



Renewable Natural Gas Procurement

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NativeEnergy

NativeEnergy

- Project development on behalf of corporations interested in taking meaningful climate action
- Structured, developed, and financed **80+ shared-value emission projects** over last 10 years.
 - Offset projects
 - Supply chain emission reduction projects
 - Renewable Natural Gas projects

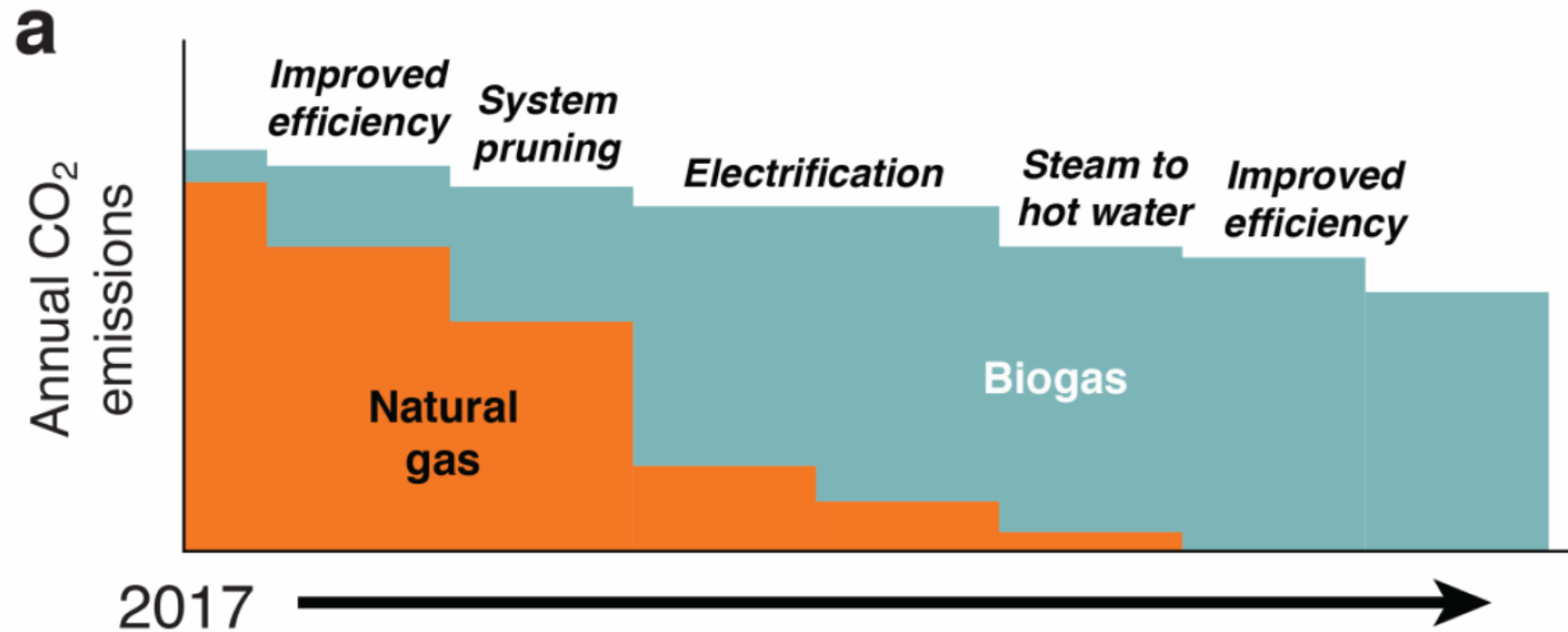


SCIENCE
BASED
TARGETS

DRIVING AMBITIOUS CORPORATE CLIMATE ACTION

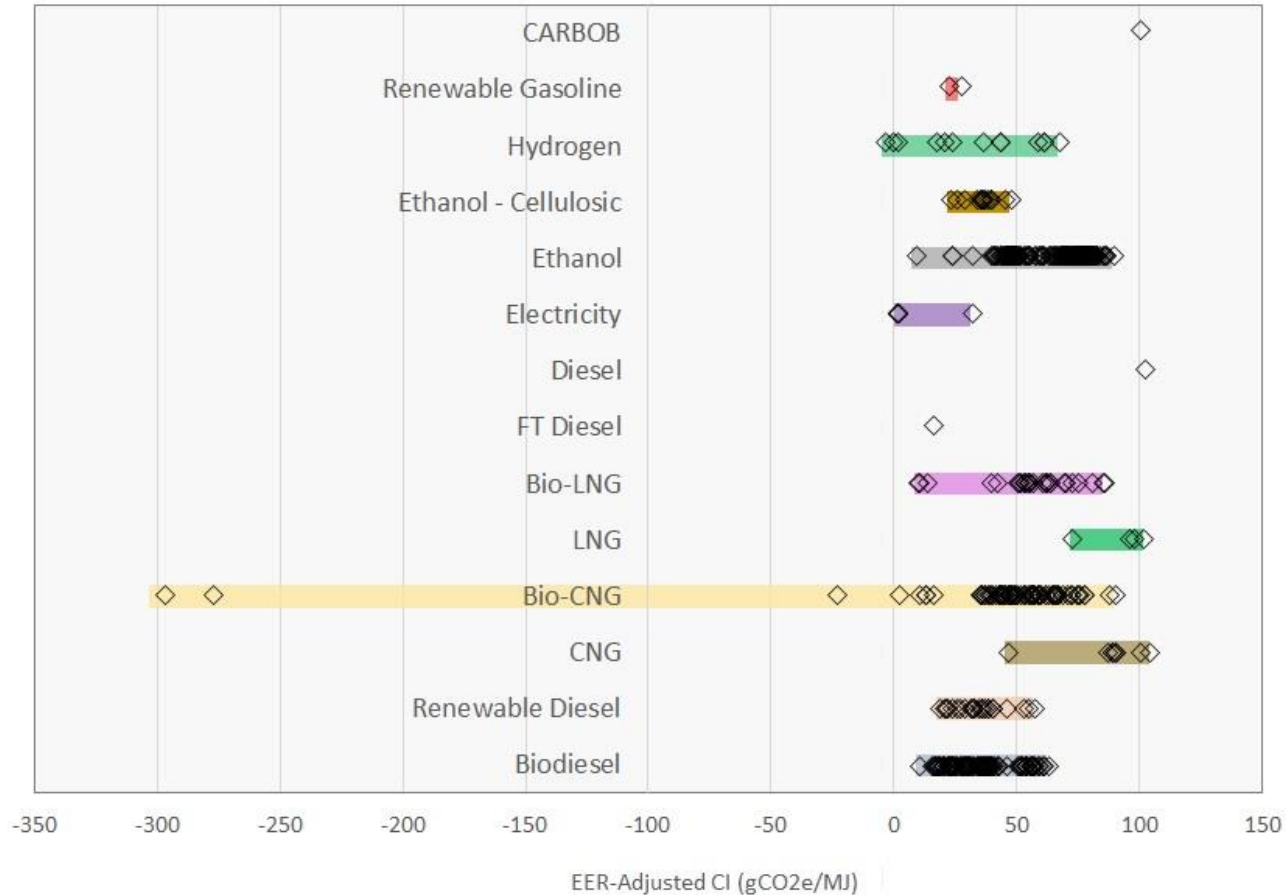
How to handle natural gas emissions

- 1) Efficiency (reduce)
- 2) Electrify (avoid)
- 3) Renewable natural gas



RNG has a wide range of climate benefits...

