Incentive Programs for Organic Waste Management

Evan WR Edgar
Edgar & Associates

In the Wheelhouse of the Circular Economy

Net-Zero GHG

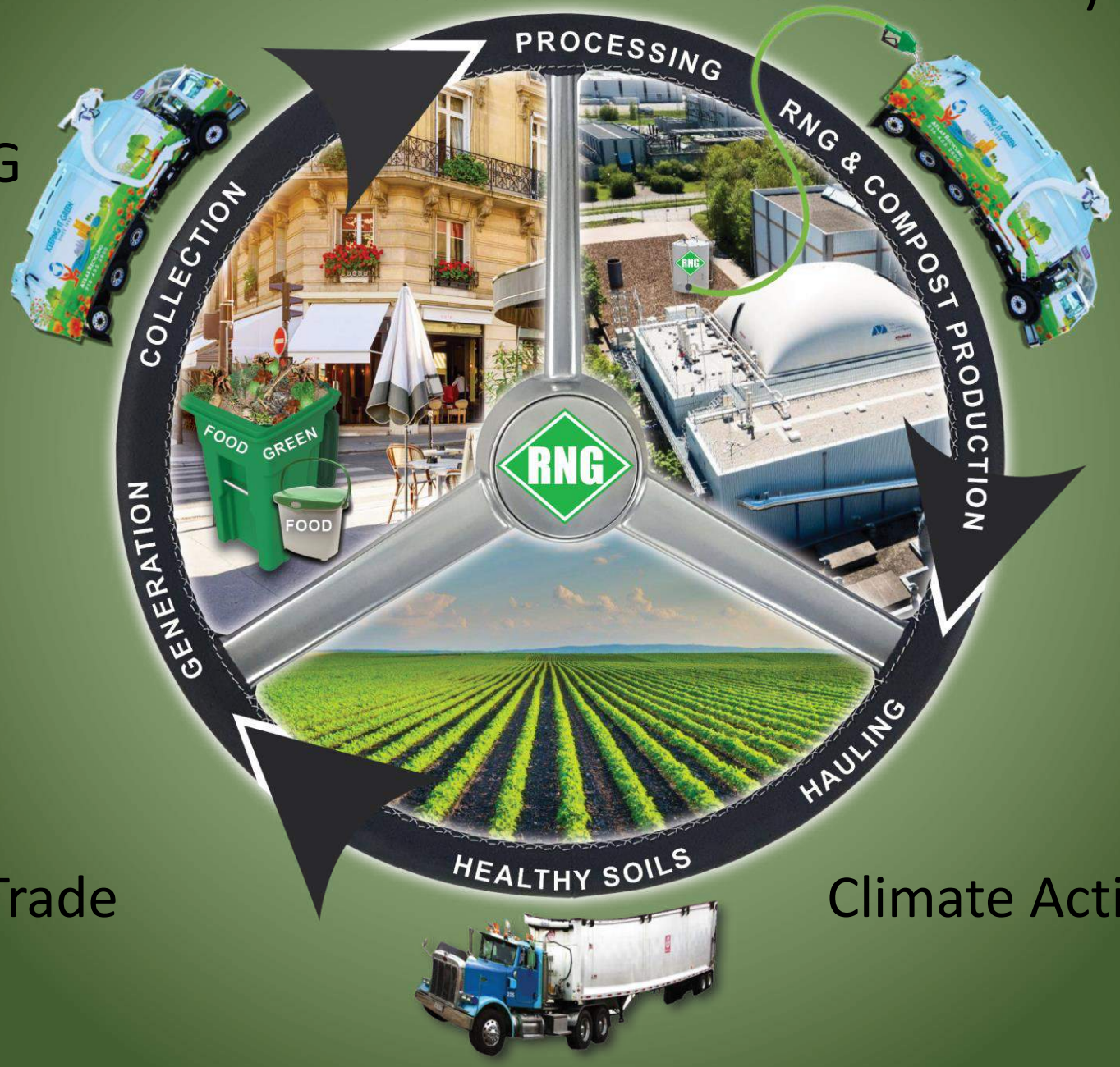
LCFS

SB 1383

BioMAT

Cap-and-Trade

Climate Action Reserve



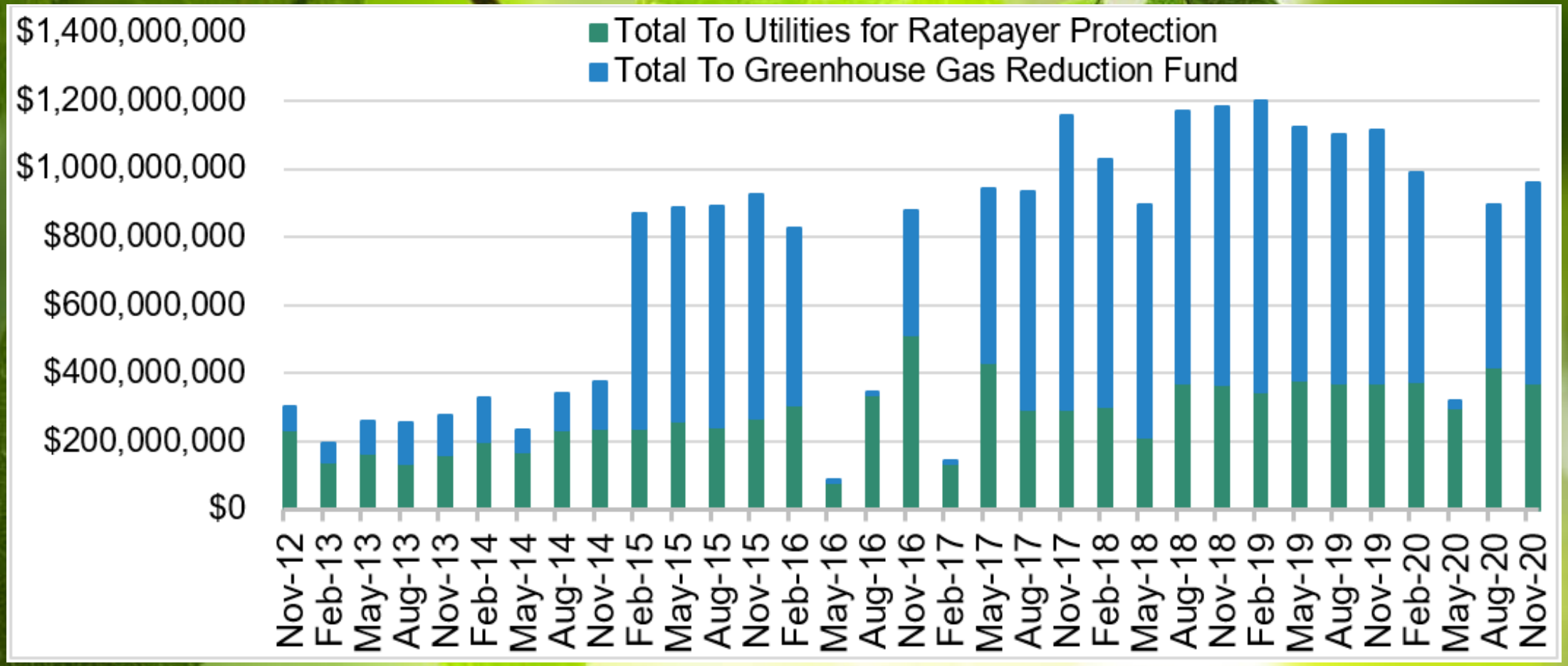
SB 1383 – Climate Change Legislation

Net-Zero GHG Analysis 2017

• Scope 1	Landfill Activity – DOE Data	2,363,000	$MTCO_2e$
• Scope 1	Fleet – DOT data	117,887	$MTCO_2e$
• Scope 2	Energy Use – Industry averages	17,683	$MTCO_2e$
• Scope 3	Recycling (Composting, AD, Combustion) DOE Data with Federal WARM Model	<7,064,545>	$MTCO_2e$

$$\frac{\text{Avoided GHG Emissions – Scope 3}}{\text{GHG Emissions – Scope 1 and 2}} = \frac{7{,}064{,}545}{2{,}498{,}570} = \textbf{2.8 Times}$$

