

# Simulating an “EJ Scenario” for the Low Carbon Fuel Standard Rule update using the ARB CATS Model

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# Introduction



## Michael Wara, JD, PhD

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- Leads team working with EJ advocates to conduct modeling to understand impact of EJ policy asks, using ARB's CATS model.
- Stanford team composed of energy researchers, postdoc, graduate students and undergraduates worked to evaluate assumptions and EJ scenarios.
- Team members: Mareldi Ahumada Paras, Mike Mastrandrea, Henry Zhu, Claire Morton, Rani Chor.
- Fact sheet released soon that will provide more detail on today's presentation
- Personal views; not those of Stanford University.

# Context Setting

The CATS model used by CARB evaluates the likely future transportation fuel mix incentivized under LCFS, by finding the least cost solution to meet fuel demand given a GHG constraint.

These can lead to incentives for alternative fuels that 1) have local impacts to EJ communities, 2) have questionable GHG reductions if assumptions regarding carbon intensities are inaccurate.

We modeled the impacts of two key requests as our “EJ Scenario”

**1) End avoided methane crediting in 2024.**

(CARB proposal is 2040)

**2) Impose cap on biofuel crop feedstocks.**

(CARB proposal is no cap)

**Added Assumption: Spend banked credits**

(CARB modeling maintains bank)

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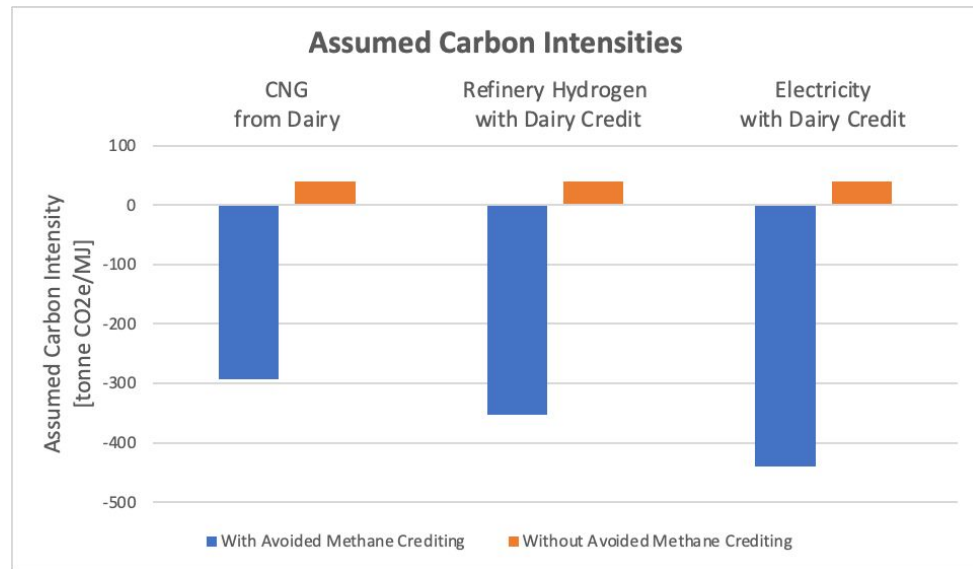
- Per CARB's advice, have focused on model outputs through 2030 as most reliable.
- We found that CARB's assumptions used for scenario development **are out of date** in ways that drive model results.
- We made a **preliminary update** to the energy demand assumptions to reflect recent policy. (Scoping Plan, ACC2, ACT, ACF)

# Policy Adjustments - Avoided Methane Crediting

CARB's Preferred Scenario maintains avoided methane crediting through 2040.

## EJ Scenario: Phase-out of avoided methane in 2024.

- Avoided methane crediting allows for capture of methane at dairies to be credited to fossil gas use at energy facilities like refineries.
- Subsidizes CAFOs and use of existing refinery capacity - not green H<sub>2</sub>.

