

# IMM Proposals and Results

2022 Quadrennial Review  
April 22, 2022

IMM



Monitoring Analytics

# CONE CT and CC Technology

- **IMM cost estimated same designs as Brattle**
  - **CT – Single GE Frame 7HA.02**
    - CT Inlet Air Evaporative Cooling
    - SCR and CO Catalyst
  - **CC – Two Train 1x1 Single Shaft GE Frame 7HA.02**
    - CT Inlet Air Evaporative Cooling
    - SCR and CO Catalyst
    - Air Cooled Condenser (ACC)

# CONE Financial Structure

- **IMM used Brattle assumptions:**
  - **Equity Percent – 45%**
  - **Debt Percent – 55%**
  - **Target IRR – 13.6%**
  - **Debt Interest Rate- 4.70%**
  - **Asset/Economic Life – 20 Years**
  - **Federal Income Tax rate – 21%**
  - **State Tax Rates**
    - **NJ 9.0%; MD 8.25%; PA 9.99%;**
  - **Depreciation Effective in 2026**
    - **First Year Bonus 20%**
    - **MACRS – 80%**
  - **Fixed O&M General Escalation – 2.0% (Brattle used 2.9%)**
  - **Same capital cost escalation from 2021 to 2026 – CT 7.9% and CC 9.1%**
- **IMM included major maintenance in Gross CONE**

# CT Capital Cost Comparison

CT Capital Costs (000\$) (2021\$)	IMM - Dual Fuel				IMM - Non-Firm Gas Only			
PJM LDA	CONE 1	CONE 2	CONE 3	CONE 4	CONE 1	CONE 2	CONE 3	CONE 4
Plant ICAP (MW)	362.430	359.402	350.786	357.480	362.430	359.402	350.786	357.480
Plant Proper EPC	\$218,362	\$207,460	\$206,641	\$204,996	\$208,562	\$198,090	\$197,301	\$195,706
Electric Interconnect/System Upgrades	\$7,757	\$7,369	\$7,339	\$7,281	\$7,757	\$7,369	\$7,339	\$7,281
Gas Interconnect	\$18,790	\$17,850	\$17,780	\$17,638	\$18,790	\$17,850	\$17,780	\$17,638
Water and Sewer Connection	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Equipment Spares	\$4,452	\$4,452	\$4,452	\$4,452	\$4,452	\$4,452	\$4,452	\$4,452
Initial Fuel and Other Inventory	\$1,194	\$1,194	\$1,194	\$1,194	\$0	\$0	\$0	\$0
Mobilization and Startup	\$2,313	\$2,197	\$2,189	\$2,171	\$2,313	\$2,197	\$2,189	\$2,171
Land Purchase/Land Reservation Payment	\$2,123	\$1,173	\$646	\$862	\$2,123	\$1,173	\$646	\$862
Construction Period/Upfront Land Lease	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Decommissioning Bond Costs	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Development Expenses	\$7,093	\$7,093	\$7,093	\$7,093	\$7,093	\$7,093	\$7,093	\$7,093
Legal Fees	\$2,204	\$2,204	\$2,204	\$2,204	\$2,204	\$2,204	\$2,204	\$2,204
Permits	\$2,055	\$2,055	\$2,055	\$2,055	\$2,055	\$2,055	\$2,055	\$2,055
Emission Reduction Credits	\$14,609	\$14,445	\$579	\$998	\$14,609	\$14,445	\$579	\$998
Financing Fees	\$2,896	\$2,832	\$2,673	\$2,659	\$2,782	\$2,723	\$2,564	\$2,551
Interest During Construction	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Owner's Contingency	\$5,459	\$5,187	\$5,166	\$5,125	\$5,214	\$4,952	\$4,933	\$4,893
Sales Tax	\$290	\$276	\$260	\$259	\$278	\$272	\$256	\$255
Net Start Up Fuel	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Total Project Overnight Cost (2021\$)</b>	<b>\$289,596</b>	<b>\$275,785</b>	<b>\$260,271</b>	<b>\$258,986</b>	<b>\$278,232</b>	<b>\$264,875</b>	<b>\$249,391</b>	<b>\$248,158</b>
<b>Total Project Cost (\$/kW)</b>	<b>\$799.04</b>	<b>\$767.34</b>	<b>\$741.96</b>	<b>\$724.48</b>	<b>\$767.69</b>	<b>\$736.99</b>	<b>\$710.95</b>	<b>\$694.19</b>
<b>Total Project Overnight Cost (2026\$)</b>	<b>\$321,451</b>	<b>\$305,534</b>	<b>\$287,179</b>	<b>\$285,294</b>	<b>\$308,905</b>	<b>\$293,488</b>	<b>\$275,167</b>	<b>\$273,339</b>
<b>Total Project Cost (\$/kW)</b>	<b>\$886.93</b>	<b>\$850.12</b>	<b>\$818.67</b>	<b>\$798.07</b>	<b>\$852.32</b>	<b>\$816.60</b>	<b>\$784.43</b>	<b>\$764.63</b>
Interest During Construction	\$6,313	\$6,000	\$5,640	\$5,603	\$6,066	\$5,763	\$5,404	\$5,368

