

Gross ACR Estimates

PRESENTED BY

BRATTLE AND S&L TEAM

PRESENTED TO

PJM MARKET IMPLEMENTATION
COMMITTEE

DECEMBER 6, 2022



Goals and Contents of Today's Presentation

Goals of Today's Presentation

🌀 Solicit stakeholder feedback on ACRs

Contents

🌀 ACRs for listed types



Gross ACR Estimates for Existing Generation

Resource Type	Representative Low-Cost Plant \$/MW-day	Representative Plant \$/MW-day	Representative High-Cost Plant \$/MW-day
Multi-unit nuclear	476	537	552
Single-unit nuclear	-	591	-
Coal	86	92	151
Natural Gas CC	62	63	65
Simple-cycle CT	43	52	69
Onshore wind	120	127	176
Large-scale solar PV	50	55	60
Steam oil & gas	47	58	96

Note: All values shown are in Mid-2022 Dollars per Nameplate MW per Day.

Nuclear

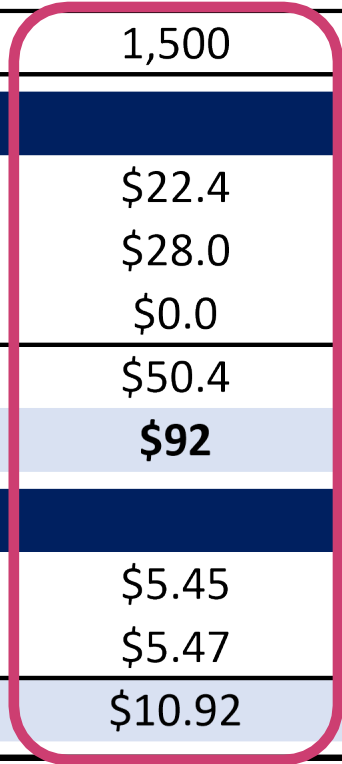


		Multi-Unit Nuclear Plant			
	Units	Single-Unit Nuclear Plant	Representative Low-Cost Plant	Representative Plant	Representative High-Cost Plant
Capacity	<i>Nameplate MW</i>	1,200	2,400	2,400	2,400
Gross ACR					
Fixed Operating Costs	<i>\$/MWh</i>	\$21.52	\$16.73	\$19.50	\$20.17
Fixed Capital Costs	<i>\$/MWh</i>	\$1.39	\$1.29	\$1.25	\$1.25
Enhancements	<i>\$/MWh</i>	\$1.99	\$1.85	\$1.79	\$1.79
Property Taxes	<i>\$/MWh</i>	\$1.01	\$1.01	\$1.01	\$1.01
Total	<i>\$/MWh</i>	\$25.92	\$20.89	\$23.55	\$24.23
Gross ACR	<i>\$/MW-day</i>	\$591	\$476	\$537	\$552
Variable Costs					
Operating Costs	<i>\$/MWh</i>	\$0.33	\$0.25	\$0.30	\$0.31
Major Maintenance	<i>\$/MWh</i>	\$2.04	\$1.90	\$1.83	\$1.84
Total Variable Costs	<i>\$/MWh</i>	\$2.37	\$2.16	\$2.13	\$2.14

Note: Including Major Maintenance in the Gross ACRs would add 47 \$/MW-day to Single Unit Nuclear and 42 \$/MW-day to Multi-Unit Nuclear

Coal

	Units	Coal Plant		
		Representative Low-Cost Plant	Representative Plant	Representative High-Cost Plant
Capacity	<i>Nameplate MW</i>	1,800	1,500	100
Gross ACR				
Labor	<i>\$ million</i>	\$25.0	\$22.4	\$2.2
Fixed Expenses	<i>\$ million</i>	\$31.2	\$28.0	\$2.9
Property Taxes	<i>\$ million</i>	\$0.0	\$0.0	\$0.4
Total	<i>\$ million</i>	\$56.3	\$50.4	\$5.5
Gross ACR	<i>\$/MW-day</i>	\$86	\$92	\$151
Variable Costs				
Operating Costs	<i>\$/MWh</i>	\$5.00	\$5.45	\$5.62
Maintenance Adder	<i>\$/MWh</i>	\$5.47	\$5.47	\$3.99
Total Variable Costs	<i>\$/MWh</i>	\$10.47	\$10.92	\$9.61

