CALIFORNIA COMPOST COALITION

November 2019 | Volume 6, Issue 11 **Sustainable Organics Management**

Deep Carbon Now with Near-Zero NOx Now!

The State and the California Air Resources Board (CARB) asked the energy and transportation sector to get off of petroleum products, to be carbon neutral by 2045, and also told the waste sector to get off of diesel and landfills. Fifteen years ago the South Coast Air Quality Management District passed technology-forcing regulations to mandate refuse transition to natural gas vehicles and the industry responded by replacing their diesel fleets. With SB 1383, removing organics from landfills and producing a renewable natural gas to reduce short-lived climate pollutants creates a carbon neutral RNG for the CNG fleet and continues the pathway of getting off of diesel. CARB is now leapfrogging the local air districts and Short-Lived Climate Pollution Strategies to pursue an Advanced Clean Trucks regulation that will not achieve the same near-term NOx and carbon intensity reductions. CARB and the California Energy Commission are considering policies and envisioning Deep Carbon plans to 2045 and 2050, where their long-term climate change goals are getting in the way of greenhouse gas reductions today.

This clean heavy-duty near-zero NOx, RNG transportation proposition did not emerge suddenly nor in a vacuum. As described in Game Changer – Technical White Paper – Next Generation Heavy-Duty Natural Gas Engines Fueled by Renewable Natural Gas, a wide array of public and private heavy-duty fleet operators and the natural gas vehicles (NGV) industry stakeholders spent billions of dollars to purchase the CNG fleet, build fueling infrastructure, upgrade maintenance facilities, and train personnel. Today, the NGV refuse fleet displaces a significant volume of diesel and reduced NOx by over 90% (compared to diesel engines available today). The NGV industry can go Deep Carbon Now and not wait until 2045 to be carbon neutral. CARB is ACTing out in their Advanced Clean Truck Regulations by promoting a regulation to replace the NGV industry and leave billions of dollars in stranded investment. This ACT long-term strategy will not achieve the same near-term NOx and carbon reductions that NGVs are delivering today.

The California Legislature has enacted several statutes that clearly reflect the intent to establish low NOx engines as 'near-zero' and they have invested billions of dollars of Cap-and-Trade revenue intended for Low Carbon Transportation and Short-Lived Climate Pollutant Reduction. CARB opted to focus on 'zero tailpipe' emissions with electrification without the same life-cycle analysis. It is time to reinforce the existing 'near-zero' definition in statute coupled with an in-state RNG requirement, restore the HVIP funding that was discontinued at the October 2019 CARB meeting. Refuse fleet owners have experienced large transitionary infrastructure costs moving from diesel to NGV over the last decade and are not convinced by heavy-duty ZEV technology readiness now nor in the future due to the duty cycle of collection trucks and the weight penalty that is an enormous barrier to an efficient collection system. There are concerns about the State's existing electrical infrastructure with blackouts and its ability to address a broader deployment of ZEVs. Refuse fleet owners that may have been on their way to convert to NGV and produce and/or procure RNG are staying on the diesel platform.

There was hope last year that SB 44 (Skinner) could have done more than provide a comprehensive strategy by 2021, and every five years thereafter, to deploy near-zero heavy-duty vehicles with reasonable and achievable goals. With the proposed ACT regulations, the refuse fleet owners need assurance that their NGV investment is not stranded. Using the concepts of SB 44, CARB should not be able to force ZEV heavy-duty technology upon the refuse industry, should the ZEV technology not be reasonable, achievable, and cost-effective to handle the payload. CARB could report back every five years to the Legislature, and when ZEV is ready, the refuse fleet owner would have at least 10 years to transition off NGVs, and if they are RNG producers, another 10 years to recover the capital invested in their anaerobic digestion facility. This should not be a Zero Sum ZEV game, but a Near-Zero play.

Near-Zero Funding and Legislation

CARB ACTing Out

CARB voted on October 24, 2019 to keep largest Class 8 (11.9L engine) near-zero emission trucks in the HVIP funding program. This is after releasing a formal staff proposal that would have eliminated funding for everything except zero tailpipe emission vehicles. After a hard-fought battle to restore funding for near-zero vehicles, CARB agreed to put the biggest vehicles back in the HVIP program and to address concerns about the Carl Moyer (diesel truck replacement) program.

Because CARB received voucher requests for the entire $142 million budget, the ability to request new vouchers has been put on hold until new funding is identified, as announced in a November 1, 2019 press release. During the 30-day period, that ended October 24, HVIP received more than $80 million in additional funding requests. In many cases, HVIP vouchers can make zero-emission buses and near-zero emissions trucks nearly as affordable as their diesel replacement vehicles. While funding for HVIP is currently exhausted, CARB points toward a portfolio of other funding programs that do not have capacity.

CARB has been ACTing out for years and has giveth and taketh away funding schemes, phasing out HVIP funding for near-zero emissions CNG vehicles. The proposed Advance Clean Truck (ACT) regulations that were released on October 8, 2019, display the true intentions of CARB to only support the electrification of the transportation sector and purposefully restrict the definition of near-zero vehicles. The California Legislature enacted statutes, SB 1204, SB 1403, SB 2601, and SB 44, that clearly reflect the Legislature's intent that low NOx engines are considered 'near-zero'.