# CT Capital Cost Comparison

CT Capital Costs (000\$) (2021\$)	IMM - Firm Gas Only				Brattle - Firm Gas Only			
	PJM LDA	CONE 1	CONE 2	CONE 3	CONE 4	CONE 1	CONE 2	CONE 3
Plant ICAP (MW)	362.430	359.402	350.786	357.480	360.589	362.838	352.927	349.94
Plant Proper EPC	\$208,562	\$198,090	\$197,301	\$195,706	\$220,713	\$207,018	\$210,008	\$214,693
Electric Interconnect/System Upgrades	\$7,757	\$7,369	\$7,339	\$7,281	\$6,807	\$6,850	\$6,663	\$6,606
Gas Interconnect	\$18,790	\$17,850	\$17,780	\$17,638	\$29,552	\$29,552	\$29,552	\$29,552
Water and Sewer Connection	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Equipment Spares	\$4,452	\$4,452	\$4,452	\$4,452	\$1,104	\$1,035	\$1,050	\$1,073
Initial Fuel and Other Inventory	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Mobilization and Startup	\$2,313	\$2,197	\$2,189	\$2,171	\$2,207	\$2,070	\$2,100	\$2,147
Land Purchase/Land Reservation Payment	\$2,123	\$1,173	\$646	\$862	\$366	\$295	\$164	\$306
Construction Period/Upfront Land Lease	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Decommissioning Bond Costs	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Development Expenses	\$7,093	\$7,093	\$7,093	\$7,093	\$11,036	\$10,351	\$10,500	\$10,735
Legal Fees	\$2,204	\$2,204	\$2,204	\$2,204	\$0	\$0	\$0	\$0
Permits	\$2,055	\$2,055	\$2,055	\$2,055	\$0	\$0	\$0	\$0
Emission Reduction Credits	\$14,609	\$14,445	\$579	\$998	\$0	\$0	\$0	\$0
Financing Fees	\$2,782	\$2,723	\$2,564	\$2,551	\$1,200	\$1,178	\$1,192	\$1,185
Interest During Construction	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Owner's Contingency	\$5,214	\$4,952	\$4,933	\$4,893	\$4,042	\$3,968	\$4,012	\$3,991
Sales Tax	\$278	\$272	\$256	\$255	\$0	\$0	\$0	\$0
Net Start Up Fuel	\$0	\$0	\$0	\$0	(\$551)	(\$555)	\$123	(\$532)
Total Project Overnight Cost (2021\$)	\$278,232	\$264,875	\$249,391	\$248,158	\$276,476	\$261,762	\$265,364	\$269,756
Total Project Cost (\$/kW)	\$767.69	\$736.99	\$710.95	\$694.19	\$766.74	\$721.43	\$751.89	\$770.86
Total Project Overnight Cost (2026\$)	\$308,905	\$293,488	\$275,167	\$273,339	\$325,299	\$307,089	\$311,425	\$317,007
Total Project Cost (\$/kW)	\$852.32	\$816.60	\$784.43	\$764.63	\$902.13	\$846.35	\$882.41	\$905.89
Interest During Construction	\$6,066	\$5,763	\$5,404	\$5,368	\$5,050	\$4,768	\$4,835	\$4,922

