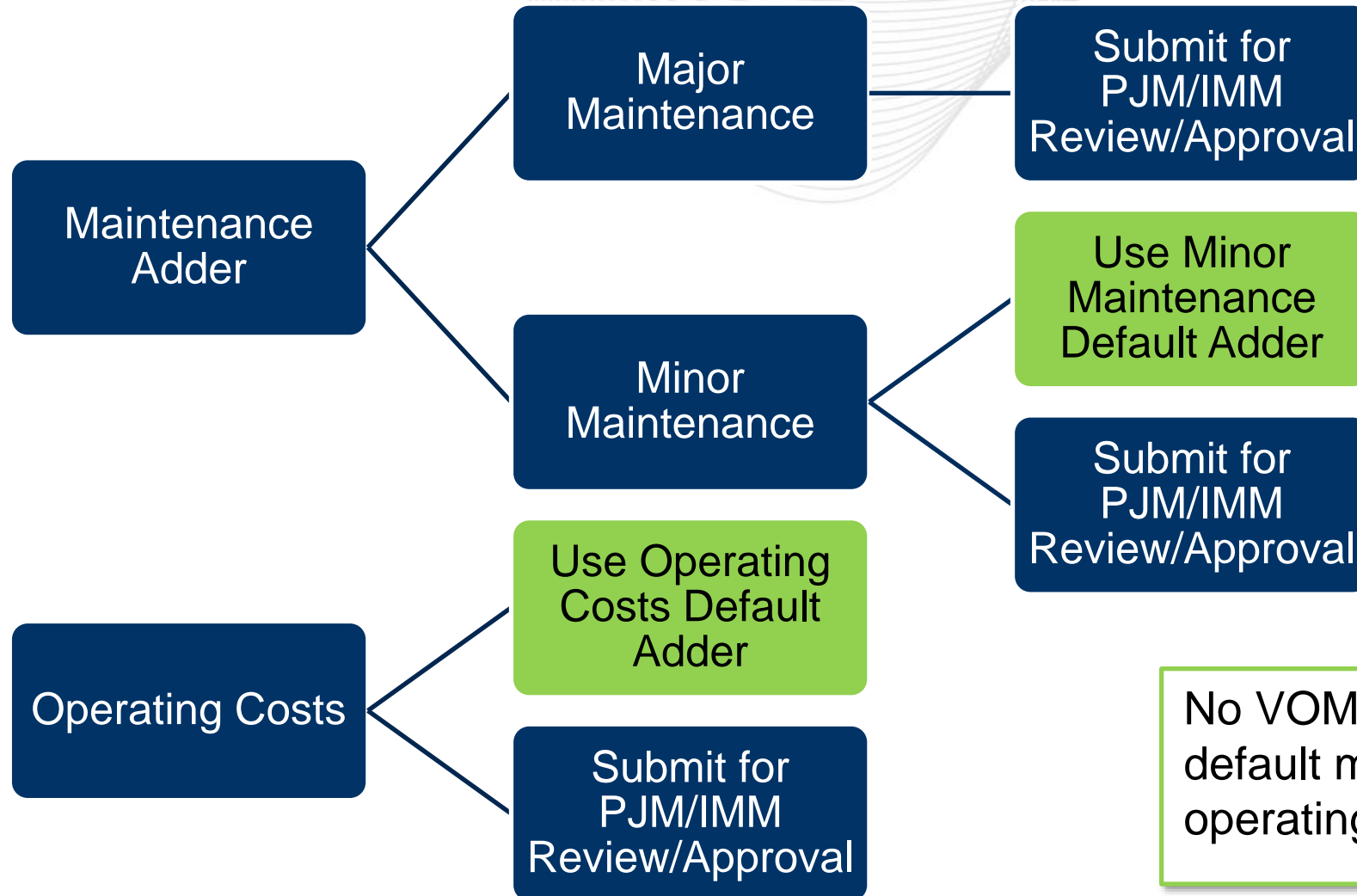


# 2023 VOM Education Session

Roger Cao  
Jennifer Warner-Freeman  
Special MIC  
May 10, 2023

- Main changes:
  - Established default minor maintenance and operating costs
  - Clarified major and minor maintenance
  - Changed annual review to periodic review if using default values
- Other changes:
  - Requirements for supporting documentation
  - Clarifications on multiple maintenance adders, ESH, LTSA, etc.

