



Public Workshop on Revisions to the Oil Production Greenhouse Gas Emissions Estimator (OPGEE) Model

4/26/2022

9:00 am – 10:30 am

Agenda

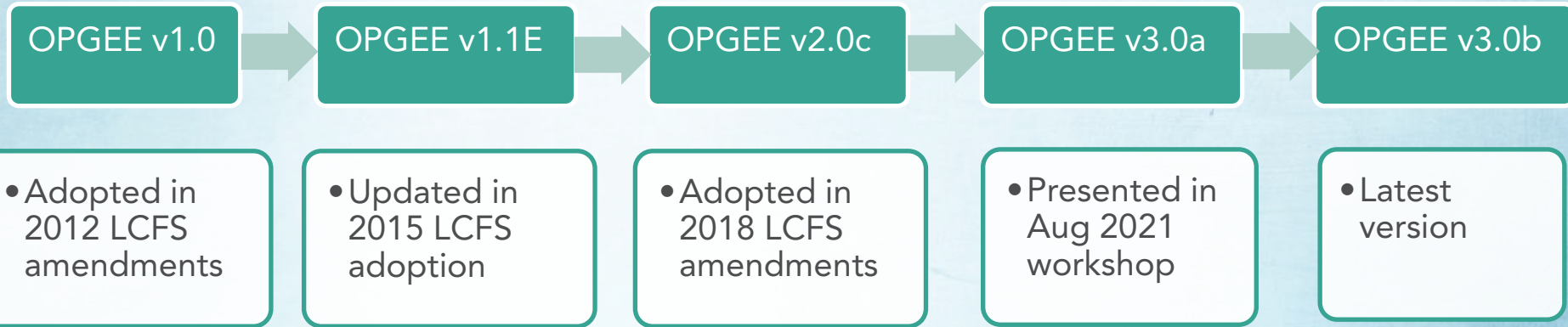
- Background
- Recap: August 2021 workshop on OPGEE v3.0a
- Introducing OPGEE v3.0b
- Next steps for LCFS

Workshop Logistics

- Workshop materials and public comment docket available on the LCFS Meetings and Workshops page:
<https://ww2.arb.ca.gov/our-work/programs/low-carbon-fuel-standard/lcfs-meetings-and-workshops>
- Written comments may be submitted to the public comment docket
 - Comment docket open April 26 to May 10 (5 pm Pacific)
- Q&A during the workshop
 - Use the “Raise Hand” function in the GoToWebinar toolbar, which should be located to the right of your screen as shown
 - When staff call your name, please “Unmute” yourself by clicking the red button, and proceed to introduce yourself



Oil Production Greenhouse Gas Emission Estimator (OPGEE) Model



Recap: 2021 OPGEE Workshop

Updates to the model



- Improved model organization and process interconnections
- Expansion of natural gas life cycle coverage
- Improved gas processing modeling
- New methodology for venting and fugitive emissions modeling
- Updated default inputs

Updates to OPGEE

OPGEE v3.0a candidate model
versus OPGEE v2.0c

Adam R. Brandt, Mohammad S. Masnadi, Jeff
Rutherford
Energy Resources Engineering Department, Stanford
University

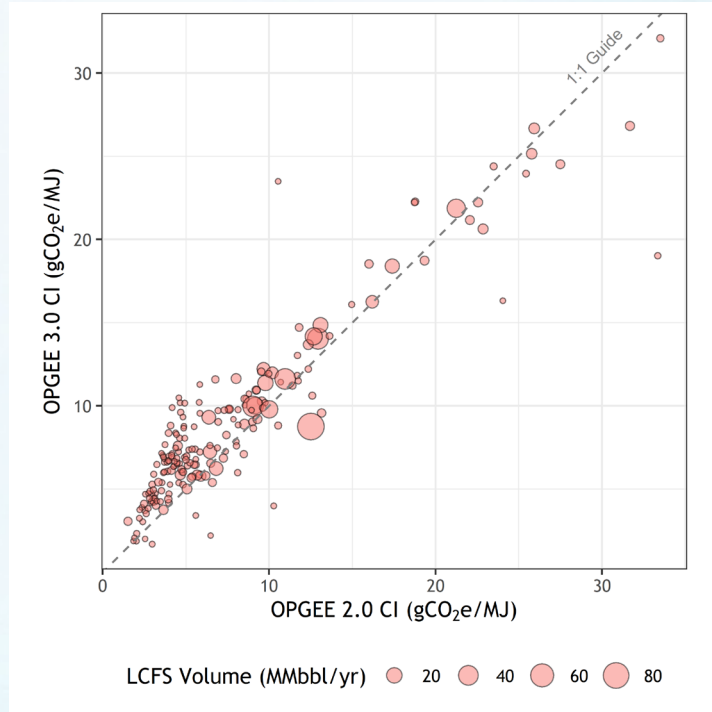
CARB OPGEE Modeling update
California Air Resources Board
August 10th, 2021



