



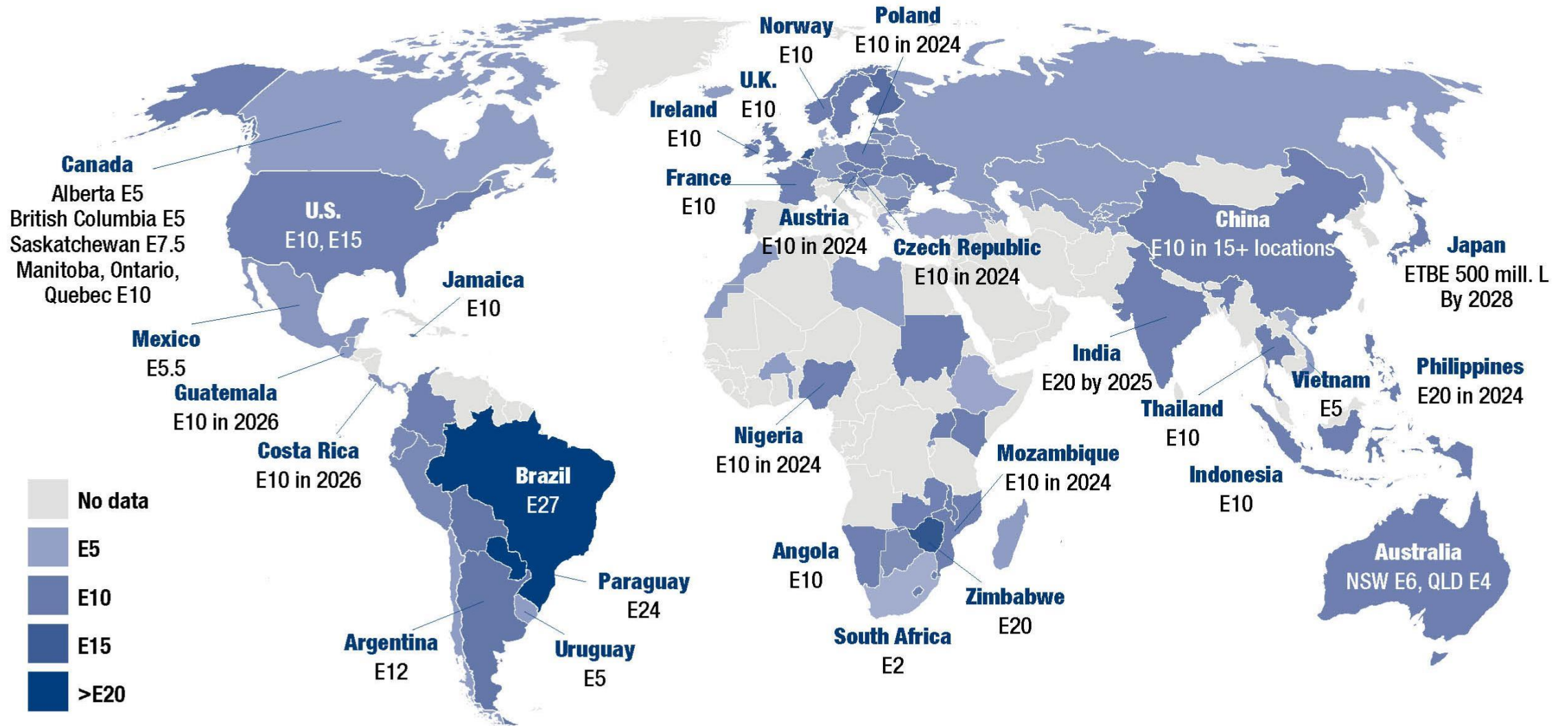
BIOETHANOL TRENDS

October 2024



U.S. GRAINS
COUNCIL

Blending Trends



Pathway to net zero emissions



➤ **The United Nations Framework Convention on Climate Change (UNFCCC)** invited the reduction of greenhouse gas emissions in the form of **Nationally Determined Contributions (NDCs)** in 2022.

➤ **Bioethanol** recognized substitute for fossil fuel with immediate emissions reduction noted in NDCs:

Canada “reducing emissions ...by increasing ethanol and biodiesel fuel content requirements.”

