A Clean Fuel Policy for the MW?

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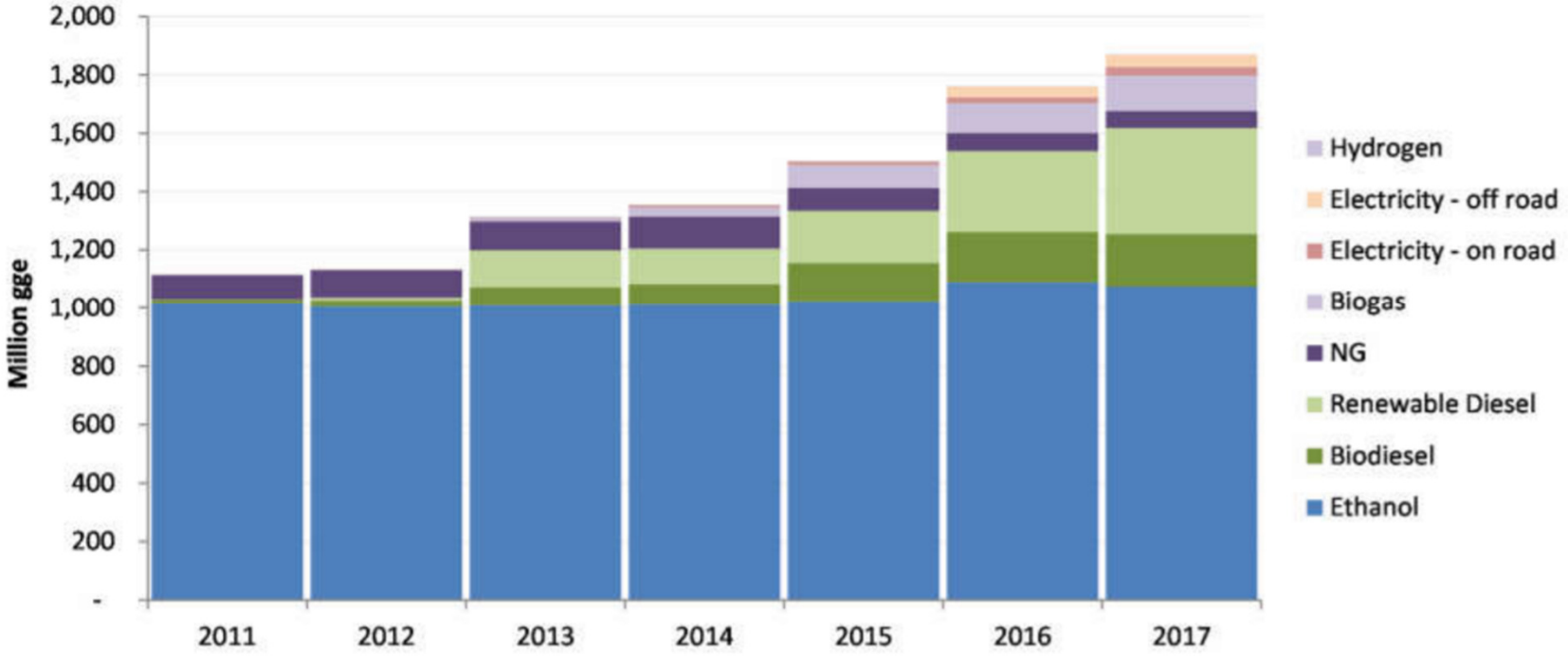
Clean Fuel Policy/LCFS Background

