

# Interagency Working Draft Biofuel Greenhouse Gas Modeling Workshop

California's perspective on modeling land-based biofuel  
GHGs

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# The Low Carbon Fuel Standard

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- Executive Order S-1-07 called for the reduction of the carbon intensity of transportation fuels in California
- University of California reports established the LCFS framework
- Use of carbon intensity metric to include all activities in the production, transport, storage and use of a fuel including other 'processes' such as land use change (LUC) that may result from biofuel production\*
- Staff evaluated models available and underwent a multi-year public process to establish LUC factors

\* A Low-Carbon Fuel Standard for California Part 1: Technical Analysis, August 1, 2007, Project Directors: Alex Farrell and Dan Sperling

# Corn Ethanol LUC GHG Emissions

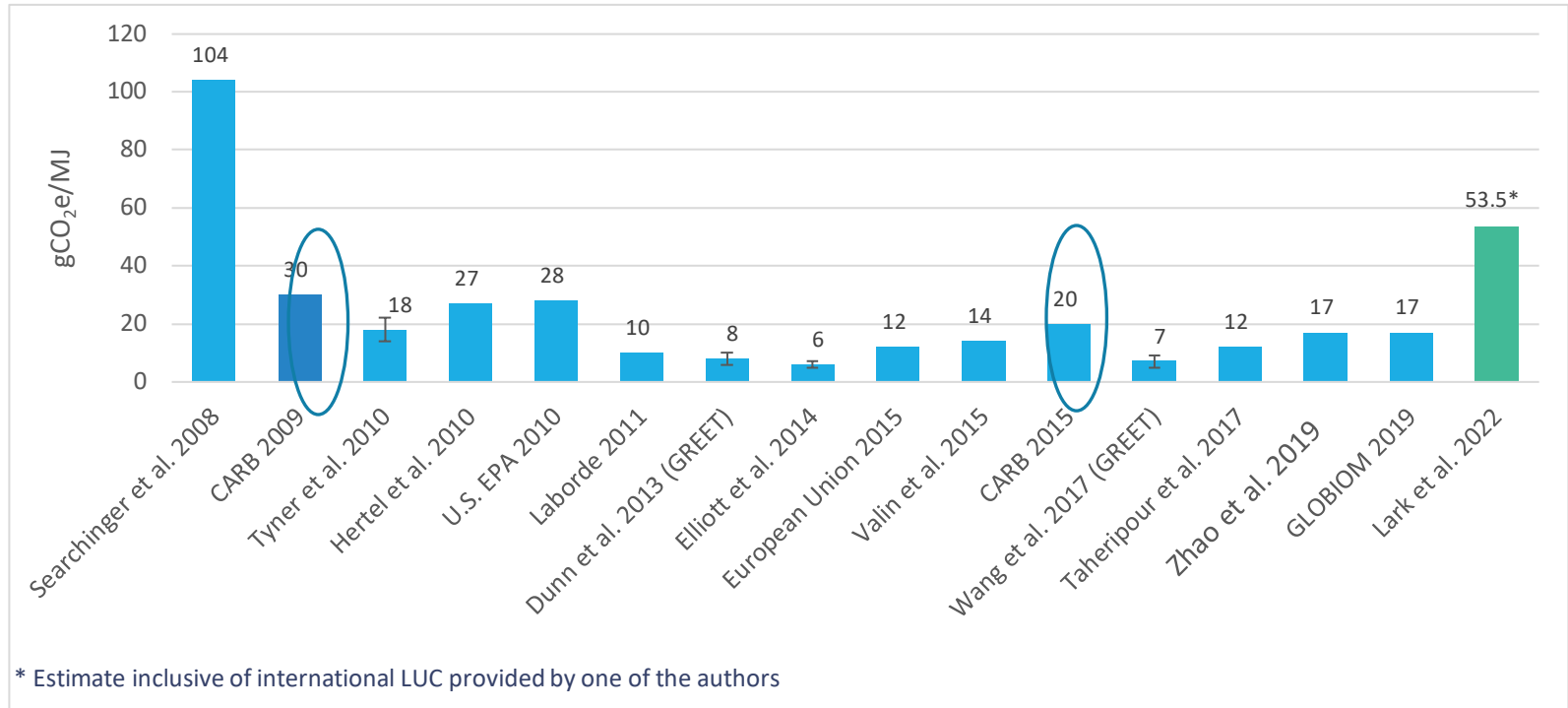
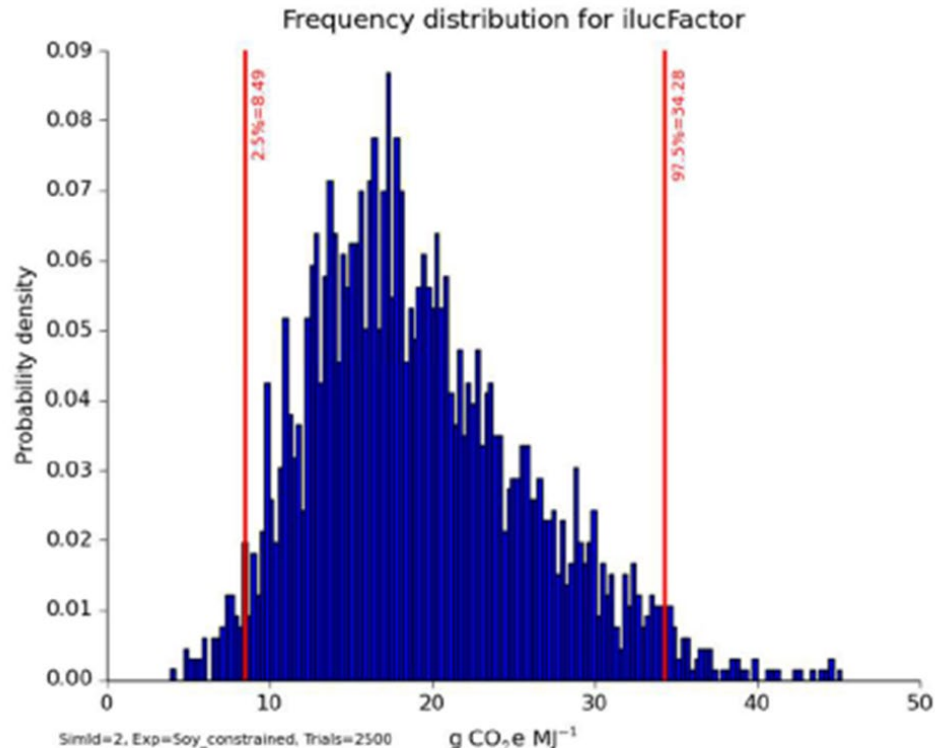


