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**Applicable Reported Costs for the Project - Quest (\$m)**

Actual or Estimated	Funding Agreement														
	Construction							Commercial Operations							
	2009	2010	2011	2012	2013	2014	2015	2015 *	2016	2017	2018	2019	2020	2021	2022
	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Estimated
<b>A. Capture</b>															
<b>i) Activities - Design, Construction &amp; Commissioning</b>															
FEED and Detailed Engineering	\$ 5.931	\$ 24.161	\$ 42.050	\$ 21.628	\$ 39.118	\$ 44.862	\$ 5.240								
Construction & Commissioning				\$ 49.953	\$ 120.465	\$ 148.651	\$ 53.738								
<b>Sub-Total</b>	\$ 5.931	\$ 24.161	\$ 42.050	\$ 71.581	\$ 159.583	\$ 193.512	\$ 58.978	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>ii) Capture Facility Components &amp; Procurement</b>															
Stripper															
Compressor															
Dehydration System															
Pumps															
Equipment Ancillary															
<b>Sub-Total</b>				\$ 34.144	\$ 62.742	\$ 11.420	\$ 2.633								
<b>iii) Operating Costs</b>															
Energy; Power, Steam, Cooling Water								\$ 1.491	\$ 11.137	\$ 13.801	\$ 13.457	\$ 15.842	\$ 15.016	\$ 27.406	\$ 39.2
Maintenance and Repair								\$ 0.107	\$ 0.945	\$ 1.478	\$ 1.072	\$ 1.811	\$ 4.006	\$ 7.286	\$ 2.0
Labor, Regulatory, Administration								\$ 1.316	\$ 14.134	\$ 14.843	\$ 10.845	\$ 10.358	\$ 9.578	\$ 18.703	\$ 11.0
<b>Sub-Total</b>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2.914	\$ 26.216	\$ 30.122	\$ 25.375	\$ 28.012	\$ 28.600	\$ 53.395	\$ 52.2
<b>B. Transportation</b>															
<b>i) Activities - Design, Construction &amp; Commissioning</b>															
FEED and Detailed Engineering	\$ 0.797	\$ 0.737	\$ 2.501	\$ 3.336	\$ 3.818	\$ 1.321	\$ 0.139								
Construction & Commissioning				\$ 2.463	\$ 27.548	\$ 73.878	\$ 1.395								
Land Procurement					\$ 0.403	\$ 0.322									
<b>Sub-Total</b>	\$ 0.797	\$ 0.737	\$ 2.501	\$ 5.799	\$ 31.768	\$ 75.521	\$ 1.535	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>ii) Transportation Facility Components &amp; Procurement</b>															
12" Diameter Line Pipe															
6" Diameter Line Pipe															
Valve Stations															
Equipment Ancillary															
<b>Total Collective Cost of Above</b>				\$ 0.405	\$ 18.003	\$ 9.464	\$ -								
<b>iii) Operating costs</b>															
Maintenance and Repair								\$ 0.002	\$ 0.353	\$ 0.378	\$ 0.203	\$ 0.151	\$ 0.313	\$ 0.400	\$ 0.300
<b>C. Storage</b>															
<b>i) Activities - Design, Construction &amp; Commissioning</b>															
FEED and Detailed Engineering	\$ 21.453	\$ 32.241	\$ 9.481												
Construction & Commissioning				\$ 3.522	\$ 2.117	\$ 2.201	\$ 2.063								
MMV including Baseline Collecting				\$ 0.999	\$ 3.102	\$ 3.978	\$ 2.584								
Drill and Complete Wells				\$ 11.085	\$ 12.048	\$ -	\$ 2.404								
<b>Sub-Total</b>	\$ 21.453	\$ 32.241	\$ 9.481	\$ 15.605	\$ 17.266	\$ 6.179	\$ 7.051	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>ii) Injection Facility Components &amp; Procurement</b>															
Injection wellbore equipment, wellheads & flowlines															
MMV equipment															
<b>Sub-Total</b>	\$ -	\$ -	\$ -	\$ 4.003	\$ 1.102	\$ 0.378	\$ 1.158								
<b>iii) Operating costs</b>															
Maintenance and Repair								\$ 0.003	\$ 0.501	\$ 0.208	\$ 0.093	\$ 0.268	\$ 1.546	\$ 0.888	\$ 1.000
Monitoring, Measurement and Verification								\$ 0.637	\$ 3.117	\$ 2.002	\$ 0.610	\$ 0.381	\$ 1.336	\$ 1.913	\$ 4.000
<b>Sub-Total</b>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 0.640	\$ 3.617	\$ 2.211	\$ 0.703	\$ 0.650	\$ 2.881	\$ 2.802	\$ 5.000
<b>Total Reported Costs</b>	\$ 28.181	\$ 57.138	\$ 54.032	\$ 131.537	\$ 290.465	\$ 296.474	\$ 71.354	\$ 3.557	\$ 30.187	\$ 32.710	\$ 26.281	\$ 28.812	\$ 31.794	\$ 56.596	\$ 57.500

