



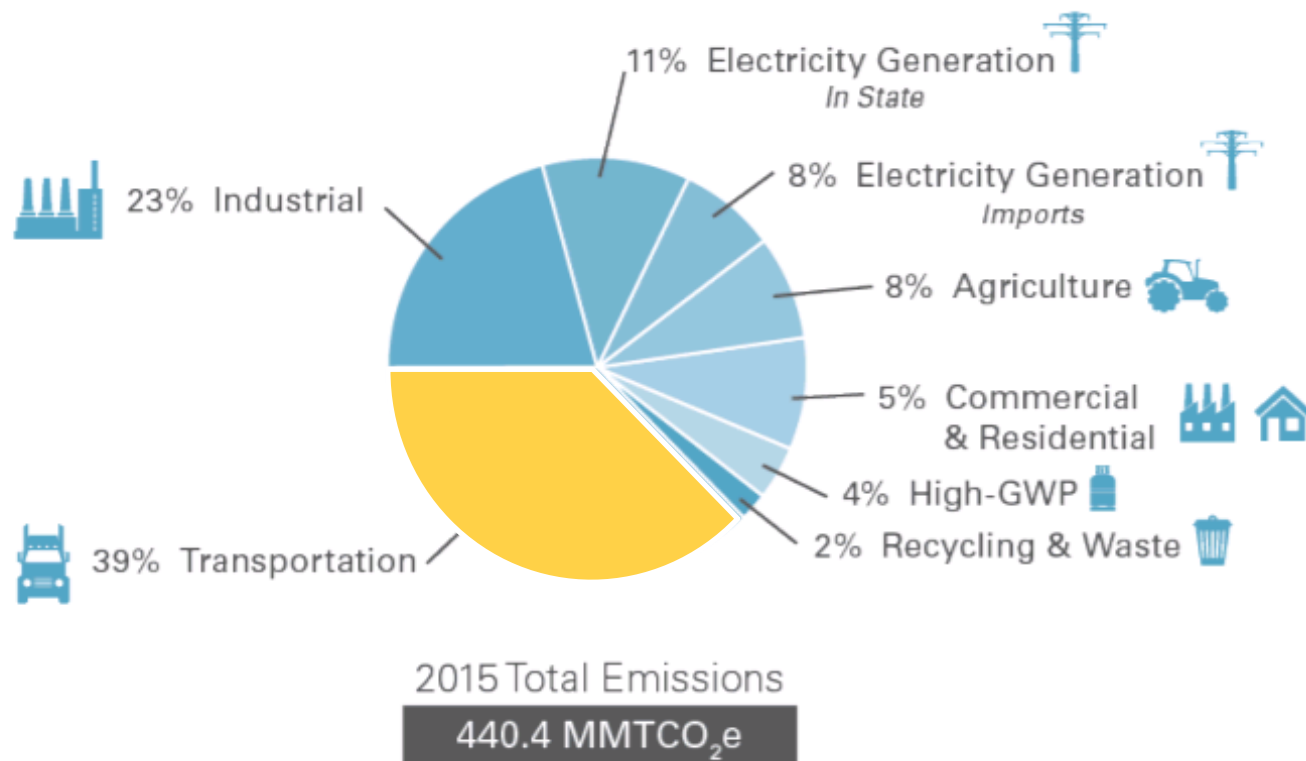
UC DAVIS SUSTAINABLE TRANSPORTATION ENERGY PATHWAYS

Transportation in California's Climate Policy

Challenge & Approach

Julie Witcover, PhD
University of California, Davis
November 2, 2017

Transportation in California GHG Emissions



~10% of U.S. Transport Energy
~87% of Canadian Transport Energy

Sources: California Draft 2030 Climate Change Scoping Plan (Oct 2017), LCFS 2016 Data, 2015 StatCan