# CT Capital Cost Comparison

- **IMM CONE CT EPC cost is similar to Brattle cost on a \$/kW basis.**
- **Brattle gas interconnection cost nearly 2 x IMM cost.**
- **Brattle did not include Emissions Reductions Credits.**



# CT First Year Fixed Expenses Comparison

CT Fixed O&M (000\$) (2026\$)	IMM - Dual Fuel				IMM - Non-Firm Gas Only			
PJM LDA	CONE 1	CONE 2	CONE 3	CONE 4	CONE 1	CONE 2	CONE 3	CONE 4
Site O&M Labor	\$1,850	\$1,757	\$1,750	\$1,737	\$1,850	\$1,757	\$1,750	\$1,737
O&M Contract Parts and Labor	\$538	\$511	\$509	\$505	\$538	\$511	\$509	\$505
Major Maintenance	\$8,134	\$11,113	\$11,199	\$9,108	\$8,134	\$11,113	\$11,199	\$9,108
LTSA Fixed Fee	\$333	\$333	\$333	\$333	\$333	\$333	\$333	\$333
O&M Management Fees	\$162	\$162	\$162	\$162	\$162	\$162	\$162	\$162
Gas Transport Demand Charge	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Electric Purchases	\$305	\$305	\$305	\$305	\$305	\$305	\$305	\$305
Employee Training Expenses	\$110	\$110	\$110	\$110	\$110	\$110	\$110	\$110
Insurance	\$1,378	\$1,311	\$1,305	\$1,295	\$1,324	\$1,259	\$1,254	\$1,244
General and Administrative Expenses	\$226	\$226	\$226	\$226	\$226	\$226	\$226	\$226
Property Lease	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Property Taxes	\$835	\$695	\$358	\$361	\$802	\$667	\$358	\$361
Other (Brattle Working Capital)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Total Fixed O&amp;M</b>	<b>\$13,871</b>	<b>\$16,522</b>	<b>\$16,256</b>	<b>\$14,141</b>	<b>\$13,784</b>	<b>\$16,443</b>	<b>\$16,205</b>	<b>\$14,089</b>

# CT First Year Fixed Expenses Comparison

CT Fixed O&M (000\$) (2026\$)	IMM - Firm Gas Only				Brattle - Firm Gas Only			
PJM LDA	CONE 1	CONE 2	CONE 3	CONE 4	CONE 1	CONE 2	CONE 3	CONE 4
Site O&M Labor	\$1,850	\$1,757	\$1,750	\$1,737	\$1,156	\$1,241	\$883	\$910
O&M Contract Parts and Labor	\$538	\$511	\$509	\$505	\$530	\$543	\$485	\$489
Major Maintenance	\$8,134	\$11,113	\$11,199	\$9,108	\$0	\$0	\$0	\$0
LTSA Fixed Fee	\$333	\$333	\$333	\$333	\$346	\$346	\$346	\$346
O&M Management Fees	\$162	\$162	\$162	\$162	\$545	\$589	\$407	\$417
Gas Transport Demand Charge	\$3,744	\$5,453	\$6,726	\$4,327	\$4,359	\$5,414	\$7,136	\$6,318
Electric Purchases	\$305	\$305	\$305	\$305	\$0	\$0	\$0	\$0
Employee Training Expenses	\$110	\$110	\$110	\$110	\$0	\$0	\$0	\$0
Insurance	\$1,324	\$1,259	\$1,254	\$1,244	\$1,952	\$1,843	\$1,869	\$1,902
General and Administrative Expenses	\$226	\$226	\$226	\$226	\$249	\$263	\$205	\$210
Property Lease	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Property Taxes	\$802	\$667	\$358	\$361	\$14	\$4,108	\$2,033	\$12
Other (Brattle Working Capital)	\$0	\$0	\$0	\$0	\$36	\$34	\$34	\$35
<b>Total Fixed O&amp;M</b>	<b>\$17,528</b>	<b>\$21,895</b>	<b>\$22,930</b>	<b>\$18,416</b>	<b>\$9,187</b>	<b>\$14,381</b>	<b>\$13,398</b>	<b>\$10,639</b>