\* Note: The project started commercial operations during 2015; OPEX costs were only incurred for 92 days and CO<sub>2</sub> was captured and avoided over 131 days.

**Applicable Reported Annual CO<sub>2</sub> Volumes for the Project - Quest (Million Tonnes)**

	Construction							Commercial Operations							
	2009	2010	2011	2012	2013	2014	2015	2015	2016	2017	2018	2019	2020	2021	2022
<b>A. CO<sub>2</sub> Captured</b>								0.371	1.108	1.138	1.066	1.128	0.941	1.055	
<b>B. CO<sub>2</sub> Efficiency Upgrader</b>															
<b>C. CO<sub>2</sub> Avoided</b>								0.291	0.870	0.897	0.826	0.892	0.736	0.823	

**Funding Efficiency Inputs - Quest (current million \$)**

**A. Government Funding**

	Construction							Commercial Operations							
	2009	2010	2011	2012	2013	2014	2015	2015	2016	2017	2018	2019	2020	2021	2022
Alberta Innovates Grant	\$ 3.226	\$ 1.817	\$ 1.303	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -				
NRCan Funding	\$ -	\$ -	\$ -	\$ 108.000	\$ -	\$ -	\$ 12.000	\$ -	\$ -	\$ -	\$ -				
Government of Alberta Funding	\$ -	\$ -	\$ -	\$ 130.000	\$ 115.000	\$ 53.000	\$ 149.000	\$ -	\$ 29.452	\$ 30.100	\$ 30.796	\$ 30.050	\$ 27.033	\$ 29.006	
<b>Total</b>	\$ 3.226	\$ 1.817	\$ 1.303	\$ 238.000	\$ 115.000	\$ 53.000	\$ 161.000	\$ -	\$ 29.452	\$ 30.100	\$ 30.796	\$ 30.050	\$ 27.033	\$ 29.006	\$ -

## Levelized Cost per Tonne - Project Quest

User Defined - Inputs	
Project life ( $T$ )	25.0 years
Nominal Discount Rate ( $r$ )	4.150%
General Inflation Rate ( $e_{inf}$ )	2.00%
Real Annual Escalation Rate ( $e_r$ )	1.00%
Estimated mass of CO <sub>2</sub> captured (million tonnes per year)	1.08
Estimated mass of CO <sub>2</sub> avoided (million tonnes per year)	0.90
Calculations	
Fixed Charge Factor ( $FCF$ )	0.065
<b>A</b>	15.377
Apparent Escalation Rate ( $e_a$ )	3.0%
<b>k</b>	0.989
Opex Levelization Factor ( $l$ )	1.415

