

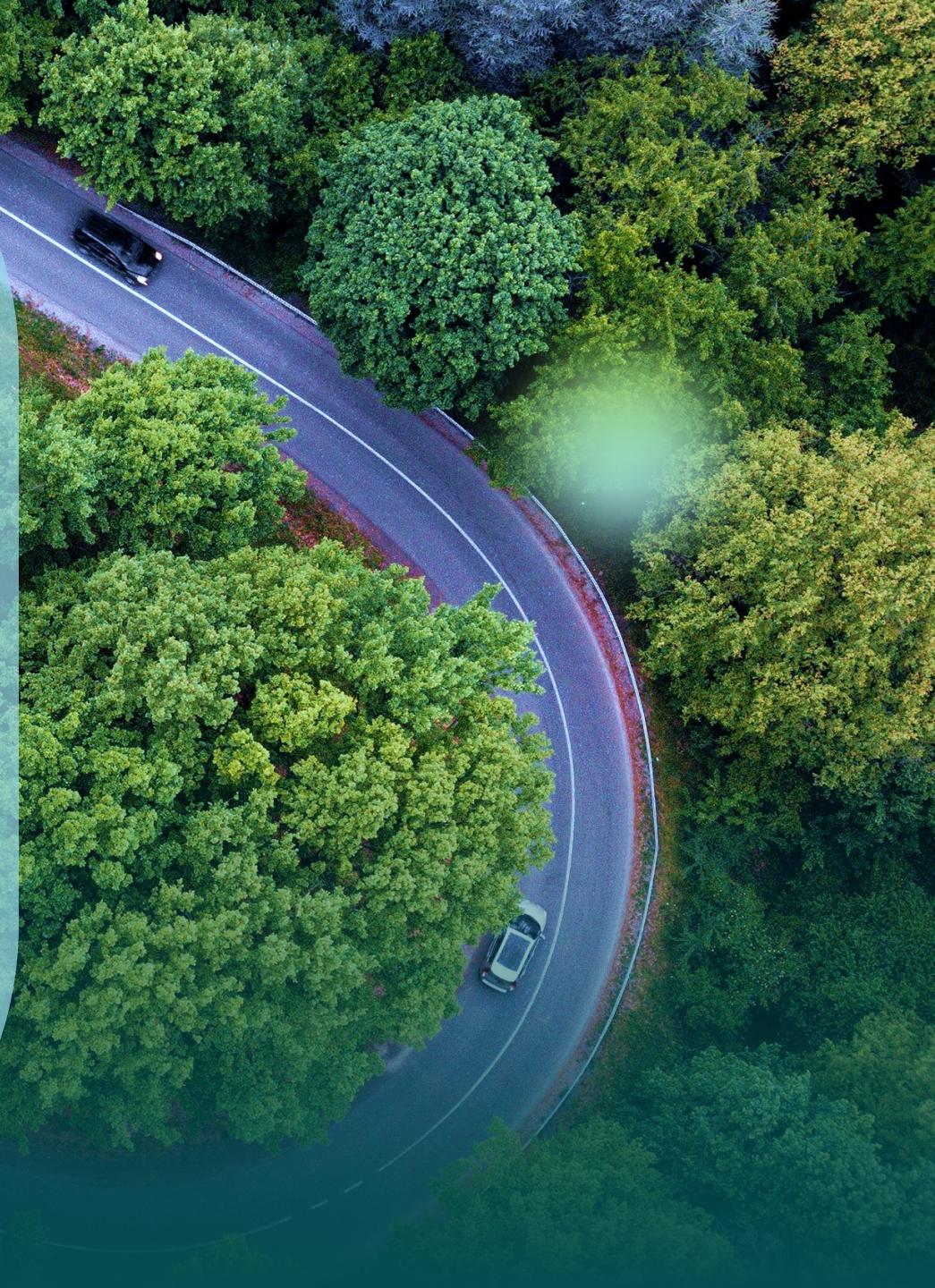
# DECARBONIZATION: Challenge of 21<sup>st</sup> Century