Stanford University

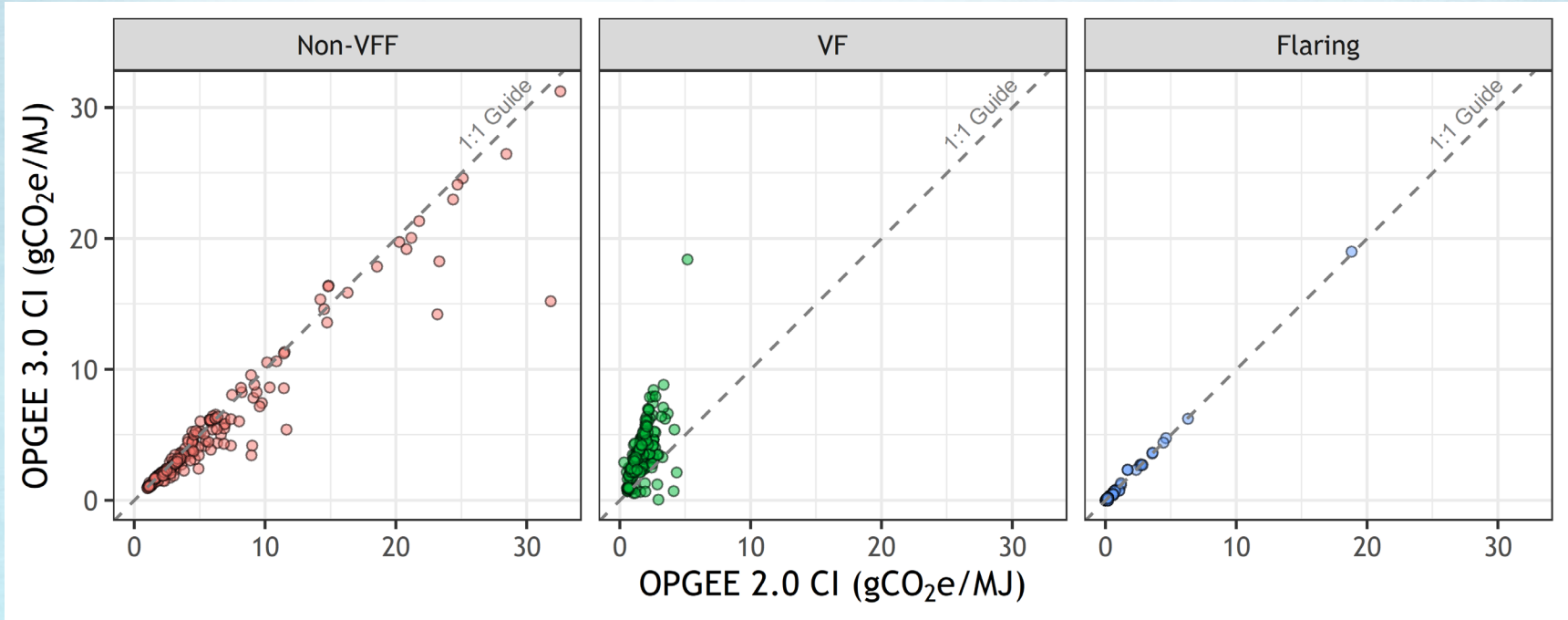
Recap: 2021 OPGEE Workshop (cont.)