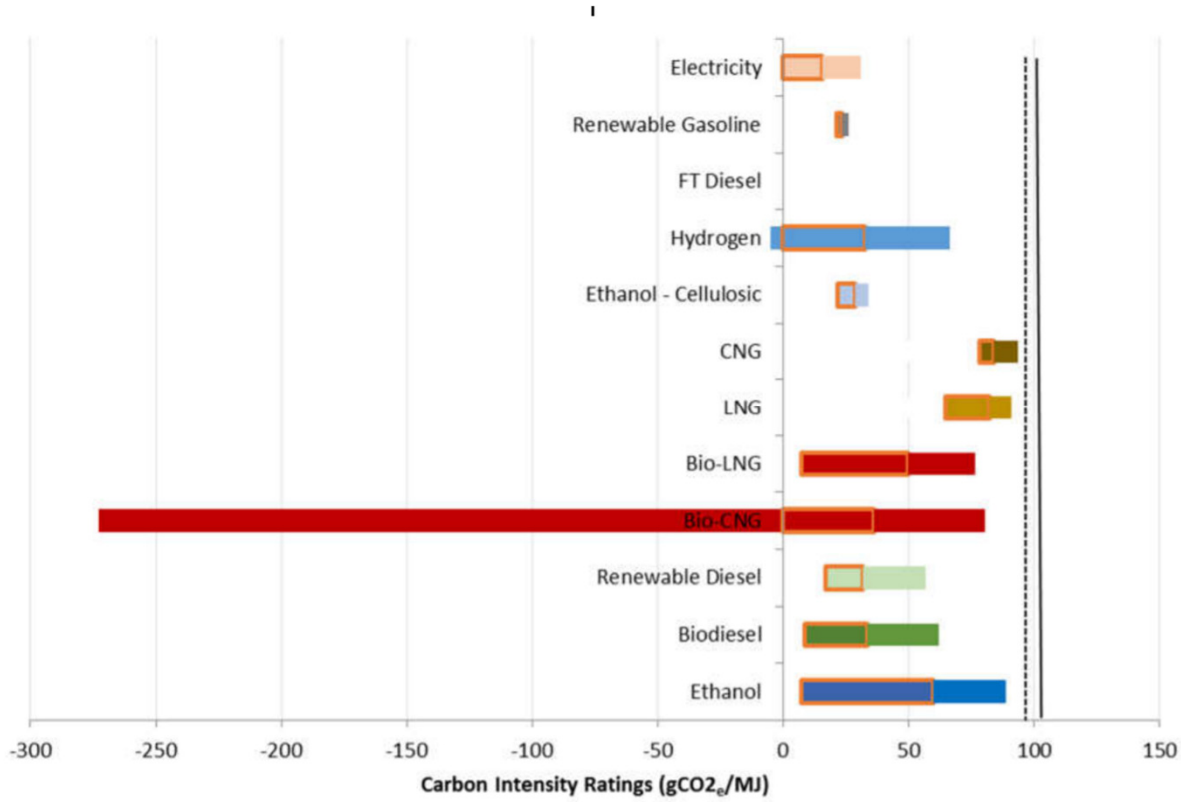
- Require average carbon intensity reductions for all transportation fuels
  - Higher carbon fuels pay
  - Lower carbon fuels receive payment
- Seeks to encourage deployment of a portfolio of low carbon fuels
- Based on full lifecycle carbon intensity
- More and more jurisdictions – CA, OR, WA, Canada, Brazil
- VS RFS:
  - Rewards carbon intensity reductions (not just volumes)
  - Rewards innovation by all fuel producers, including conventional biofuels
  - All facilities have a unique "score" and receive more incentive for a lower score.

CA Low Carbon Fuels



Source: UC Davis Institute of Transportation Studies. "Status Review of California's Low Carbon Fuel Standard, 2011-2018. September 2018.

California fuel pathways



Source: UC Davis Institute of Transportation Studies. "Status Review of California's Low Carbon Fuel Standard, 2011-2018. September 2018.

