



ETHANOL: A Cleaner Alternative for the Global Market

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FUEL ETHANOL LABORATORY CONFERENCE — 2022



Nebraska Ethanol Board

AGENDA

- Nebraska Ethanol Board
- Ethanol as a clean fuel
- Ethanol as a renewable chemical
- Summary



Nebraska Ethanol Board

**NEBRASKA ETHANOL BOARD
(NEB)**



Nebraska Ethanol Board

NEBRASKA ETHANOL BOARD

- Formed through Legislation originally in 1971
- Gone through several name/mission changes
 - Agriculture Products Industrial Utilization Committee (APIUC)
 - Nebraska Gasohol Committee
 - Nebraska Ethanol Authority & Development Board
 - Nebraska Ethanol Board
- The NEB is the **ONLY** state government agency devoted solely to the development of the ethanol industry in the country!

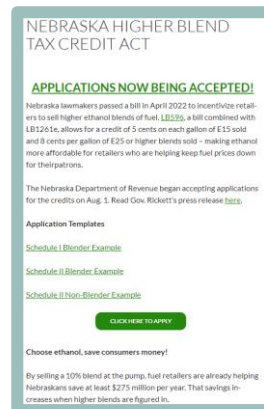
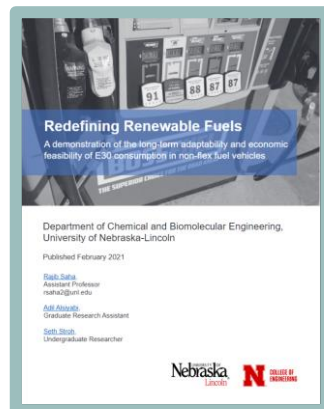
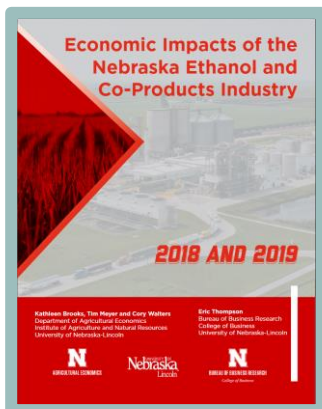


NEBRASKA ETHANOL BOARD OBJECTIVES

- **Encourage processing, market development, promotion, distribution, and research on products derived from the manufacture of ethyl alcohol**
- **Expand demand for and usage of the state's agricultural production**
- **Encourage the production of efficient and less-polluting fuel sources to reduce toxic emissions**
- Retain energy dollars in the Nebraska economy and to increase jobs and tax revenue
- Develop alternative local outlets for Nebraska's agricultural production
- Cooperate with private industry to establish ethanol-related production facilities in NE
- **Develop markets, in cooperation with private industry, for products from these facilities**
- **Sponsor research in the areas of production as well as industrial and commercial uses for ethanol and its co-products**
- Educate and inform policy makers, regulators and the general public about the benefits of the ethanol industry

NEBRASKA ETHANOL BOARD PROJECTS

- E30 Demonstration
- Higher Blends Infrastructure
 - USDA HBIIP Assistance
 - Nebraska Higher Blends Tax Credit Act
- GHG Modeling Advising/Research
- Export Market Growth
- Renewable Chemicals & Bioeconomy Development



HBIIP 101

Increase access to healthier fuels

HIGHER BLENDS INFRASTRUCTURE INCENTIVE PROGRAM (HBIIP)

APPLY NOW!

Opened August 23, 2022, Closes November 21, 2022, 3:30 p.m. CST.

The [USDA](#) is targeting resources and investments, including ethanol and biodiesel, to improve the strength and resiliency of America's sustainable fuel markets. Through the Higher Blends Infrastructure Incentive Program (HBIIP), transportation fueling and fuel distribution facilities will be able to apply for grants to help install, retrofit, and/or upgrade fuel storage, dispenser pumps, related equipment and infrastructure to be able to sell ethanol and biodiesel.