California Cap-and-Trade Program – Quarterly Auction Proceeds



2021-2022 Cap-and-Trade Expenditure Plan

$1.534 Billion

$130 million to CalRecycle

$25 million for Heathy Soils program

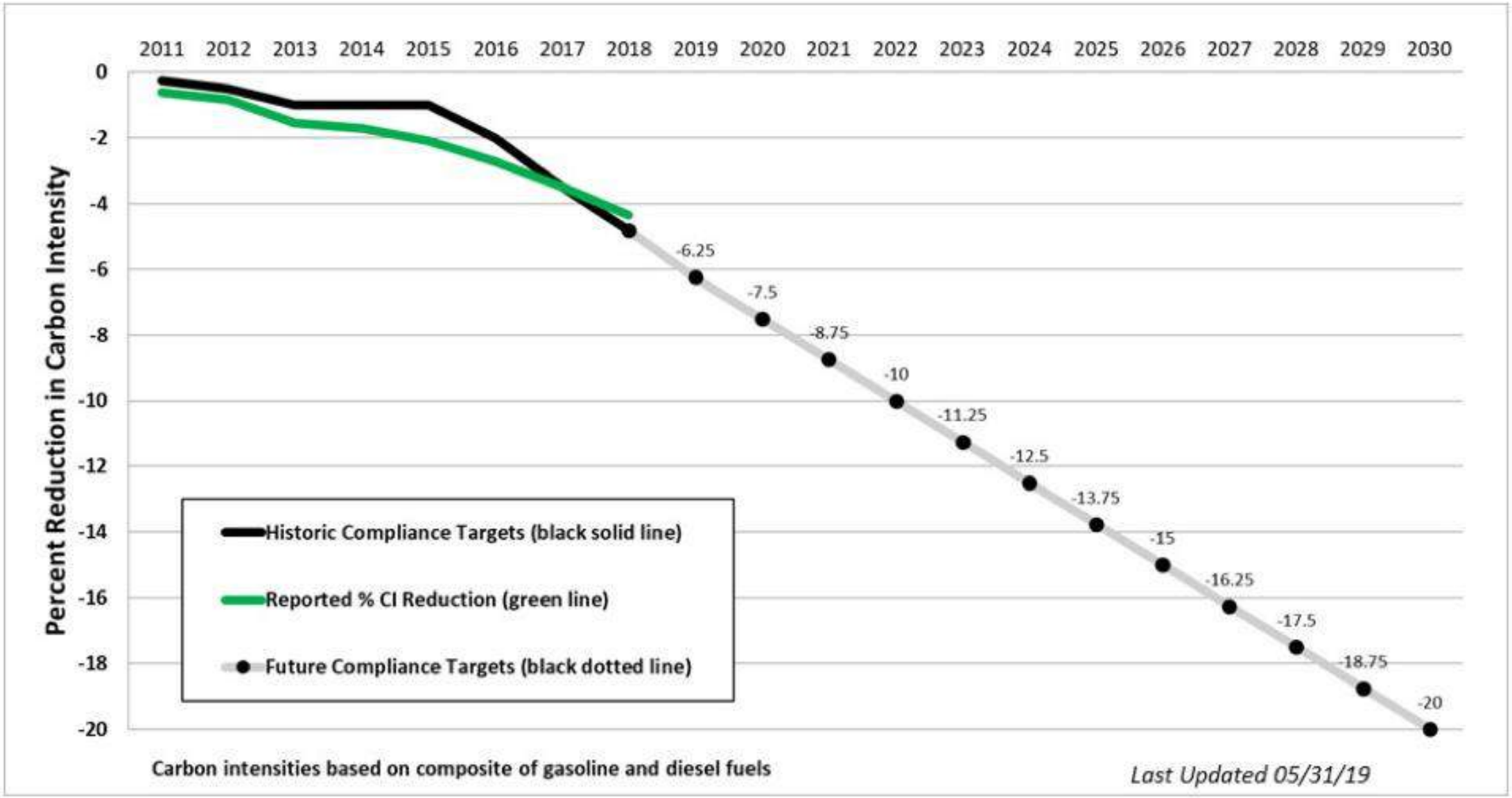
2021-22 Cap and Trade Expenditure Plan
($ in millions)

