

CARB Tier 1 OW Calculator Public Comments

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Dear CARB Staff,

We would like to express our appreciation for publishing the proposed Tier 1 simplified calculators and providing an opportunity for public comment. We apologize for the delay in submitting our comments, but we hope that you will still consider our input.

Our comments and recommendations are summarized below.

Recommendation: Allow for the option to model avoided composting of "Other" feedstocks

The proposed Tier 1 OW Calculator has the same waste categories as the previous calculator: Urban Landscaping Waste, Food Scraps, and "Other." While this may seem to allow for flexibility, in practice the "Other" category can only be used to model avoided landfilling and not avoided composting. The original intent of the Tier1 OW calculator was to reflect the diversion from lanfilled material where Urban Landsciping Waste and Food Scraps incuded a avoided composting component. The introduction of SB 1383 does not invalidate the landfill avoidance for these materials as the actions under SB 1383 are implemented on a muncipality-wide basis.

Composting of diverse materials has expanded in California since the implementation of SB 1383. California composts varied materials such as soiled paper products, bio-plastics, agricultural residues, and food processing wastes. These materials contribute to California's compost production and play a role in the state's waste management strategy. To accommodate the diversity of compost in California, we propose adding the optionality to model avoided compost in the Tier 1 OW Calculator.

Figure 1 provides an example of a potential location for this use defined input.

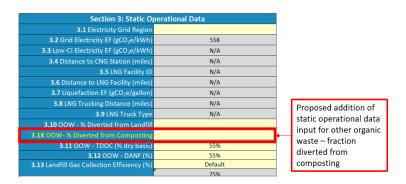


Figure 1. Proposed location of user defined input for organic waste diverted from composting.

While avoiding landfilling avoids methane emissions, avoiding composting has the additional benefit of avoiding nitrous oxide emissions, a powerful short-term climate pollutant, and an important part of California's goals under both SB 1383 and the LCFS. By not allowing a credit for



avoided N₂O for other waste streams, CARB will hinder the development of projects aiming to reduce high GWP climate pollutants in the state.

Comment: Composting emissions factors are outdated and calculated using flawed methodology

In the proposed regulation, as in the current regulation, the composting emission factors for methane (CH_4) and nitrous oxide (N_2O) are the same for food scraps and urban landscaping waste. However, CARB has made adjustments to the emission factors for both N_2O and CH_4 in the new regulation (see Table 1).

Table 1. Emission factors for composting in the current and proposed Tier 1 calculators.

Emission Factor	Current Tier 1	Proposed Tier 1
gCH ₄ /wet ton	3,719.46	1,960.00
gN₂O/wet ton	81.65	70.47

Upon reviewing the provided references for the proposed composting factors in the new Tier 1 calculator, several issues become apparent.

1. The References Provided are Outdated

The references used for composting emission factors range in age from 10 to 26 years (see Figure 2). This is problematic for several reasons:

- 1. These references do not account for advancements in data collection and analysis techniques.
- Changes in composting practices, technologies, and regulations over time may not be captured in older references, resulting in inaccurate assessments. This is especially true in California where compost has seen a dramatic change since the implementation of SB 1383.
- 3. Environmental conditions and factors influencing emissions will vary, making outdated references unreliable.

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Table 3. Fugitive CH₄ emissions from composting.			Table 4. Fugitive N₂O emissions from composting.		
Reference	Feedstock	Emission factor (gcH4/kg)	Reference	Feedstock	Emission factor
	Household organic mixed		Reference	recustock	(g _{N2O} /kg)
Beck-Friis et al (2000) ^a	with coarsely chipped branches and bushes	7.63	Beck-Friis et al	Household organic mixed with coarsely	
Hellmann et al <mark> (1997)</mark> ⁵	Organic MSW with bush, leaves and grass clippings	0.17	(2000) ^a	chipped branches and bushes Organic MSW with bush, leaves and grass clippings	0.1
Amlinger et al (2008)°	Green waste, sewage sludge and biowaste	0.21	Hellmann et al		0.022
San Joaquin Valley Air Pollution Control District	Central California Green waste	2.90	(1997) ^b		
(2013) ^d South Coast Air Quality	Southern California Green		Amlinger et al	Green waste and grass	0.13
Management District (2001)	waste	0.41	San Joaquin Valley Air Pollution Control	Central California	0.046
South Coast Air Quality Management District (2001)	Southern California Green waste	0.45	District (2013)	Green waste	

Figure 2. Screenshots of proposed Tier 1 calculator references for fugitive CH₄ and N₂0 emissions from composting.