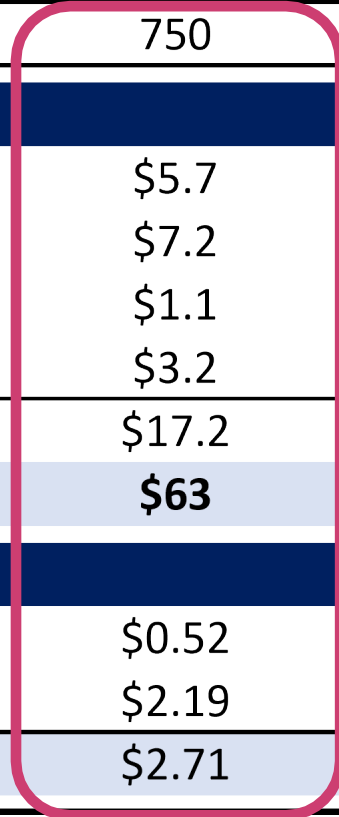


Natural Gas Combined Cycle



Natural Gas Combined Cycle Plant

	Units	Representative Low-Cost Plant	Representative Plant	Representative High-Cost Plant
Capacity	<i>Nameplate MW</i>	1,100	750	400
Gross ACR				
Labor	<i>\$ million</i>	\$6.7	\$5.7	\$3.4
Fixed Expenses	<i>\$ million</i>	\$8.4	\$7.2	\$4.9
Property Taxes	<i>\$ million</i>	\$2.5	\$1.1	\$0.3
Insurance	<i>\$ million</i>	\$7.4	\$3.2	\$0.9
Total	<i>\$ million</i>	\$25.1	\$17.2	\$9.5
Gross ACR	<i>\$/MW-day</i>	\$62	\$63	\$65
Variable Costs				
Operating Costs	<i>\$/MWh</i>	\$0.75	\$0.52	\$0.94
Maintenance Adder	<i>\$/MWh</i>	\$1.61	\$2.19	\$1.66
Total Variable Costs	<i>\$/MWh</i>	\$2.36	\$2.71	\$2.60

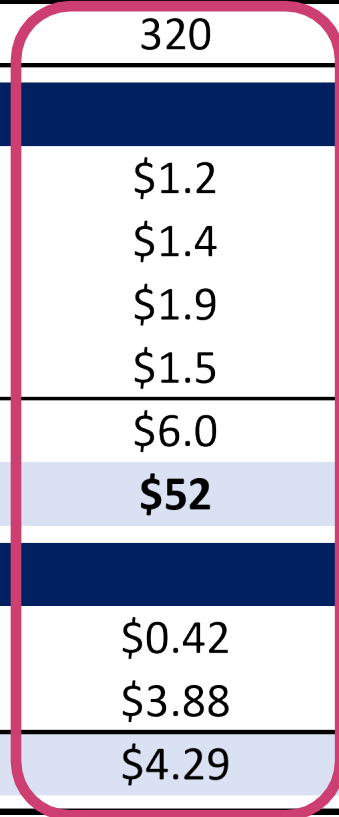


Simple-Cycle Combustion Turbine



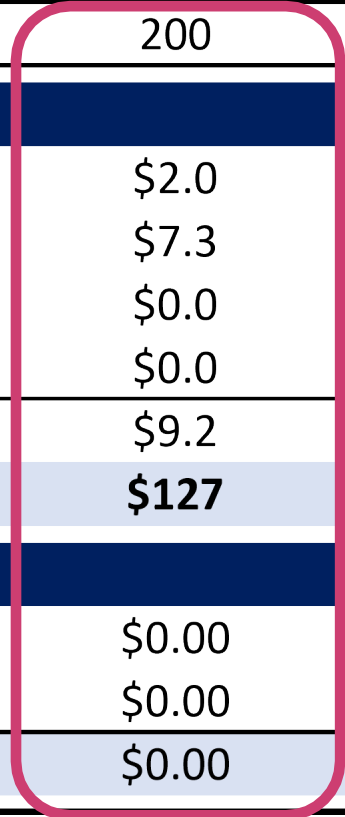
Natural Gas Combustion Turbine Plant

	Units	Representative Low-Cost Plant	Representative Plant	Representative High-Cost Plant
Capacity	<i>Nameplate MW</i>	640	320	100
Gross ACR				
Labor	<i>\$ million</i>	\$1.5	\$1.2	\$0.8
Fixed Expenses	<i>\$ million</i>	\$1.8	\$1.4	\$1.0
Property Taxes	<i>\$ million</i>	\$3.8	\$1.9	\$0.1
Insurance	<i>\$ million</i>	\$3.0	\$1.5	\$0.6
Total	<i>\$ million</i>	\$10.1	\$6.0	\$2.5
Gross ACR	<i>\$/MW-day</i>	\$43	\$52	\$69
Variable Costs				
Operating Costs	<i>\$/MWh</i>	\$0.42	\$0.42	\$0.97
Maintenance Adder	<i>\$/MWh</i>	\$3.88	\$3.88	\$4.43
Total Variable Costs	<i>\$/MWh</i>	\$4.29	\$4.29	\$5.39