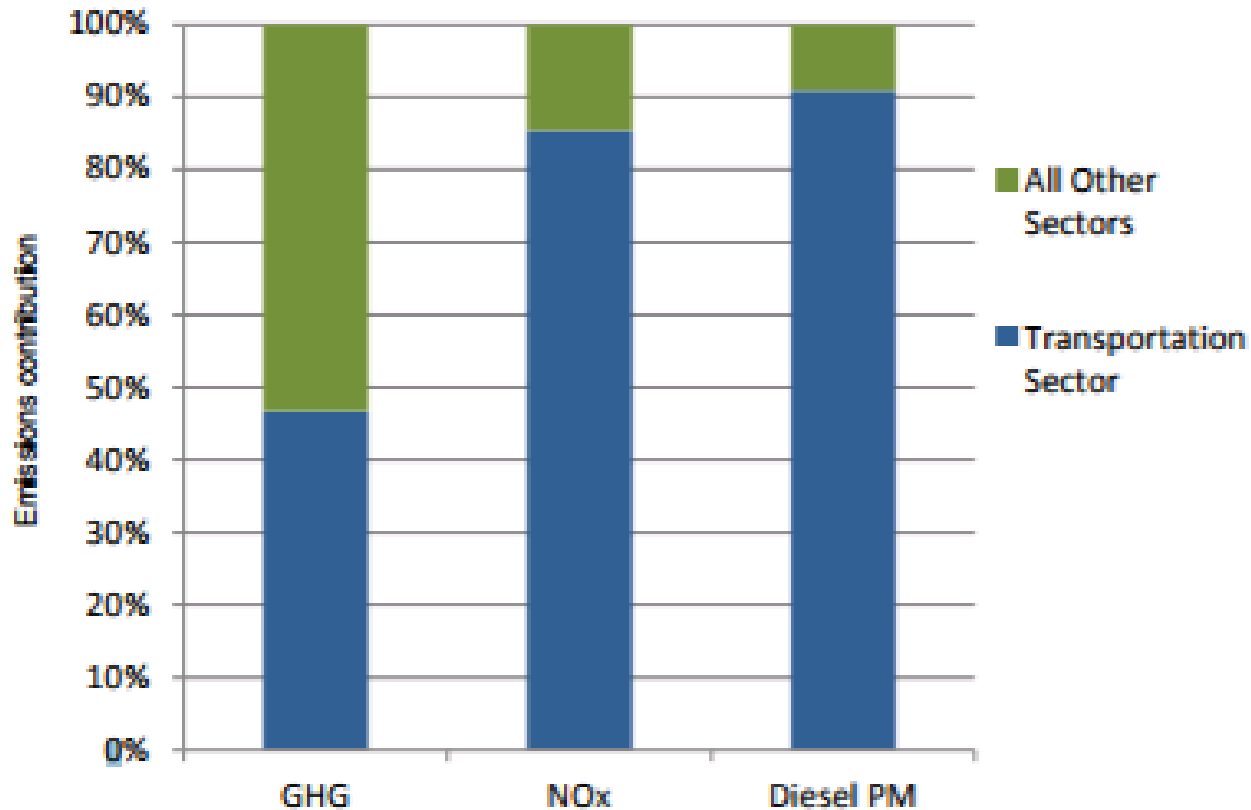
UCDAVIS

SUSTAINABLE TRANSPORTATION ENERGY PATHWAYS

An Institute of Transportation Studies Program

Transportation Emissions as Policy Target

California Mobile Source Emissions



Source: California Mobile Source Strategy 2016 (California Air Resources Board)

Suite of Policies, Policy Targets

- **Vehicle Miles Traveled (VMT)**
 - Sustainable community strategies (SB 375)
 - Land use planning
- **Vehicles***
 - Higher efficiency, electric drivetrain
- **Fuels****
 - Lower carbon per unit of energy

Scoping Plan: ~27-32% GHG reductions by 2030 from 1990 levels

Source: California Draft 2030 Climate Change Scoping Plan (Oct 2017)