ETHANOL AS A CLEAN ALTERNATIVE

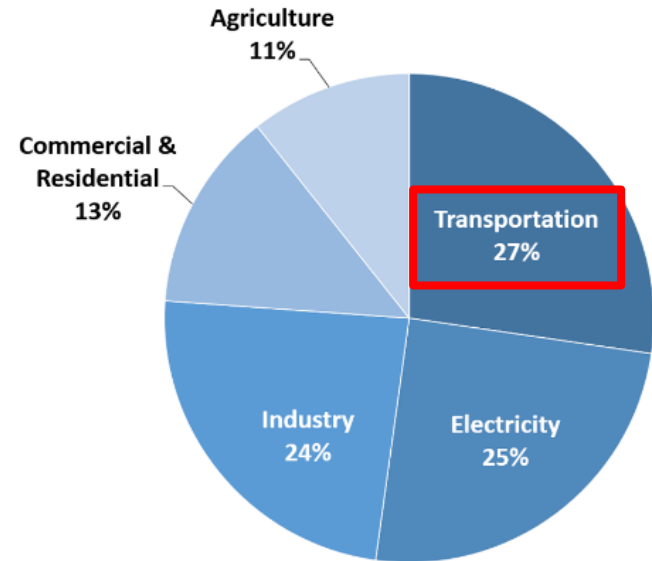


Nebraska Ethanol Board

U.S. EMISSIONS PROFILE

- According to the U.S. EPA, *human activities are responsible for almost all of the increase in greenhouse gases in the atmosphere over the last 150 years*
- Transportation has overtaken other sectors as the highest polluter
- Ethanol has a key role to play in reducing the emissions of each of these sectors

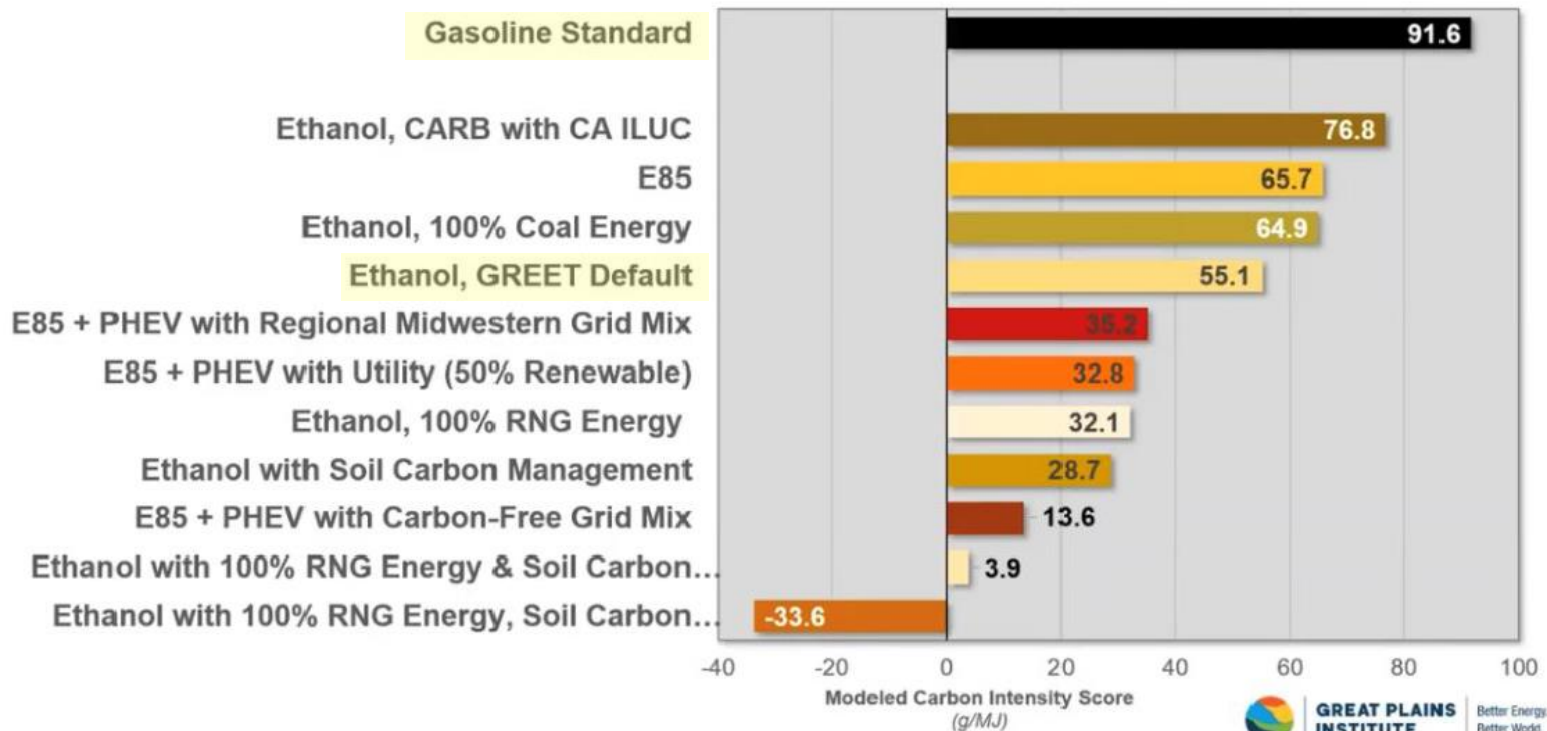
Total U.S. Greenhouse Gas Emissions
by Economic Sector in 2020



