US ETHANOL PRODUCERS – REDUCING CARBON INTENSITY

Conference on Decarbonization of U.S. Bioethanol Production

Tokyo, Japan – December 3, 2025

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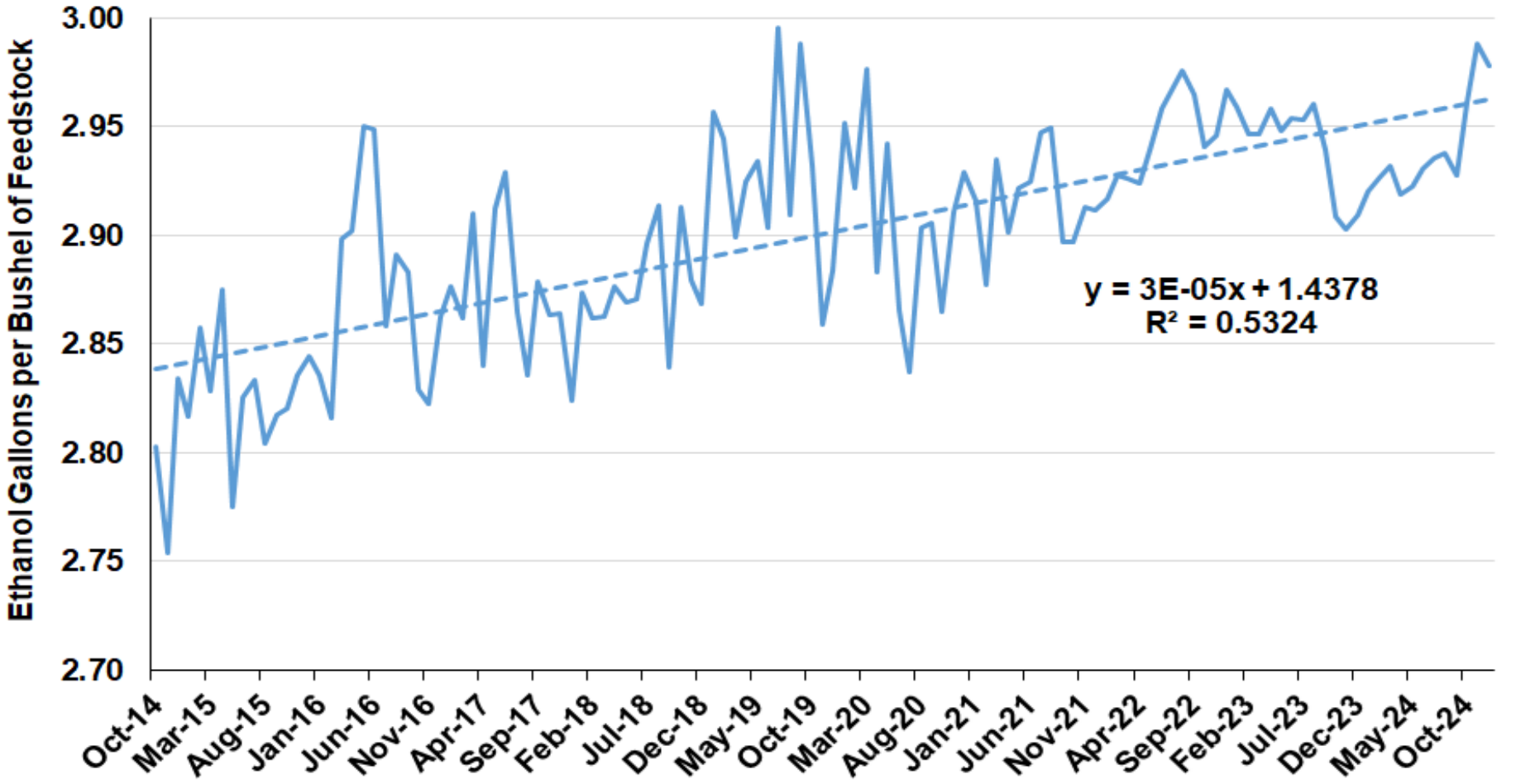
American Coalition for Ethanol

Figure 1. Monthly Conversion Rate for Fuel Ethanol Production per Bushel of Corn and Sorghum Feedstock at U.S. Dry Mill Ethanol Plants, October 2014 - December 2024