2019 vs 2010 – changing perceptions about the policy

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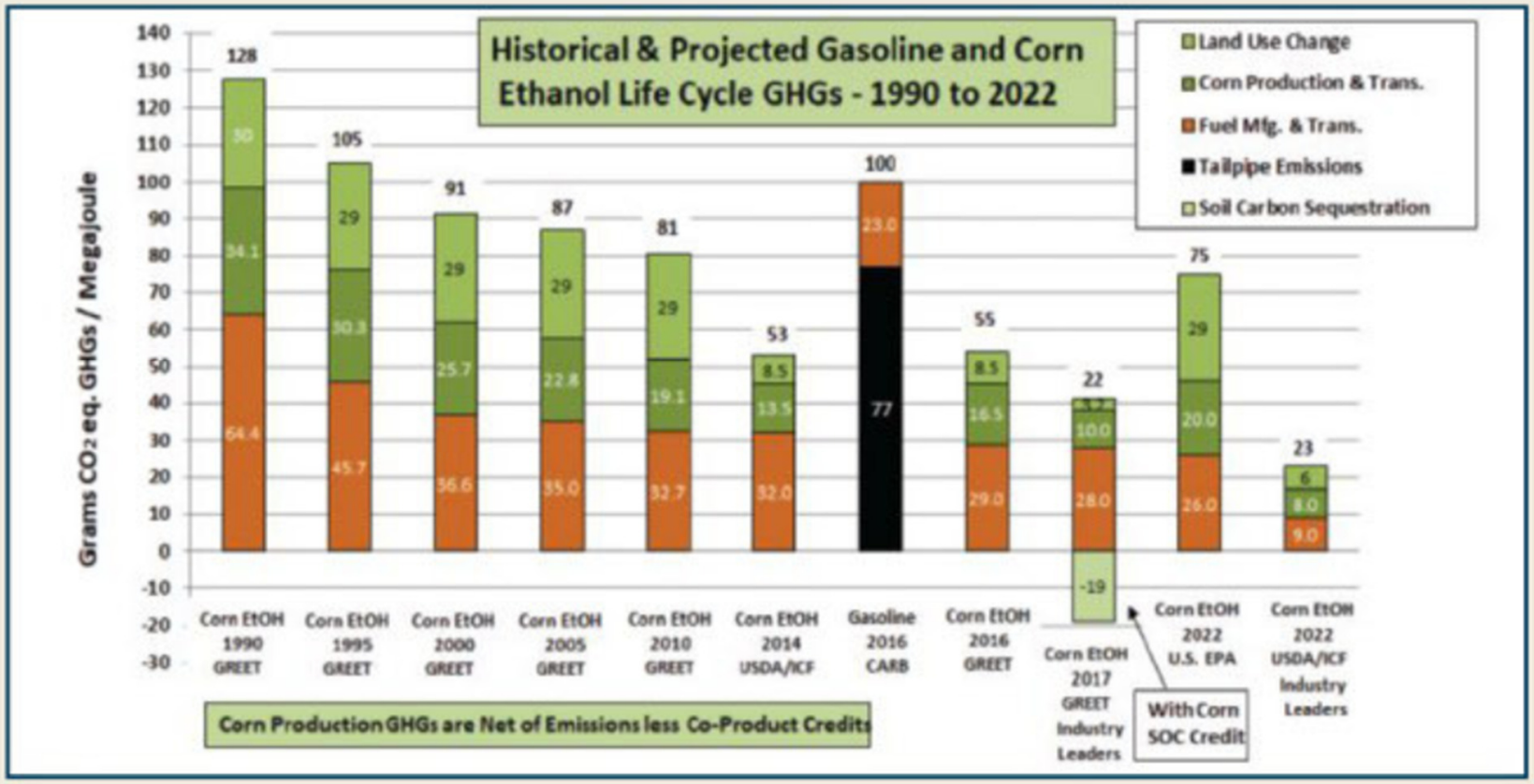
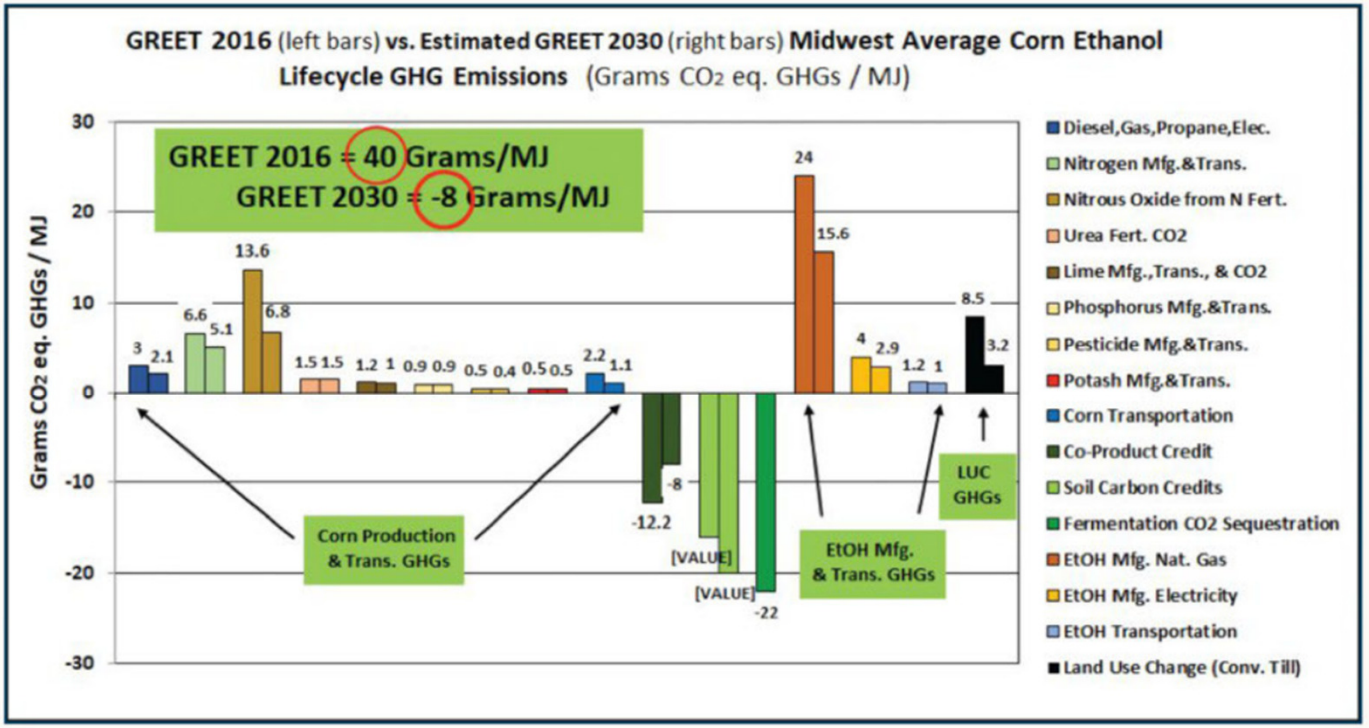
Figure 2. Historical and Projected Gasoline and Corn Ethanol Lifecycle GHGs – 1990 to 2022