Chart adapted from Plevin, R.J., J.F. Beckman, A. Golub, Julie Witcover, and M. O'Hare. 2015. 'Carbon accounting and economic model uncertainty of emissions from biofuels-induced land use change', *Environmental Science & Technology*, 49: 2656–64. DOI: 10.1021/es505481d

# Uncertainty in LUC CI

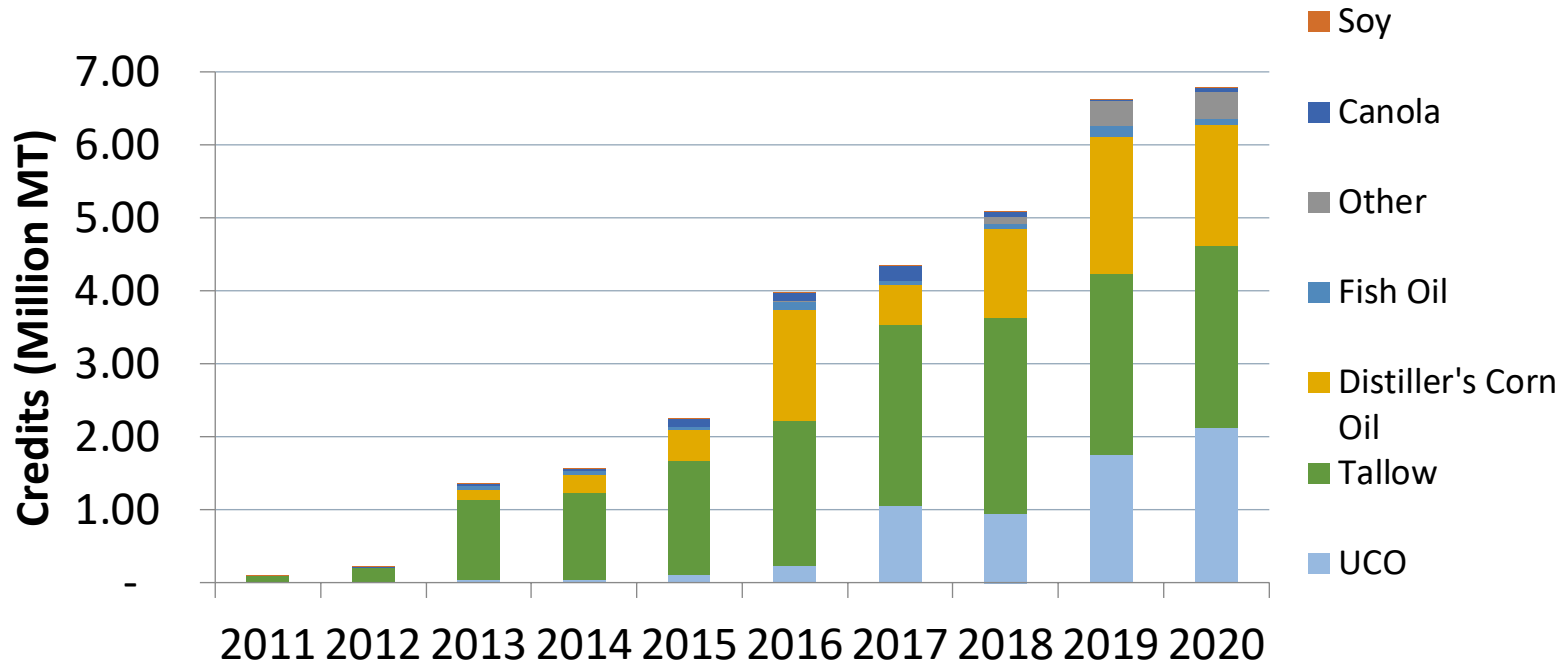


# Differences Across LUC Models

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- Methodology used (i.e., partial-equilibrium, general equilibrium, integrated assessment, static, dynamic)
- Embedded parameters (i.e., elasticities) and assumptions governing trade of commodities
- Land cover types, land availability and relationship which govern transformation between the various types of land
- Carbon stock data and emissions profile related to land conversion
- Amortization period over which emissions are attributed

# Crops and Residues used in Biomass-based Diesel Production



# Additional Considerations for Biofuels and Transportation Fuel Policy

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- Uncertainty and risk
- Verification and ground truthing
- Non-linear effects as biofuels become widely adopted
- Least regrets policies

# Resources

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- LCFS webpage: <https://ww2.arb.ca.gov/our-work/programs/low-carbon-fuel-standard>
- LCFS contacts list: <https://ww2.arb.ca.gov/our-work/programs/low-carbon-fuel-standard/lcfs-contacts>
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