

# AN ASSESSMENT: CALIFORNIA'S IN-STATE RNG SUPPLY FOR TRANSPORTATION, 2020 - 2024

*A survey of the existing and developing RNG  
production capacity in California for use in  
motor vehicles*

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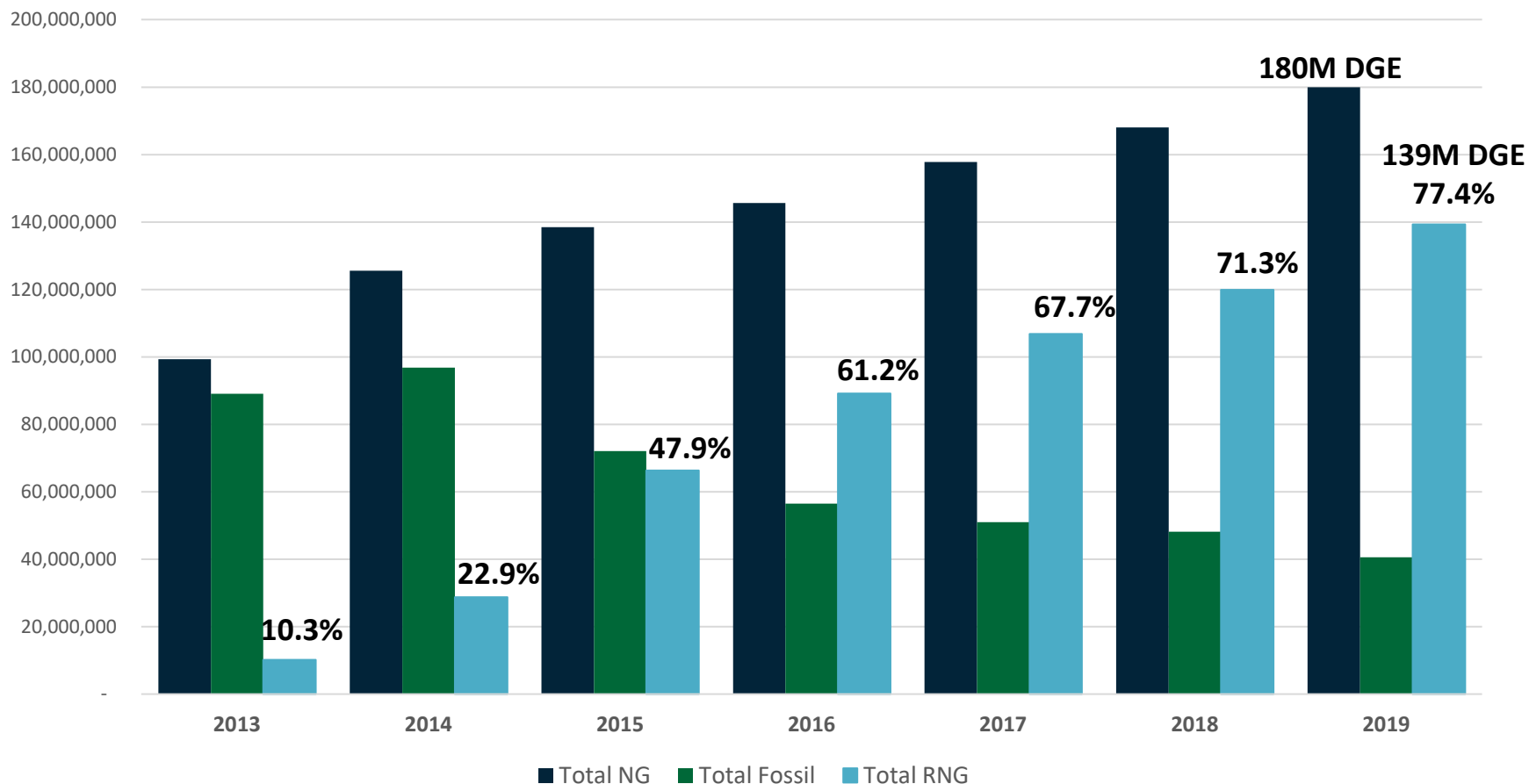
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# Growth in RNG Share of CA CNG/LNG