Negative Carbon Corn Ethanol?

A Comparison of 2016 Corn Ethanol Carbon Intensity and Estimated 2030 Carbon Intensity



Zero Carbon corn ethanol is being produced right now on some farms and ethanol plants and will likely be commonplace by 2030

Midwestern Clean Fuels Vision

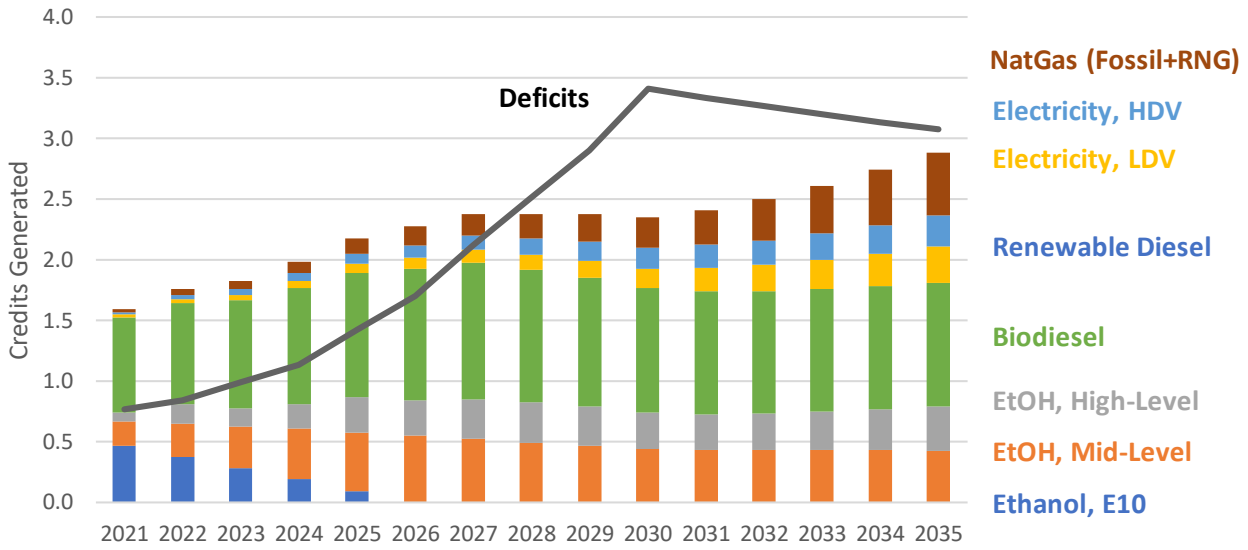
- Supports a portfolio of clean fuels, including biofuels, EVs, low carbon conventional fuels, and other clean fuel options.
- Achieve GHG reductions from transportation fuels over time through a technology neutral policy that balances economic development and carbon intensity.
- Fuels evaluated with a consistent, science and engineering based, updated, and inclusive GHG LCA framework.
- Make improvements across a variety of environmental outcomes beyond GHG reduction, including water quality, air quality, and soil quality.
- Broad economic benefit from investment in lower carbon fuels.
- Improvements in public health.
- Increased energy security from increased reliance on clean fuels produced in the Midwest

Unique MW approach in AT LEAST these areas

- Electricity accounting (indirect accounting, utility-specific)
- Customized farming practices
- Argonne ILUC
- Investments in soil health and water quality