Comparisons of CI results between v2.0c and v3.0a



Recap: 2021 OPGEE Workshop (cont.)

- Comparisons of CI results between v2.0c and v3.0a




Major Stakeholder Comments from 2021 OPGEE Workshop

- How OPGEE accounts for venting and fugitive emissions (VF) in CA under stricter regulations?
- Have the OPGEE results been validated against operator data or MRR (Mandatory Greenhouse Gas Reporting Regulation) data?
- Use-specific inputs: steam pressure, part load fraction/efficiency, CCS or other mitigation options, gas vs. electric acid gas removal unit reboiler, imported gas composition, etc.
- Implication to LCFS and baseline data for LCFS

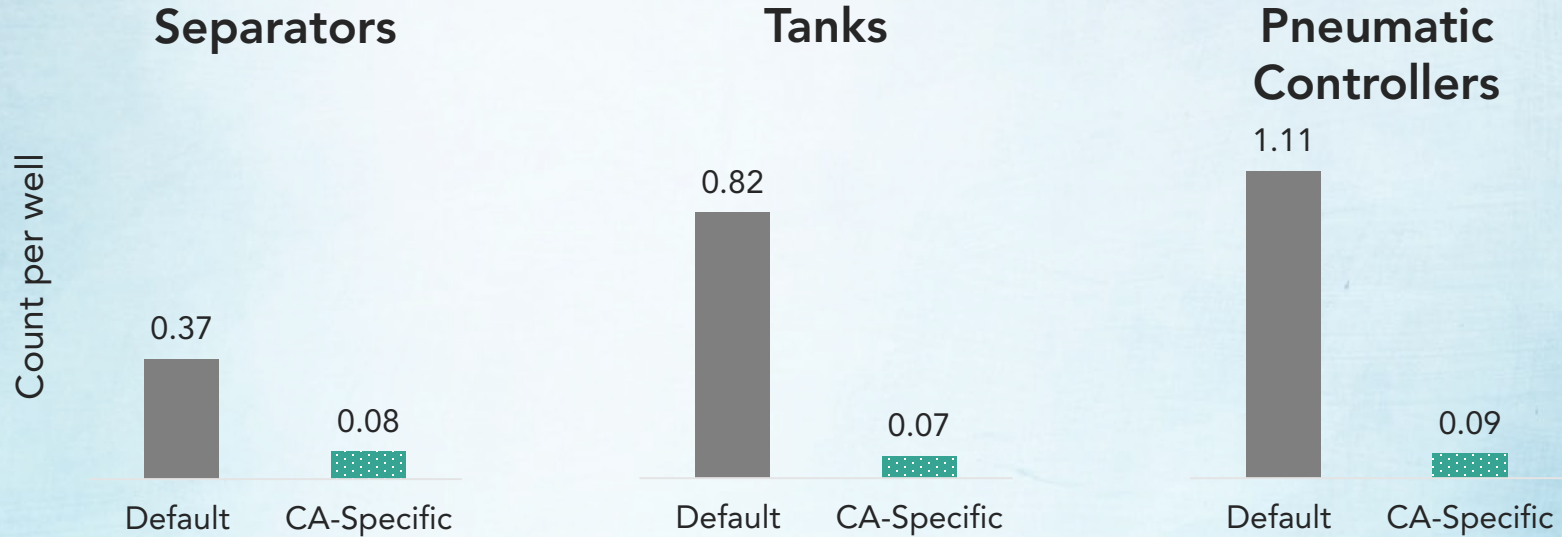
OPGEE v3.0b

Part 1: CA-specific adjustments

CA-specific Adjustments for 2010 Baseline

- Equipment activity factors
 - Tank controls fraction
 - Purposeful venting rate
 - Basin/field-level flaring
 - CA-specific grid mix (eGRID grid mix)
- 
- VF