Carbon Intensity Values of Current Certified Pathways (2019)

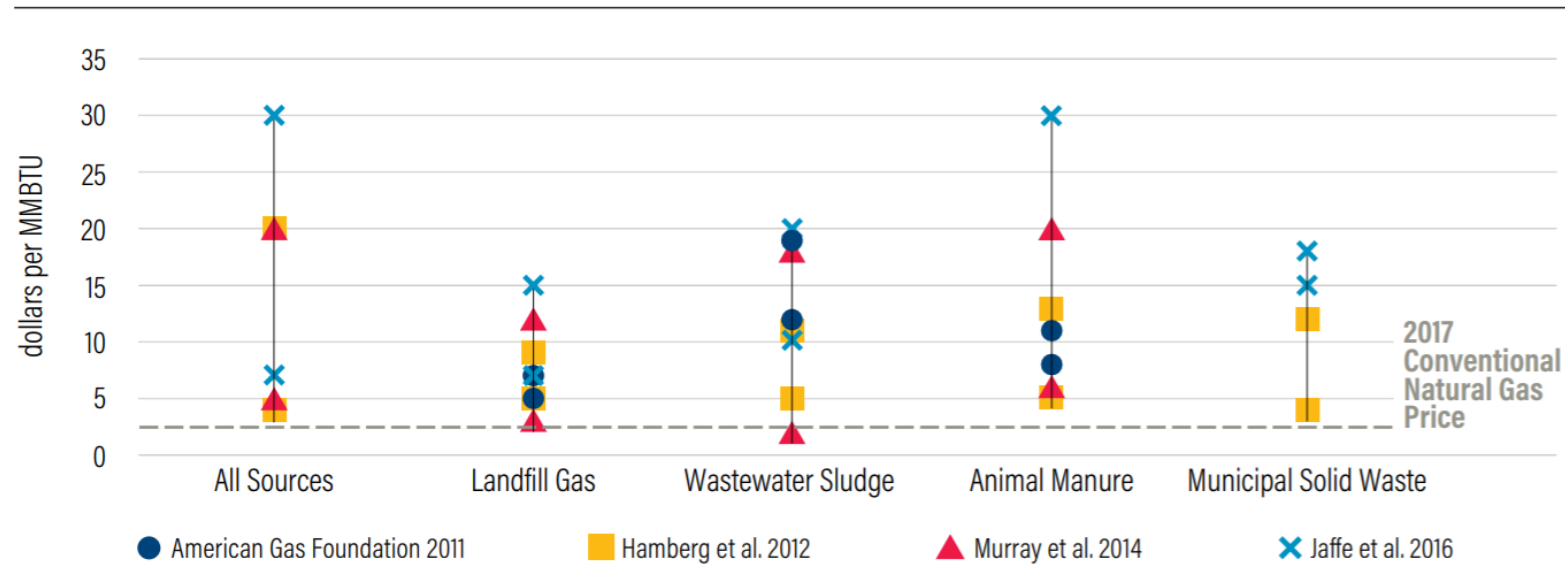


Renewable Natural Gas source	Illustrative carbon intensity
Landfill gas	45 gCO2e/MJ
Wastewater treatment plant	20 gCO2e/MJ
Food waste	-25 gCO2e/MJ
Dairy digester	-250 gCO2e/MJ

California Air Resources Board. LFCS Pathway Certified Carbon Intensities. January 2019.

...and a range of costs

Figure 7 | Estimated RNG Production Costs from Anaerobic Digestion of Wet Waste Sources



World Resources Institute. The Production and Use of Renewable Natural Gas as a Climate Strategy in the United States. April 2018.