Source: US EPA – Sources of Greenhouse Gas Emissions Overview

CARBON INTENSITY (CI)

Carbon intensity (CI) scores of ethanol pathways compared to gasoline standard



**GREAT PLAINS
INSTITUTE**

Better Energy.
Better World.

ETHANOL AS A CLEAN FUEL



Nebraska Ethanol Board

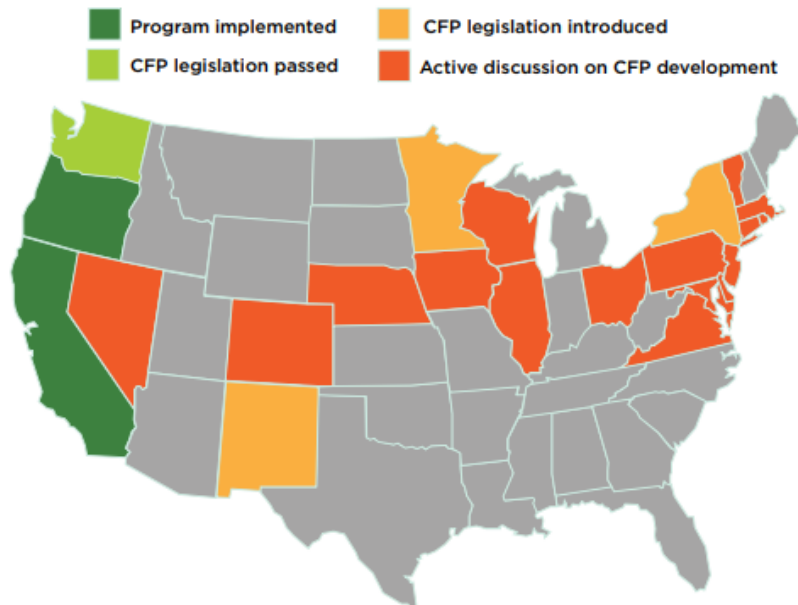
CLEAN FUELS OPPORTUNITIES

- **Higher Blends in Gasoline**
 - Mid-Level Blends (E15, E25 & E30)
 - Breaking the “blend wall”
 - 15BGY = 10.34% blend rate
 - Flex Fuel (E85)
- **Sustainable Aviation Fuel (SAF)**
 - Sustainable Aviation Fuel Grand Challenge
 - 3 billion gallons by 2030
 - Alcohol-to-jet (ATJ) pathway
 - Total aviation fuel market is ~21+ BGY
- **Heavy-Duty Transportation Industry**
 - Renewable diesel via corn oil
 - Diesel engines may be modified for direct use of ethanol
 - Total diesel fuel market is ~47+ BGY



CLEAN FUELS POLICIES (U.S.)

STATE ACTIVITY ON LOW CARBON AND CLEAN FUEL STANDARDS



State and Regional Clean Fuel Programs

- **California:** Active Low Carbon Fuel Standard since 2010.
- **Oregon:** Active Clean Fuels Program since 2016.
- **Washington:** Clean fuel program signed into law in May 2021.
- **New York, New Mexico and Minnesota:** Legislatures considered clean fuel legislation in 2021.
- **Nevada:** State energy and environmental agencies are considering adoption of clean-fuel policy.
- **Colorado:** A 2018 executive order directed adoption of California's low-emission vehicle standards; the Colorado Energy Office is evaluating a clean fuel standard.
- **Midwest states:** Ongoing stakeholder discussions underway regarding feasibility and design of a state or sub-regional program. Wisconsin and Illinois governors recommend adoption of a clean fuel standard. Ohio has formed the Clean Fuels Ohio coalition to push for CFS adoption.
- **Northeast/Mid-Atlantic:** Ten states and the District of Columbia are exploring a regional CFP.

CLEAN FUELS POLICIES (U.S.)