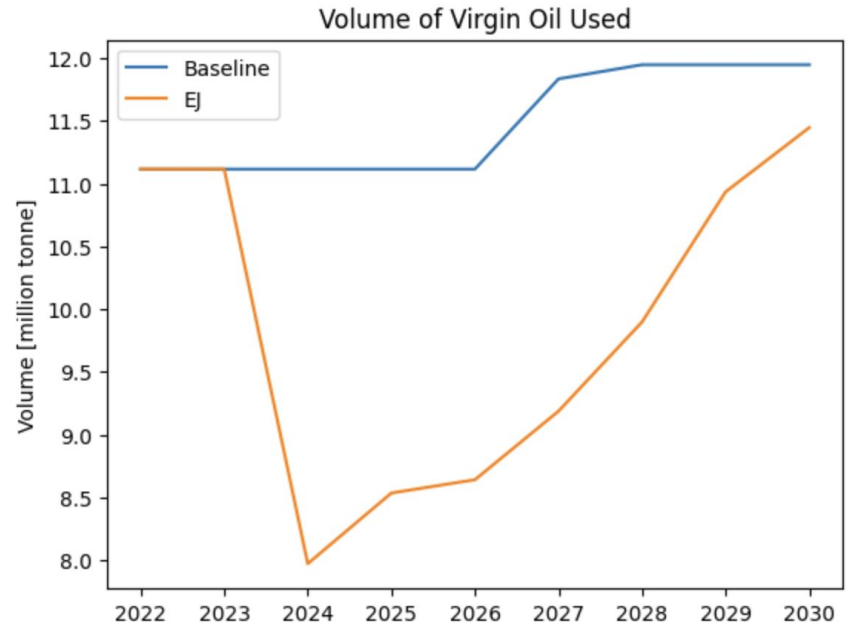


# Policy Adjustments - Biofuel Feedstock Caps

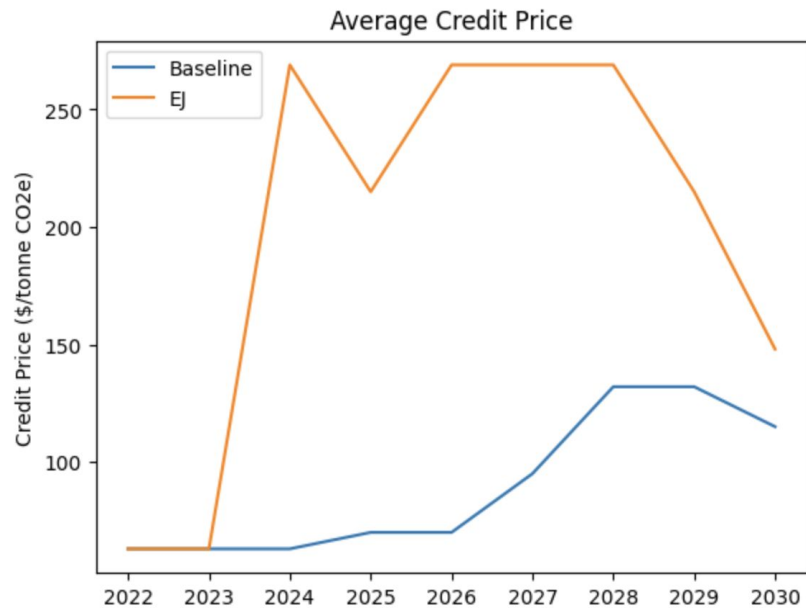
CARB's Preferred Scenario allows unlimited use of crop oils.

**EJ Scenario: Cap crop oils at 1.2 million DGE [[ICCT 2022](#)].**

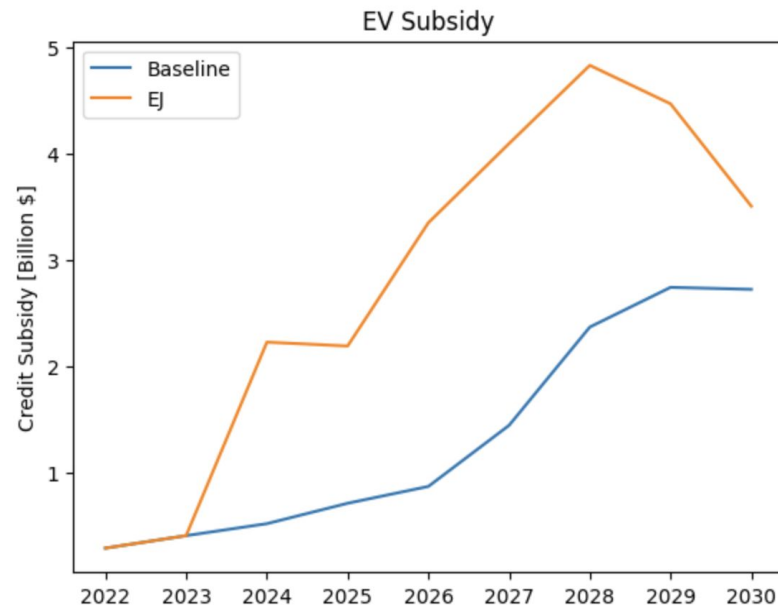
- Additional **500,000 acres** of land needed under baseline compared to EJ.
- Marginal land for soy production often provided by destruction of Amazonian rainforest.
- ARB is not updating ILUC as part of this rulemaking.