By including near-zero engines in ACT regulations, rather than impacting just 15% of the class 7 and class 8 sales market by 2030, CARB could potentially achieve over 50% market penetration as early as 2025 in the solid waste sector, while overachieving the emission reductions through the regulations.

SB 44 (Skinner)

TOPIC: This bill would require the State Board, no later than January 1, 2021, and at least every 5 years thereafter, to update the State Board's 2016 mobile source strategy to include a comprehensive strategy for the deployment of medium-duty and heavy-duty vehicles in the State for the purpose of bringing the State into compliance with federal ambient air quality standards and reducing motor vehicle greenhouse gas emissions from the medium-duty and heavy-duty vehicle sector. The bill requires the State Board to recommend reasonable and achievable goals, based on specified factors, for reducing emissions from medium-duty and heavy-duty vehicles by 2030 and 2050, respectively, as part of the comprehensive strategy. The bill authorized the State Board to establish a process to identify heavy-duty vehicle segments that can more quickly reduce motor vehicle emissions.

STATUS: Signed by Gov. Sep. 20, 2019

AB 2061 (Frazier)

TOPIC: Near-zero-emission and zero-emission vehicles. This bill, to the extent expressly authorizes by federal law, authorize a near-zero-emission vehicle or a zero-emission vehicle, as defined, to exceed the weight limits on the power unit by up to 2,000 pounds. This bill increases the weight limit to 82,000 pounds for a near-zero-emission or zero-emission vehicle.

STATUS: Signed by Gov. Sep. 20, 2018

AB 1403 (Lara)

TOPIC – Three-year Plan and 20% of funding for near-zero heavy duty vehicles until December 31, 2020.

STATUS: Signed by Gov. Sep. 13, 2019

SB 1204 (Lara)

TOPIC: Created Technology Program to fund near-zero trucks with Cap-and-Trade revenues. 'Near-zero emission' means vehicles, fuels, and related technologies that reduce greenhouse gas emissions and improve air quality when compared with conventional or fully commercialized alternatives.

STATUS: Signed by Gov. Sep. 21, 2014

Near-Zero Regs

ACT Regulations

The proposed Advanced Clean Truck (ACT) Regulation is part of a holistic approach determined by CARB to accelerate a large-scale transition of zero-emission medium- and heavy-duty vehicles from Class 2B to Class 8. The proposed regulation has two components including a manufacturer sales requirement, and a reporting requirement (CARB is hearing it on Dec. 12, 2019, where comments are due by Dec. 9, 2019):

Zero-emission truck sales: Manufacturers who certify Class 2B-8 chassis or complete vehicles with combustion engines would be required to sell zero-emission trucks as an increasing percentage of their annual California sales from 2024 to 2030. By 2030, zero-emission truck/chassis sales would need to be 50% of class 4 – 8 trucks sales and 15% of all other truck sales. **'Near-Zero emission vehicles' does not include the Near-Zero NOx CNG engines manufactured by Cummins Westport.**

Company and fleet reporting: Large employers including retailers, manufacturers, brokers, and others would be required to report information about shipments and shuttle services. Fleet owners, with 100 or more trucks, would be required to report on their existing fleet operations. This information would help identify future strategies to ensure that fleets purchase available zero-emission trucks and place them in service where suitable to meet their needs. A huge CalChamber-led coalition is underway to bring reality to this rule.

The expansion of the medium and heavy-duty ZEV market is dependent on matching suitability of zero-emission technologies with fleet operational needs. CARB staff worked with select stakeholders during the rulemaking process, including the Truck and Engine Manufacturers Association (EMA), to help identify those truck market segments where the operational nature of ZEVs would be compatible with existing truck uses. EMA developed an initial assessment matrix of the suitability of battery electric applications for Class 2B – 8 commercial vehicles by identifying 87 market segments and 4 suitability factors to rank the compatibility of each market segment for electrification. A response to this flawed Market Assessment is underway.

SB 1383 Circular Economy of Collection, Production and Use

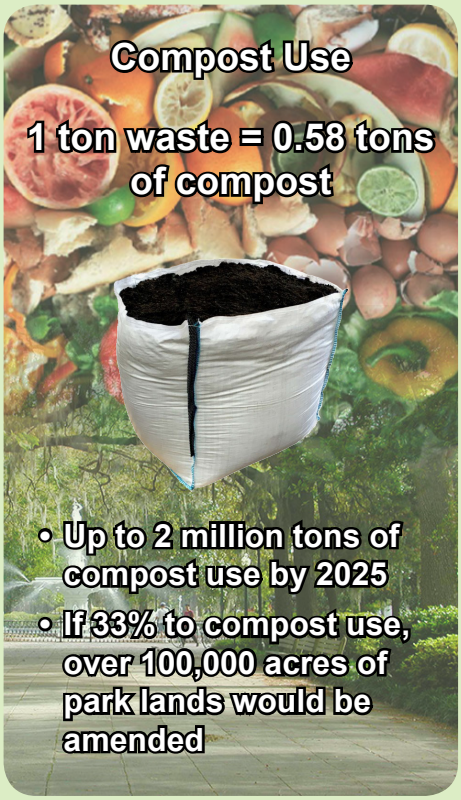
CCC members are the fleet owners that collect organics that fuel our trucks. We are organic facility operators that can produce renewable natural gas (RNG) from collected organics. We are Net-Zero Facilities that can make carbon negative fuels from the collected organics, and we haul compost and wood chips to markets. We implement the circular economy in California.