# CT First Year Fixed Expenses Comparison

- **IMM includes major maintenance.**
- **IMM CONE CT site labor higher than Brattle.**
- **Brattle SWMAAC and RTO annual property tax higher than IMM. EMAAC and WMAAC much lower.**
- **Most other Fixed O&M line items are similar.**

# Two by 1x1 CC Capital Cost Comparison

CC Capital Costs (000\$) (2021\$)	IMM - Two Train 1 x 1 CC - Dual Fuel				IMM - Two Train 1 x 1 CC - Non-Firm Gas Only			
PJM LDA	CONE 1	CONE 2	CONE 3	CONE 4	CONE 1	CONE 2	CONE 3	CONE 4
Plant ICAP (MW)	1,104.138	1,096.342	1,072.416	1,090.292	1,104.138	1,096.342	1,072.416	1,090.292
Plant Proper EPC	\$1,014,585	\$962,502	\$954,041	\$947,032	\$994,175	\$942,652	\$934,281	\$927,332
Electric Interconnect/System Upgrades	\$23,786	\$22,675	\$22,462	\$22,261	\$23,786	\$22,675	\$22,462	\$22,261
Gas Interconnect	\$26,478	\$24,507	\$24,277	\$24,060	\$26,478	\$24,507	\$24,277	\$24,060
Water and Sewer Connection	\$7,218	\$6,681	\$6,618	\$6,559	\$7,218	\$6,681	\$6,618	\$6,559
Equipment Spares	\$8,097	\$8,097	\$8,097	\$8,097	\$8,097	\$8,097	\$8,097	\$8,097
Initial Fuel and Other Inventory	\$2,387	\$2,387	\$2,387	\$2,387	\$0	\$0	\$0	\$0
Mobilization and Startup	\$5,741	\$5,314	\$5,264	\$5,217	\$5,741	\$5,314	\$5,264	\$5,217
Land Purchase/Land Reservation Payment	\$5,308	\$2,932	\$1,615	\$2,154	\$5,308	\$2,932	\$1,615	\$2,154
Construction Period/Upfront Land Lease	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Decommissioning Bond Costs	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Development Expenses	\$9,457	\$9,457	\$9,457	\$9,457	\$9,457	\$9,457	\$9,457	\$9,457
Legal Fees	\$2,834	\$2,834	\$2,834	\$2,834	\$2,834	\$2,834	\$2,834	\$2,834
Permits	\$3,330	\$3,330	\$3,330	\$3,330	\$3,330	\$3,330	\$3,330	\$3,330
Emission Reduction Credits	\$32,916	\$32,510	\$1,393	\$2,399	\$32,916	\$32,510	\$1,393	\$2,399
Financing Fees	\$11,805	\$11,196	\$10,775	\$10,712	\$11,569	\$10,966	\$10,546	\$10,484
Interest During Construction	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Owner's Contingency	\$25,365	\$24,063	\$23,851	\$23,676	\$24,854	\$23,566	\$23,357	\$23,183
Sales Tax	\$1,180	\$1,120	\$1,077	\$1,071	\$1,157	\$1,097	\$1,055	\$1,048
Net Start Up Fuel	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Project Overnight Cost (2021\$)	\$1,180,486	\$1,119,604	\$1,077,479	\$1,071,245	\$1,156,919	\$1,096,618	\$1,054,586	\$1,048,415
Total Project Cost (\$/kW)	\$1,069.15	\$1,021.22	\$1,004.72	\$982.53	\$1,047.80	\$1,000.25	\$983.37	\$961.59
Total Project Overnight Cost (2026\$)	\$1,274,343	\$1,208,620	\$1,163,146	\$1,156,417	\$1,248,902	\$1,183,806	\$1,138,433	\$1,131,771
Total Project Cost (\$/kW)	\$1,154.15	\$1,102.41	\$1,084.60	\$1,060.65	\$1,131.11	\$1,079.78	\$1,061.56	\$1,038.04
Interest During Construction	\$46,487	\$44,089	\$42,431	\$42,185	\$45,559	\$43,184	\$41,529	\$41,286