			Budget Act	Summer Package	
			2021-22		
Program	**BU**	**Department**	**GGRF**	**GGRF**	**Total Funding**
Healthy & Resilient Forests (SB 901)	3540	CAL FIRE	$75	$155	$230
AB 617 - Community Air Protection	3900	CARB		$260	$260
AB 617 - Local Implementation	3900	CARB		$50	$50
AB 617 - Technical Assistance	3900	CARB		$10	$10
AB 617 -CARB Implementation	3900	CARB		$0	$0
Agricultural Diesel Engine Replacement & Upgrades	3900	CARB		$170	$170
Clean Trucks, Buses, & Off-Road Freight Equipment	3900	CARB	$315		$315
Clean Cars 4 All & Transportation Equity Projects	3900	CARB	$150		$150
CVRP	3900	CARB	$100		$100
Safe & Affordable Drinking Water (full funding of $130m)	3940	SWRCB	$44		$44
Healthy Soils	8570	CDFA		$25	$25
Waste Diversion/Recycling Infrastructure		Cal Recycle		$130	$130
Low-Income Weatherization Program (LWIP)	4700	CSD		$15	$15
Woodstove replacements	3900	CARB		$5	$5
Small Off Road Engines (SORE)	3900	CARB		$30	$30
		Total	**$684**	**$850**	**$1,534**

California Low Carbon Fuel Standard (LCFS)