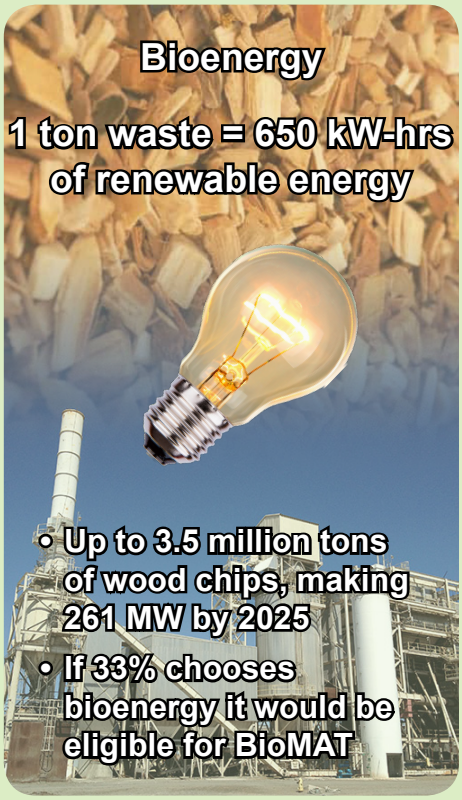
Recovered Organic Waste Products have regional markets for current tons and will soon have local government procurement SB 1383 requirements for millions of new tons. A ton of organic waste can produce 21 diesel gallon equivalents of RNG and can fuel the entire refuse and recycling fleet. Much of the refuse industry has already transitioned off of diesel far before Governor Newson's 2030 diesel pollution phase out and into a CNG fleet that uses RNG and/or will produce their own RNG.

Procurement of Recovered Organic Waste Products is being proposed in Article 12, as authorized in SB 1383. Recognizing the importance in developing RNG demand, compost use, and bioenergy, CCC has been out in front supporting this inclusion in the regulation. CalRecycle presented a fair share calculation with flexibility of procuring these bio-products with an RNG option, where up to 74 million gallons of diesel gallon equivalents of RNG could be used each year and fueling up to 6,000 CNG refuse trucks, of the 15,000 statewide refuse fleet. Local jurisdictions can delegate the RNG use to the local franchise hauler and fulfill the procurement requirement. This is an elegant community-scale fit.

SB 1383 Procurement of Recovered Organic Waste Products

CalRecycle will provide the annual recovered organic waste product procurement for each jurisdiction, which shall be calculated by multiplying the per capita procurement target of 0.08 tons per resident, which may be achieved directly or via a contract. Jurisdictions have the flexibility to purchase one of the three products below to implement the circular economy locally, and on a statewide basis would create huge markets with a population of 44 million people by 2025. A balanced procurement portfolio could fuel 2,000 trucks, produce 87 MW and amend 100,000 acres of parklands.