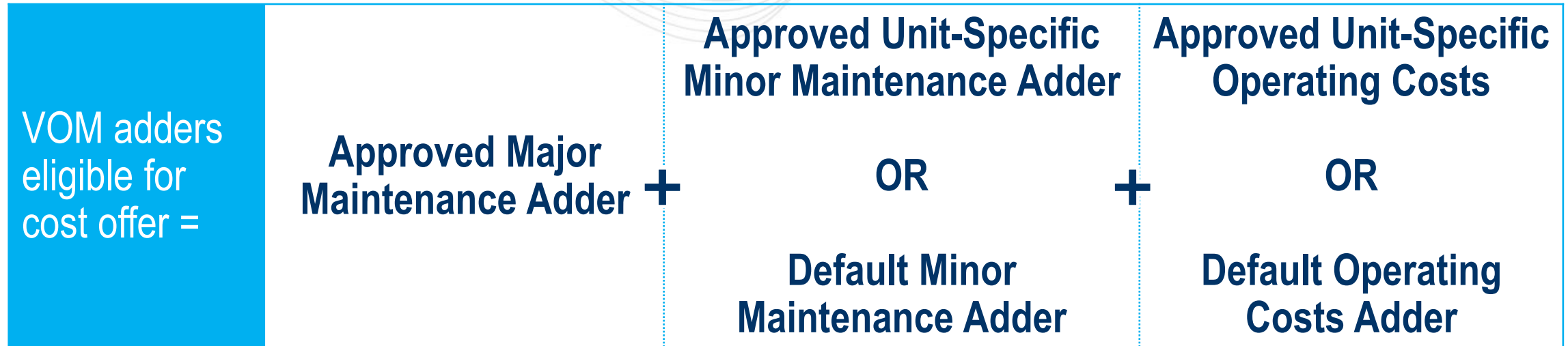


No VOM submission if using the default minor maintenance and/or operating costs (effective 1/1/2024)

Variable Operations and Maintenance (VOM) costs include three distinct components:

- **Major Maintenance**  
Maintenance expenses that are overhauls, repairs, or refurbishments that require disassembly to complete
- **Minor Maintenance**  
Maintenance expenses that are repairs or refurbishments on equipment and components directly related to electric production and not otherwise classified as major maintenance
- **Operating Costs**  
Operating costs are expenses related to consumable materials used during unit operation.

- The adders that represent the three VOM components can be included in the cost-based energy offer:



- Market Sellers may elect, but are not required, to include maintenance and operating costs in their cost-based energy offer
- Submission of Unit Specific Minor maintenance and/or Operating Cost data to PJM for review prevents ability to utilize default adders for respective year

- Major Maintenance - maintenance expenses that are overhauls, repairs, or refurbishments that require disassembly to complete.
- Section 1: Provide detailed major maintenance expenses for 2022 if major maintenance performed in 2022.
- Section 2: Include only major maintenance dollars for 2021 and prior years. Years that did not perform major maintenance shall enter zero dollars but still include actual operating history.
  - A minimum of 10 years operating history shall be provided except for new immature units.
- Approved Major Maintenance Adder expires when the oldest major maintenance dollars rolls off from the maintenance history.
  - PJM will indicate the expiration date of the adder on the approval notice.