Source: EIA and USDA

ADVANCEMENTS IN DRY MILL ETHANOL PRODUCTION 2000-2025

- Oil extraction (2005–2010): ~5–8 gCO2e/MJ reduction

- Dryer optimization & heat recovery (2005–present): ~3–5 gCO2e/MJ

ADVANCEMENTS IN DRY MILL ETHANOL PRODUCTION 2000-2025

- Advanced enzymes & yeasts (2010–2015): ~3–6 gCO2e/MJ
- CHP & renewable electricity adoption (2010–present): ~5–15 gCO2e/MJ

ADVANCEMENTS IN DRY MILL ETHANOL PRODUCTION 2000-2025

- Fiber separation / High-protein feed (2015–2020): ~5–10 gCO2e/MJ

ADVANCEMENTS IN DRY MILL ETHANOL PRODUCTION 2000-2025

- Carbon capture readiness / early adoption (2020–present): ~ 20–30+ gCO2e/MJ

EFFICIENT TRANSPORTATION OF ETHANOL

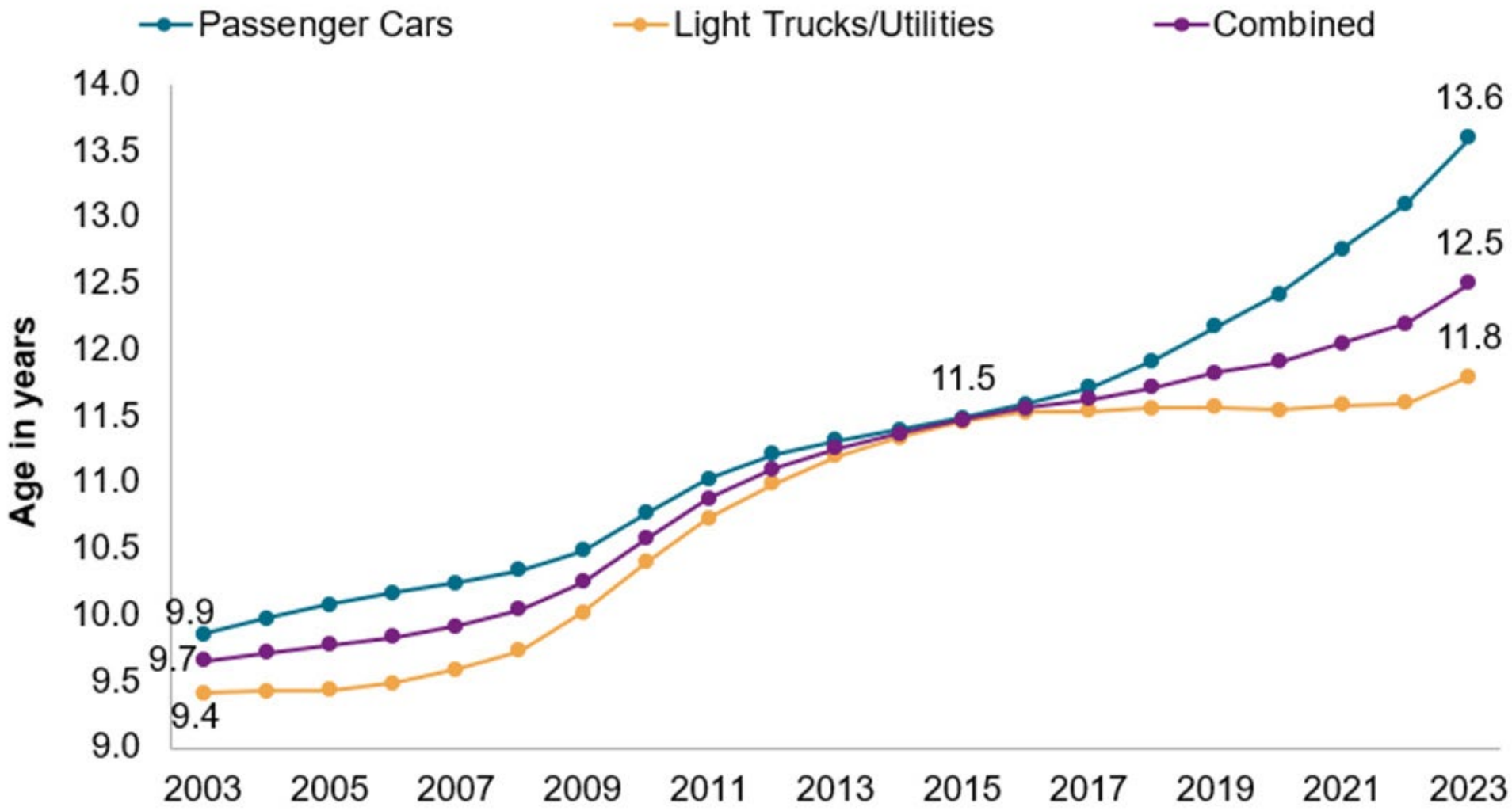
- Ethanol as Bunker Fuel
- Regional supply alignment reduces long-distance transport
- West Coast supplied mostly by western ethanol plants
- East Coast supplied mostly by eastern producers
- Marketers trade gallons to avoid cross-shipping
- Example: IL → PA and KS → CA swap instead of reversing shipments