# Two x 1x1 CC Capital Cost Comparison

CC Capital Costs (000\$) (2021\$)	IMM - Two Train 1 x 1 CC - Firm Gas				Brattle - Two Train 1 on 1 CC - Firm Gas			
	PJM LDA	CONE 1	CONE 2	CONE 3	CONE 4	CONE 1	CONE 2	CONE 3
Plant ICAP (MW)	1,104.138	1,096.342	1,072.416	1,090.292	1,170.730	1,173.658	1,144.094	1,133.424
Plant Proper EPC	\$994,175	\$942,652	\$934,281	\$927,332	\$1,035,003	\$944,845	\$959,961	\$996,574
Electric Interconnect/System Upgrades	\$23,786	\$22,675	\$22,462	\$22,261	\$22,102	\$22,157	\$21,599	\$21,398
Gas Interconnect	\$26,478	\$24,507	\$24,277	\$24,060	\$29,552	\$29,552	\$29,552	\$29,552
Water and Sewer Connection	\$7,218	\$6,681	\$6,618	\$6,559	\$0	\$0	\$0	\$0
Equipment Spares	\$8,097	\$8,097	\$8,097	\$8,097	\$5,175	\$4,724	\$4,800	\$4,983
Initial Fuel and Other Inventory	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Mobilization and Startup	\$5,741	\$5,314	\$5,264	\$5,217	\$10,350	\$9,448	\$9,600	\$9,966
Land Purchase/Land Reservation Payment	\$5,308	\$2,932	\$1,615	\$2,154	\$2,196	\$1,770	\$984	\$1,836
Construction Period/Upfront Land Lease	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Decommissioning Bond Costs	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Development Expenses	\$9,457	\$9,457	\$9,457	\$9,457	\$51,750	\$47,242	\$47,998	\$49,829
Legal Fees	\$2,834	\$2,834	\$2,834	\$2,834	\$0	\$0	\$0	\$0
Permits	\$3,330	\$3,330	\$3,330	\$3,330	\$0	\$0	\$0	\$0
Emission Reduction Credits	\$32,916	\$32,510	\$1,393	\$2,399	\$2,000	\$2,000	\$2,000	\$2,000
Financing Fees	\$11,569	\$10,966	\$10,546	\$10,484	\$2,591	\$2,441	\$2,533	\$2,517
Interest During Construction	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Owner's Contingency	\$24,854	\$23,566	\$23,357	\$23,183	\$8,577	\$8,072	\$8,380	\$8,326
Sales Tax	\$1,157	\$1,097	\$1,055	\$1,048	\$0	\$0	\$0	\$0
Net Start Up Fuel	\$0	\$0	\$0	\$0	(\$13,918)	(\$13,994)	(\$9,784)	(\$13,490)
Total Project Overnight Cost (2021\$)	\$1,156,919	\$1,096,618	\$1,054,586	\$1,048,415	\$1,155,378	\$1,058,257	\$1,077,623	\$1,113,491
Total Project Cost (\$/kW)	\$1,047.80	\$1,000.25	\$983.37	\$961.59	\$986.89	\$901.67	\$941.90	\$982.41
Total Project Overnight Cost (2026\$)	\$1,248,902	\$1,183,806	\$1,138,433	\$1,131,771	\$1,358,547	\$1,240,495	\$1,263,279	\$1,307,619
Total Project Cost (\$/kW)	\$1,131.11	\$1,079.78	\$1,061.56	\$1,038.04	\$1,160.43	\$1,056.95	\$1,104.17	\$1,153.69
Interest During Construction	\$45,559	\$43,184	\$41,529	\$41,286	\$35,625	\$32,530	\$33,127	\$34,290



# CC Capital Cost Comparison

- **IMM CONE CC EPC cost is similar to Brattle cost on a \$/kW basis.**
- **Brattle includes same Emissions Reductions Credits for all CONE areas. No consideration for RGGI in NJ and MD**
- **Brattle Development Expenses are significantly higher.**
- **Brattle net start up fuel negative.**
  - **Reasons are not clear.**