California NGV Fuel Use (in DGE)



## As of 2019:

- Total CA NG fuel demand grew 7.5%/yr (since 2013)
- CA NGV demand 29% of U.S. total, but CA RNG consumption is 58% of total U.S. RNG consumption
- Only 2.7% of CA RNG produced in state (6.8M DGE)
- Energy-weighted CI of CA RNG supply was 32.7 gCO<sub>2</sub>e/MJ



**Goal:** Provide accurate tally/assessment of current/future in-state RNG supply (focused on RNG for transportation)



**Method:** Collected data by:

- Surveying RNG project developers/operators, government agencies, relevant trade associations, natural gas utilities, fuel marketers and other pertinent stakeholders
- Analyzing existing public sources, such as DDRDP and AgStar

# Screening Projects for Inclusion

A project was included if it:

- Received grant funding or other incentives from a state or local government agency
- Received other debt or equity financing from private entities
- Secured feedstock and/or offtake agreements
- Entered into or completed CEQA review
- Applied for and received permits from relevant regulatory agencies
- Could substantiate that significant private resources have been expended for the development of the project
- Could demonstrate other attributes that indicate that the project is vested and in the process of development



# California RNG Facilities by Sector (Jan 2024)



Sector	# of Facilities
Dairy	137
Landfill	8
HSAD	7
Gasification	1
Wastewater	7
Total	160



# Projected Annual RNG Production by Sector (Jan 2024)

Sector	%	MMBTU	SCF	GGE	DGE
Landfill	38.4%	6,087,775	5,935,084,199	51,745,235	45,729,776
Dairy	36.6%	5,797,281	5,628,428,291	49,191,380	43,564,503
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		15,850,515	15,434,691,818	134,613,543	118,999,483

**119 M**  
DGE of  
in-state RNG  
will be available



# Calculating CI Value of CA RNG

- Evaluated the energy weighted CI of CA RNG each quarter
- Used projected CI values from developers (if available); mostly used sector average CI's
  - This approach likely underestimates the CI value of CA RNG
  - CA Dairy RNG has lower CI
  - Will add 15 – 20 dairies with October announcement from CDFA

Sector	Average CI
Landfill	44.37
Dairy	-277.73
HSAD	-11.30
Gasification	-87.50
Wastewater	25.33