Item	Annuity Cost (\$ Million)	Cost/Tonne Captured (\$/Tonne)	Cost/Tonne Avoided (\$/Tonne)
<b>CAPEX</b>			
<b>A. Capture - CAPEX</b>	<b>\$45.07</b>	<b>\$41.73</b>	<b>\$50.07</b>
i) Activities - Design, Construction & Commissioning	\$37.54	\$34.76	\$41.71
FEED and Detailed Engineering	\$12.58	\$11.65	\$13.98
Construction & Commissioning	\$24.95	\$23.10	\$27.73
ii) Capture Facility Components & Procurement	\$7.53	\$6.97	\$8.37
<b>B. Transportation - CAPEX</b>	<b>\$9.82</b>	<b>\$9.09</b>	<b>\$10.91</b>
i) Activities - Design, Construction & Commissioning	\$7.95	\$7.36	\$8.83
FEED and Detailed Engineering	\$0.87	\$0.81	\$0.97
Construction & Commissioning	\$7.02	\$6.50	\$7.81
Land Procurement	\$0.05	\$0.04	\$0.05
ii) Transportation Facility Components & Procurement	\$1.87	\$1.73	\$2.08
<b>C. Storage - CAPEX</b>	<b>\$8.12</b>	<b>\$7.52</b>	<b>\$9.02</b>
i) Activities - Design, Construction & Commissioning	\$7.67	\$7.10	\$8.52
FEED and Detailed Engineering	\$4.55	\$4.22	\$5.06
Construction & Commissioning	\$0.67	\$0.62	\$0.74
MMV including Baseline Collecting	\$0.71	\$0.66	\$0.79
Drill and Complete Wells	\$1.74	\$1.61	\$1.93
ii) Injection Facility Components & Procurement	\$0.45	\$0.42	\$0.50
<b>OPEX</b>			
<b>A. Capture-OPEX</b>	<b>\$73.87</b>	<b>\$68.40</b>	<b>\$82.08</b>
Energy; Power, Steam, Cooling Water	\$55.48	\$51.37	\$61.64
Maintenance and Repair	\$2.83	\$2.62	\$3.14
Labour, Regulatory, Administration	\$15.57	\$14.41	\$17.30
<b>B. Transportation-OPEX</b>	<b>\$0.42</b>	<b>\$0.39</b>	<b>\$0.47</b>
Maintenance and Repair	\$0.42	\$0.39	\$0.47
<b>C. Storage-OPEX</b>	<b>\$7.08</b>	<b>\$6.55</b>	<b>\$7.86</b>
Maintenance and Repair	\$1.42	\$1.31	\$1.57
Monitoring, Measurement and Verification	\$5.66	\$5.24	\$6.29
<b>Capture</b>	\$118.94	\$110.13	\$132.16
<b>Transport</b>	\$10.24	\$9.49	\$11.38
<b>Storage</b>	\$15.19	\$14.07	\$16.88
<b>Total Cost/Tonne</b>		<b>\$133.68</b>	<b>\$160.42</b>