# Major Maintenance Template Example – Section 1

SECTION 1: PREVIOUS YEAR'S MAINTENANCE EXPENSES			
INSTRUCTIONS:		<p>Please add Previous Year's Maintenance Expenses below using the optional dropdowns provided. These must only be variable expenses directly related to electric production.</p> <p><b>*CANNOT INCLUDE: Any costs included in ACR and/or any other fixed costs.</b></p> <p><b>Note: Use of Maintenance Expense Type provided in the dropdown list is optional. If not used, Description must be provided. The full dropdown list can be found on 'Expense and Cost Type List' sheet.</b></p>	
Previous Year: 2022			
Maintenance System	Maintenance Expense Type	Description	Cost
Boiler	turbine diaphragm repair		\$ 1,000,000.00
Boiler	turbine blade repair/replacement		\$ 2,000,000.00
Boiler			
Reactor			
Heat Recovery Steam Generator (HRSG)			
Steam turbine			
Gas/Combustion turbine			
Hydro turbine			
Generator			
Engine			
	turbine blade repair/replacement		
	turbine diaphragm repair		
	turbine casing repair/replacement		
	turbine bearing repair/refurbishment		
	turbine seal repair/replacement and generator refurbishr		
	selective catalytic reduction and carbon monoxide reduct		
	compressor blade repair/replacement		
	hot gas path inspections, repairs, or replacements		



# Major Maintenance Template Example – Section 2

Select Maintenance History:	10	Operating History Units:	Annual MWh
	Maintenance History	Operating History	
Year	Annual \$	Annual MWh	
2022	3000000	250000	
2021	0	300000	
2020	0	400000	
2019	0	350000	
2018	0	400000	
2017	0	200000	
2016	0	300000	
2015	0	300000	
2014	3000000	200000	
2013	0	300000	
2012			
2011			
2010			
2009			
2008			
2007			
2006			
2005			
2004			
2003			
Total Historical Maintenance Cost		\$ 6,000,000.00	
Total Annual MWh		3,000,000	
Per Unit Maintenance Cost		\$ 2.00	/ MWh

Note 1: Escalation removed for purpose of demonstration

Note 2: The \$2/MWh adder expiration to be set to 12/31/2025 in PJM approval



# Submitting Unit-Specific Minor Maintenance

(this slide only applies if not utilizing Default Minor Maintenance adder)

- Minor Maintenance - repairs or refurbishments on equipment and components directly related to electric production and not otherwise classified as major maintenance
- Section 1: Provide detailed minor maintenance expenses for 2022 if minor maintenance performed in 2022.
- Section 2: Include only minor maintenance dollars for 2021 and prior years. Years that did not perform minor maintenance shall enter zero dollars but still include actual operating history (same as major maintenance adder template if provided).
  - A minimum of 10 years operating history shall be provided except for immature units.
- Approved Minor Maintenance Adder expires 12/31/2024.

# Minor Maintenance Template Example – Section 1

SECTION 1: PREVIOUS YEAR'S MAINTENANCE EXPENSES			
INSTRUCTIONS:		<p>Please add Previous Year's Maintenance Expenses below using the optional dropdowns provided. These must only be variable expenses directly related to electric production.</p> <p><b>*CANNOT INCLUDE:</b> Any costs included in ACR and/or any other fixed costs.</p> <p><b>Note:</b> Use of Maintenance Expense Type provided in the dropdown list is optional. If not used, Description must be provided. The full dropdown list can be found on 'Expense and Cost Type List' sheet.</p>	
Previous Year: 2022			
Maintenance System	Maintenance Expense Type	Description	Cost
Feedwater	repair and replacement of pumps		\$ 35,000.00
Condenser	repair and replacement of condenser components		\$ 65,000.00
Cooling towers	cooling tower fill and drift eliminators replacement		\$ 100,000.00
<div> Main steam  Feedwater  Condensate  Condenser  Cooling towers  Transformers  Fuel systems </div>			
	heat transfer replacement and cleaning		
	cooling tower fan motor and gearbox inspection		
	cooling tower fill and drift eliminators replacement		
	air filter replacement		
	repair and replacement of valves and piping components		
	repair and replacement of control equipment		
	repair and replacement of pumps		
	repair and replacement of motors		



## Minor Maintenance Template Example – Section 2

Select Maintenance History:		10	▼	Operating History Units:		Annual MWh
		Maintenance History		Operating History		
Year		Annual \$		Annual MWh		
	2022	\$	200,000.00		250000	
	2021	\$	100,000.00		300000	
	2020	\$	300,000.00		400000	
	2019	\$	400,000.00		350000	
	2018	\$	200,000.00		400000	
	2017	\$	100,000.00		200000	
	2016	\$	300,000.00		300000	
	2015	\$	400,000.00		300000	
	2014	\$	50,000.00		200000	
	2013	\$	50,000.00		300000	
	2012					
	2011					
	2010					
	2009					
	2008					
	2007					
	2006					
	2005					
	2004					
	2003					
Total Historical Maintenance Cost		\$	2,100,000.00			
Total Annual MWh				3,000,000		
Per Unit Maintenance Cost		\$	0.70			/ MWh

