#### **GEN-1 ETHANOL OPPORTUNITIES:**

#### Improving Lifecycle GHG Benefits of Existing Biofuel Production

Scott Richman Renewable Fuels Association



#### Heightened Focus on Net-Zero Emissions

California Executive Order Requires Zero-

**Emissions Vehicles by 2035** 

SEPTEMBER 25, 2020 BY ALYSSA DANIGELIS

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Joe Biden's \$5T climate plan: Net zero emissions by 2050

By BILL BARROW June 4, 2019

#### Biden order requires net-zero federal government emissions by 2050

A White House fact sheet said the order will direct federal agencies to derive electricity from carbon-free sources by 2030.



President Joe Biden's order to hit net-zero emissions could eliminate a sizable chunk of planet-heating emissions from the world's No. 2 contributor to climate change. | Anna Moneymaker/Getty Images

By ZACK COLMAN 12/08/2021 02:59 PM EST

WHITE HOUSE









## RFA Members Have Responded



July 27, 2021

The President The White House 1600 Pennsylvania Avenue, N.W. Washington, D.C. 20500

Dear Mr. President,

As members of the Renewable Fuels Association (RFA), we share your vision for decarbonizing the transportation fuels sector and we applaud your commitment to addressing climate change. We support your goals of achieving a 50 percent reduction in U.S. greenhouse gas (GHG) emissions by 2030 and reaching net zero emissions economywide by 2050.

Low-carbon renewable fuels like ethanol are already helping our nation confront climate change by significantly reducing GHG emissions from the transportation sector. In fact, since 2008, the use of ethanol and other renewable fuels in the United States has prevented nearly 1 billion metric tons of GHG from entering the atmosphere.

Today's ethanol already reduces GHG emissions by 52 percent, on average, when compared directly to gasoline. Furthermore, many of us are already producing advanced and cellulosic ethanol that is certified by the California Air Resources Board as providing a 65-75 percent GHG reduction compared to gasoline."

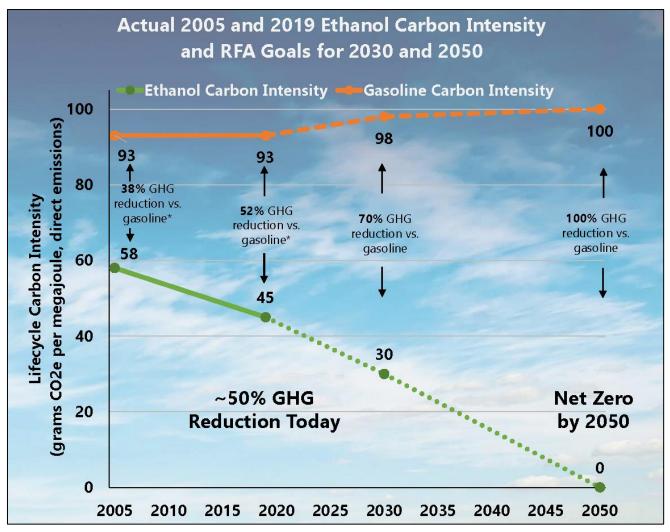
But given the urgency of the climate crisis and the need to reasonably decarbonize, we can—and must—do more. Therefore, the producer members of the Renewable Fuels Association are committing today to the pursuit of the following carbon performance goals:

- By 2030, ensure that ethanol reduces GHG emissions by at least 70 percent, on average, when compared directly to gasoline. This equates to a 33 percent reduction in ethanol's average carbon footprint from 45 grams CO<sub>2</sub>-equivalent per megajoule (g/MJ) today<sup>™</sup> to about 30 g/MJ by 2030.
- By 2050, ensure that ethanol achieves net zero lifecycle GHG emissions, on average. As ethanol producers continue to adopt carbon capture, utilization, and sequestration (CCUS) and other low- and no-carbon technologies between 2030 and 2050, U.S. ethanol can achieve net carbon neutrality, on average, by mid-century or even sooner.

- Pledge by RFA producer-members:
  - By 2030, ensure ethanol reduces GHG emissions by at least 70%, on average, compared directly to gasoline.
  - By 2050, ensure ethanol achieves netzero lifecycle GHG emissions, on average.



#### Progress to Date ... and the Road Ahead



\*Lee, U., Kwon, H., Wu, M. and Wang, M. (2021), Retrospective analysis of the U.S. corn ethanol industry for 2005–2019: implications for greenhouse gas emission reductions. *Biofuels, Bioprod. Bioref.*, 15: 1318-1331.