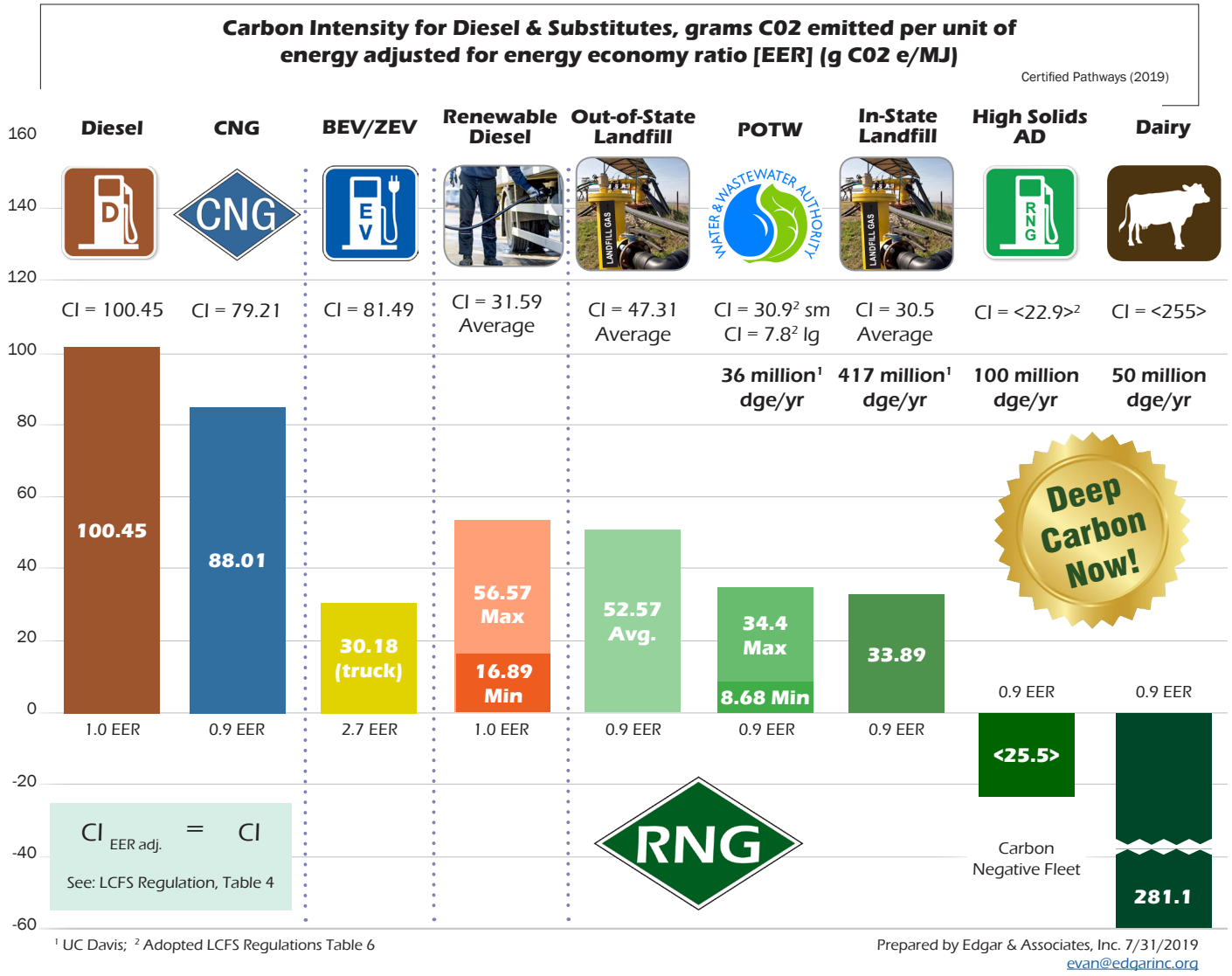


Refuse Fleets Winning the Race to Deep Carbon Intensity

The Low Carbon Fuel Standard (LCFS), which sets annual carbon intensity (CI) standards, takes into account the GHG emissions associated with all of the steps of producing, transporting, and consuming a fuel—also known as a complete lifecycle. The wide range of carbon intensities is due to variations in feedstock types, origin, raw material production processing efficiencies, and transportation, all of which contribute to an individual producer's fuel pathway CI.

Replacing diesel with a lowest CI fuel should receive priority funding from CARB, when allocating GHG dollars. The solid waste industry made great strides developing the CNG infrastructure and purchasing CNG fleets to reduce diesel, as CARB has insisted for years. The industry viewed CNG as a bridge fuel that has been replaced by renewable natural gas (RNG) with much lower CIs, such as the case with current RNG use in California. Referencing the 2019 CARB Certified Pathways, out-of-state landfill gas averages 52.57 CI while in-state landfill gas averages 33.89 CI and can produce up to 417 million dge/year. Wastewater RNG has been 8.68 CI for larger facilities and 34.4 CI for smaller facilities and can produce up to 36 million dge/year, with some individual pathways heading toward carbon negative CI. Anaerobic digestion RNG is now certified as default 'carbon neutral' with specific pathway development to 'carbon negative' CI, and has the ability to produce 100 million dge/year. Dairy RNG can produce 50 million dge/year deep into 'carbon negative' CI.

Out-of-state landfill gas RNG is now being viewed as a bridge fuel, as in-state RNG is being developed. The solid waste industry is racing to 'carbon neutral' CI for their RNG fleet by 2025, with full implementation of SB 1383. Meanwhile ZEVs have a 38.9 CI and will not reach carbon neutral CI until 2045, when the California grid is expected to be carbon-free. Refuse fleets may be winning the race, but are losing the funding to ZEVs, as near-zero NOx and Deep Carbon Now is not enough for CARB.



¹ UC Davis; ² Adopted LCFS Regulations Table 6

Prepared by Edgar & Associates, Inc. 7/31/2019
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Deep Carbon Studies

Deep Carbon Now!

Deep Decarbonization in a High Renewables Future, published by the California Energy Commission in March 2019, provides pathways to have the electrical grid become 'carbon neutral' by 2045, while squeezing out biomass energy and petroleum products by 2030. CEC followed up in October 2019 by publishing, Natural Gas Distribution in California's Low-Carbon Future, which finds that renewable natural gas (RNG) could provide almost half of the gas needed in 2050, but is laced with many errors and omissions that need to be rectified. Key findings look toward building electrification over RNG use. Additionally, Cal-EPA just kicked off the Vehicle Emissions Study to identify strategies to significantly reduce emissions from vehicles and to achieve carbon neutrality by 2045, including transition to zero-emission heavy vehicles, and the adoption of other technology to significantly reduce emissions from heavy vehicles; the role of alternative fuels. Near-zero NOx engines with carbon negative RNG may be left at the curb and need to be part of the narrative to protect the huge investments that the industry made deploying the CNG platform, as we transitioned off diesel – Comments were due November 22, 2019.

