

California's In-State RNG Supply for Transportation: 2020 to 2024 Assessment

As the California Air Resources Board (ARB) evaluates strategies to best use dwindling state incentive funds to achieve multiple environmental and economic development goals, it must prioritize cost-effectiveness. To date, some of ARB's most efficient climate protection investments have been in renewable gas production facilities that reduce fugitive methane emissions, coupled with incentive funding for near-zero emission natural gas trucks.

In October 2019, the ARB changed the requirements for one of the state's most popular clean transportation programs—the Heavy-Duty Vehicle Incentive Program (HVIP)—to help bolster the development of in-state renewable gas production facilities. Going forward, in order for fleets to qualify for HVIP funding for natural gas vehicles, the vehicle must be fueled with renewable natural gas (RNG) produced within the state of California and be equipped with an 11.9L near-zero emission engine. This new in-state RNG fuel requirement might help the state achieve its SB 1383 goals, as it may encourage investment in facilities that capture and clean methane from major sources of short-lived climate pollutants—but the policy was approved without understanding the availability of in-state RNG supply.


At the end of 2019, only 3.7% of the 139.3 million diesel gallon equivalent (DGE) of RNG consumed by California motor vehicles was produced by in-state facilities. Given the low volume of RNG produced in California at the time of ARB's policy change, Gladstein, Neandross & Associates (GNA) initiated an inventory of the total in-state RNG supply forecast, beginning with January 1, 2020 and culminating on January 1, 2024.

With the help of state and local agencies, RNG project developers, third party marketers, and other reliable sources, this study has concluded that as of January 1, 2024:

Table 1

 160 RNG production facilities will be operational in California	Total In-State Production Facilities by Sector		 >\$1B will have been invested in California to build the RNG supply infrastructure (64% being private investment)
	Dairy	137	
	Landfill	8	
	High Solid Anaerobic Digester (HSAD)	7	
	Wastewater Treatment Plant	7	
	Gasification of Dry Wood	1	

Table 2

 119 M DGE of in-state RNG will be available	Total In-State Production Volumes by Sector					
	Sector	Percentage	MMBTU	SCF	GGE	DGE
	Landfill	38.5%	6 6,087,775	5,935,084,199	51,745,235	45,729,776
	Dairy	36.6%	5,787,922	5,794,082,583	49,819,236	43,494,169
	HSAD	10.5%	1,669,325	1,628,800,738	14,193,660	12,538,192
	Gasification	10.4%	1,650,000	1,601,941,748	14,000,663	12,399,162
	Wastewater	4.0%	646,134	640,436,841	5,482,605	4,767,849
	Total		15,841,156	15,600,346,109	135,241,398	118,929,149

The average energy-weighted carbon intensity value of all in-state RNG will be -101.98 gCO₂e/MJ as of January 1, 2024. The energy-weighted average carbon intensity fluctuates based on the CI value of the RNG from the projects that come online that quarter.

Table 3 **Cumulative Average Carbon Intensity by Quarter**

Year	Quarter	Annualized Energy Production (MMBTU/year)	RNG added by end of the Quarter (MMBTU)	Annual Energy Production (DGE)	RNG added by end of the Quarter (DGE)	Energy-weighted average CI of total production within the quarter (gCO ₂ e/MJ)
2019	4	897,221	-	6,742,299	-	-236.87
	1	1,269,782	372,561	9,541,962	2,799,664	-192.94
2020	2	3,446,378	2,176,596	25,898,304	16,356,342	-155.42
	3	3,773,002	326,624	28,350,496	2,452,192	-165.12
	4	4,758,002	985,000	35,752,421	7,401,924	-161.99
2021	1	5,941,270	1,183,268	44,644,259	8,891,838	-185.04
	2	5,997,161	55,891	45,064,259	420,000	-182.89
	3	5,997,161	-	45,064,259	-	-182.89
	4	7,500,860	1,503,699	56,364,023	11,299,764	-201.91
2022	1	10,541,896	3,041,036	79,216,325	22,852,303	-130.86
	2	10,614,896	73,000	79,764,894	548,569	-131.87
	3	10,614,896	-	79,764,894	-	-131.87
	4	11,024,879	409,983	82,845,774	3,080,880	-137.30
2023	1	11,024,879	-	82,845,774	-	-137.30
	2	11,024,879	-	82,845,774	-	-137.30
	3	11,024,879	-	82,845,774	-	-137.30
	4	11,024,879	4,816,276	82,845,774	36,083,375	-137.30
2024	1	15,841,156	14,943,934	118,929,149	112,186,850	-101.98

To ensure that California's RNG production facilities are successful, it is vital for the state to invest in the near-zero emission natural gas trucks that will consume the carbon negative, locally produced fuel. Given the fuel consumption of the average medium or heavy-duty truck in California (9,600 DGE per year), 119 million DGE of RNG can fuel 12,400 new near-zero emission natural gas trucks.

12,400

NZE trucks

could be fueled by in-state RNG

Annually, these trucks would reduce:

- 3.4 million tons of CO₂e
- 154 tons of NO_x
- 1 ton of diesel particulates

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Report Authors: The study was produced by Gladstein, Neandross & Associates (GNA), a leading North American consulting firm specializing in market development for low-emission and alternative fuel vehicle technologies, infrastructure and fuels for both on and off-road applications.