#### Case Study: Western Plains Energy

- WPE (Oakley, KS) recently installed a
  2.7 MW wind turbine
  - Goal to offset 50% of the plant's annual electrical load
- First in a series of decarbonization projects WPE has identified, with a goal of producing carbon-neutral fuel
- "Every kilowatt-hour that we use from the wind turbine has a direct effect on decarbonizing our production process"
  - Derek Peine, General Manager





#### Case Study:

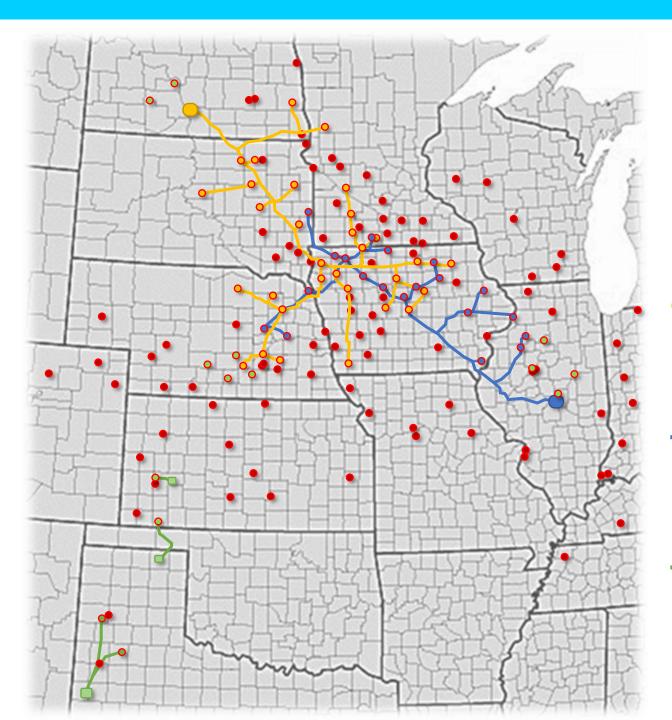


- Dakota Ethanol (Wentworth, SD) was selected for USDA's Regional Conservation Partnership Program
  - Climate-smart agriculture practices (no-till, cover crops and nutrient management) for farmers supplying corn to the facility
  - Potential premium of \$0.40/bushel
- "Properly structured clean fuel policies can incentivize significant GHG contributions from the farmers who supply our corn. Compensating the 500 farmers in Dakota Ethanol's grain shed to lower the carbon intensity of their corn production ... would result in significant climate and economic benefits."
  - Scott Mundt, CEO

### **Case Study:**



- Undertaking interconnected projects to supply low-carbon biofuels, including ethanol from its facility in Keyes, CA
  - Completing a 36-mile pipeline to source biogas from dairy digesters
    - Using at ethanol facility and upgrading for sale as RNG
    - Facility also sells distillers grains to dairy producers
  - Carbon Zero initiative to convert below-zero-carbon feedstocks into liquid renewable fuels
    - Bought site for a renewable diesel and SAF production facility
      - Feedstock to include distillers corn oil from Keyes ethanol plant
      - Plan for sugars from waste wood to be extracted and trucked to ethanol plant
  - Conducted a study that estimated 1 MMT of CO<sub>2</sub> can be sequestered in underground saline formations near Keyes facility



# Carbon Capture and Sequestration (CCS)

- Roughly half of ethanol biorefineries are moving forward with plans for CCS
- Can cut 25-35 g CO<sub>2</sub>/MJ off CI score
  - **Summit Carbon Solutions** pipeline route (proposed)
  - Biorefineries providing CO<sub>2</sub> to SCS pipeline
  - SCS sequestration site (proposed)
    - Navigator CO<sub>2</sub> Ventures pipeline route (proposed)
  - Biorefineries on Navigator pipeline route
  - Navigator sequestration site (proposed)
    - Other CO<sub>2</sub> pipeline routes (active or proposed)
  - Other biorefineries with CCS (active or proposed)

**ASSOCIATION** 

Other sequestration sites

#### RFA "Pathways to Net Zero" Study

- Identified and analyzed impacts of actions to allow industry to achieve net-zero emissions by 2050, including:
  - Conservation tillage;
  - Renewable energy usage on farms and at ethanol facilities;
  - Enhanced facility efficiency;
  - Conversion of corn kernel fiber;
  - · Increased sales of wet distillers grains; and
  - Carbon capture and sequestration.
- Expect report to be released this month.



#### Thank You!