- Clean fuels philosophy is gaining federal traction!
- Inflation Reduction Act (2022)
 - Clean Fuel Producer Credit (2025 – 2027)
 - Valued at \$0.50/gal to \$1.00/gal depending on CI
 - Minimum CI to hit for the credit is ~48 gCO₂e/MJ
 - Uses GREET Model for calculation of CI
- Driveclean Initiative
 - Push to implement a CFP at the national level
 - Many key industry stakeholders (below)



GLOBAL CLEAN FUELS POLICIES & OPPORTUNITY

- Many countries have environmental goals and energy security top of mind

Features > [News](#) [Biofuel](#) [Biofuels](#) [Cleantech](#) [News](#)

Canada's final Clean Fuel Regulations to incentivize low-carbon fuels production

July 6, 2022 By Maria Church

 United States Department of Agriculture
Foreign Agricultural Service

 **GAIN**
Global Agricultural
Information Network

Voluntary Report – Voluntary - Public Distribution

Date: March 24, 2022

Report Number: BR2022-0019

Report Name: Brazil Eliminates Import Tariffs for Ethanol through December 2022

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Ethanol Blog

United Kingdom to Expand Ethanol Blends from E5 to E10 by September

2/26/2021 | 12:21 PM CST

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White House Announces Japan Commits To Double Ethanol Demand

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India to launch 20% ethanol-mixed gasoline: Why it's important and what are the challenges

TIMESOFINDIA.COM / May 19, 2022, 15:20 IST

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GLOBAL CLEAN FUELS CONT'D

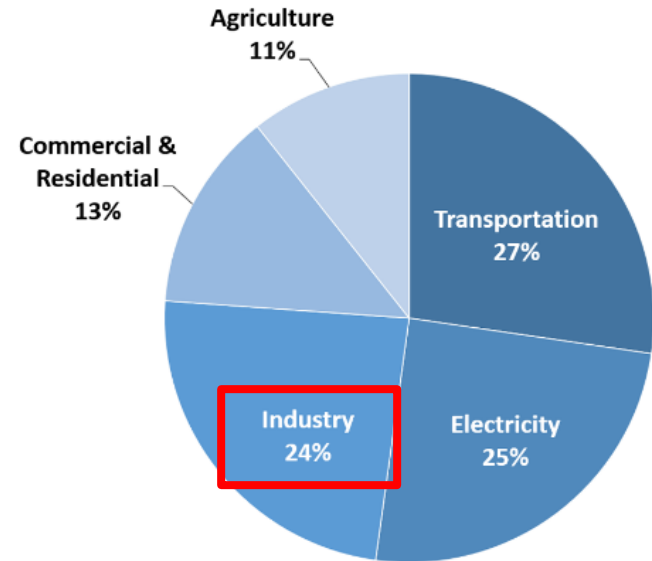
- **Canada**
 - 2022 Clean Fuel Regulations
 - Target 15% ethanol blended gasoline by 2030
- **India**
 - Target 20% ethanol blended gasoline
- **United Kingdom**
 - Increased national blend requirement from 5% to 10% in 2021
 - Target 15% blend by 2032
- **Brazil**
 - Need more conventional biofuels for meeting clean fuels demand during an industry growth period

	PREVIOUS MARKET YEAR (SEPTEMBER 2020 - JULY 2021)	CURRENT MARKET YEAR (SEPTEMBER 2021 - JULY 2022)
World Total	1,142,085,601 \$2,185,016,041	1,375,803,432 ^{↑ 20.5%} \$3,731,334,739
 Canada	319,404,956 \$691,863,661	413,462,202 ^{↑ 29.4%} \$1,288,068,294
 Korea, South	129,285,822 \$253,201,753	169,539,682 ^{↑ 31.1%} \$426,436,045
 European Union-27	81,570,691 \$190,439,680	133,080,588 ^{↑ 63.1%} \$340,196,116
 India	140,358,482 \$217,707,869	127,559,115 ^{↓ -9.1%} \$301,485,271
 Brazil	49,826,906 \$87,828,860	98,318,616 ^{↑ 97.3%} \$251,637,987
United Kingdom	12,737,155 \$27,700,718	82,386,504 ^{↑ 546.8%} \$201,521,068
 Mexico	33,751,814 \$67,464,251	67,778,072 ^{↑ 100.8%} \$165,542,953
 Nigeria	30,476,603 \$49,671,903	52,222,040 ^{↑ 71.4%} \$109,135,510
 Singapore	4,362,370 \$8,696,472	51,139,876 ^{↑ 1072.3%} \$129,230,808
 Peru	44,693,234 \$77,800,709	45,744,446 ^{↑ 2.4%} \$141,528,581