Note 1: Escalation removed for purpose of demonstration

Note 2: The \$0.7/MWh adder expiration to be set to 12/31/2024 in PJM approval

# Submitting Unit-Specific Operating Costs

(this slide only applies if not utilizing Default Operating Costs adder)

- Provide detailed operating costs for 2022.
- Provide historical operating costs for 2021 and prior.
- Approved Operating Costs expires 12/31/2024.
- Shall update COA monthly if using monthly rolling average.
  - Submit new Operating Costs if cost items change.
- State of Market (SOM) value no longer applies.

- Supporting documentation must be provided for all years included in the template.
- Clearly show how each cost submitted for review was calculated:
  - maintenance management system records,
  - general ledger data, accounting records or invoices.
- Maintenance expenses shall include the work order and/or description of maintenance activities performed.
- Operating costs shall include the amount of each consumable used while in operation, and the cost per unit of each consumable.
- VOM templates and supporting documentation must be linked and traceable.

- Immature units (new units with less than 10 years of operating history) select 'actual < 10' for Maintenance Period:
  - Maintenance costs, operating costs and operating history must correspond to the number of years for which supporting documentation is available.
- Mature units select 10 or 20 years of Maintenance Period:
  - Supporting documentation required for all years.
  - Mature units that transferred ownership:
    - Include maintenance and operating costs for which supporting documentation is available.
    - Operating history at least 10 years.

- Multiple Maintenance Adders are only allowed if supported by LTSA.
  - Multiple variable maintenance payment criteria specified.
- Total maintenance dollars must be split based on LTSA.
- The format of adder must be consistent with LTSA (\$/start, \$/hour, N-Ratio, etc.)
  - The format of adder must be consistent with how maintenance expenses vary as defined in LTSA.
- Can only split major maintenance expenses.



- One template can include one unit or multiple units at the same plant.
- If including multiple units are included in one template,
  - units must be in same technology type.
  - must include total operating history for all units

- Cyclic starting and peaking factors
- Only LTSA or OEM specified values
- Cyclic fuel factor or multiple peaking factor allowed if specified
- Only applied to major maintenance

# Unallowable Expenses Examples

- ☐ Annual or time-based, preventative maintenance:
  - ☐ Vibration surveys
  - ☐ Oil sampling
  - ☐ Infrared surveys
  - ☐ Conditioning monitoring
  - ☐ Annual condenser cleaning
  - ☐ Weekly filter changes
  - ☐ Annual or monthly CT borescope inspection
- ☐ Buildings
- ☐ HVAC
- ☐ Compressed air
- ☐ Closed cooling water
- ☐ Heat tracing/freeze protection
- ☐ Control room equipment and software
- ☐ Reactor safety system
- ☐ Plant water treatment systems



## Default VOM Values for use starting January 1, 2024

VOM Technology Type	Minor Maintenance Default (\$/MWh)	Operating Cost Default (\$/MWh)
Combined Cycle	\$ 1.13	\$ 0.46
Simple Cycle Combustion Turbine	\$ 4.14	\$ 0.86
Reciprocating Engine	\$ 4.64	\$ 1.87
Fossil Steam	\$ 1.97	\$ 3.31

## Initial Default Values - 2021

Technology Type	Default Minor Maintenance Adders (\$/MWh)	Default Operating Costs Adders (\$/MWh)
Combined Cycle	0.98	0.40
Combustion Turbine	3.59	0.75
Reciprocating Engine	4.03	1.62
Fossil Steam	1.71	2.87

## Escalated Default Values - 2024



Technology Type	Default Minor Maintenance Adders (\$/MWh)	Default Operating Costs Adders (\$/MWh)
Combined Cycle	1.13	0.46
Combustion Turbine	4.14	0.86
Reciprocating Engine	4.64	1.87
Fossil Steam	1.97	3.31