# Two by 1x1 CC First Year Fixed Expenses Comparison

CC Fixed O&M (000\$) (2026\$)	IMM - Two Train 1 x 1 CC - Dual Fuel				IMM - Two Train 1 x 1 CC - Non-Firm Gas Only			
	PJM LDA	CONE 1	CONE 2	CONE 3	CONE 4	CONE 1	CONE 2	CONE 3
Site O&M Labor	\$4,971	\$4,601	\$4,558	\$4,517	\$4,971	\$4,601	\$4,558	\$4,517
O&M Contract Parts and Labor	\$2,688	\$2,488	\$2,464	\$2,442	\$2,688	\$2,488	\$2,464	\$2,442
Major Maintenance	\$9,103	\$9,184	\$9,656	\$9,651	\$9,103	\$9,184	\$9,656	\$9,651
LTSA Fixed Fee	\$666	\$666	\$666	\$666	\$666	\$666	\$666	\$666
O&M Management Fees	\$355	\$355	\$355	\$355	\$355	\$355	\$355	\$355
Gas Transport Demand Charge	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Electric Purchases	\$417	\$417	\$417	\$417	\$417	\$417	\$417	\$417
Employee Training Expenses	\$142	\$142	\$142	\$142	\$142	\$142	\$142	\$142
Insurance	\$5,969	\$5,662	\$5,612	\$5,571	\$5,857	\$5,552	\$5,503	\$5,462
General and Administrative Expenses	\$1,018	\$1,018	\$1,018	\$1,018	\$1,018	\$1,018	\$1,018	\$1,018
Property Lease	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Property Taxes	\$3,404	\$2,820	\$2,132	\$2,172	\$3,336	\$2,763	\$2,086	\$2,126
Other (Brattle Working Capital)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Total Fixed O&amp;M</b>	<b>\$28,735</b>	<b>\$27,353</b>	<b>\$27,021</b>	<b>\$26,952</b>	<b>\$28,554</b>	<b>\$27,186</b>	<b>\$26,866</b>	<b>\$26,797</b>

# Two by 1x1 CC First Year Fixed Expenses Comparison

CC Fixed O&M (000\$) (2026\$)	IMM - Two Train 1 x 1 CC - Firm Gas				Brattle - Two Train 1 on 1 CC - Firm Gas			
PJM LDA	CONE 1	CONE 2	CONE 3	CONE 4	CONE 1	CONE 2	CONE 3	CONE 4
Site O&M Labor	\$4,971	\$4,601	\$4,558	\$4,517	\$5,202	\$5,581	\$3,974	\$4,095
O&M Contract Parts and Labor	\$2,688	\$2,488	\$2,464	\$2,442	\$6,561	\$6,717	\$5,998	\$6,058
Major Maintenance	\$9,103	\$9,184	\$9,656	\$9,651	\$0	\$0	\$0	\$0
LTSA Fixed Fee	\$666	\$666	\$666	\$666	\$824	\$824	\$824	\$824
O&M Management Fees	\$355	\$355	\$355	\$355	\$1,577	\$1,697	\$1,177	\$1,203
Gas Transport Demand Charge	\$8,424	\$12,269	\$15,133	\$9,735	\$10,025	\$12,442	\$16,392	\$14,506
Electric Purchases	\$417	\$417	\$417	\$417	\$0	\$0	\$0	\$0
Employee Training Expenses	\$142	\$142	\$142	\$142	\$0	\$0	\$0	\$0
Insurance	\$5,857	\$5,552	\$5,503	\$5,462	\$8,151	\$7,443	\$7,580	\$7,846
General and Administrative Expenses	\$1,018	\$1,018	\$1,018	\$1,018	\$1,378	\$1,441	\$1,168	\$1,188
Property Lease	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Property Taxes	\$3,336	\$2,763	\$2,086	\$2,126	\$84	\$16,564	\$8,235	\$69
Other (Brattle Working Capital)	\$0	\$0	\$0	\$0	\$150	\$137	\$140	\$145
<b>Total Fixed O&amp;M</b>	<b>\$36,978</b>	<b>\$39,455</b>	<b>\$41,999</b>	<b>\$36,532</b>	<b>\$33,952</b>	<b>\$52,846</b>	<b>\$45,488</b>	<b>\$35,934</b>