It is readily apparent that CARB and CEC are already moving beyond CNG, even when using RNG and near-zero NOx engines, in order to electrify the transportation sector and go Deep Carbon Now!, but are focused on 2045 to achieve carbon neutrality. The organic waste processors and collection companies are Net-Zero Now and could utilize carbon-negative RNG industry-wide by 2025, should incentives continue from CARB and CEC on HVIP and biofuel production. Going deep Decarbonization at CARB and CEC means pushing the biomethane from the heavy-duty RNG tank and new buildings and into making electricity or hydrogen for battery or fuel cell electric vehicles, which is more than a generation away for garbage trucks. Because low NOx CNG trucks are immediately available and can create a demand for deep carbon RNG, they are an excellent backstop for the Alternative Truck Regulation; these near-zero trucks need to remain in the definition.

Cal-EPA Studies

The 2019-2020 California State Budget authorizes $3 million from Cap-and-Trade proceeds for two studies focused on the State's goal of achieving carbon neutrality by 2045. These studies are being coordinated by the California Environmental Protection Agency. Comments and inquiries about the studies were sent to climatechange@calepa.ca.gov by November 22, 2019.

Vehicle Emissions Study: $1,500,000 shall be available for a study to identify strategies to significantly reduce emissions from vehicles and to achieve carbon neutrality in the sector, including the transition to zero-emission light-duty vehicles, in particular, passenger vehicles, the transition to zero-emission heavy vehicles, and the adoption of other technology to significantly reduce emissions from heavy vehicles; the role of alternative fuels; and the impact of land use policy.

Demand and Supply of Fossil Fuels Study: $1,500,000 shall be available for a study to identify strategies to decrease demand and supply of fossil fuels, while managing the decline of fossil fuel use in a way that is economically responsible and sustainable. The Study shall further develop the scope of the study in order to evaluate pathways to achieve a carbon neutral economy by 2045 and manage the decline of in-state production as the State's fossil fuel demand decreases.

CEC Deep Carbon

Natural Gas Distribution in California's Low-Carbon Future is the interim report for the future of natural gas projects conducted by Energy and Environmental Economics and the University of California, Irvine. This study evaluates scenarios that achieve an 80 percent reduction in California's greenhouse gas (GHG) emissions by 2050 from 1990 levels, focusing on the implications of achieving these climate goals for gas customers and the gas distribution system. These scenarios suggest that building electrification, which reduces or eliminates the use of gas in buildings, is likely to be a lower-cost, lower-risk long-term strategy compared to renewable natural gas (RNG).

Regs Watch

SB 1383 Regulations

The California Department of Resources, Recycling and Recovery (CalRecycle) announced a 15-day comment period regarding changes to the Proposed Organic Waste Reduction Regulations. The 15-day written public comment period for this rulemaking ended at 1:00 PM on October 18th, 2019. The full text of the regulation including the newly proposed changes clearly indicated is available on the SB 1383 Rulemaking website at:

https://www.calrecycle.ca.gov/Laws/Rulemaking/SLCP

CalRecycle posted a revised draft of the Proposed Organic Waste Reduction Regulations designed to implement the statutory provisions of SB 1383. The revised draft includes regulatory changes made in response to stakeholder comments. The Summary of Changes,linked here, made to the Proposed Organic Waste Reduction Regulations serves as a high-level summary of sections where key policy changes were made in response to stakeholder feedback.

Another 15-day comment period is expected soon with adoption expected by CalRecycle in January 2020.

AB 901 Regulations

Starting July 1, 2019, CalRecycle transitioned away from the current Disposal Reporting System (DRS) to a brand-new Recycling and Disposal Reporting System (RDRS). Entities that are required to report were required to registered in the Recycling and Disposal Reporting System by April 30, 2019. Permitted stations and disposal facilities should have submitted their Q2 2019 reports under the prior Disposal Reporting System (DRS) to their counties or regional agencies by September 15, 2019. The final reporting due date to CalRecycle under DRS was **October 15, 2019**.

The reporting deadlines by reporting entity for 2019 (third and fourth quarters) are listed here:

https://www.calrecycle.ca.gov/docs/cr/swfacilities/rdrs/2019reportingdeadlines.pdf

CALIFORNIA COMPOST COALITION

CCC Haulers

Refuse Fleet RNG Business Model for SB 1383

CCC and CleanFleets.net co-authored a White Paper for the California Energy Commission, Biomethane Transportation Fuel Powering the Solid Waste Industry: Community-Scale Distributed Fuel Production Facilities, applicable today in the SB 1383 era. CEC found this business model attractive: franchised organic feedstocks are taken to an anaerobic digestion facility that is co-located where the captive fleet is parked and fueled, in a community-scale system that could be replicated throughout California. A 30,000 ton per year anaerobic digestion renewable natural gas (AD-to-RNG) project can be designed without a PUC pipeline as a community-scale model, and can serve a population of approximately 100,000 people. This model can produce 400,000 diesel gallon equivalents per year of RNG with a default carbon intensity of neutral to 0.0 g CO_2e/MJ, and could file for a site-specific intensity as low as negative 105 g CO_2e/MJ, for a fleet of 50 heavy-duty trucks.