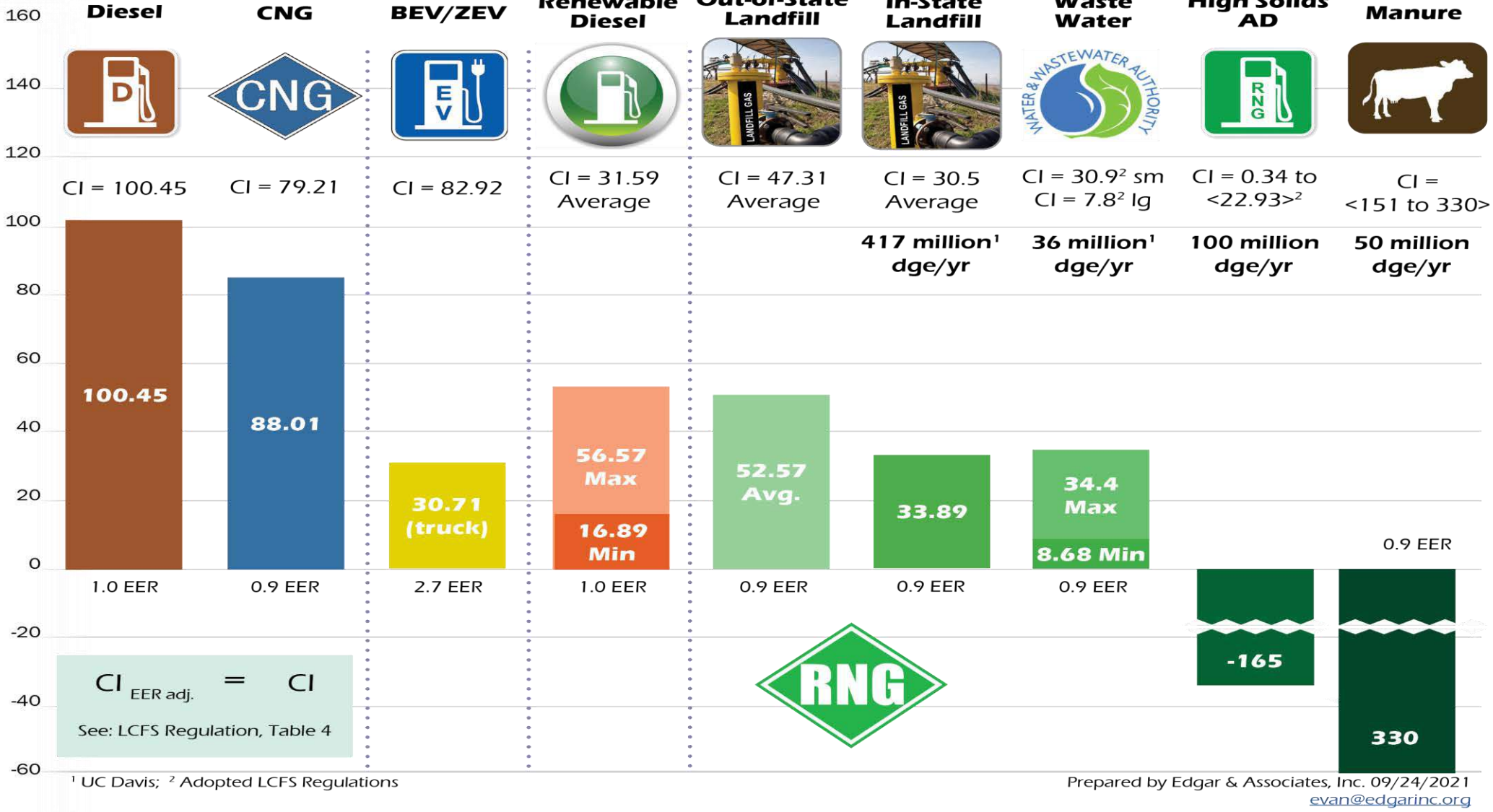
- The LCFS is designed to decrease the carbon intensity (CI) of California's transportation fuel pool and provide an increasing range of low-carbon and renewable alternatives, which reduce petroleum dependency and achieve air quality benefits.
- 7.5% CI reduction by 2020 and 20% by 2020
- Providers of transportation fuels must demonstrate that the mix of fuels they supply for use in California meets the LCFS carbon intensity standards, or benchmarks, for each annual compliance period.
- A deficit generator meets its compliance obligation by ensuring that the amount of credits it earns or otherwise acquires from another party is equal to, or greater than, the deficits it has incurred.
- Anaerobic Digestion to Renewable Natural Gas (RNG)

2011-2018 Performance of the Low Carbon Fuel Standard



Carbon Intensity for Diesel & Substitutes, grams C02 emitted per unit of energy adjusted for energy economy ratio [EER] (g C02 e/MJ)

Certified Pathways (2020)



¹ UC Davis; ² Adopted LCFS Regulations

Prepared by Edgar & Associates, Inc. 09/24/2021
evan@edgarinc.org

LCFS

- The Low Carbon Fuel Standard (LCFS) is a California incentive program that offers incentives based on the relative carbon intensity of an alternative fuel compared to a baseline fossil fuel amount. The unit of measurement for pricing is $/MTCO$_2$e of fuel substituted.
- Currently the baseline carbon intensity is 100.45 grams of CO$_2$e/MJ.
- Wholesale price of diesel (CA) - $2.18/gallon

Fuel Equivalency $/diesel gallon-equivalent (DGE)