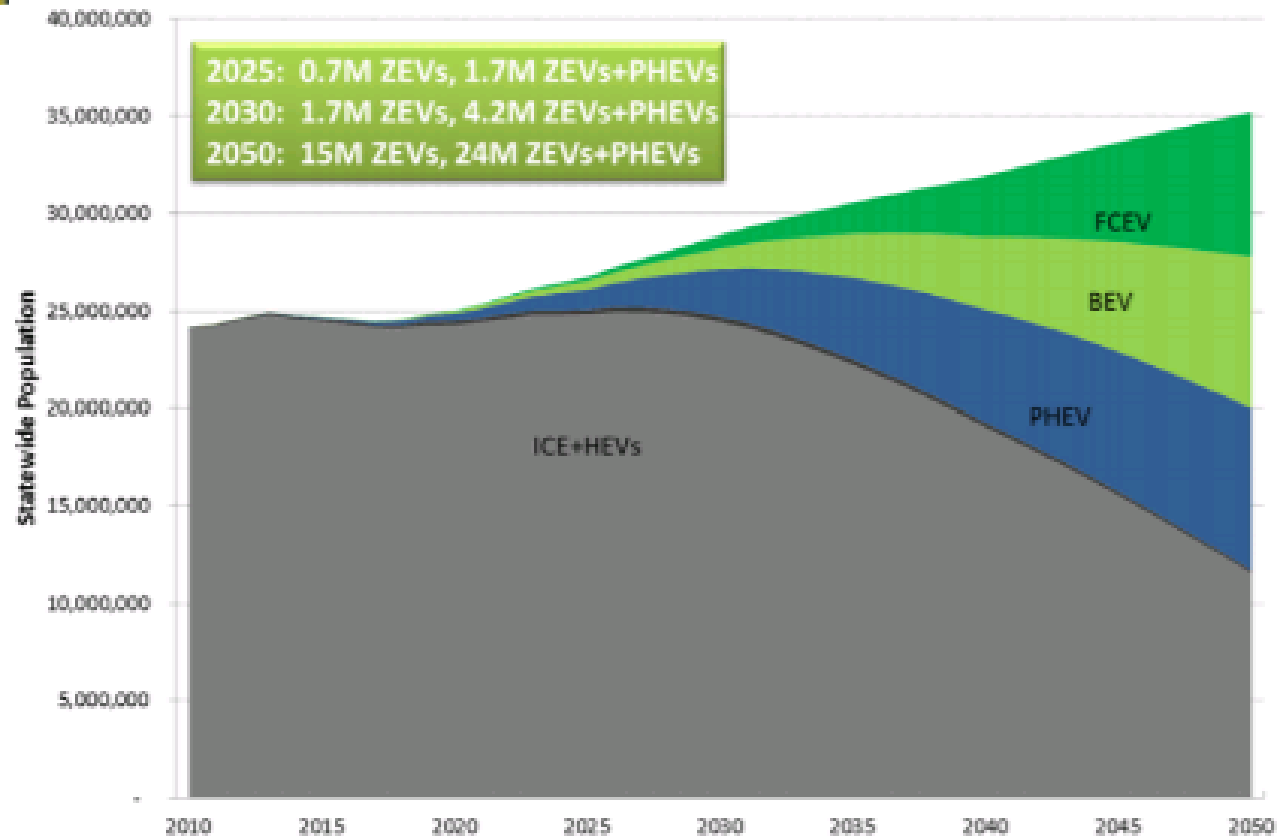
UCDAVIS

SUSTAINABLE TRANSPORTATION ENERGY PATHWAYS

An Institute of Transportation Studies Program