Colombia reports it “will use ethanol blends of E10.”

Costa Rica will limit “the use of fossil fuels, promoting energy efficiency, and innovation in energy sources.”

Indonesia reports it will use clean and renewable energy to meet reduction commitments.

Malaysia focuses on economy-wide carbon intensity reduction (against GDP) of 45% in 2030.

Clean Cooking is also reflected in 2022 NDCs and under consideration for 2025 NDCs.

➤ **New five-year NDCs** due in February 2025 for COP30 in Belém, Brazil, November 10-21, 2025.

Smart climate practices and **carbon capture and sequestration** continue to reduce the carbon intensity of bioethanol.

*Grams of carbon dioxide equivalent per megajoule (gCO₂e/MJ)

Recognized public health benefits



CLEANER AIR

- **Mitigates indoor and outdoor air pollution**
 - ✓ Lowers carbon monoxide emissions
 - ✓ Lowers nitrogen oxide emissions
 - ✓ Lowers hydrocarbon emissions
 - ✓ Lowers particulate matter

REPLACES TOXIC OXYGENATES

- **Methyl Tertiary Butyl Ether (MTBE)**
- **Benzene, Toluene, ethylbenzene, and Xylenes (BTEX)**
- MTBE and BTEX are **prohibited** or **severely restricted** in most **high-income economies** due to the high risk of air and ground water pollution. (Banned in the USA in 2007.)

BLEND BENEFITS

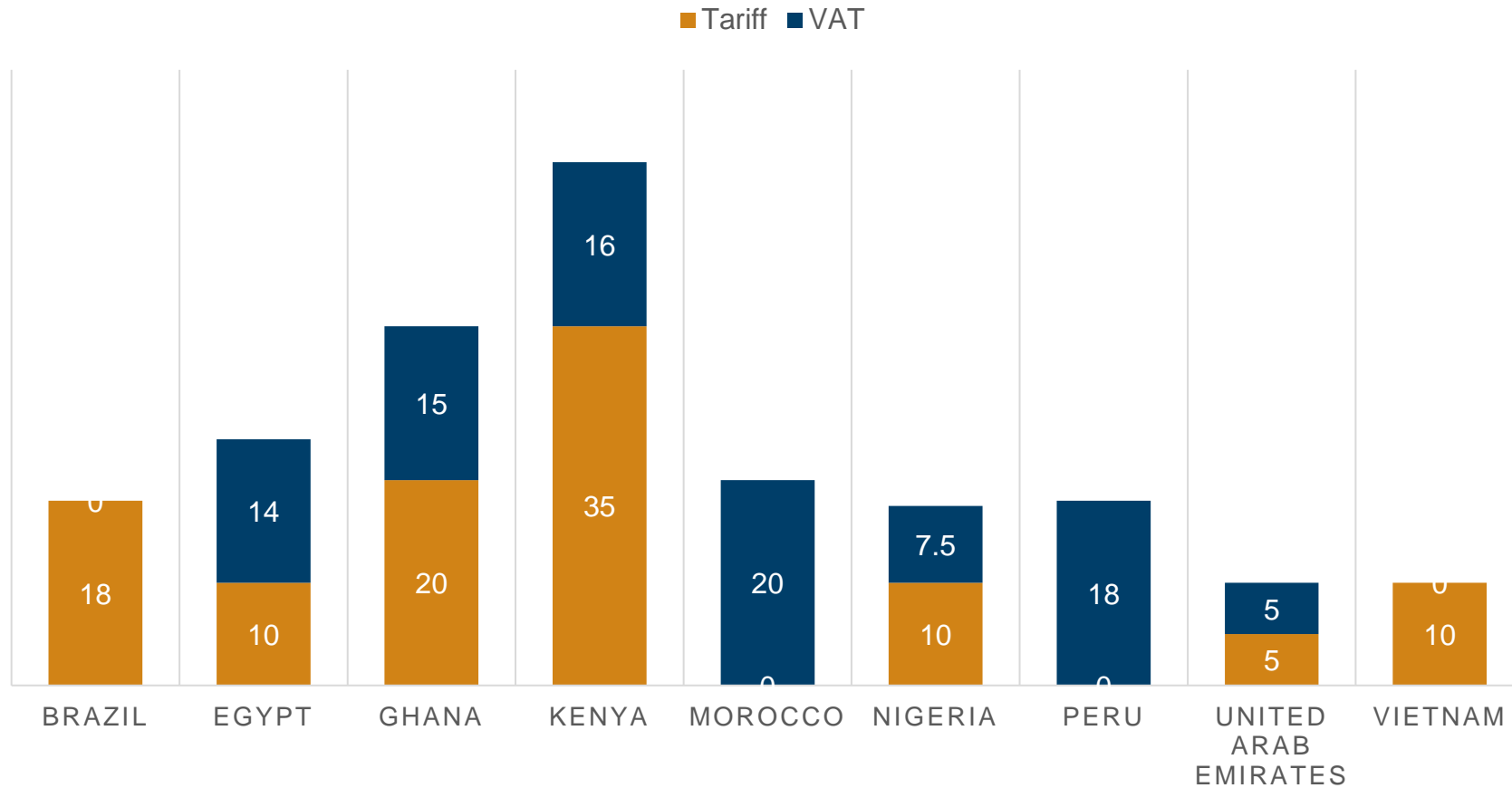
- The **higher** the ethanol blend percentage
 - ✓ The **lower** the **GHG emissions**
 - ✓ The **less use** of **toxic oxygenates**
 - ✓ The **less air and ground water pollution**