E10 HISTORY SHOWS EQUIPMENT AND VEHICLE SAFETY

- E10 has been used in the US, E21-E29 in Brazil since the 1980s
- Over 95% of U.S. gasoline today is E10
- No statistically significant increase in vehicle failures
- No measurable increase in service station equipment damage, no unusual or more rapid wear
- Concerns over corrosion, fuel system wear, and elastomer degradation have proven unfounded

Average age by vehicle type

Combined average age rises for the sixth consecutive year



WHY E10 HAS NOT CAUSED DAMAGE

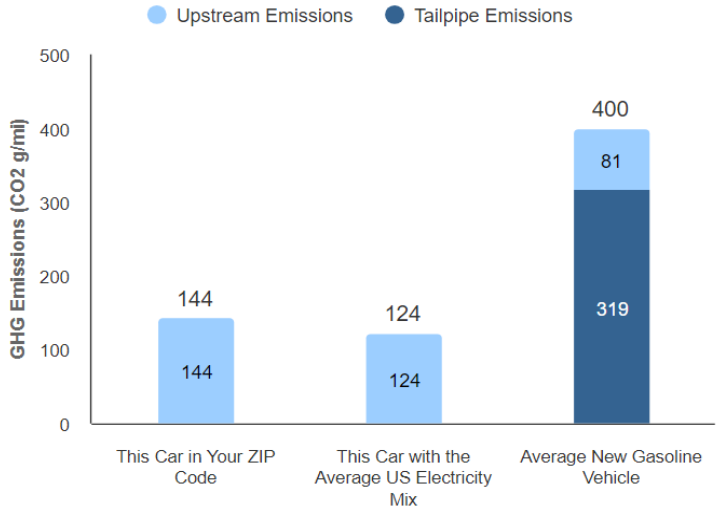
- Modern vehicles designed for E10 since the 1980s
- EPA has certified E10 as compatible with all vehicles since 1979
- Service station equipment approved for E10 for decades
  - TESTED with E15 – UL Listing is for equipment “up to 15% alcohol”
- Two trillion gallons of ethanol blended gasoline sold and more than fifty trillion miles driven on E10+ in the US since 2000 confirm safety of ethanol blends

2019 Tesla Model 3 Long Range AWD

X

Electric Vehicle

Comparing Total GHG Emissions*



144 g/mi
This Car's Total Emissions in your ZIP Code (Tailpipe + Upstream)

124 g/mi
This Car's Total Emissions with the Average US Electricity Mix

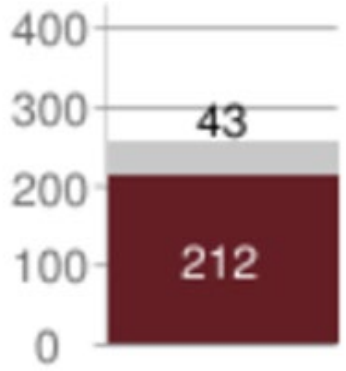
400 g/mi
Average New Gasoline Vehicle's Total Emissions

american coalition for ethanol

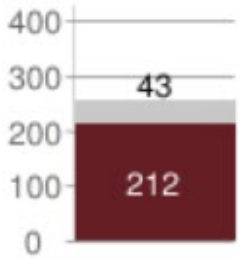
2019 Ford Fusion Hybrid FWD

Hybrid Vehicle
Gasoline

Regular Gasoline



Regular Gasoline



2019 Tesla Model 3 Long Range AWD

Electric Vehicle

144 g/mi

This Car's Total Emissions in your ZIP Code (Tailpipe + Upstream)