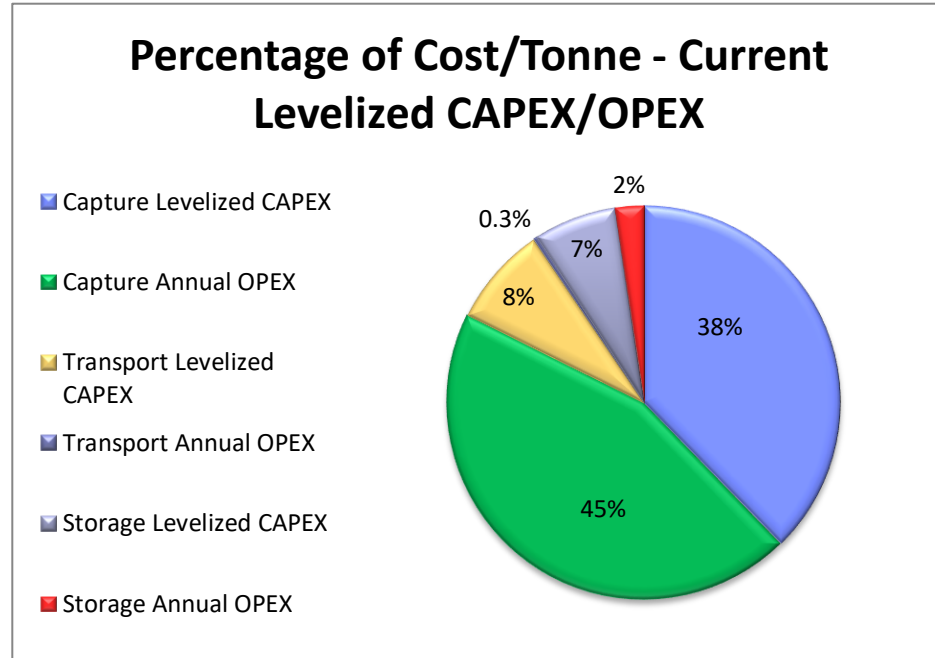
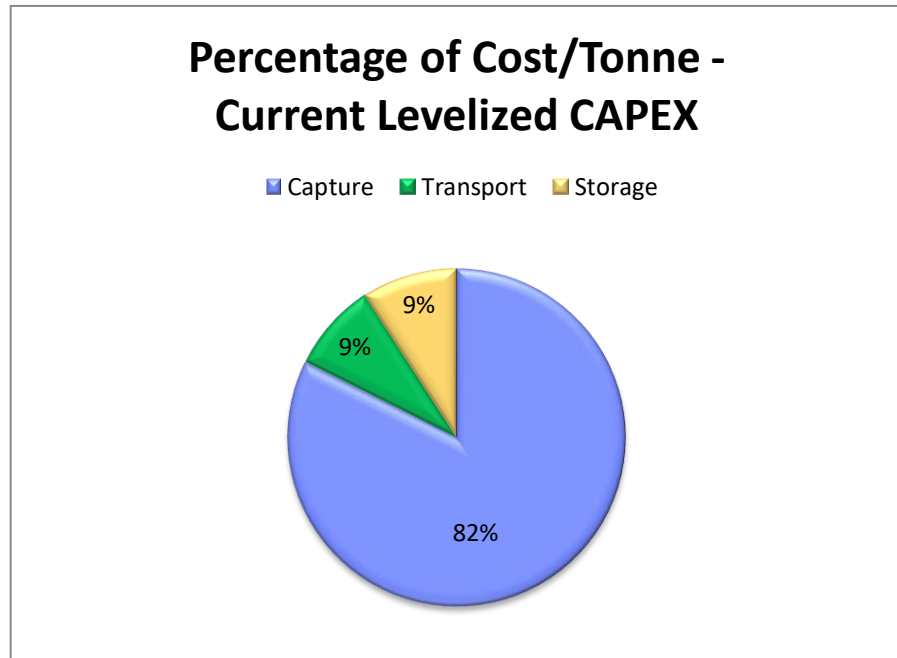
Forecasted OPEX (\$ Million/Year)	Estimated (2022)	Levelized
<b>Capture</b>	<b>\$ 52.20</b>	<b>\$ 73.87</b>
Energy; Power, Steam, Cooling Water	\$ 39.20	\$ 55.48
Maintenance and Repair	\$ 2.00	\$ 2.83
Labour, Regulatory, Administration	\$ 11.00	\$ 15.57
<b>Transport</b>	<b>\$ 0.30</b>	<b>\$ 0.42</b>
Maintenance and Repair	\$ 0.30	\$ 0.42
<b>Storage</b>	<b>\$ 5.00</b>	<b>\$ 7.08</b>

Maintenance and Repair	\$	1.00	\$	1.42
Monitoring, Measurement and Verification	\$	4.00	\$	5.66
<b>Total</b>	<b>\$</b>	<b>57.50</b>	<b>\$</b>	<b>81.37</b>

\* Note: The project started commercial operations during 2015; OPEX costs were only incurred for 92 days and CO<sub>2</sub> was captured and avoided over 131 days.

**Reported Cost per Tonne - Project Quest**

User Defined - Inputs		
Levelized CAPEX capture	45.07	C\$ MM
Levelized CAPEX transport	9.82	C\$ MM
Levelized CAPEX storage and MMV	8.12	C\$ MM