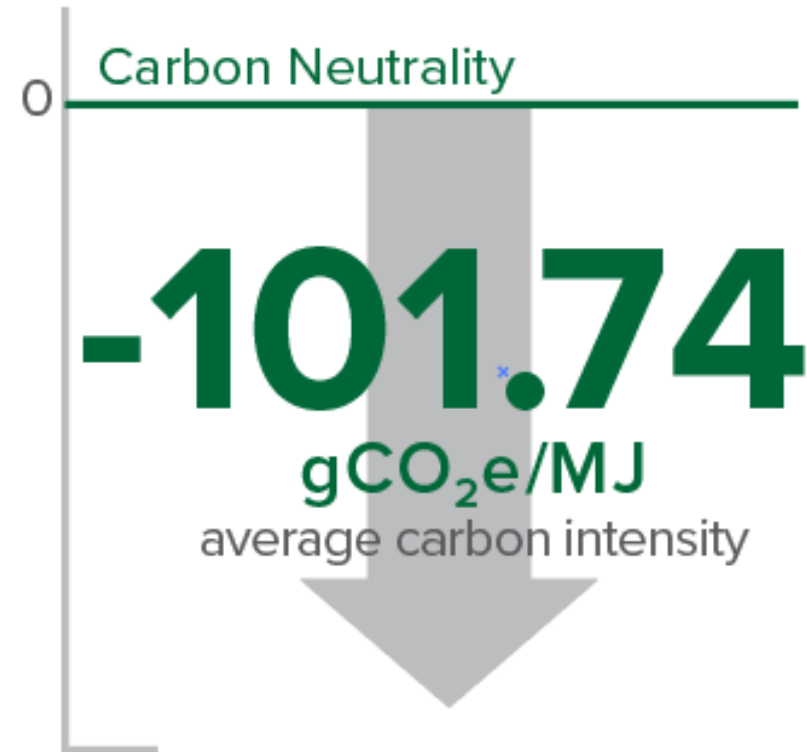


# Cumulative Energy Weighted Carbon Intensity by Quarter



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 (gCO2e/MJ)
2019	4	502,176	-	3,773,670	-	-193.95
2020	1	784,678	282,502	5,896,573	2,122,902	-133.63
	2	2,961,273	2,176,596	22,252,914	16,356,342	-133.55
	3	3,307,846	346,573	24,855,017	2,602,103	-147.64
	4	4,292,846	985,000	32,256,941	7,401,924	-148.19
2021	1	5,512,279	1,219,433	41,420,548	9,163,606	-176.84
	2	5,568,170	55,891	41,840,548	420,000	-174.62
	3	5,568,170	-	41,840,548	-	-174.62
	4	7,515,999	1,947,829	56,477,789	14,637,241	-201.34
2022	1	10,557,035	3,041,036	79,330,092	22,852,303	-130.56
	2	10,630,035	73,000	79,878,661	548,569	-131.57
	3	10,630,035	-	79,878,661	-	-131.57
	4	11,034,239	404,204	82,916,108	3,037,447	-136.93
2023	1	11,034,239	-	82,916,108	-	-136.93
	2	11,034,239	-	82,916,108	-	-136.93
	3	11,034,239	-	82,916,108	-	-136.93
	4	11,034,239	4,816,276	82,916,108	36,083,375	-101.74
For all 2024		15,850,515	15,348,340	118,999,483	115,225,812	-101.74

**RNG enables  
fleets to go  
beyond carbon  
neutrality!**



# Potential Environmental Benefits

Time Frame	Projected GHG Reduction (MTCO2e)	Projected NOx Reduction (tons)	Projected DPM Reductions (tons)
One Year	3,424,156	1,387	8.62
Ten Years	34,241,560	13,870	86.2
Fifteen Years	51,362,336	20,802	129.27

## Assumptions:

- Beginning January 2024, CA RNG used in MY 2020 NZE NGVs
- Vehicles replace MY 2020 diesel trucks



# Economic Investment

- Secured cost data for 129 of 160 facilities
- Average investment: \$7.9 million
- Extrapolated to 31 facilities with missing cost data = \$235 million



**RNG production facilities**

will be operational in California



**will have been invested in California**

to build the RNG supply infrastructure (77% being private investment)


Public Funding Secured	Private Match	Total Investment
\$223,835,745	\$751,949,125	\$975,784,870

# Ample Fuel Supply

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.

- 119 million DGE of available RNG
- Fuel consumption of the average medium or heavy-duty truck in California = 7,800 DGE per year

**13,731**



**NZE trucks**  
could be fueled by in-state RNG

# A Cost-Effectiveness Scenario



Assuming the HVIP average incentive for an NZE natural gas truck (\$45K), it would cost California \$618 million to get the 13,731 new trucks on the road, the trucks would generate significant emissions reductions:

- 51.4 million metric tons of CO<sub>2</sub>e
- 20.8 thousand tons of NO<sub>x</sub>
- 129 tons of diesel PM

*\*Assumes 15-year lifespan (useful life for HVIP)*

	Cost/MT of CO <sub>2</sub> e Reduction	Cost/ton of NO <sub>x</sub> Reduction
Battery-Electric Truck*	\$546	\$299,400
NZE Trucks + RNG Fuel	\$12.03	\$29,700

**45x**

more cost effective

**10x**

more cost effective

*\*Based on the average heavy-duty battery electric truck that received a HVIP voucher on the 2019 wait list*

# Thank You!

Cliff Gladstein

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