124 g/mi

This Car's Total Emissions with the Average US Electricity Mix

Code | Average US Electricity Mix | Vehicle

144 g/mi

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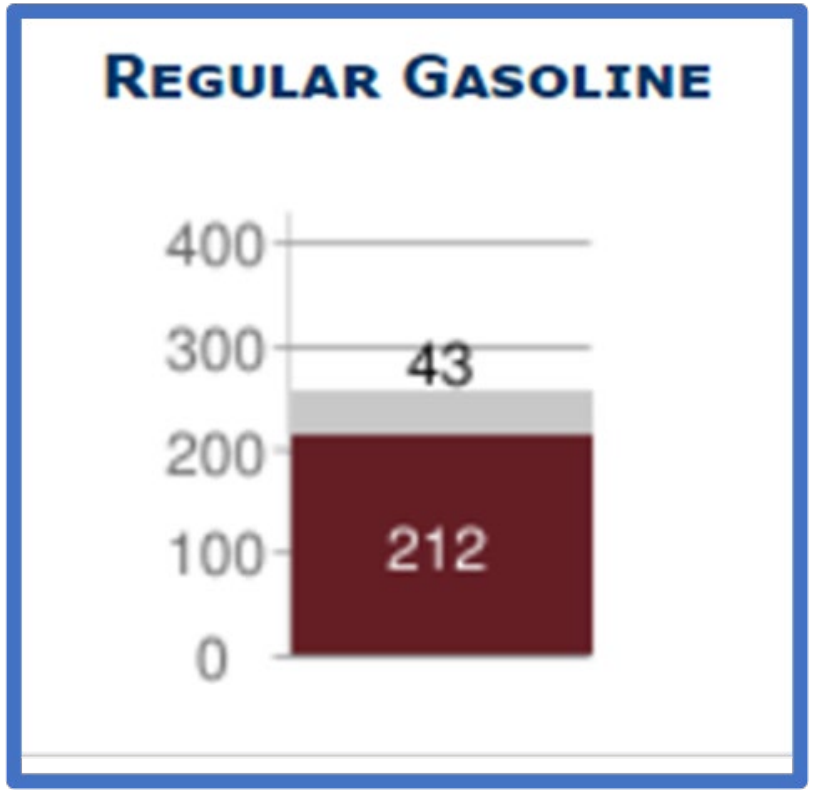
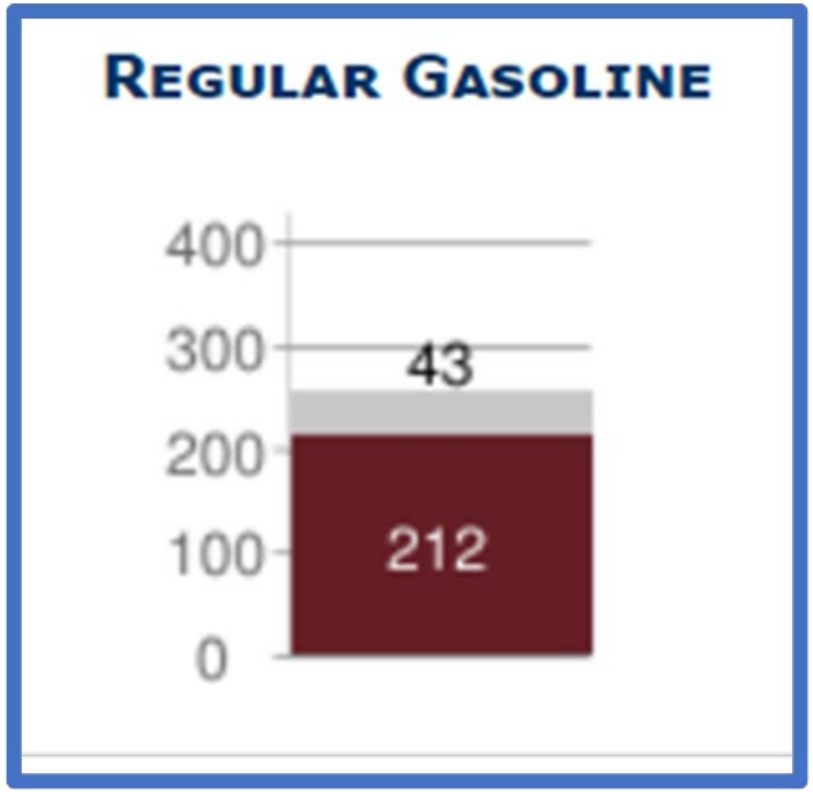
Average New Gasoline Vehicle's Total Emissions