Source: World Health Organization. World Health Statistics 2024 monitoring health for the SDGs, sustainable development goals. 2024.

Tariffs and VAT place a premium on decarbonization



Figure 1: National tariff% and VAT% on HS 22072 denatured bioethanol



Source: U.S. Grains Council. Ethanol Market and Pricing Data. September 2024.



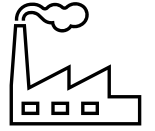
Behind the border standards implementation

Stages of standards adoption and implementation require concerted attention

<i>Standards Specifications</i>	<i>Adoption</i>	<i>Capacity building</i>	<i>Private sector using</i>	<i>Quality control of product</i>	<i>Marketplace functioning</i>
ASTM E3050-22	Denatured ethanol for use as cooking or appliance fuel				
ASTM D4806	Denatured fuel ethanol for blending with gasolines for use as automotive spark-ignition engine fuel				
ASTM D8011	Natural gasoline as a blendstock in ethanol fuel blends or as a denaturant for fuel ethanol				
ASTM D4814	Automotive spark-ignition engine fuel				
ASTM D5798	Ethanol fuel blends for flexible-fuel automotive spark-ignition				

BIOETHANOL

Production overview



COUNTRY	PRODUCTION RANKING	BIOETHANOL FEEDSTOCK
United States	1 (46.4%)	Maize
Brazil	2 (25.2%)	Sugarcane / Maize
China	3 (7.9%)	Maize / Cassava
European Union	4 (5.3%)	Sugar Beet / Wheat / Maize
India	5 (4.3%)	Molasses / Sugarcane / Maize / Wheat / Rice
Canada	6 (1.6%)	Maize / Wheat
Thailand	7 (1.4%)	Molasses / Cassava / Sugarcane
Argentina	8 (1%)	Maize / Sugarcane / Molasses
Paraguay	10 (0.5%)	Maize / Sugarcane
Colombia	13 (0.4%)	Sugarcane
Indonesia	18 (0.1%)	Molasses



UN Sustainable Goals



1 NO POVERTY

2 NO HUNGER

3 GOOD HEALTH

4 QUALITY EDUCATION

5 GENDER EQUALITY

6 CLEAN WATER AND SANITATION

7 RENEWABLE ENERGY

8 GOOD JOBS AND ECONOMIC GROWTH

9 INNOVATION AND INFRASTRUCTURE

10 REDUCED INEQUALITIES

11 SUSTAINABLE CITIES AND COMMUNITIES

12 RESPONSIBLE CONSUMPTION

13 CLIMATE ACTION

14 LIFE BELOW WATER

15 LIFE ON LAND

16 PEACE AND JUSTICE

17 PARTNERSHIPS FOR THE GOALS



Source: United Nations Sustainable Development Goals

The Council's Mission

Developing Markets

Enabling Trade

Improving Lives

