

Tank Emissions Abatement Costs



About this Tool

This abatement cost tool has been developed by Clean Air Task Force. The tool allows the user to adjust a number of key parameters and Vapor Recovery Unit replacement thresholds. Abatement costs are available in CAD per metric ton of CH₄ and CO₂e.

Navigation in this Tool

[Abate costs at various thresholds](#)

This tab presents abatement costs (USD or CAD per metric ton of avoided methane or CO₂e pollution) associated with various emission limits, for both use of a flare and use of VRU (with two cost estimates for a VRU provided). Annualized cost for controls are calculated in the Cost Comparison Tab. Users can vary other input parameters (methane content of gas, value of recovered gas, etc.)

[Control Costs Annualization](#)

Here the user can see the annualized costs of installing a flare, and a VRU as presented in the Colorado and California rules. The user can also adjust interest rate and amortization period to recalculate costs using common assumptions.

Tank vent threshold:		
Adjust threshold in orange cell	4,000	m3/month
	133.33	m3/day
	4,709	ft3/day
	4.71	mcf/day

From Cost Comparison Tab (converted from USD to CAD):

		CARB VRU annualized cost:		Colorado VRU annualized cost:		Colorado Flare annualized cost:
USD	\$	11,995	\$	22,709	\$	6,649
CAD	\$	15,492	\$	29,330	\$	8,587

Threshold to require VRU			Abatement Cost (CAN\$/metric ton CH4)								Net Abatement Cost (CAN\$/tonne CO2e)	
Metric tons per year	Mcf/day controlled	m3/month	Gas recovered/destroyed (metric tons)	mcf/year saved	Value of saved gas (CAN\$)	VRU				Flare (no saved gas)	VRU (based on Colorado Hig Cost Est.)	Flare
						Low Estimate (CARB)		High Estimate (Colorado)				
						<i>ignoring value of saved gas</i>	accounting for value of saved gas	<i>ignoring value of saved gas</i>	accounting for value of saved gas			
20.0	4.71	4,000	19.62	1,684	\$ 5,053	\$ 790	\$ 532	\$ 1,495	\$ 1,237	\$ 438	\$ 17.51	\$ 49.49
5	1	999	4.90	421	\$ 1,262	\$ 3,162	\$ 2,904	\$ 5,986	\$ 5,728	\$ 1,752	\$ 70.10	\$ 229.13
6	1	1,199	5.88	505	\$ 1,514	\$ 2,635	\$ 2,377	\$ 4,988	\$ 4,731	\$ 1,460	\$ 58.42	\$ 189.22
7	2	1,399	6.86	589	\$ 1,767	\$ 2,258	\$ 2,001	\$ 4,275	\$ 4,018	\$ 1,252	\$ 50.07	\$ 160.72
8	2	1,598	7.84	673	\$ 2,019	\$ 1,976	\$ 1,719	\$ 3,741	\$ 3,484	\$ 1,095	\$ 43.81	\$ 139.34
9	2	1,798	8.82	757	\$ 2,271	\$ 1,756	\$ 1,499	\$ 3,325	\$ 3,068	\$ 974	\$ 38.94	\$ 122.71
10	2	1,998	9.80	841	\$ 2,524	\$ 1,581	\$ 1,323	\$ 2,993	\$ 2,735	\$ 876	\$ 35.05	\$ 109.41
15	4	2,997	14.70	1,262	\$ 3,786	\$ 1,054	\$ 796	\$ 1,995	\$ 1,738	\$ 584	\$ 23.37	\$ 69.51
20	5	3,996	19.60	1,683	\$ 5,048	\$ 790	\$ 533	\$ 1,496	\$ 1,239	\$ 438	\$ 17.52	\$ 49.56
30	7	5,994	29.40	2,524	\$ 7,571	\$ 527	\$ 269	\$ 998	\$ 740	\$ 292	\$ 11.68	\$ 29.60
40	9	7,992	39.20	3,365	\$ 10,095	\$ 395	\$ 138	\$ 748	\$ 491	\$ 219	\$ 8.76	\$ 19.63
50	12	9,990	49.00	4,206	\$ 12,619	\$ 316	\$ 59	\$ 599	\$ 341	\$ 175	\$ 7.01	\$ 13.64
60	14	11,988	58.80	5,048	\$ 15,143	\$ 263	\$ 6	\$ 499	\$ 241	\$ 146	\$ 5.84	\$ 9.65
70	16	13,985	68.60	5,889	\$ 17,667	\$ 226	\$ (32)	\$ 428	\$ 170	\$ 125	\$ 5.01	\$ 6.80
80	19	15,983	78.40	6,730	\$ 20,190	\$ 198	\$ (60)	\$ 374	\$ 117	\$ 110	\$ 4.38	\$ 4.66