**Annual Reporting**

			Funding Agreement										
			Commercial Operations										
			2015 **	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
			Actual	Actual	Actual	Actual	Actual	Actual	Actual				
<b>Capture</b>	Capture Levelized CAPEX	C\$ MM	45.07	45.07	45.07	45.07	45.07	45.07	45.07	45.07	45.07	45.07	45.07
	Capture Reported CAPEX*	C\$ MM	40.28	41.20	42.32	43.45	45.42	43.31	45.13				
	Capture Annual OPEX	C\$ MM	11.56	26.22	30.12	25.37	28.01	28.60	53.39				
	<b>Total w/ Levelized CAPEX</b>	C\$ MM	<b>56.63</b>	<b>71.28</b>	<b>75.19</b>	<b>70.44</b>	<b>73.08</b>	<b>73.67</b>	<b>98.46</b>	<b>45.07</b>	<b>45.07</b>	<b>45.07</b>	<b>45.07</b>
	<b>Total w/ Reported CAPEX</b>	C\$ MM	<b>51.84</b>	<b>67.42</b>	<b>72.44</b>	<b>68.82</b>	<b>73.43</b>	<b>71.91</b>	<b>98.53</b>	-	-	-	-
<b>Transport</b>	Transport Levelized CAPEX	C\$ MM	9.82	9.82	9.82	9.82	9.82	9.82	9.82	9.82	9.82	9.82	9.82
	Transport Reported CAPEX	C\$ MM	8.77	8.97	9.21	9.46	9.90	9.44	9.82				
	Transport Annual OPEX	C\$ MM	0.01	0.35	0.38	0.20	0.15	0.31	0.40				
	<b>Total w/ Levelized CAPEX</b>	C\$ MM	<b>9.83</b>	<b>10.17</b>	<b>10.20</b>	<b>10.02</b>	<b>9.97</b>	<b>10.13</b>	<b>10.22</b>	<b>9.82</b>	<b>9.82</b>	<b>9.82</b>	<b>9.82</b>
	<b>Total w/ Reported CAPEX</b>	C\$ MM	<b>8.78</b>	<b>9.32</b>	<b>9.59</b>	<b>9.66</b>	<b>10.05</b>	<b>9.75</b>	<b>10.22</b>	-	-	-	-
<b>Storage</b>	Storage Levelized CAPEX	C\$ MM	8.12	8.12	8.12	8.12	8.12	8.12	8.12	8.12	8.12	8.12	8.12
	Storage Reported CAPEX	C\$ MM	7.26	7.42	7.63	7.83	8.18	7.80	8.12				
	Storage Annual OPEX	C\$ MM	2.54	3.62	2.21	0.70	0.65	2.88	2.80				
	<b>Total w/ Levelized CAPEX</b>	C\$ MM	<b>10.66</b>	<b>11.74</b>	<b>10.33</b>	<b>8.82</b>	<b>8.77</b>	<b>11.00</b>	<b>10.92</b>	<b>8.12</b>	<b>8.12</b>	<b>8.12</b>	<b>8.12</b>
	<b>Total w/ Reported CAPEX</b>	C\$ MM	<b>9.80</b>	<b>11.04</b>	<b>9.84</b>	<b>8.53</b>	<b>8.83</b>	<b>10.68</b>	<b>10.92</b>	-	-	-	-
<b>Total Levelized CAPEX + OPEX</b>	C\$ MM	<b>77.12</b>	<b>93.19</b>	<b>95.72</b>	<b>89.29</b>	<b>91.82</b>	<b>94.80</b>	<b>119.60</b>	<b>63.01</b>	<b>63.01</b>	<b>63.01</b>	<b>63.01</b>	
<b>Total Reported CAPEX + OPEX</b>	C\$ MM	<b>70.42</b>	<b>87.78</b>	<b>91.87</b>	<b>87.02</b>	<b>92.31</b>	<b>92.34</b>	<b>119.67</b>	-	-	-	-	
Annual CO <sub>2</sub> Captured	MM tonne/year	1.03	1.11	1.14	1.07	1.13	0.94	1.05					
Annual CO <sub>2</sub> Avoided	MM tonne/year	0.81	0.87	0.90	0.83	0.89	0.74	0.82					
<b>Operating Cost/Tonne Captured</b>	C\$/tonne	<b>13.65</b>	<b>27.25</b>	<b>28.73</b>	<b>24.65</b>	<b>25.54</b>	<b>33.80</b>	<b>53.65</b>					
<b>Operating Cost/Tonne Avoided</b>	C\$/tonne	<b>17.40</b>	<b>34.70</b>	<b>36.47</b>	<b>31.82</b>	<b>32.30</b>	<b>43.20</b>	<b>68.77</b>					
<b>Total Reported Cost/Tonne Captured (Levelized CAPEX)</b>	C\$/tonne	<b>74.60</b>	<b>84.12</b>	<b>84.08</b>	<b>83.74</b>	<b>81.40</b>	<b>100.79</b>	<b>113.38</b>					
<b>Total Reported Cost/Tonne Avoided (Levelized CAPEX)</b>	C\$/tonne	<b>95.11</b>	<b>107.12</b>	<b>106.71</b>	<b>108.09</b>	<b>102.93</b>	<b>128.82</b>	<b>145.32</b>					
<b>Total Reported Cost/Tonne Captured (Reported CAPEX)</b>	C\$/tonne	<b>68.13</b>	<b>79.23</b>	<b>80.70</b>	<b>81.62</b>	<b>81.84</b>	<b>98.18</b>	<b>113.44</b>					
<b>Total Reported Cost/Tonne Avoided (Reported CAPEX)</b>	C\$/tonne	<b>86.85</b>	<b>100.89</b>	<b>102.42</b>	<b>105.35</b>	<b>103.49</b>	<b>125.48</b>	<b>145.40</b>					
<b>Avg. Total Reported Cost/Tonne Captured (Levelized CAPEX)</b>												<b>88.87</b>	
<b>Avg. Total Reported Cost/Tonne Avoided (Levelized CAPEX)</b>												<b>113.44</b>	
<b>Avg. Total Reported Cost/Tonne Captured (Reported CAPEX)</b>												<b>86.16</b>	
<b>Avg. Total Reported Cost/Tonne Avoided (Reported CAPEX)</b>												<b>109.98</b>	