CA-specific Adjustments on VF: Equipment Activity Factors



CA-specific Adjustments on VF: Tank Controls and Purposeful Venting

Tank flashing
emission control rate

Default
49% controlled

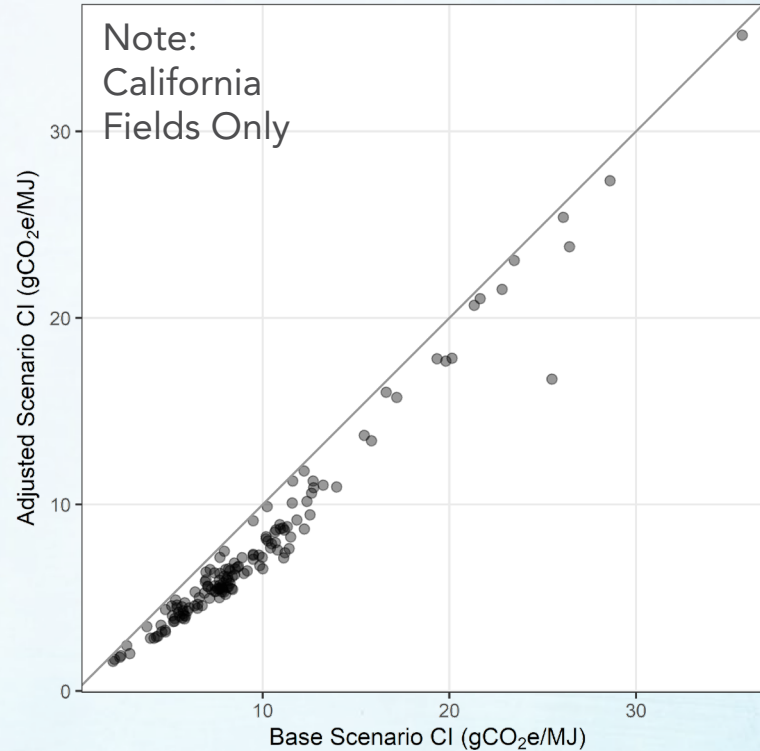
CA-Specific
65% controlled

Purposeful venting