The solid waste and recycling industry of 14,000 heavy-duty vehicles uses over 182 million gallons per year of fuel and can produce its own fuel. Additional RNG could be procured from dairies, wastewater treatment plants, and in-state landfills with an estimated potential of over 36 million dge per year for wastewater treatment plants, an estimated production of 417 million dge per year from in-state landfills (Williams, et. al., 2014), and 50 million dge per year from dairies. The incremental cost differential between diesel and CNG heavy-duty trucks is about $50,000, and both the CEC and CARB have been requested to maintain funding the difference following the Hybrid Voucher Incentive Program model. With nearly 5,200 refuse trucks already using CNG/RNG, approximately 7,000 waste collection vehicles and 1,800 transfer trucks are still operating on diesel in California's solid waste management industry. It would take a $440 million over the next 4 years to have the refuse fleet be carbon neutral with near-zero NOx engines.

Waste Sector (Organics, Recycling, MSW)

Class 7 - 12,000 in CA: 5,000 CNG and 7,000 Diesel (60% Public/40% Private)

Class 8 - 2,000 in CA: 200 CNG and 1,800 Diesel

Incremental CNG Truck Cost Compared to Diesel Truck

CNG $50,000 Per Truck Average - 8,800 Class 7 and 8 Trucks from Diesel to CNG

CNG $440 Million for 8,800 Trucks (20/21 - 24/25) - $110 Million per Year

CNG Fleet with RNG Off-Take Agreement

RNG Demand 14,000 Trucks - 50 dge/day/truck - 182 Million dge per Year

RNG RNG Supply - 100 Million dge from Organic/HSAD (minus 23 carbon intensity)

RNG RNG Supply - 50 Million dge from Dairies (minus 281.1 carbon intensity)

RNG RNG Supply - 36 Million dge from Wastewater Plants (9 to 34 carbon intensity)

RNG RNG Supply - 417 Million dge from Landfills (52 carbon intensity)

The California Compost Coalition

is a registered Lobbying Coalition with the Fair Political Practices Commission (FPPC), created in 2002 by a group of compost operators in response to demands for increased recycling of organic materials & production of clean compost, bioenergy, anaerobic digestion, renewable natural gas, and biochar.

CCC Members

Agromin
American Refuse
Atlas Disposal
Burrtec Waste Industries
Caglia Environmental
California Waste Recovery Systems
California Wood Recycling
CleanFleets.net
Clean Fleets Advocates
Clover Flat Compost
Cold Canyon Compost
GreenWaste Recovery
Marin Sanitary Service
Mt. Diablo Resource Recovery
Napa Recycling Compost
Northern Recycling Compost
Phoenix Energy
Quackenbush Mt. Compost
Recology Blossom Valley Organics
Recology Feather River Organics
Recology Jepson Prairie Organics
ReFuel Energy Partners
Soiland Co, Inc.
Sonoma Compost
Trillium CNG
Tracy Material Recovery Compost
Upper Valley Recycling
Vision Recycling
Zanker Road Resource Management
Z-Best Compost Facility
Zero Waste Energy Development
Zero Waste Energy, LLC