Parameters to Adjust	% recovered / destroyed	Percent methane by volume	Gas Value (CAD)	Exchg. Rate: 1 CAD = x USD	GWP of CH4
	98%	60%	\$3.00	0.77	25

VRU Costs as presented:	CARB		Colorado **
	Economic Analysis Table B-7		Economic Impact Analysis Table 17
	25 mscf/d VRU	50 mscf/d VRU	single size
Capital Costs	20,421	26,327	90,000
Non recurring one time costs	15,316	19,745	12,802
Capital Recovery Factor	0.13	0.130	0.14
Annualized Capital Costs	4,628	5,989	16,315
Ongoing Cost	7,367	8,419	9,396
Annualized Total Cost (without value of saved gas)	11,995	14,408	25,711
	11,995	14,408	25,711
\$Year	\$2006	\$2006	\$2013
Source:	CARB Economic Analysis: https://www.arb.ca.gov/cc/oil-gas/Oil%20and%20Gas%20Appx%20B%20Economic%20Analysis.pdf		CDPHE Cost-Benefit Analysis: https://www.regulations.gov/document?D=EPA-HQ-OAR-2010-0505-7573
	Based on Gas Star document: https://www.epa.gov/sites/production/files/2016-06/documents/ll_final_vap.pdf		These costs were also used in EPA OOOO

Flare Costs as presented:	Colorado
	Economic Impact Analysis Table 1
Capital Costs	19817
Non recurring one time costs	8628
Capital Recovery Factor	0.14
Annualized Capital Costs	3,322
Ongoing Cost	2,965
Annualized Total Cost (without value of saved gas)	6,287
	6,287
	CDPHE Cost-Benefit Analysis: https://www.regulations.gov/document?D=EPA-HQ-OAR-2010-0505-7573

0.07

Different cost estimates use different assumptions for amortization period and interest rate. Below, we recalculate costs using common assumptions:
 Amortization Period 10
 Interest Rate 5%
 Capital Recovery Factor 0.13 https://en.wikipedia.org/wiki/Capital_recovery_factor

Colorado	Capital Costs (one time)	Non-Recurring Costs (one time)	O&M Costs (recurring)	Annualized Total Costs
VRU	\$ 90,000			
Freight/Engineering		\$ 1,648		
Installation		\$ 11,154		
Maintenance			\$ 9,396	
Subtotal Costs	\$ 90,000	\$ 12,802	\$ 9,396	
Capital Recovery Factor	0.130	0.130		
Annualized Costs without value of saved gas	\$ 11,655	\$ 1,658	\$ 9,396	\$ 22,709

	Capital Costs (one time)	Non-Recurring Costs (one time)	O&M Costs (recurring)	Annualized Total Costs
Flare	\$ 18,169			
Freight/Engineering		\$ 1,648		
Flare Installation		\$ 6,980		
Auto Igniter	\$ 1,648			
Pilot Fuel			\$ 768	
Maintenance			\$ 2,197	
Subtotal Costs	\$ 19,817	\$ 8,628	\$ 2,965	
Capital Recovery Factor	0.13	0.13		
Annualized Costs without value	\$ 2,566	\$ 1,117	\$ 2,965	\$ 6,649

CARB: 25 mscf/day	Capital Costs (one time)	Non-Recurring Costs (one time)	O&M Costs (recurring)	Annualized Total Costs
VRU	\$ 20,421			
Installation		\$ 15,316		
Maintenance			\$ 7,367	
Subtotal Costs	\$ 20,421	\$ 15,316	\$ 7,367	
Capital Recovery Factor	0.130	0.130		
Annualized Costs without value of saved gas	\$ 2,645	\$ 1,983	\$ 7,367	\$ 11,995

CARB: 50 mscf/day	Capital Costs (one time)	Non-Recurring Costs (one time)	O&M Costs (recurring)	Annualized Total Costs
VRU	\$ 26,327			
Installation		\$ 19,745		
Maintenance			\$ 8,419	
Subtotal Costs	\$ 26,327	\$ 19,745	\$ 8,419	
Capital Recovery Factor	0.130	0.130		
Annualized Costs without value of saved gas	\$ 3,409	\$ 2,557	\$ 8,419	\$ 14,386