rate

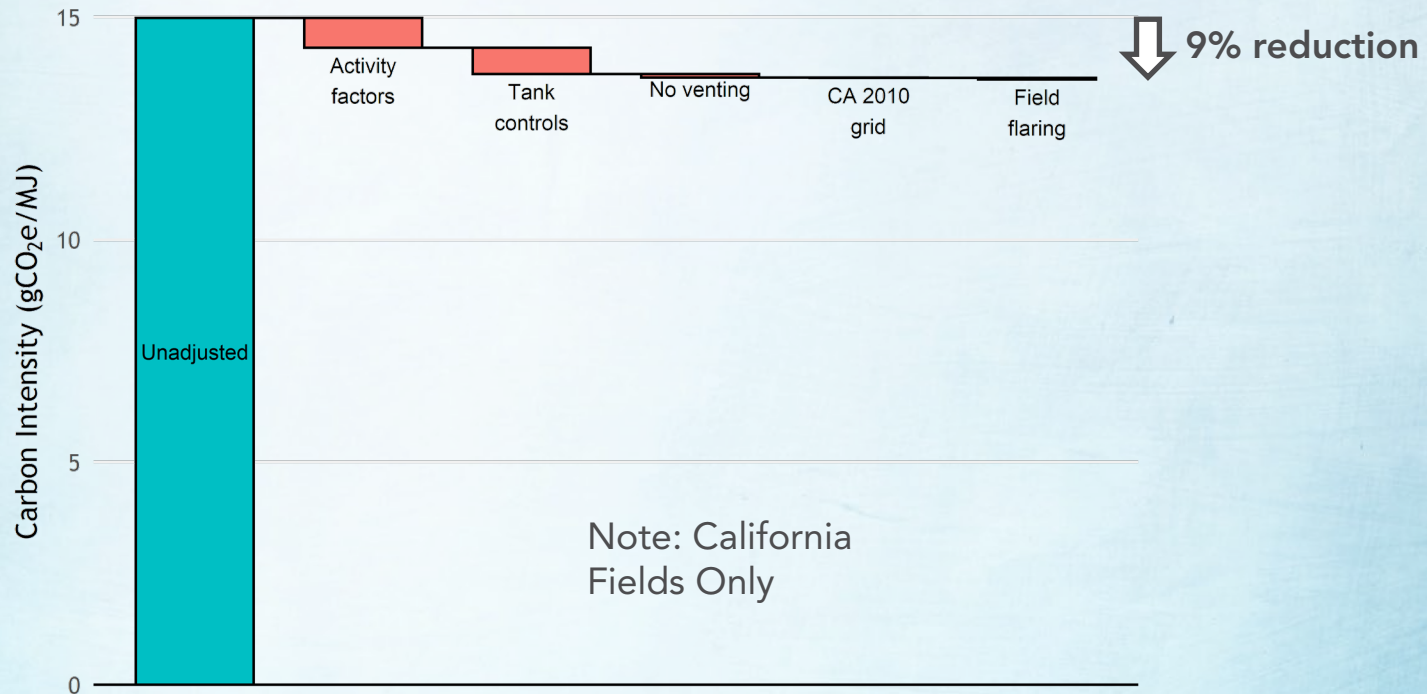
Default
0.2% of post-flare gas

CA-Specific
No purposeful venting

California Fields Cls w/ vs. w/o Adjustments



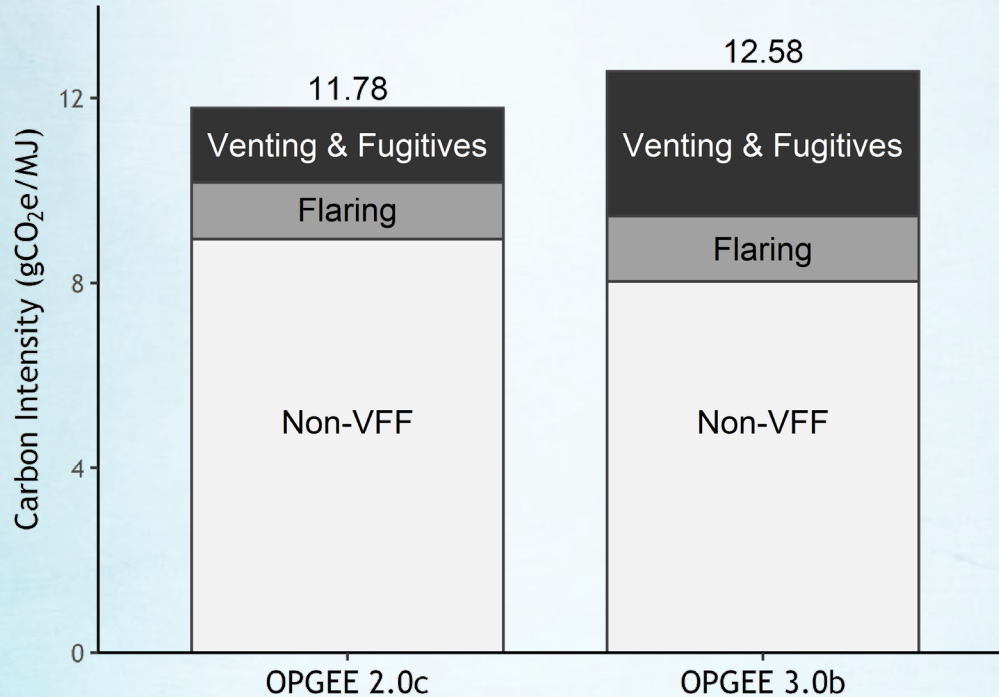
Weighted-average California CIs Before vs. After Adjustments