\* "Reported CAPEX" refers to the Annualized CAPEX (now called "Levelized CAPEX" in this sheet) total that was reported in the CPT submitted by Shell during that year.  
 \*\* Note: In the first year of commercial operation (2015), the project was only capturing CO<sub>2</sub> for 131 days, and in commercial operation for 92 days. Assuming linear extrapolation, the 92days of OPEX costs and 131days of CO<sub>2</sub> captured and avoided were annualized. Given the transition to begin commercial operations, the 2015 values are not an accurate representation of a typical operating year.

User Defined - Inputs	
Project Life ( $T$ )	25.0 years
Discount Rate ( $r$ )	4.150%
General Inflation Rate ( $e_{inf}$ )	2.00%
Calculations	
Fixed Charge Factor (FCF)	0.065

<b>Total</b>	
<b>Current Funding</b>	
<b>During Construction</b>	<b>\$ 594.32</b>

<b>Annualized</b>	
<b>CAPEX</b>	
<b>Funding</b>	<b>\$ 38.65</b>

### Funding Efficiency Results - Quest

Funding Year	Avoided Volumes of CO <sub>2</sub> (million tonnes)	Yearly Injection Funding (\$ millions)	Annualized		Funding Cost per Tonne (\$/tonne)	Social Cost of CO <sub>2</sub> ** (\$/tonne)	Funding Efficiency (%)
			Capital Funding (\$ millions)				
2015*	0.29	\$ -	\$ 38.65		\$ 47.67	\$ 45.10	94.62%
2016	0.87	\$ 29.45	\$ 38.65		\$ 78.28	\$ 47.54	60.73%
2017	0.90	\$ 30.10	\$ 38.65		\$ 76.64	\$ 50.06	65.31%
2018	0.83	\$ 30.80	\$ 38.65		\$ 84.07	\$ 52.65	62.63%
2019	0.89	\$ 30.05	\$ 38.65		\$ 77.02	\$ 55.33	71.84%
2020	0.74	\$ 27.03	\$ 38.65		\$ 89.25	\$ 71.38	79.98%
2021	0.82	\$ 29.01	\$ 38.65		\$ 82.21	\$ 74.19	90.25%
2022	0.00	\$ -	\$ 38.65		N/A	\$ 77.09	N/A
2023	0.00	\$ -	\$ 38.65		N/A	\$ 80.08	N/A
2024	0.00	\$ -	\$ 38.65		N/A	\$ 83.15	N/A
2025	0.00	\$ -	\$ 38.65		N/A	\$ 86.31	N/A

\* Note: In the first year of commercial operation (2015), the project was only operating for 131 days. Assuming linear extrapolation, all funding pre-commercial operation were prorated accordingly. The 2015 values are not an accurate representation of a typical operating year.

\*\* Note: The SC-CO<sub>2</sub> is a measure, in dollars, of the long-term damage done by a ton of carbon dioxide emissions in a given year as determined by the U.S EPA.

[https://19january2017snapshot.epa.gov/climatechange/social-cost-carbon\\_.html](https://19january2017snapshot.epa.gov/climatechange/social-cost-carbon_.html)

[https://www.whitehouse.gov/wp-](https://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf?source)

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