42.0
MPG

255
Grams/Mile

Regular Gasoline



30.5
MPG

177
Grams/Mile

E85 – Flex Fuel

2019 TESLA MODEL 3 LONG RANGE – 310 Mile/charge

144 g/mi

This Car's Total Emissions in your ZIP Code (Tailpipe + Upstream)

124 g/mi

This Car's Total Emissions with the Average US Electricity Mix

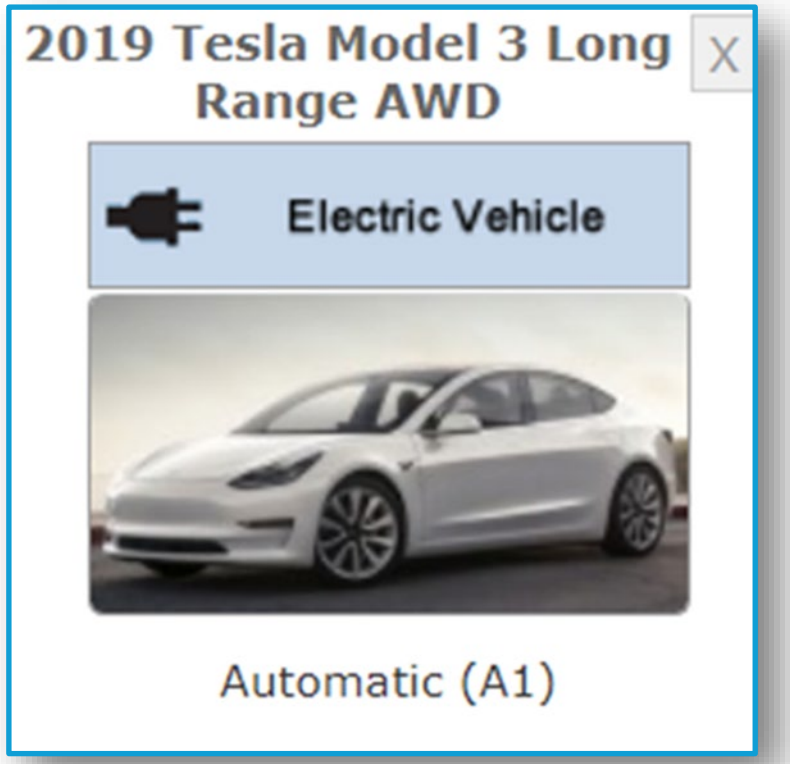
30.5

MPG

177

Grams/Mile

E85 – Flex Fuel



310 Range/Miles

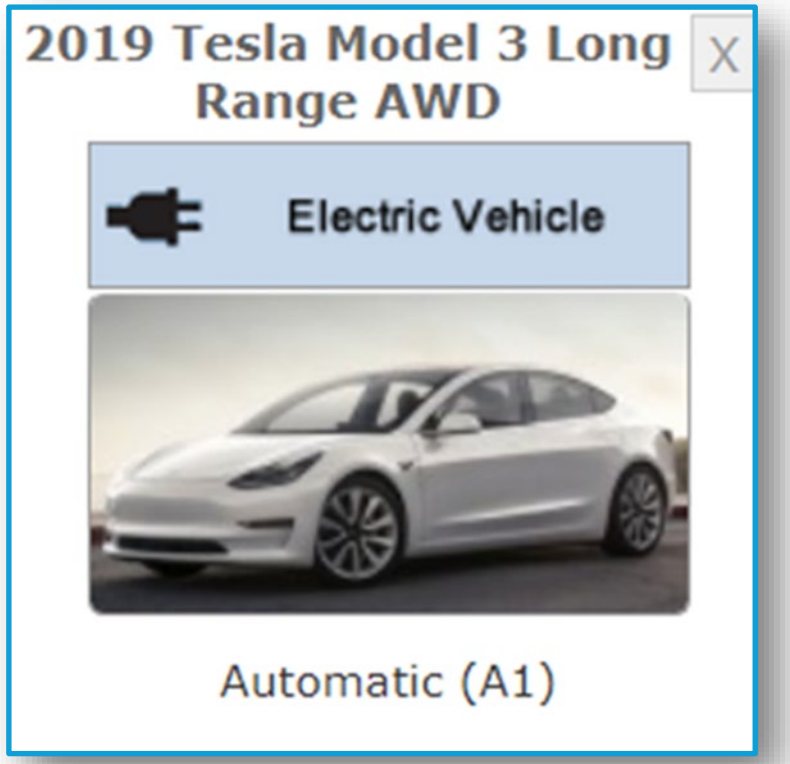
124 Grams/Mile

Battery Electric Vehicle (BEV)