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ZERO HERO PROGRAMS OF THE RECYCLING INDUSTRY

READVANTAGING COMMUNITY-SCALE SYSTEMS

THROUGH SUSTAINABLE FACILITY, FUEL, FLEET, FEEDSTOCKS & FARMING

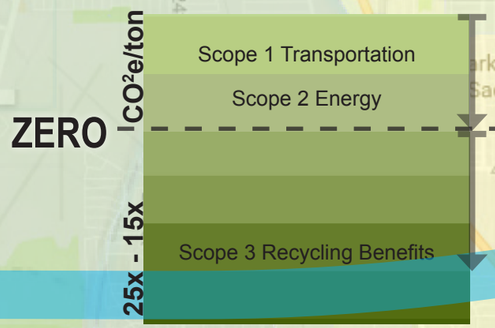
Edgar & Associates

California Compost Coalition

NET ZERO FACILITIES

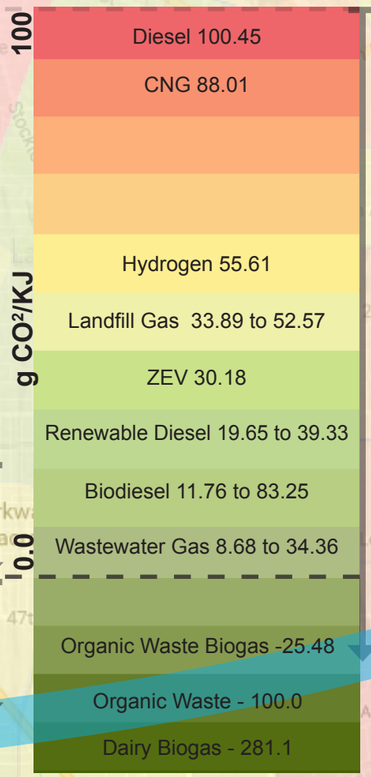
Greenhouse Gases

The Net Zero Facilities in recycling sector including material recovery facilities processing recyclable materials, compost facilities, anaerobic digestion facilities, and biomass conversion facilities. The new composting facilities are covered aerated static pile systems using the best available control technologies and the anaerobic digestion facilities are enclosed closed-loop system without high temperature incineration. The avoided GHG emissions for these facilities compared to landfilling fully offset the project emissions including collection, hauling, processing activities and the landfilling of residuals. Landfills and garbage Transfer Stations are in the waste sector and are not Net Zero Facilities.