Vehicles. Toward Zero Emission Fleet

Passenger Vehicles & Light Trucks

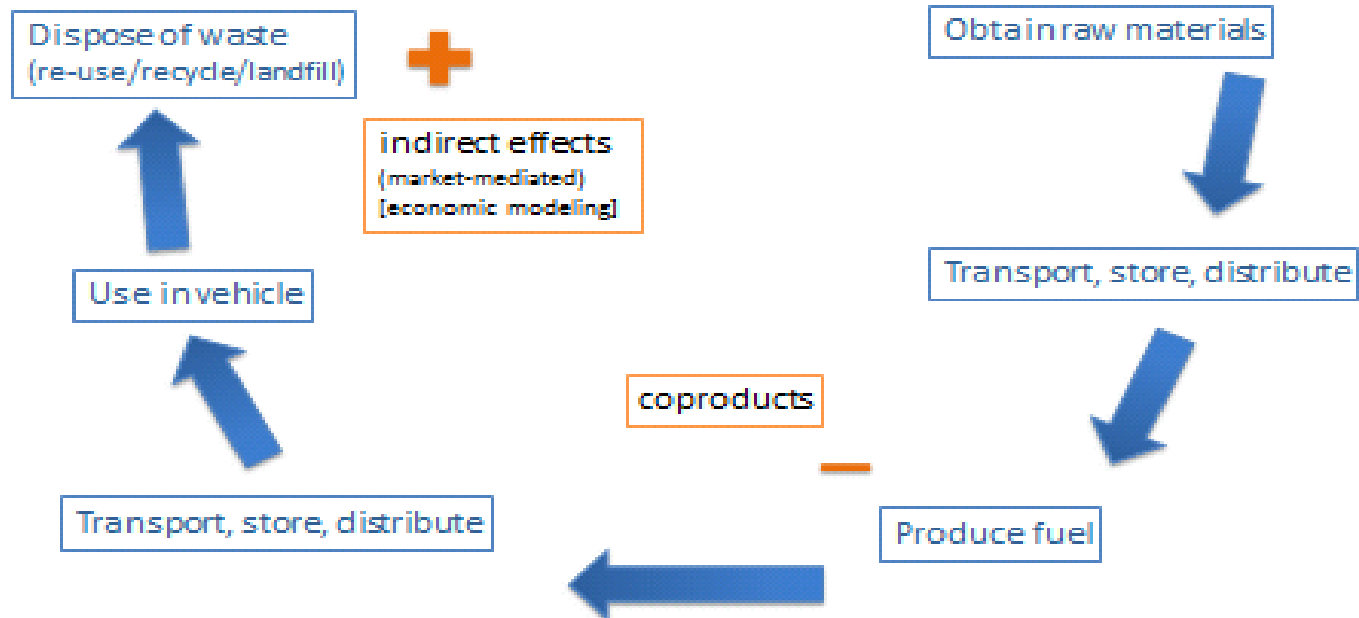


Heavy Duty Fleet. 100K by 2030