26.4 MPG

202 Grams/Mile

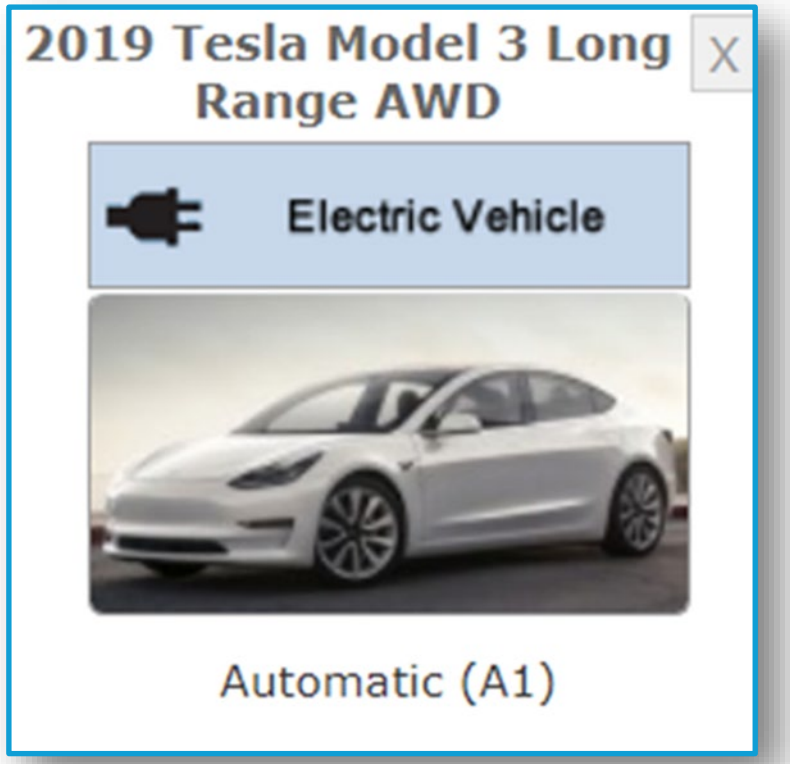
E72 – Flex Fuel



230	167	26.4	202
Range/Miles	Grams/Mile	MPG	Grams/Mile

Car & Driver 40K MI Road Test

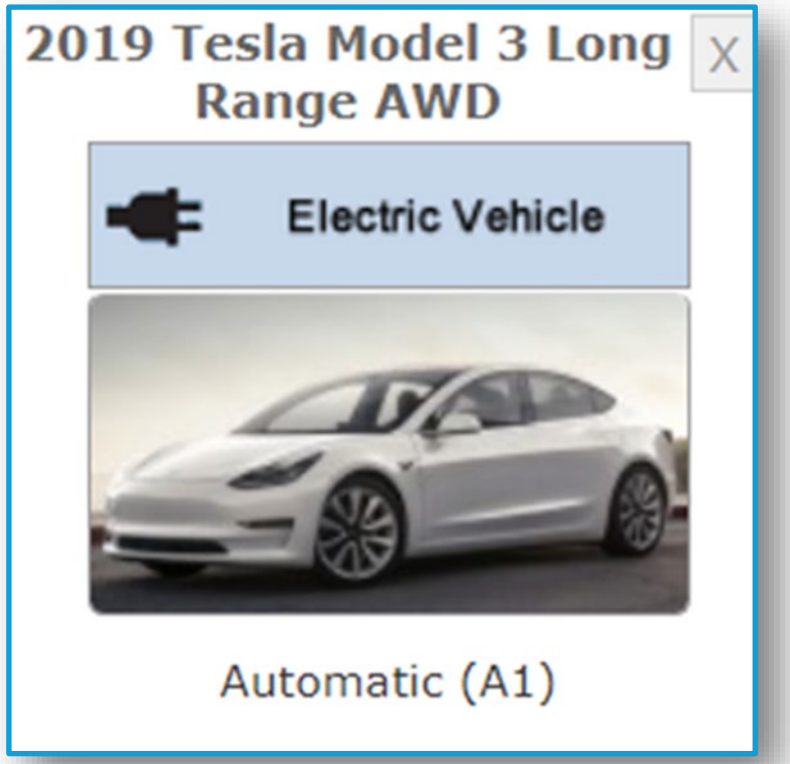
E72 – Flex Fuel



230	167	26.4	176
Range/Miles	Grams/Mile	MPG	Grams/Mile