# CC First Year Fixed Expenses Comparison

- **IMM includes major maintenance.**
- **IMM CONE CC site labor similar to Brattle.**
- **Brattle SWMAAC and RTO annual property tax higher than IMM. EMAAC and WMAAC much lower.**
- **Most other Fixed O&M line items are similar.**

# CT Revenue Requirements Comparison: Historic EAS

CT Revenue Requirement (\$/MW-Day)	IMM - Dual Fuel				IMM - Non-Firm Gas Only			
PJM LDA	CONE 1	CONE 2	CONE 3	CONE 4	CONE 1	CONE 2	CONE 3	CONE 4
Gross CONE	\$441.60	\$419.70	\$412.13	\$383.95	\$428.31	\$408.20	\$400.56	\$372.65
IMM EAS Historical No Major Maintenance	\$53.34	\$90.20	\$113.72	\$120.71	\$53.34	\$90.20	\$113.72	\$120.71
Net CONE	\$388.26	\$329.50	\$298.41	\$263.24	\$374.97	\$318.00	\$286.84	\$251.94

CT Revenue Requirement (\$/MW-Day)	IMM - Firm Gas Only				Brattle - Firm Gas Only			
PJM LDA	CONE 1	CONE 2	CONE 3	CONE 4	CONE 1	CONE 2	CONE 3	CONE 4
Gross CONE	\$460.80	\$456.27	\$461.32	\$411.01	\$372.98	\$388.15	\$401.60	\$391.70
IMM EAS Historical No Major Maintenance	\$53.34	\$90.20	\$113.72	\$120.71	\$53.34	\$90.20	\$113.72	\$120.71
Net CONE	\$407.46	\$366.07	\$347.60	\$290.30	\$319.64	\$297.95	\$287.88	\$270.99

*IMM EAS revenues used in Brattle Net CONE calculation*

# CT Revenue Requirements Comparison: Forward EAS

CT Revenue Requirement (\$/MW-Day)	IMM - Dual Fuel				IMM - Non-Firm Gas Only			
PJM LDA	CONE 1	CONE 2	CONE 3	CONE 4	CONE 1	CONE 2	CONE 3	CONE 4
Gross CONE	\$441.60	\$419.70	\$412.13	\$383.95	\$428.31	\$408.20	\$400.56	\$372.65
IMM EAS Projected No Major Maintenance	\$85.26	\$153.85	\$217.22	\$233.45	\$85.26	\$153.85	\$217.22	\$233.45
Net CONE	\$356.34	\$265.85	\$194.90	\$150.49	\$343.05	\$254.35	\$183.34	\$139.20

CT Revenue Requirement (\$/MW-Day)	IMM - Firm Gas Only				Brattle - Firm Gas Only			
PJM LDA	CONE 1	CONE 2	CONE 3	CONE 4	CONE 1	CONE 2	CONE 3	CONE 4
Gross CONE	\$460.80	\$456.27	\$461.32	\$411.01	\$372.98	\$388.15	\$401.60	\$391.70
IMM EAS Projected No Major Maintenance	\$85.26	\$153.85	\$217.22	\$233.45	\$85.26	\$153.85	\$217.22	\$233.45
Net CONE	\$375.54	\$302.41	\$244.10	\$177.55	\$287.72	\$234.30	\$184.37	\$158.24

*IMM EAS revenues used in Brattle Net CONE calculation  
Forward prices as of January 3, 2022*

# CC Revenue Requirements Comparison: Historic EAS

CC Revenue Requirement (\$/MW-Day)	IMM - Two Train 1 x 1 CC - Dual Fuel				IMM - Two Train 1 x 1 CC - Non-Firm Gas Only			
PJM LDA	CONE 1	CONE 2	CONE 3	CONE 4	CONE 1	CONE 2	CONE 3	CONE 4
Gross CONE	\$484.55	\$462.05	\$459.11	\$449.23	\$476.01	\$453.70	\$450.60	\$440.87
IMM EAS Historical No Major Maintenance	\$116.47	\$210.05	\$226.67	\$229.38	\$116.47	\$210.05	\$226.67	\$229.38
Net CONE	\$368.08	\$252.00	\$232.44	\$219.85	\$359.54	\$243.65	\$223.93	\$211.49