		Alternative Fuel Premiums at Sample LCFS Credit Prices					
		Current Price	Credit Price				
Fuels (EER Adjusted)	CI Score (gCO$_2$e/MJ)	$185	$80	$100	$120	$160	$200
Napa- ZWE AD	-165.05	$6.35	$2.75	$3.44	$4.12	$5.50	$6.87
South San Francisco Food AD	-79.91	$4.24	$1.83	$2.29	$2.75	$3.66	$4.58
South San Francisco Yard AD	0.28	$2.24	$0.97	$1.21	$1.45	$1.94	$2.42
POTW (large)	7.80	$2.05	$0.89	$1.11	$1.33	$1.78	$2.22
In State Landfill Gas (Average)	30.50	$1.49	$0.64	$0.81	$0.97	$1.29	$1.61
BEV	30.71	$1.49	$0.64	$0.80	$0.96	$1.28	$1.61
POTW (small)	30.90	$1.48	$0.64	$0.80	$0.96	$1.28	$1.60
Renewable Diesel (Average)	31.59	$1.46	$0.63	$0.79	$0.95	$1.27	$1.58
Temp 45 CI	45.00	$1.13	$0.49	$0.61	$0.73	$0.98	$1.22
Out of State Landfill Gas (Average)	47.31	$1.07	$0.46	$0.58	$0.70	$0.93	$1.16
Compressed Natural Gas (CNG)	79.21	$0.28	$0.12	$0.15	$0.18	$0.24	$0.30
Biodiesel 5% Blend	98.52	-$0.20	-$0.09	-$0.11	-$0.13	-$0.17	-$0.22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SCAVENGER
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FOOD WASTE/
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Washington Low Carbon Fuel Standard (LCFS)

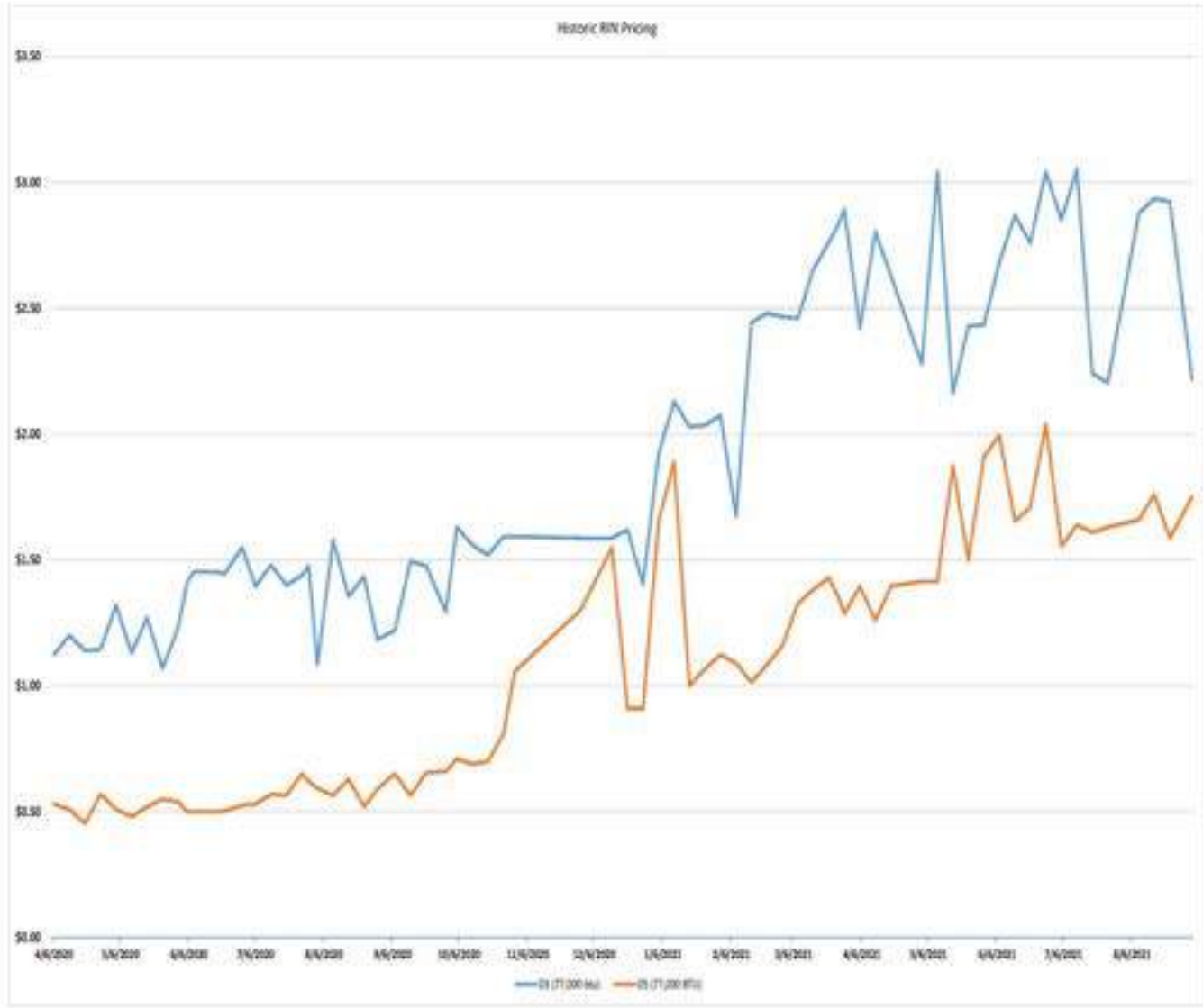
- The WA Clean Fuel Standard law requires fuel suppliers to gradually reduce the carbon intensity of transportation fuels to 20 percent below 2017 levels by 2038. There are several ways for fuel suppliers to achieve these reductions, including:
- Improving the efficiency of their fuel production processes
- Producing and/or blending low-carbon biofuels into the fuel they sell
- Purchasing credits generated by low-carbon fuel providers, including electric vehicle charging providers
- Ecology announced rulemaking for the Clean Fuels Program Rule in July 2021. The program will begin in January 2023.