Car & Driver 40K MI Road Test

E85 – Flex Fuel



230

Range/Miles

167

Grams/Mile

Car & Driver 40K MI Road Test

26.4

MPG

112

Grams/Mile

E85 w/Low CI Ethanol

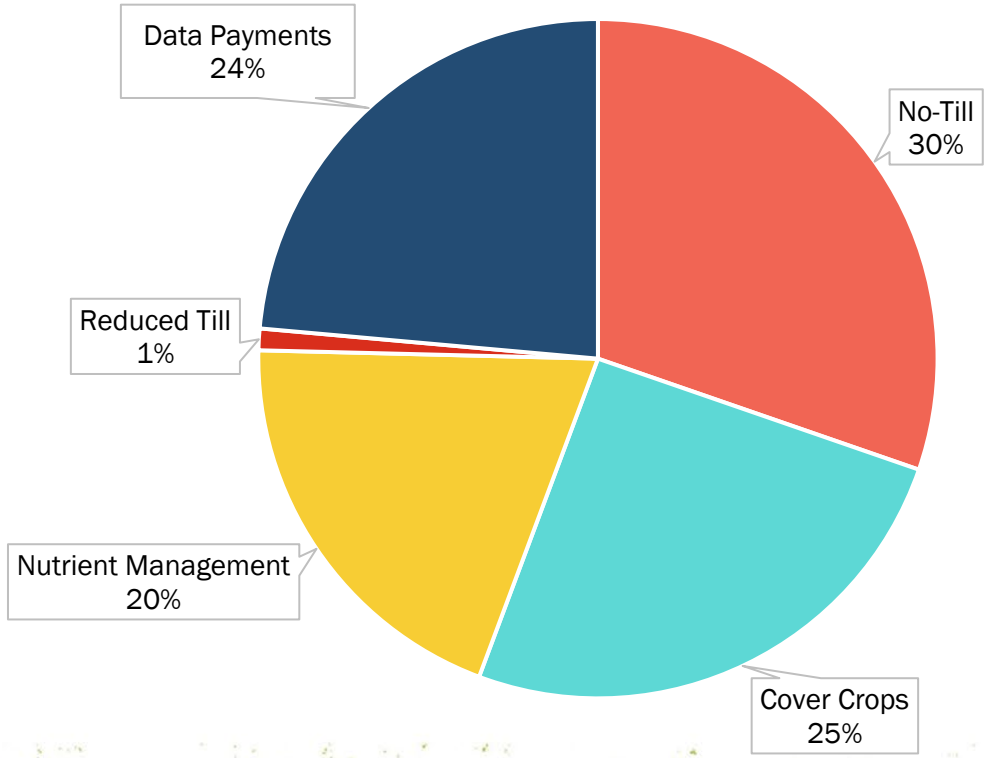
Policy Benefits for Ethanol (45Z and More)