OPGEE v3.0b

Part 2: OPGEE v2.0c vs. v3.0b

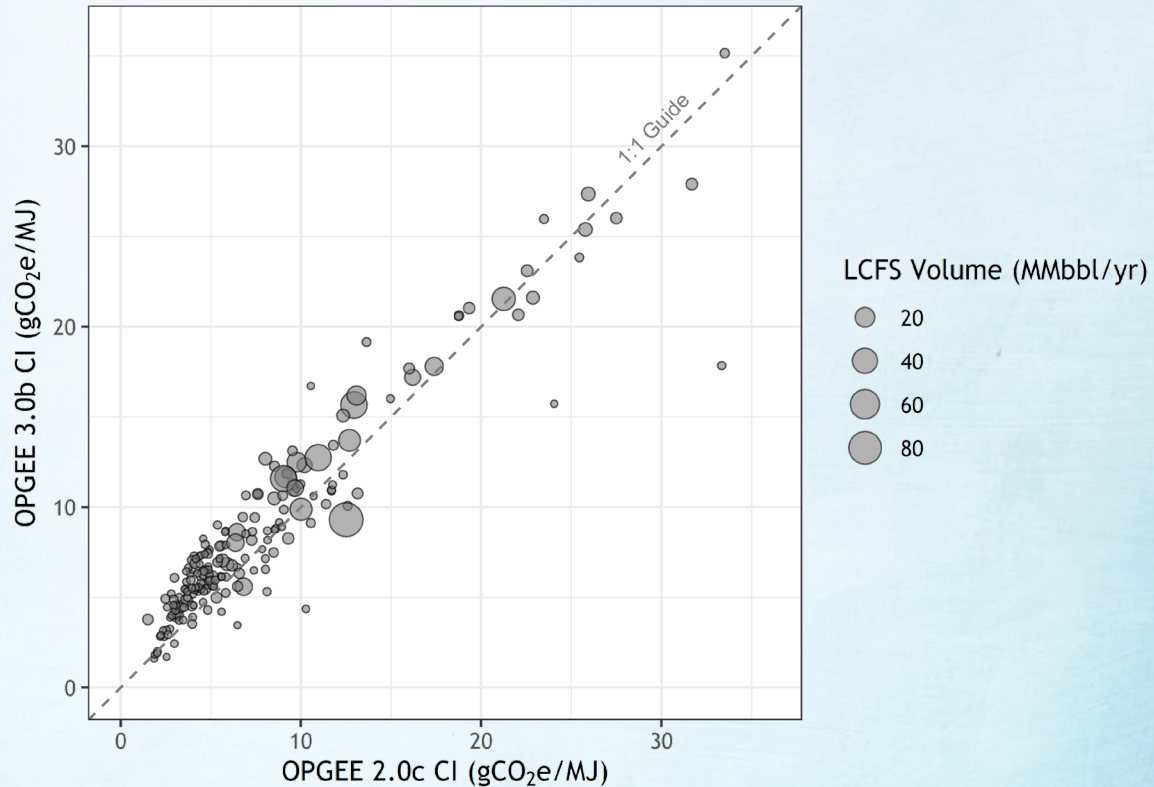
2010 Baseline Crude Average CI



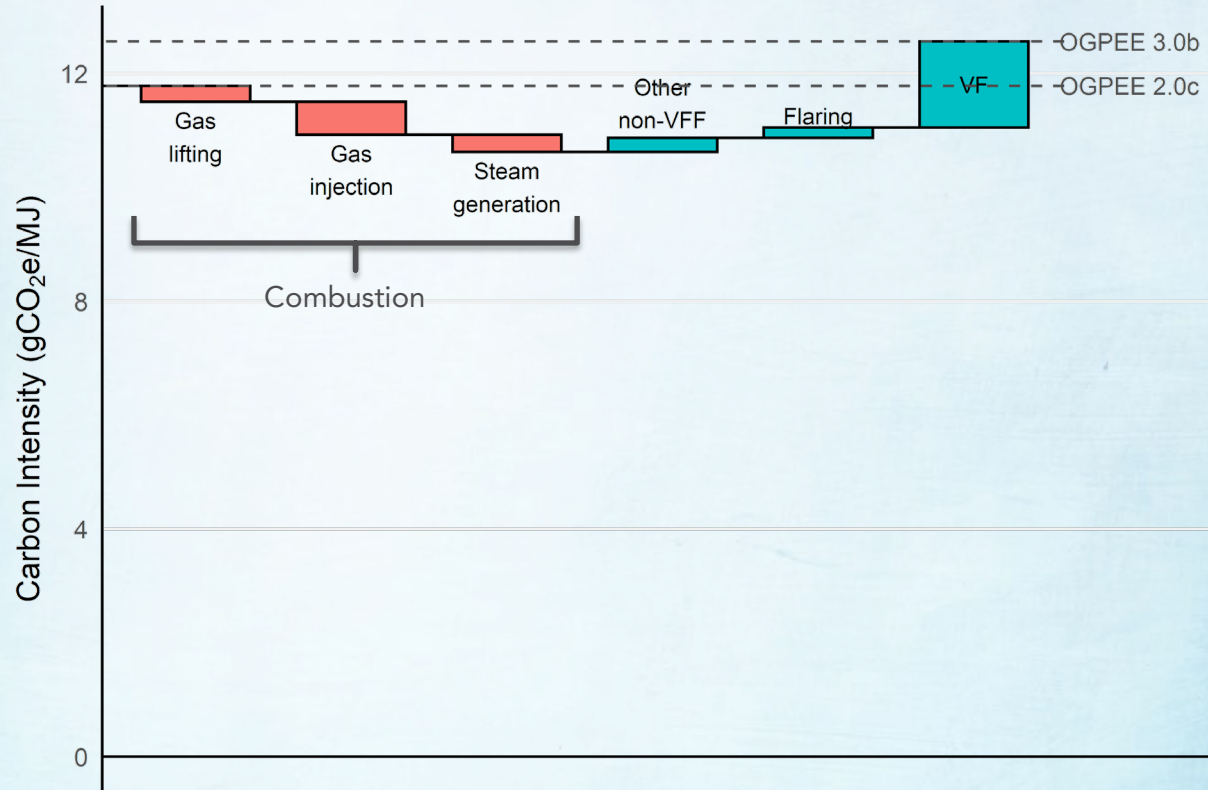
Note 1: Non-VFF includes combustion, land use, credits, debits, and small sources.

Note 2: 12.58 gCO₂e/MJ is staff recommended California 2010 baseline crude average CI, based on OPGEE v3.0b. Final CI value adopted in the upcoming LCFS amendments is subject to changes made to the OPGEE model and inputs hereafter.

2010 Baseline Crude Average CI (cont.)



2010 Baseline Crude Average CI (cont.)



Notable Changes Since v3.0a: Feature Additions

- Field/basin-level flaring lookup
- Activity factor adjustment capability
- Updated electric grid mix, added location selection
- More secondary inputs for user customization of some parameters

Notable Changes Since v3.0a: Error Fixes & Updates

- Fixed tank flashing flare portion routing
- Fixed method/unit error for bitumen mine fugitives
- Changed purposeful venting metric
 - Venting-to-oil ratio → fraction of post-flare gas vented
- API gravity input set to represent pre-dilution/upgrading
- Updated venting and fugitive emission factors based on latest updates in [Rutherford et al. 2021^a](#)

^a "Closing the methane gap in US oil and natural gas production emissions inventories." *Nature Communications*.

OPGEE v3.0b

Part 3: Potential Impacts to LCFS

Potential Impacts to LCFS

- Baseline average CIs for CARBOB and diesel (ULSD) would increase slightly, resulting in minimal impacts on credits and deficits
- Crude Carbon Intensity Lookup Table (Table 9)

What's Next for LCFS

2022 Scoping Plan: Path to Carbon Neutrality

- Spring 2022 – Draft Plan
- Summer 2022 – Board Hearing 1
- Late 2022 – Board Hearing 2 (adoption)

Broad policies and path to meet climate goals

LCFS Pre-Rulemaking

- 2022 Informal Workshops
 - Project-based crediting
 - Electricity and ZEVs
 - Pathways
 - Target-setting

Potential changes while the Scoping Plan is finalized

LCFS Formal Rulemaking (major steps)

- Issue public Notice of Preparation*
- Develop language and economic analysis
- Dept of Finance review
- Public comment period
- Board Hearing 1
- Respond to comments
- Board Hearing 2 (adoption)
- Office of Administrative Law review
- Implementation begins

Formal process with specific timelines

* One year timeline to complete once NOP is issued

How to Participate in Live Q&A

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