# Key Finding #1: EJ Scenario is Reasonable and Consistent with CARB Priorities



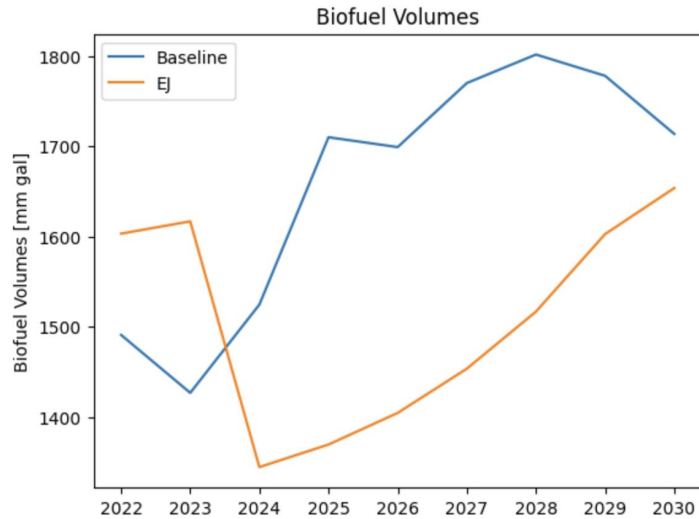
- Average Baseline Credit Price until 2030: **\$89**.
- Average EJ Credit Price until 2030: **\$198**.
- Banking of credits stabilizes credit price.



- Total Baseline EV Subsidy until 2030: **\$15 billion**.
- Total EJ EV Subsidy until 2030: **\$34 billion**.
- Faster and greater support for CARB EV policies

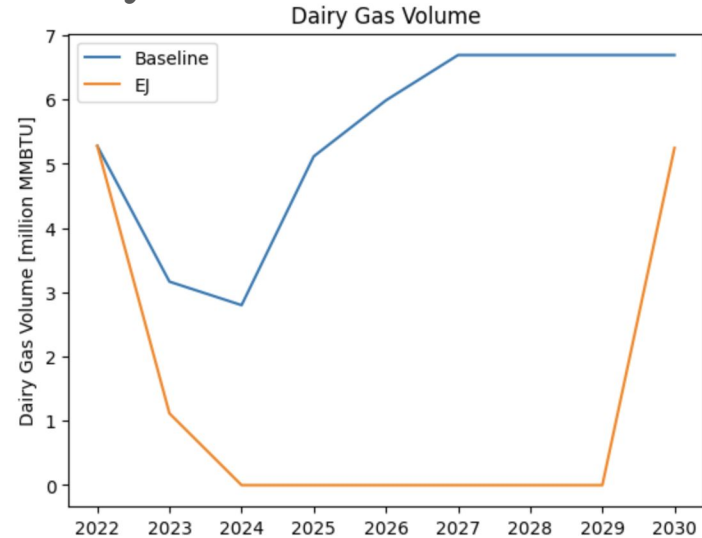
# Key Finding #2: EJ Scenario Reduces Local Impacts

## Liquid Biofuels



- **1350 million gallons** less biofuel produced by 2030 under EJ scenario.
- Reduced refinery air pollution.

## Dairy Methane



- Total Baseline Dairy Gas until 2030: **49 million MMBTU**.
- Total EJ Dairy Gas until 2030: **12 million MMBTU**.



# Key Finding #3: EJ Scenario Avoids Unintended Climate Impacts

- Avoids land conversion GHG emissions (forest->farm) for crop-based biofuels.
- Reduces economic concentration in dairy industry.
- Reduces use of liquid biofuels that emit local air pollutants in EJ communities.
- Reduces use of hydrogen produced at existing steam methane reformers that emit local air pollutants.
- Focuses LCFS subsidy in areas most likely to produce long-run transformation of transport sector including electrification and electrolytic hydrogen.



# Conclusions



- Update of assumptions to reflect rapidly changing regulations and EV adoption is critical to LCFS planning.
- Update of assumptions means “EJ Scenario” including methane crediting phaseout and crop-based biofuel cap is achievable at reasonable credit prices.
- Stanford modeling suggests EJ scenario could achieve ARB goals while lowering impacts to EJ communities and potentially improving climate outcome.

# Acknowledgement and Disclaimers

Neither the Climate and Energy Policy Program, nor any other part of Stanford University take a formal position in favor or opposed to specific proposed program design elements of the Low Carbon Fuel Standard regulation.

Any errors or opinions expressed are solely those of the authors.