- Needs zero carbon electricity, hydrogen
- Substantial incentives

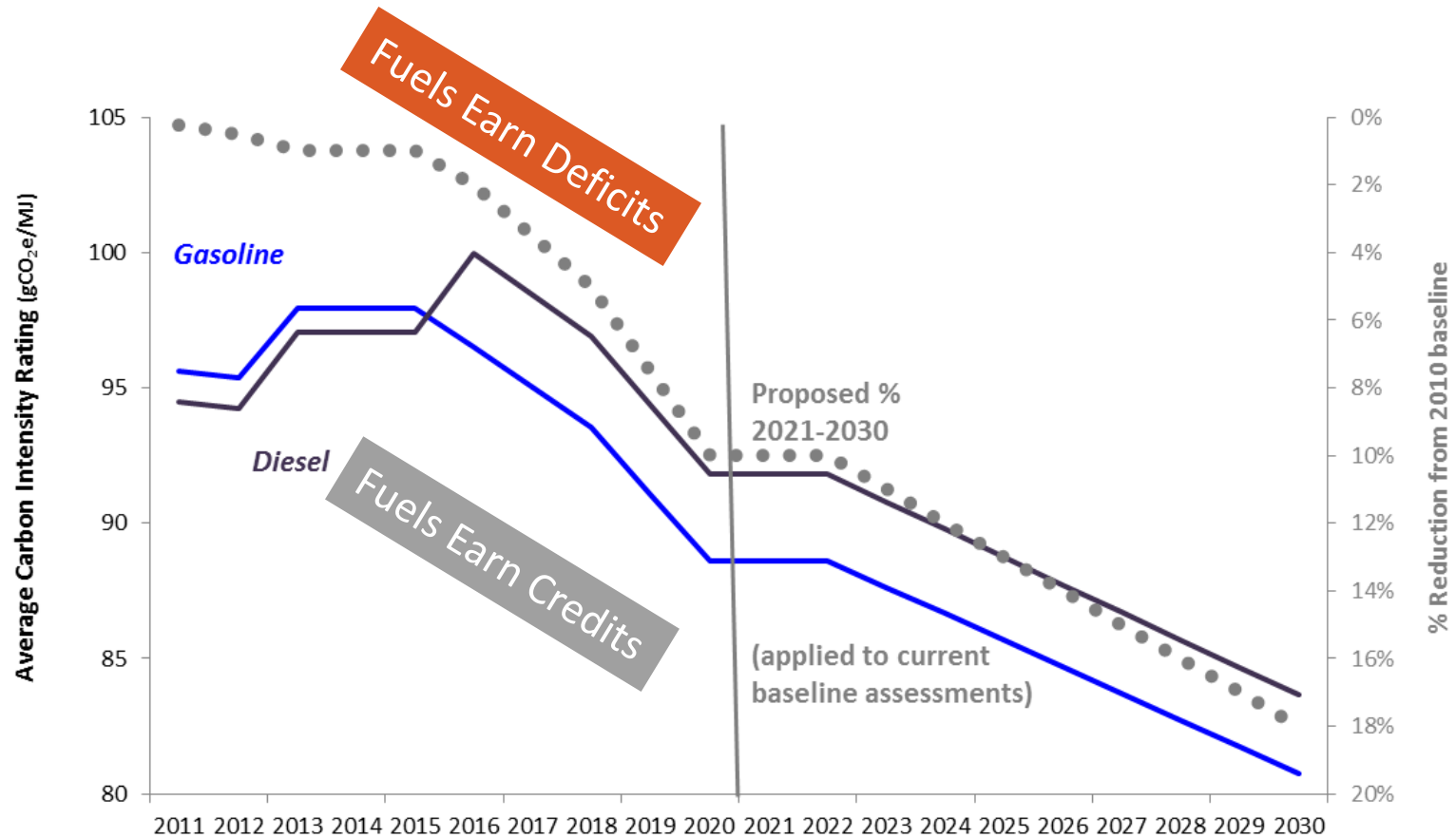
Fuels. Reducing “Lifecycle” Carbon Intensity