**Eduardo Leao de Sousa**

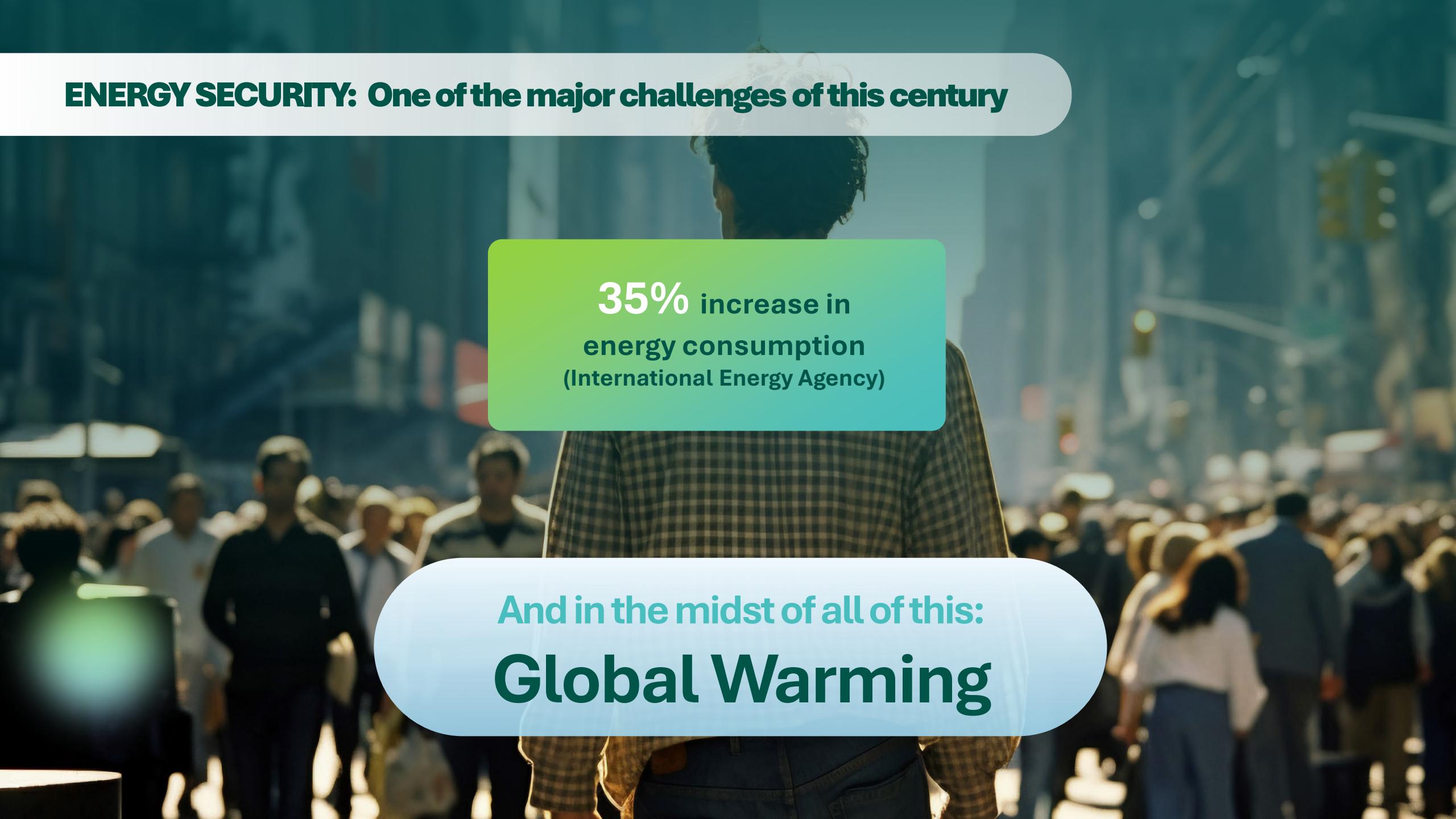
Director of Strategic Development and New Markets

**UNICA – Brazilian Sugarcane and Bioenergy Association**

**COP30 Japan Biofuel Webinar**



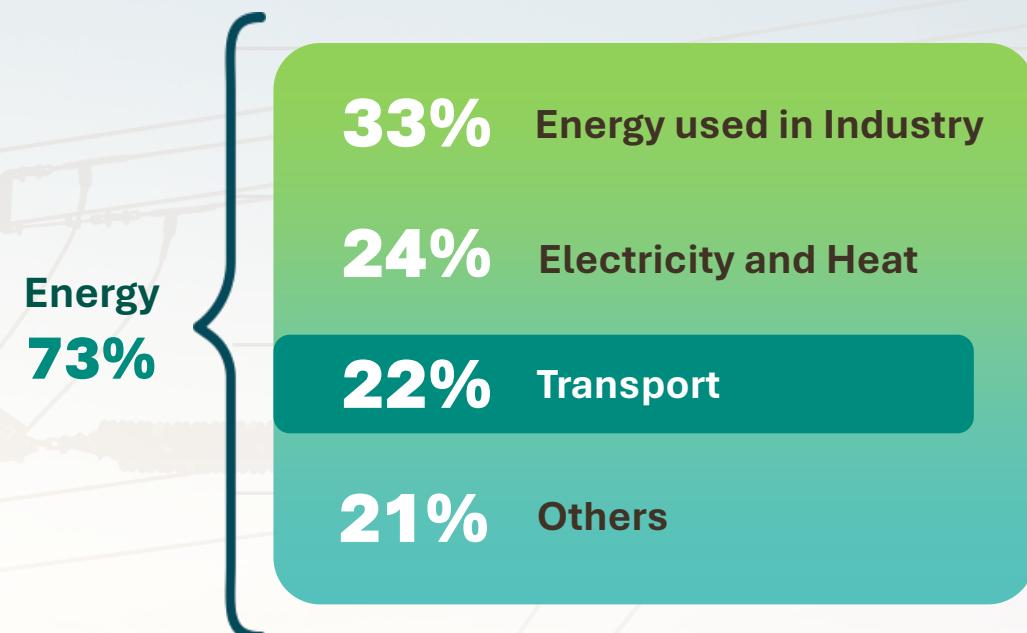
## ENERGY SECURITY: One of the major challenges of this century