Each state will develop its own approach, the group will make high level recommendations for the Midwest

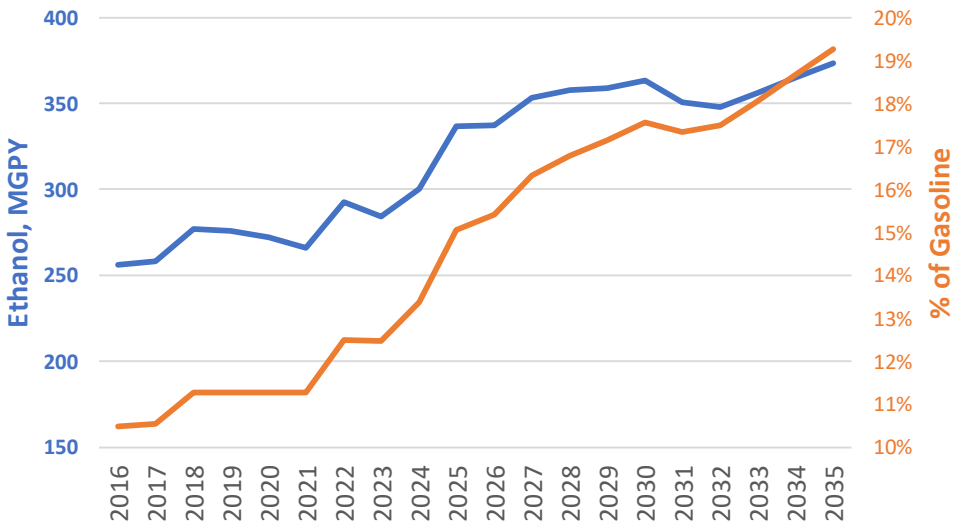
DRAFT MODELING RESULTS - Overview of Compliance Approach in the Midwest



Source: ICF research conducted for Great Plains Institute and American Coalition for Ethanol

DRAFT Scenario Modeling for the Midwest — Ethanol

- Two types of reductions:
  Higher blending + Upstream Reductions
- Higher blending: Low Level Blends (E10), Mid Level Blends (E15-E30), and High Level Blends (E85)
- Driving reductions:
  - Transition to Mid Level Blends (E15+)
  - Growth in E85
  - Transition to lower carbon ethanol from implementation of upstream agronomic practices
- Overall effective blend rate: 17% in 2030, 19% in 2035
- Average CI: About 40 g/MJ (30% decrease from base year)



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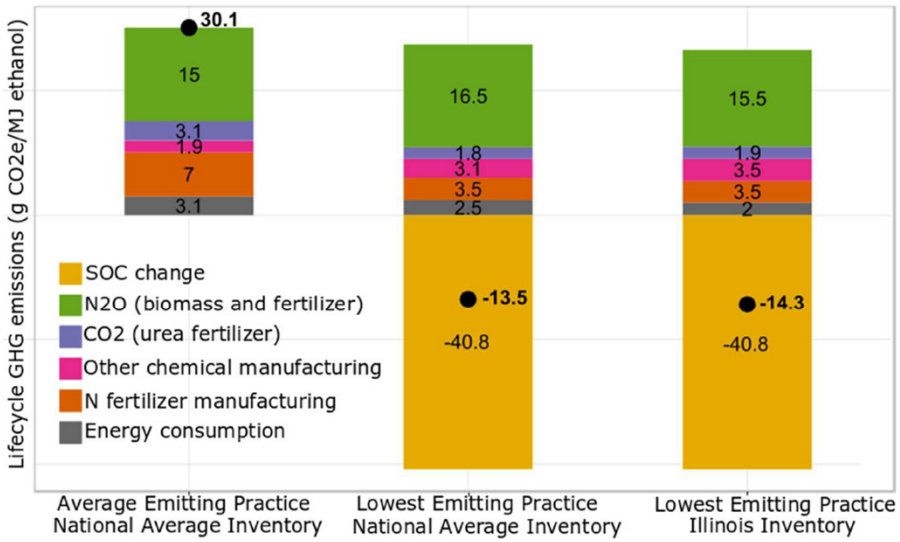
Potential for farming practices to lower CI

State-level corn ethanol LCA plus SOC



- Best practice: yield increase, rye and vetch CC (with N credit), no till, 100% stover return, manure application, N inhibitor application, improved genetic corn
- N_2O emission has contributed to 50% of the cradle-to-farm gate GHG emissions
- The best practice can result in 40.8 g CO_2e sequestration in the form of SOC

Source: Argonne National Laboratory

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