- Low Carbon Fuel Standard
 - On-road fuels, electric rail & forklift
 - Aviation proposed (credit generator only)



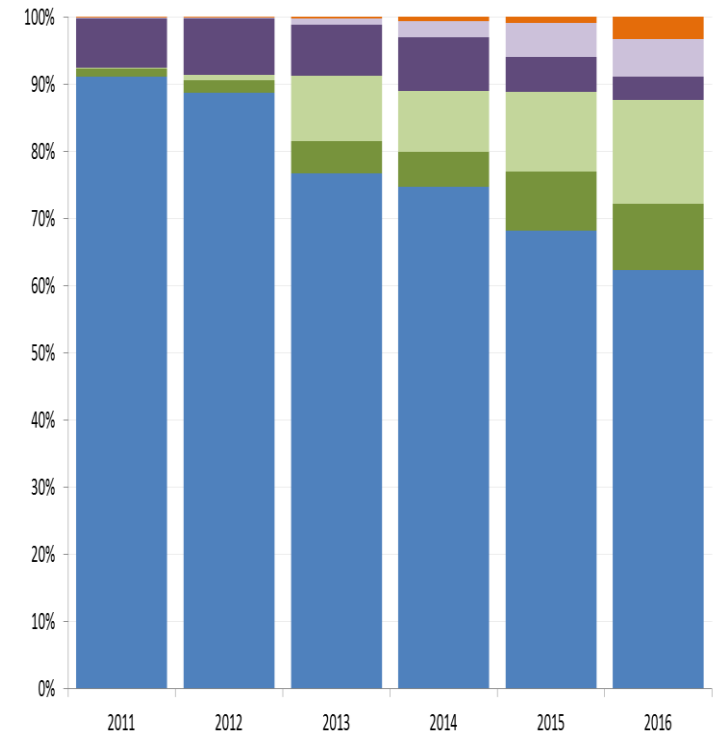
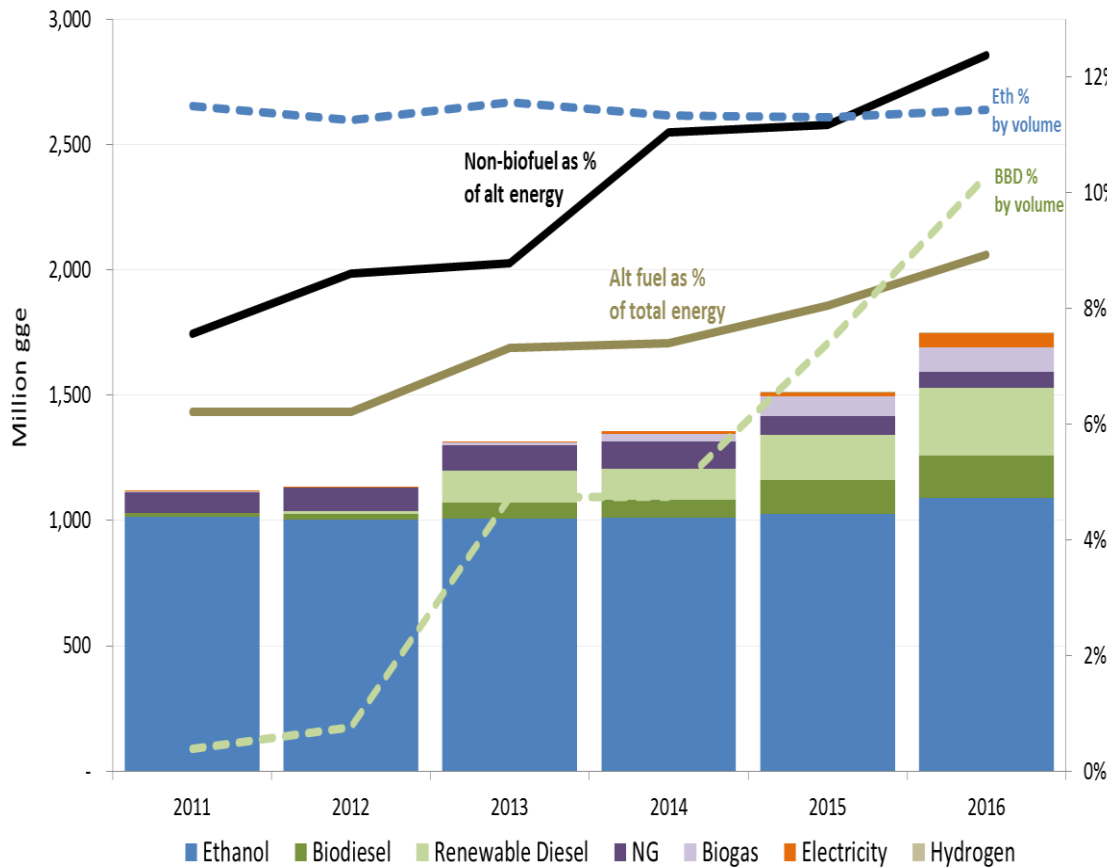
- Estimation methods (& results) vary
- Uncertainties

LCFS: 10% Carbon Intensity Reduction by 2020 (from 2010)



- 18% by 2030 (proposed)
- Bankable credit trading (revenue neutral market mechanism)
- Technology forcing (via stringency), technology neutral (for alternative fuels)