YEAR	INDEX	ESCALATION FACTOR
2003	441	2.248
2004	465	2.132
2005	493	2.011
2006	515	1.925
2007	546	1.816
2008	596	1.664
2009	578	1.715
2010	604	1.642
2011	631	1.571
2012	645	1.505
2013	653	1.518
2014	672	1.475
2015	700	1.416
2016	714	1.389
2017	711	1.395
2018	745	1.331
2019	760	1.305
2020	779	1.273
2021	861	1.152
2022	953	1.040
2023	992 (est)	1.000

Multiply initial default adders, which are expressed in 2021 dollars, by the escalation factor for 2021 data to escalate the values to current-day dollars.

- A recent upgrade to our VOM PJM Connect/SharePoint site allows multiple users from the same company to view all of the company's submissions, regardless of who submitted them.
- We have gone through current submissions to organize submissions that already have permissions granted to multiple users.
- If you want to adjust your submission permissions to allow multiple users, please contact us with the submission numbers and the user ids of the users who should have access.

## VOM Adder Submission

- [Operational Data](#)
- [Winter Storm Elliott Info](#)
- [Data Directory](#)
- [Interregional Data Map](#)
- [PJM Tools](#) 
- [Energy Market](#) 
- [Drivers of Uplift](#)
- [Energy Offer Verification](#)
- [Fuel Cost Policies](#)
- [LMP Model Information](#)
- [Market-to-Market Coordination](#)

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## Fuel Cost Policies

Market Sellers are required to have a PJM-approved fuel cost policy non-zero, cost-based offer into the energy market. Fuel cost policies are subject to review and approval by PJM. All approved fuel cost policies will undergo a policy expiration to ensure that the cost offer estimation practice

	Date
Frequently Asked Questions <span>PDF</span>	9.11.2020
<b>VOM Template</b>	
2023 <span>XLS</span>	4.27.2023
Multi Sheets <span>XLS</span>	4.27.2023
Review Guidelines <span>PDF</span>	4.27.2023
PJM Connect <span>WEB</span> <span>Login Instructions</span> <span>PDF</span>	5.10.2021
Default Values	4.27.2023

Variable Operations and Maintenance Addrs  
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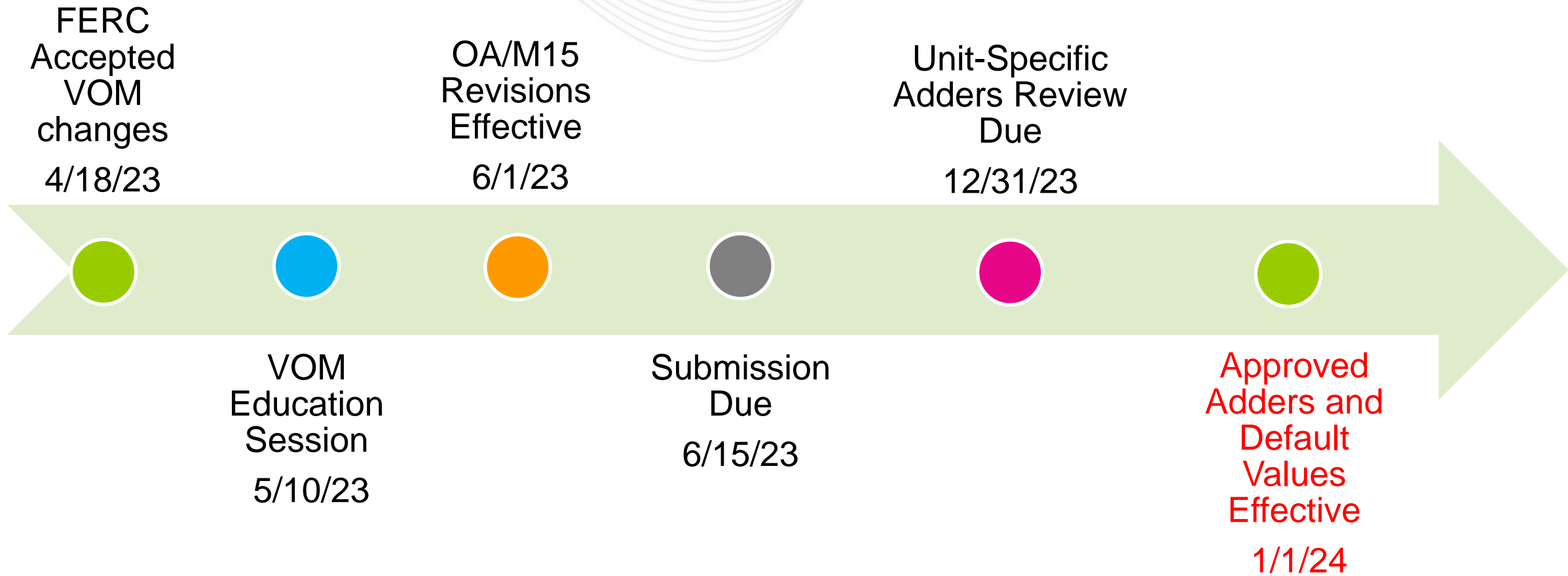
General Submissions