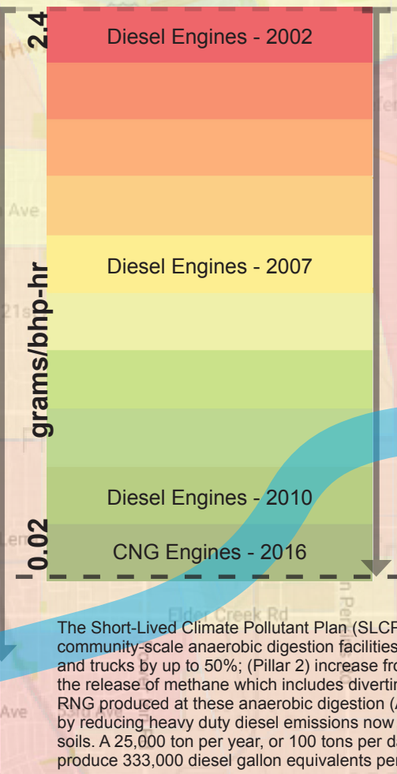
CARBON NEGATIVE FUEL

Carbon Intensity Transportation Fuel



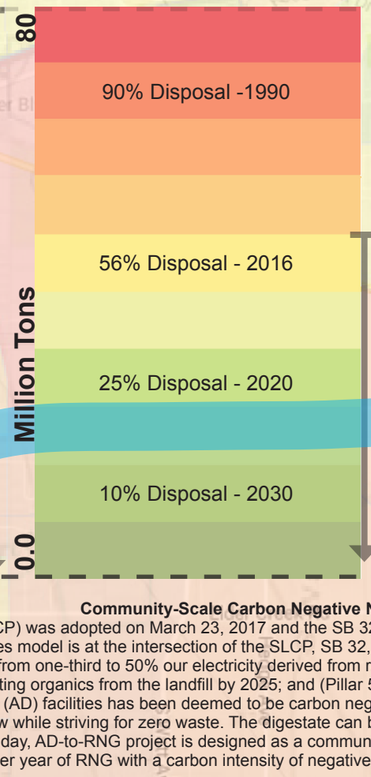
NEAR ZERO FLEET

Heavy-Duty Vehicle NOx Emissions



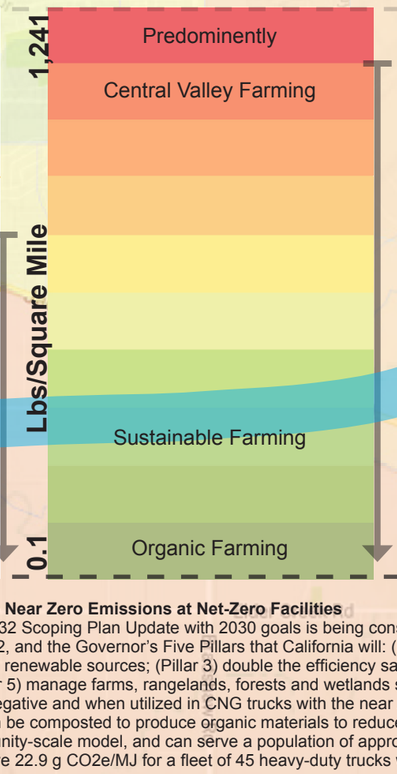
ZERO WASTE

Disposal Solid Waste Tons



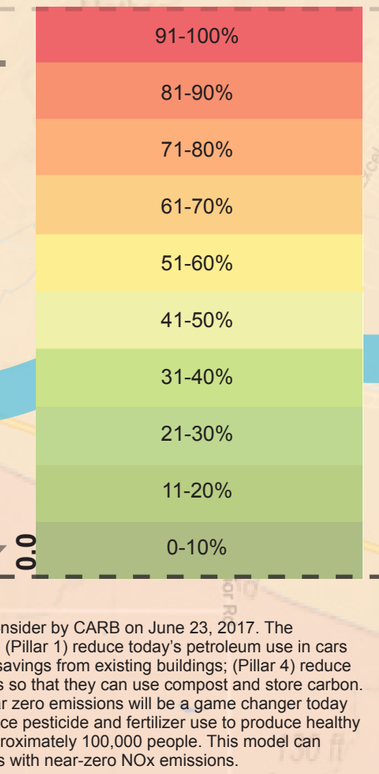
ZERO PESTICIDE USE

Pounds of selected active ingredients



DISADVANTAGED COMMUNITIES

CalEnviro Screen 3.0 results



ZERO

Community-Scale Carbon Negative Near Zero Emissions at Net-Zero Facilities

The Short-Lived Climate Pollutant Plan (SLCP) was adopted on March 23, 2017 and the SB 32 Scoping Plan Update with 2030 goals is being consider by CARB on June 23, 2017. The community-scale anaerobic digestion facilities model is at the intersection of the SLCP, SB 32, and the Governor's Five Pillars that California will: (Pillar 1) reduce today's petroleum use in cars and trucks by up to 50%; (Pillar 2) increase from one-third to 50% our electricity derived from renewable sources; (Pillar 3) double the efficiency savings from existing buildings; (Pillar 4) reduce the release of methane which includes diverting organics from the landfill by 2025; and (Pillar 5) manage farms, rangelands, forests and wetlands so that they can use compost and store carbon. RNG produced at these anaerobic digestion (AD) facilities has been deemed to be carbon negative and when utilized in CNG trucks with the near zero emissions will be a game changer today by reducing heavy duty diesel emissions now while striving for zero waste. The digestate can be composted to produce organic materials to reduce pesticide and fertilizer use to produce healthy soils. A 25,000 ton per year, or 100 tons per day, AD-to-RNG project is designed as a community-scale model, and can serve a population of approximately 100,000 people. This model can produce 333,000 diesel gallon equivalents per year of RNG with a carbon intensity of negative 22.9 g CO2e/MJ for a fleet of 45 heavy-duty trucks with near-zero NOx emissions.

AB 32 Scoping Plan 2014 Update Waste Sector

Net-Zero GHG Emissions from the Waste Sector by 2030. Reduce Scope 1 emissions with alternative fuels. Reduce Scope 2 emissions with roof-top solar and on-site bioenergy. Avoid Scope 3 GHG emissions with recycling and composting. To achieve Net-Zero, the direct GHG emissions from the Waste Sector would have to be fully offset by avoided GHG emissions. Avoided GHG emissions are reductions in life-cycle GHG emissions that would occur because waste is shifted from landfilling to alternative non-disposal pathways. Most material recovery facilities are 15 to 25 times offset over their GHG emissions.

NET ZERO NOW

LCFS Pathway CARB Certified Carbon Intensities

The wide range of carbon intensities is due to the lifecycle emissions methodology of the Low Carbon Fuel standard (LCFS); variation of feedstock types, origin, raw material production, processing efficiencies, and transportation all contribute to the producers' fuel pathway carbon intensity. The certification of carbon negative fuel for the production of renewable natural gas (RNG) from organic waste anaerobic digestion is based on the biogenic feedstocks of food waste and green waste, and the avoided methane emissions from the landfilling of the material. The CNG truck collect food waste to make RNG.

OFF DIESEL

CARB and EPA certified ISL G NZ (8.9) L CNG engines

In 2015, Cummins Westport certified the world's first heavy-duty engine at near-zero-emission levels (90 percent below the existing federal standard) for Class 7 refuse trucks and will be available for Class 8 transfer trucks in 2018. To complement the NOx reductions provided by this landmark engine, conventional (fossil) natural gas provides significant GHG reduction benefits. However, renewable natural gas with carbon negative fuel completes the game changing proposition by providing the lowest carbon intensity of any heavy duty transportation fuel available in the market today.

KNOCK OFF NOx

90% or more Waste Reduction from Landfills and Incineration

Zero Waste is a goal that is ethical, economical, efficient and visionary, to guide people in changing their lifestyles and practices to emulate sustainable natural cycles, where all discarded materials are designed to become resources for others to use. Communities that have a Zero Waste goal and are working towards or have reduced their waste to landfill, incineration and the environment by 90% or more. Dozens of large cities have adopted zero waste goal by 2025. California is at a 45% recycling rate as compost facilities are curtailed by NIMBYism.

OFF LANDFILLS

Healthy Soils Initiative with Compost Use

Communities near agricultural fields, primarily farm worker communities, may be at risk for exposure to pesticides. Drift or volatilization of pesticides from agricultural fields can be a significant source of pesticide exposure. The use of most synthetic pesticides and fertilizers is prohibited from organic production. Organic farming with certified organic compost use and a zero pesticide goal makes healthy soils. The multiple co-benefits of enhanced soil organic matter on our agricultural lands, include improved water retention, soil stability and nutrient use efficiency to reduce fertilizer use.

OFF PESTICIDES

CalEnvironScreen 3.0 Cap-and-Trade Investments

The California Communities Environmental Health Screening Tool (CalEnviroScreen) helps us to address environmental threat challenges. The objective in developing this tool is to use it to assist California communities by directing state and potentially local government resources toward a common purpose: the revitalization of disadvantaged communities and the pursuit of environmental justice. Cap-and-trade proceeds have funded projects where over $3.3 billion has been appropriated with 50% of the funding benefitting DACs and 34% located in DACs.

GREENING YOUR COMMUNITY

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