CC Revenue Requirement (\$/MW-Day)	IMM - Two Train 1 x 1 CC - Firm Gas				Brattle - Two Train 1 on 1 CC - Firm Gas			
PJM LDA	CONE 1	CONE 2	CONE 3	CONE 4	CONE 1	CONE 2	CONE 3	CONE 4
Gross CONE	\$500.18	\$489.16	\$495.31	\$469.17	\$488.70	\$489.16	\$497.28	\$497.00
IMM EAS Historical No Major Maintenance	\$116.47	\$210.05	\$226.67	\$229.38	\$116.47	\$210.05	\$226.67	\$229.38
Net CONE	\$383.71	\$279.11	\$268.64	\$239.79	\$372.23	\$279.11	\$270.61	\$267.62

*IMM EAS revenues used in Brattle Net CONE calculation*

# CC Revenue Requirements Comparison: Forward EAS

CC Revenue Requirement (\$/MW-Day)	IMM - Two Train 1 x 1 CC - Dual Fuel				IMM - Two Train 1 x 1 CC - Non-Firm Gas Only			
PJM LDA	CONE 1	CONE 2	CONE 3	CONE 4	CONE 1	CONE 2	CONE 3	CONE 4
Gross CONE	\$484.55	\$462.05	\$459.11	\$449.23	\$476.01	\$453.70	\$450.60	\$440.87
IMM EAS Projected No Major Maintenance	\$187.56	\$310.89	\$391.44	\$395.46	\$187.56	\$310.89	\$391.44	\$395.46
Net CONE	\$296.99	\$151.16	\$67.68	\$53.77	\$288.44	\$142.82	\$59.16	\$45.42

CC Revenue Requirement (\$/MW-Day)	IMM - Two Train 1 x 1 CC - Firm Gas				Brattle - Two Train 1 on 1 CC - Firm Gas			
PJM LDA	CONE 1	CONE 2	CONE 3	CONE 4	CONE 1	CONE 2	CONE 3	CONE 4
Gross CONE	\$500.18	\$489.16	\$495.31	\$469.17	\$488.70	\$489.16	\$497.28	\$497.00
IMM EAS Projected No Major Maintenance	\$187.56	\$310.89	\$391.44	\$395.46	\$187.56	\$310.89	\$391.44	\$395.46
Net CONE	\$312.62	\$178.27	\$103.87	\$73.71	\$301.14	\$178.27	\$105.84	\$101.54

*IMM EAS revenues used in Brattle Net CONE calculation  
Forward prices as of January 3, 2022*

# Areas for Discussion

- **Major maintenance**
- **Firm gas**
- **Dual fuel**
- **Emissions Reductions Credits (ERC)**
- **Cost of gas interconnection for CT**
- **Site O&M labor assumptions**
- **Annual Escalation of 2.9% from 2021 to 2046**

# Notes on Using Historical EAS

- **NJ joined RGGI in 2020**
  - **EAS for 2019 excludes RGGI costs**
- **VA joined RGGI in 2021**
  - **EAS for 2019 and 2020 excludes RGGI costs**

# Key EAS Assumptions

- **No 10 percent adder**
- **Unit is dispatched based on short run marginal cost, accounting for start costs**
  - **First against DA prices**
  - **Then against RT prices if not committed DA**
- **CT has a minimum run time of 2 hours**
- **CC has a minimum run time of 4 hours**

# Objective of Gross CONE Study

- **Develop an independent determination of CONE CT and CC revenue requirements for the four CONE areas**
- **Participants**
  - **Pasteris Energy, Inc. – Overall coordination, soft cost development, plant performance modeling and proforma**
  - **Stantec – EPC cost estimate, project schedule, drawdown and escalation**
  - **David R. Alexander, Consulting – Emissions Reductions Credits (ERC), permitting and costs.**

**Monitoring Analytics, LLC**

**2621 Van Buren Avenue**

**Suite 160**

**Eagleville, PA**

**19403**

**(610) 271-8050**

**[MA@monitoringanalytics.com](mailto:MA@monitoringanalytics.com)**

**[www.MonitoringAnalytics.com](http://www.MonitoringAnalytics.com)**