✓	ID	Applicable Year	Participant Name	Name
		2022/2023		
		2022/2023		
		2022/2023		
		2022/2023		
		2022/2023		
		2022/2023		
		2022/2023		
		2022/2023		
		2022/2023		

EDIT LINKS

Site contents





- **When do the new VOM adders go into effect?**
  - All VOM adders, both default and unit-specific, will go into effect January 1, 2024.
- **Do I have to use the default adders?**
  - No, you can still submit unit-specific templates for major maintenance expenses, minor maintenance expenses, and operating costs.
- **Do I have to use both default adders?**
  - No, you can use just the minor maintenance default or just the operating cost default value. You can use both or neither.
- **If I only want to use the default adders for minor maintenance and operating costs, and not have an adder for major maintenance, do I need to do anything else?**
  - No action is required to use the minor maintenance and operating cost default adders. Just start incorporating the adders into your cost offer starting on January 1, 2024.

- **If I choose to use the default adders this year, can I return to using unit-specific adders in the future?**
  - Yes, you may change that election at the start of each year, but can not change mid-year.
- **When submitting a template for a unit-specific major maintenance adder, do I need to strip minor maintenance activities out of my previously submitted maintenance history?**
  - Yes.
- **How many years of supporting documentation do I need to provide?**
  - You need to provide supporting documentation for all maintenance expenses and operating costs included in the maintenance history used in the template. This is a change from prior years when documentation was submitted for the just most recent year and previous years only needed to be made available upon request.

- **Can I still have multiple maintenance adders? For example, one for starts and one for run hours?**
  - This is permissible only in cases when your LTSA billing is broken out in this way and multiple maintenance adders can only be applied to major maintenance expenses covered by the LTSA.
- **Can I still use Equivalent Service Hours (ESH) as a basis for my maintenance adder?**
  - Yes, if specified in your LTSA or OEM, but ESH would only be available for use with the major maintenance adder as it can only apply to major maintenance expenses.
- **Do I have to separate my major and minor maintenance? Can't I submit my maintenance expenses as before?**
  - It is recommended to have major and minor maintenance separated out as it supports easily using default adder in future years. Including major and minor maintenance in one template might be allowed under special circumstances, such as the default minor maintenance adder is unavailable for your unit's technology type. Please contact PJM for further guidance.

VOM Submission Site (PJM Connect):

<https://connect.pjm.com/vomadders/SitePages/Home.aspx>

2023 Template:

<https://www.pjm.com/-/media/markets-ops/energy/fuel-cost-policy/vom-template.ashx>

VOM Review Guidelines:

<https://www.pjm.com/-/media/markets-ops/energy/fuel-cost-policy/vom-review-guidelines.ashx>

M15 Redlines:

<https://www.pjm.com/-/media/committees-groups/committees/mc/2022/20221221/consent-agenda-c---3-manual-15-revisions---redline.ashx>

Default Values:

<https://www.pjm.com/-/media/markets-ops/energy/fuel-cost-policy/vom-default-values.ashx>

## Presenters:

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## 2023 VOM Education Session



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