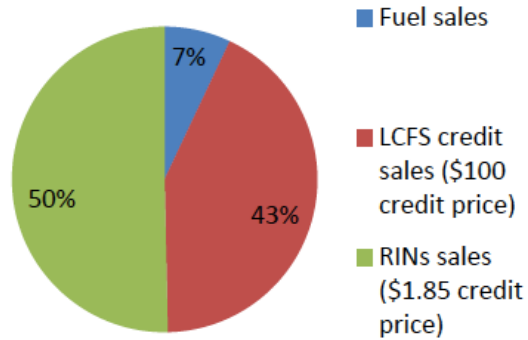
Renewable Natural Gas source	Illustrative carbon intensity	Illustrative price to incentivize production
Landfill gas	45 gCO ₂ e/MJ	\$7/MMBTU
Wastewater treatment plant	20 gCO ₂ e/MJ	\$9/MMBTU
Food waste	-25 gCO ₂ e/MJ	\$15/MMBTU
Dairy digester	-250 gCO ₂ e/MJ	\$29/MMBTU

The federal Renewable Fuel Standard and state Low Carbon Fuel Standards reward RNG is used as transportation fuel.

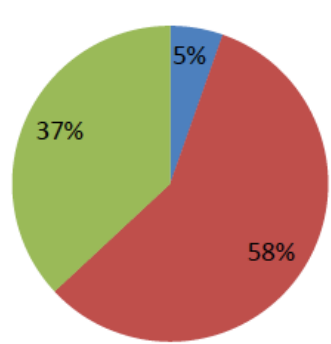
	LCFS value at current price (\$/MMBTU)	RIN value at current price (\$/MMBTU)	Current RIN and LCFS value (\$/MMBTU)
Landfill gas	\$8.69 (46gCO ₂ e/MJ)	\$31.78 (D3 Cellulosic)	\$40.47 (12x commodity)
Wastewater treatment plant	\$13.83 (19gCO ₂ e/MJ)	\$8.80 (D5 Advanced Biofuel)	\$22.62 (7x commodity)
Food waste	\$21.99 (-23gCO ₂ e/MJ)	\$8.80 (D5 Advanced Biofuel)	\$30.79 (9x commodity)
Dairy digester	\$66.52 (-254 gCO ₂ e/MJ)	\$31.78 (D3 Cellulosic)	\$98.30 (30x commodity)

Yet RNG development is still very difficult given the regulatory risk associated with these programs

Sources of revenue from a scrape conversion and digester project



Sources of revenue from a covered lagoon and digester project



- **Regulatory risk**

- Projects depend upon revenues from Renewable Fuel Standard and Low Carbon Fuel Standard in order to be financially viable.
- RIN and LCFS credits have the potential to lose ALL value in the event that policy changes.
- **Banks don't finance projects exposed to this level of regulatory risk.**

- **Limited vehicle demand**

- More than 70% of the gas fueling vehicles in California is RNG.
- Pressure to electrify over the longer term
- RNG for thermal applications may be a better use

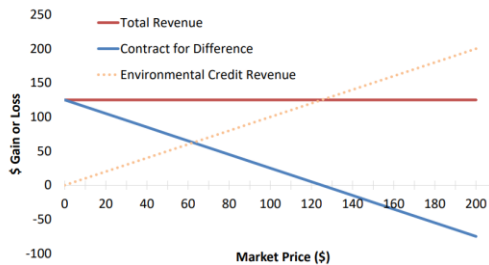
Figure 2: LCFS and D3 RIN prices



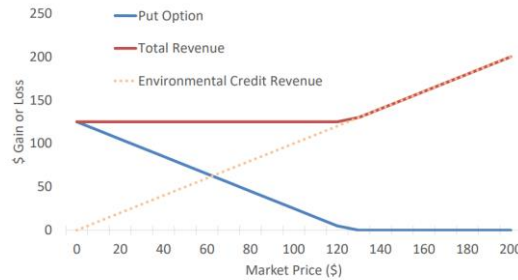
Alternatives are slow to emerge

- **Public guarantees.** California's "Pilot Financial Mechanism" (which would guarantee a minimum price) requires significant public funding.

Example: Contracts for Difference



Example: Put Options



California Air Resources Board. SB 1383 Pilot Financial Mechanism. May 2018.

- **Private purchases.** Corporate leaders are beginning to buy RNG, but it has not taken off like renewable PPAs given
 - Significant premium
 - Long-term contract



Middlebury
College