- 45Z tax credit rewards low-carbon ethanol starting 2025
- Encourages CI reduction investments: CCS, renewables, efficiency
- Improves U.S. competitiveness in global low-carbon fuel markets
- Supports lower-cost ethanol vs gasoline domestically and abroad
- Positions ethanol as a key climate solution in aviation and ground fuels

SD RCPP Acres by Practice Type

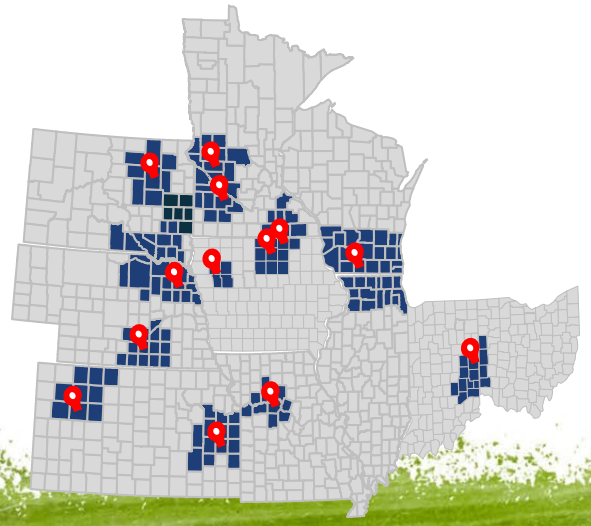
Total of 27,640 Acres Under Contract

- No-till: **8,375 acres**
- Cover Crops: **7,018 acres**
- Nutrient Management: **5,446 acres**
- Reduced Till: **284 acres**
- Data Payments: **6,517 acres**

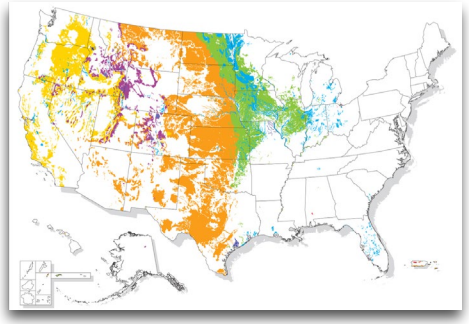


10-State RCPP Designed to Improve Existing Soil Models Used for Clean Fuel Markets and 45Z

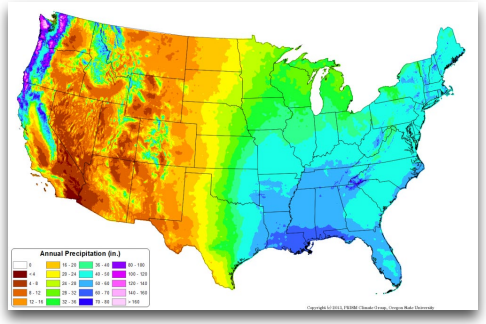
- Crop type, precipitation, soil type and temperature impact low-carbon feedstock practice GHG benefits
- ACE partnership with USDA and DoE designed to decrease perceived risks of ”over-valuing” GHG benefits inherent in 40B, State LCFS, and voluntary carbon markets
  - **45Z extension in Reconciliation legislation**
  - Could be worth hundreds of millions if farm level practices are included
  - RCPP project designed to facilitate access



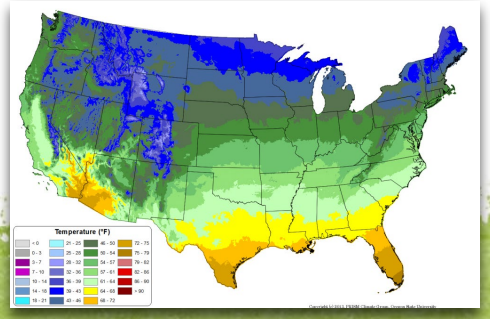
Soil Type



Precipitation



Temperature



SD RCPP Results Validate Project Value to More Accurate Carbon Credits

RCPP project field level reports show improved soil health and productivity after conservation practice adoption

RCPP project ensemble modeling improves accuracy by 50%