2. Average Values do not Accurately Reflect Waste-Specific Emission Factors

From a review of the refences provided with the proposed Tier 1 OW calculator, it is clear that CARB has used an average of the literature references (see Figure 3).

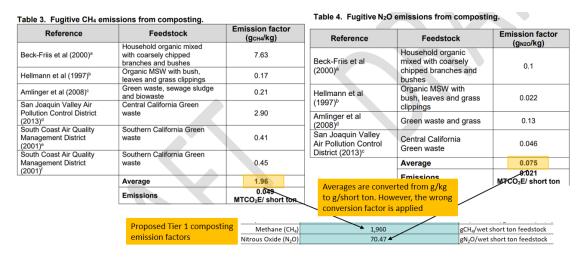


Figure 3. Screenshots of proposed Tier 1 calculator source for Fugitive CH_4 and N_2O emissions from composting and proposed composting emission factors.

The utilization of an average value for composting emission factors from various references in the proposed Tier 1 calculator raises concerns for the following reasons:

- 1. The emission factors from different studies exhibit significant variations across studies, and thus the average is a poor measure of central tendency.
- 2. The alignment between CARB's designations ("Food Scraps" or "Urban Landscaping Waste") and the references is unclear. The references encompass categories that potentially include food scraps but are not solely composed of them, such as "Household organic mixed with coarsely chipped branches and bushes" or "Organic MSW with bush, leaves, and grass clippings (see Figure 4).



Table 3. Fugitive CH₄ emissions from composting.							
Reference	Feedstock	Emission factor (gcH4/kg)					
Beck-Friis et al (2000) ^a	Household organic mixed with coarsely chipped branches and bushes	₹ 7.63	These feedstocks do not align with the categories				
Hellmann et al (1997) ^b	Organic MSW with bush, leaves and grass clippings	0.17	in the proposed tier 1 - calculator "food scraps" and "yard trimmings"				
Amlinger et al (2008)°	Green waste, sewage sludge and biowaste	0.21					
San Joaquin Valley Air Pollution Control District (2013) ^d	Central California Green waste	2.90	These feedstocks align with "yard trimmings."				
South Coast Air Quality Management District (2001) ^e	anagement District waste		However, the emission factors should not be				
South Coast Air Quality Management District (2001) ^f	Southern California Green waste	0.45	averaged with the above feedstocks				

Figure 4. Screenshot of references used to calculate composting emissions factors.

3. Organics in California jurisdictions encompass materials not included in these studies, such as food-soiled papers and compostable plastics.

Recommendation: Allow for User Defined Composting Emission Factors

Since the previous regulation, the motivaion to measure site-specific emission factors from composting facilities have increased. Facilities can employ various sampling methods such as the Flux chamber method or funnel method to obtain accurate measurements of baseline emissions. Facilities can measure the baseline CH₄ and N₂O with CARB approval. This would be similar to CARB's approval of the method for determining the heating value of distillate bottoms, which require measurements and CARB approval.

Therefore, we recommend that CARB include user-defined fields for composting CH₄ and N₂O emissions based on actual measurements subject to verification. This will allow facilities equipped with real data to accurately reflect their avoided emissions from composting (see Figure 5). In cases where facilities do not have site-specific data for emission factors, CARB could consider providing default values based on updated and comprehensive studies.

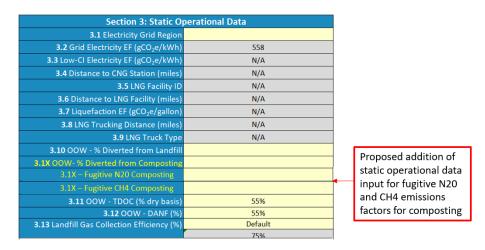


Figure 5. Proposed location of user-defined input for CH₄ and N₂O composting emissions factors



We appreciate your attention to these comments and recommendations. We believe that implementing these changes will lead to more accurate calculations of baseline emissions. Thank you for considering our input.

Sincerely,

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