California Fuel Mix Under the LCFS, 2011-2016



- Alternative energy up 57%
- Diesel substitutes

- Ethanol dominant
- Fuel mix diversifying

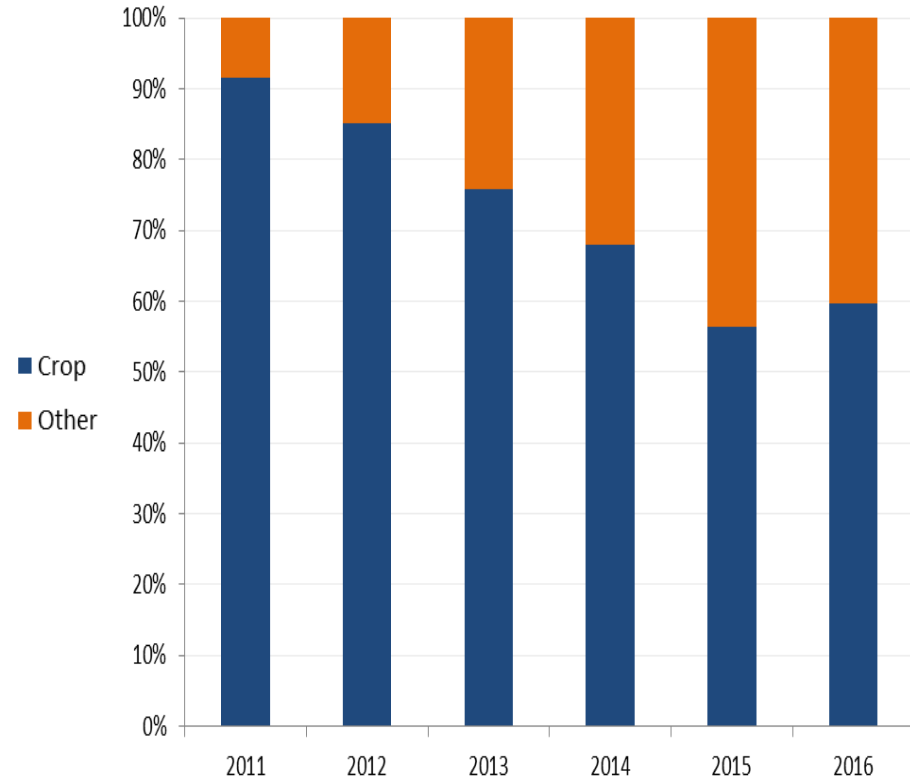
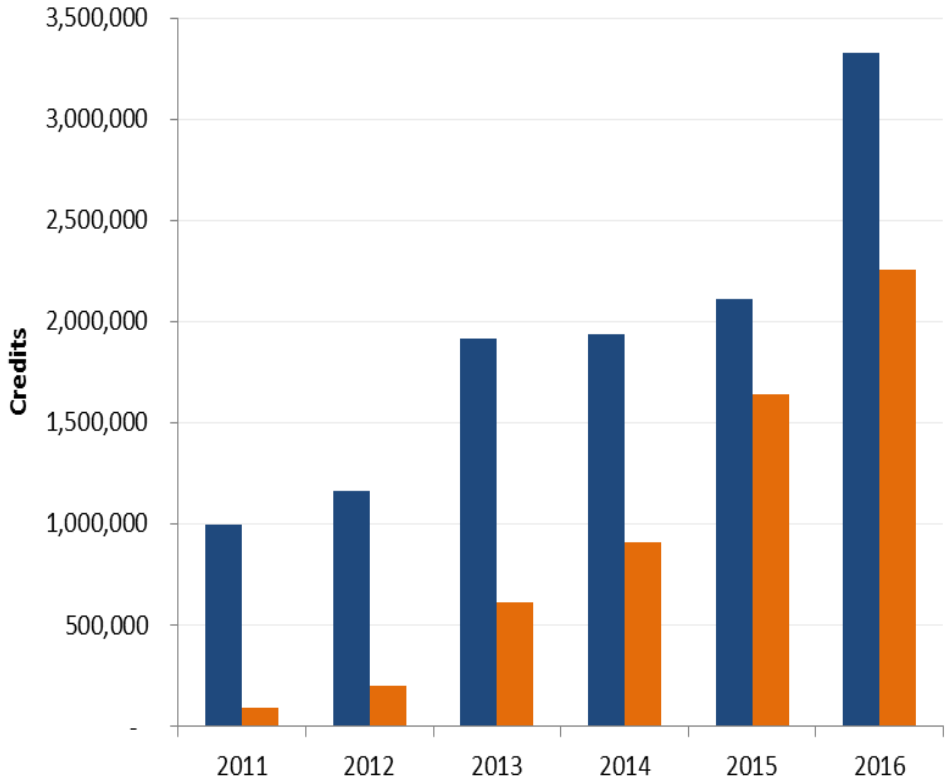
Source: ARB data

UCDAVIS

SUSTAINABLE TRANSPORTATION ENERGY PATHWAYS

An Institute of Transportation Studies Program

Crop-based Biofuels in 2016



- Models lowered carbon intensity estimates for land use change
- Corn ethanol volumes up 9% (2015-2016)