Renewable Identification Numbers (RINs) under the Renewable Fuel Standard (RFS) Program

- Renewable identification numbers (RINs) are credits used for compliance, and are the “currency” of the RFS program.
- Renewable fuel producers generate RINs
- Market participants trade RINs
- Obligated parties obtain and then ultimately retire RINs for compliance
- RINs can be traded in two forms:
- Assigned RINs - directly associated with a batch of fuel and that travel with that batch of fuel from party to party. Purchasers obtain both the renewable fuel and RINs together.
- Separated RINs - formerly assigned with a batch of fuel, but are no longer assigned to a batch. Purchase only the RIN.

RIN Pricing

- D3 RINs
  - Cellulosic
  - Green waste
  - $5.38/dge
- D5 RINs
  - Food Waste
  - $2.92/dge
- Volatile pricing
- Banks discount



BioMAT Program for Electricity Sales

- 12.77 cents/kwh for Urban waste
- 18.77 cents/kwh for Ag Waste
- 19.77 cents/kwh for Forest Waste

Bioenergy Fuel Resource Categories

		Fuel Resource Category Description	Statewide Allocation
	Category 1 Various Biogas	• **wastewater treatment** facilities used in the reclamation of sewage or industrial wastes. • diversion of **organic solid wastes** from disposal at solid waste landfills. • waste or by-products of **food processing** or manufacturing facilities. • anaerobic digestion of biodegradable substrates ("**codigestion**").	110 MW
	Category 2 Dairy/Ag	• anaerobic digestion of **dairy waste.** • biogas or biomass from facility on other **agricultural** premises, utilizing waste or by-products of growing crops, raising livestock or growing horticultural products.	90 MW
	Category 3 Forest Mgmt	• **fuel reduction** activities, per applicable regulations • **infrastructure clearance** activities. • other approved **sustainable forest management.**	50 MW

Voluntary Carbon Off-sets

- Corporate Sustainability Programs
- CARB may eventually adopt as regulatory off-set
- Protocols
  - Organic Waste Composting Facilities
  - Organic Waste Digestion Facilities
  - Soil Enrichment
  - Biochar

Washington State

- Net-Zero GHG in 2017 (2.7x)
- Cap-and-Trade
- LCFS
- SB 1383