U.S. EMISSIONS PROFILE (AGAIN)

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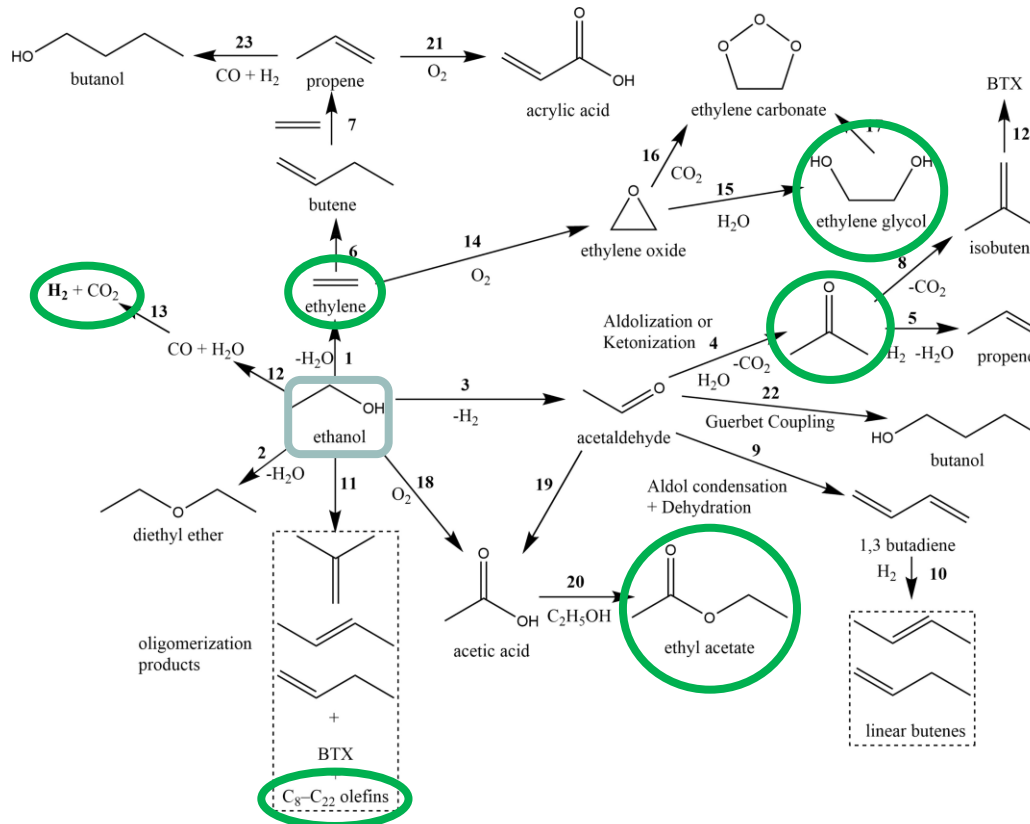
ETHANOL AS A RENEWABLE CHEMICAL



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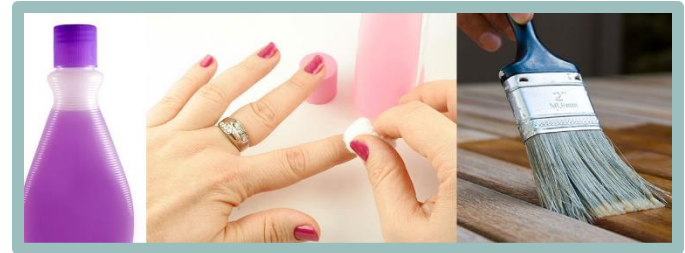
RENEWABLE CHEMICALS

- Ethanol is truly a “Building Block Molecule”



RENEWABLE CHEMICALS

- **Displacement of Petroleum-based Products**
 - Ethyl Acetate
 - Acetone
 - Plastics (LDPE/HDPE)
- **Intermediate Chemicals**
 - Ethylene
 - Nanolipid Particles
- **CO₂-based Chemistry & Markets**
 - Carbohydrate Fuels
 - CO₂ to alcohols
 - Beverages/Dry Ice/Fire Equipment
- **Green Hydrogen**
 - Green Ammonia (Fertilizer)
- **Synthetic Biology**
 - Ethanol technology may be used for synthetic materials



SUMMARY

ethanol.nebraska.gov | **402-471-2941**



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THANK YOU

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QUESTIONS?

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