Onshore Wind

		Onshore Wind Plant		
	Units	Representative Low-Cost Plant	Representative Plant	Representative High-Cost Plant
Capacity	<i>Nameplate MW</i>	300	200	30
Gross ACR				
Labor	<i>\$ million</i>	\$2.8	\$2.0	\$0.5
Fixed Expenses	<i>\$ million</i>	\$10.3	\$7.3	\$1.4
Property Taxes	<i>\$ million</i>	\$0.0	\$0.0	\$0.0
Insurance	<i>\$ million</i>	\$0.0	\$0.0	\$0.0
Total	<i>\$ million</i>	\$13.2	\$9.2	\$1.9
Gross ACR	<i>\$/MW-day</i>	\$120	\$127	\$176
Variable Costs				
Operating Costs	<i>\$/MWh</i>	\$0.00	\$0.00	\$0.00
Maintenance Adder	<i>\$/MWh</i>	\$0.00	\$0.00	\$0.00
Total Variable Costs	<i>\$/MWh</i>	\$0.00	\$0.00	\$0.00

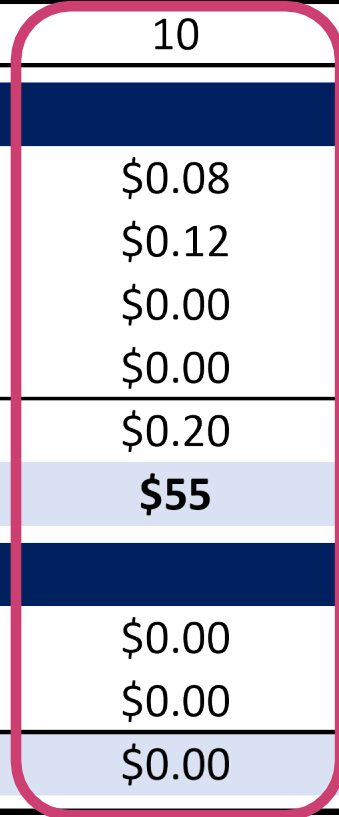


Solar PV



Large Scale Solar Photovoltaic Plant

	Units	Representative Low-Cost Plant	Representative Plant	Representative High-Cost Plant
Capacity	<i>Nameplate MW</i>	80	10	2
Gross ACR				
Labor	<i>\$ million</i>	\$0.6	\$0.08	\$0.02
Fixed Expenses	<i>\$ million</i>	\$0.9	\$0.12	\$0.03
Property Taxes	<i>\$ million</i>	\$0.0	\$0.00	\$0.00
Insurance	<i>\$ million</i>	\$0.0	\$0.00	\$0.00
Total	<i>\$ million</i>	\$1.4	\$0.20	\$0.04
Gross ACR	<i>\$/MW-day</i>	\$50	\$55	\$60
Variable Costs				
Operating Costs	<i>\$/MWh</i>	\$0.00	\$0.00	\$0.00
Maintenance Adder	<i>\$/MWh</i>	\$0.00	\$0.00	\$0.00
Total Variable Costs	<i>\$/MWh</i>	\$0.00	\$0.00	\$0.00