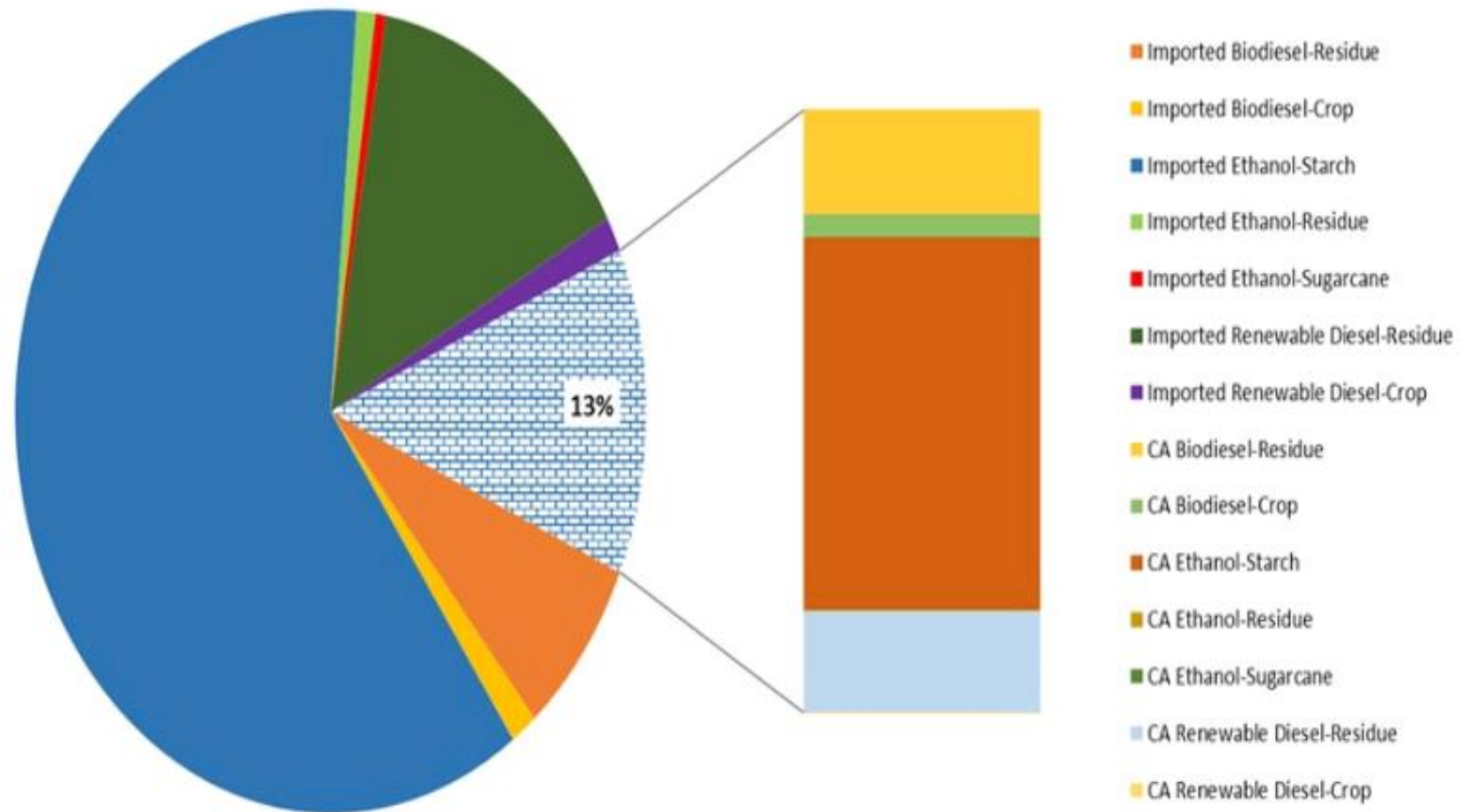
Source: ARB data

UCDAVIS

SUSTAINABLE TRANSPORTATION ENERGY PATHWAYS

An Institute of Transportation Studies Program

In-State Biofuels Production Share Steady (~11-14%)



2016 Biofuel by Source

Source: ARB LCFS Data Dashboard

UC DAVIS

SUSTAINABLE TRANSPORTATION ENERGY PATHWAYS

An Institute of Transportation Studies Program



Thank You

Julie Witcover

UCDAVIS

SUSTAINABLE TRANSPORTATION ENERGY PATHWAYS

An Institute of Transportation Studies Program