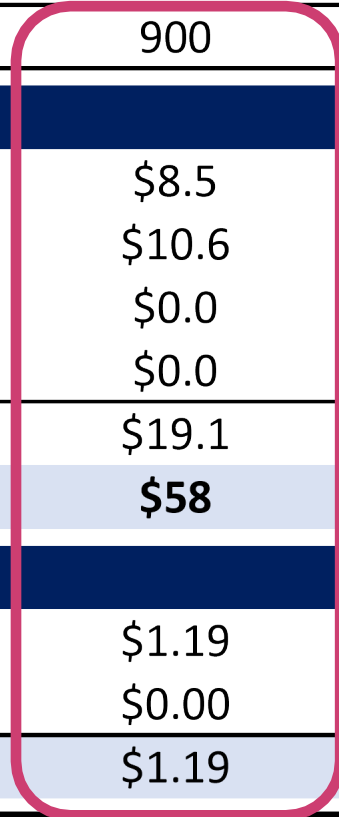


Steam Turbine Oil and Gas



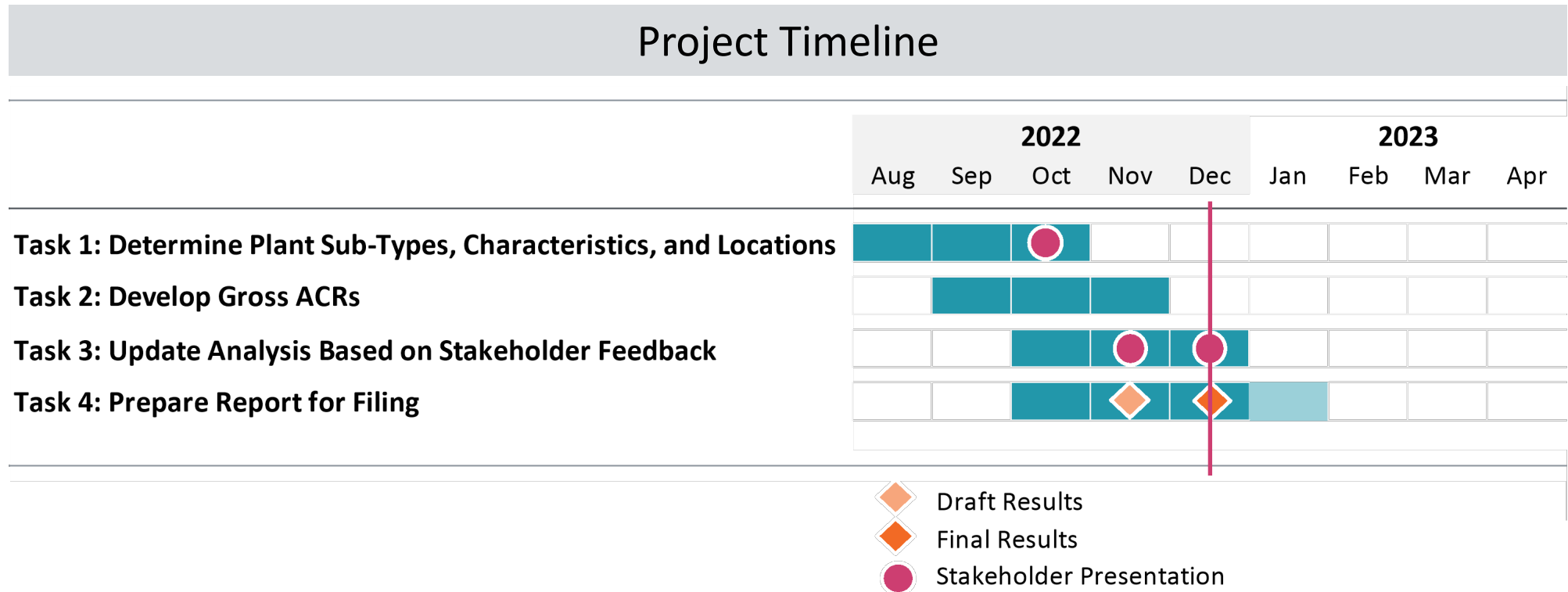
Steam Oil & Gas Plant

	Units	Representative Low-Cost Plant	Representative Plant	Representative High-Cost Plant
Capacity	<i>Nameplate MW</i>	1,300	900	350
Gross ACR				
Labor	<i>\$ million</i>	\$9.9	\$8.5	\$5.5
Fixed Expenses	<i>\$ million</i>	\$12.3	\$10.6	\$6.8
Property Taxes	<i>\$ million</i>	\$0.0	\$0.0	\$0.0
Insurance	<i>\$ million</i>	\$0.0	\$0.0	\$0.0
Total	<i>\$ million</i>	\$22.2	\$19.1	\$12.3
Gross ACR	<i>\$/MW-day</i>	\$47	\$58	\$96
Variable Costs				
Operating Costs	<i>\$/MWh</i>	\$1.19	\$1.19	\$1.19
Maintenance Adder	<i>\$/MWh</i>	\$0.00	\$0.00	\$0.00
Total Variable Costs	<i>\$/MWh</i>	\$1.19	\$1.19	\$1.19



Next Steps

Finalize Gross ACR costs and prepare final report



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