35% increase in  
energy consumption  
(International Energy Agency)

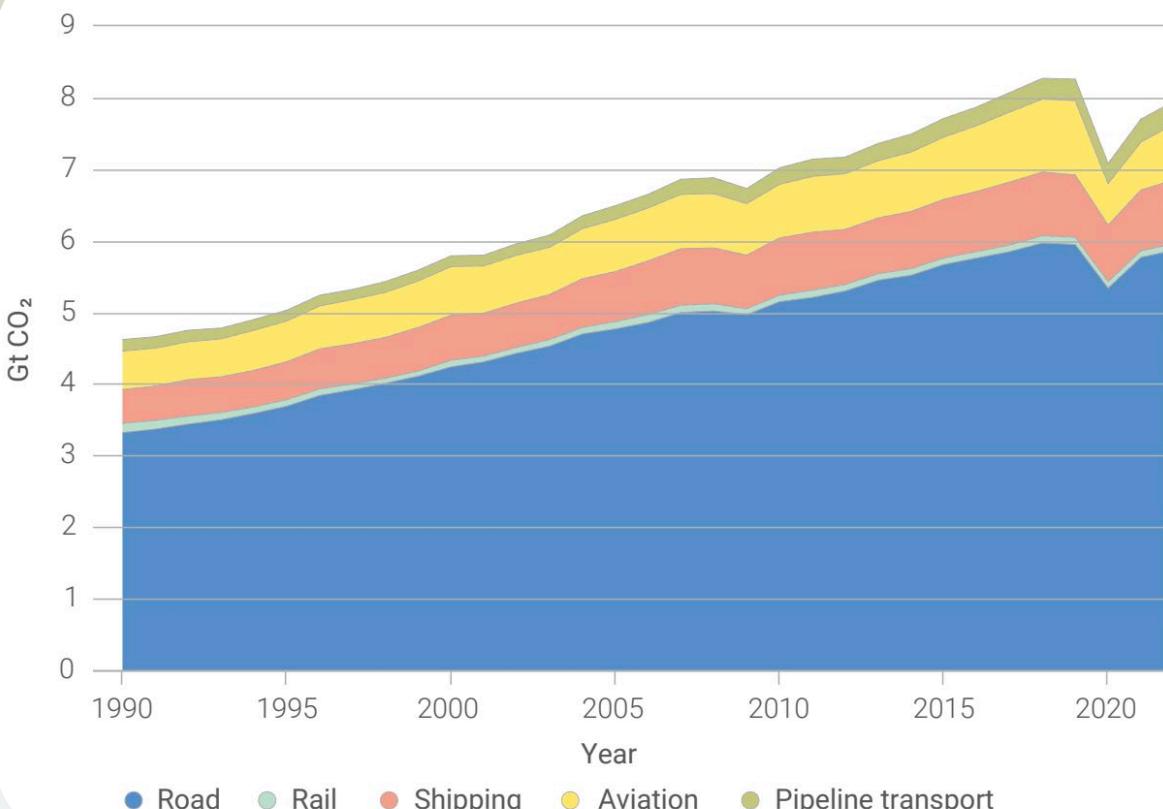
And in the midst of all of this:  
**Global Warming**

# ENERGY: 73% OF GLOBAL EMISSIONS OUT OF THIS: 22% TRANSPORT SECTORS



Source: Agroicone, based on IEA (2023); Ritchie et al. (2020).

# DISTRIBUTION OF CO<sub>2</sub> EMISSIONS BY THE TRANSPORTATION SECTOR GLOBALLY IN 2022 BY SUBSECTOR



**Road - 72% (16%)**  
**Maritime - 14% (3.0%)**  
**Aviation - 11% (2.5%)**

Source: [iea.org/energy-system/transport](http://iea.org/energy-system/transport)



**BIOFUELS**

**ready, economically viable, and scalable solution:**



**Road**

- Reduces emissions
- Creates Jobs
- Increases Revenue
- Enhances Diversification



**Maritime Transport**



**Sustainable Aviation Fuel**

# THE BRAZILIAN Experience



# Getting to a Petrol Station in Brazil



Vehicle that runs on both ethanol-blended fuel and pure ethanol (E100)  
All 42,000 gas stations with E100 available



# 45%

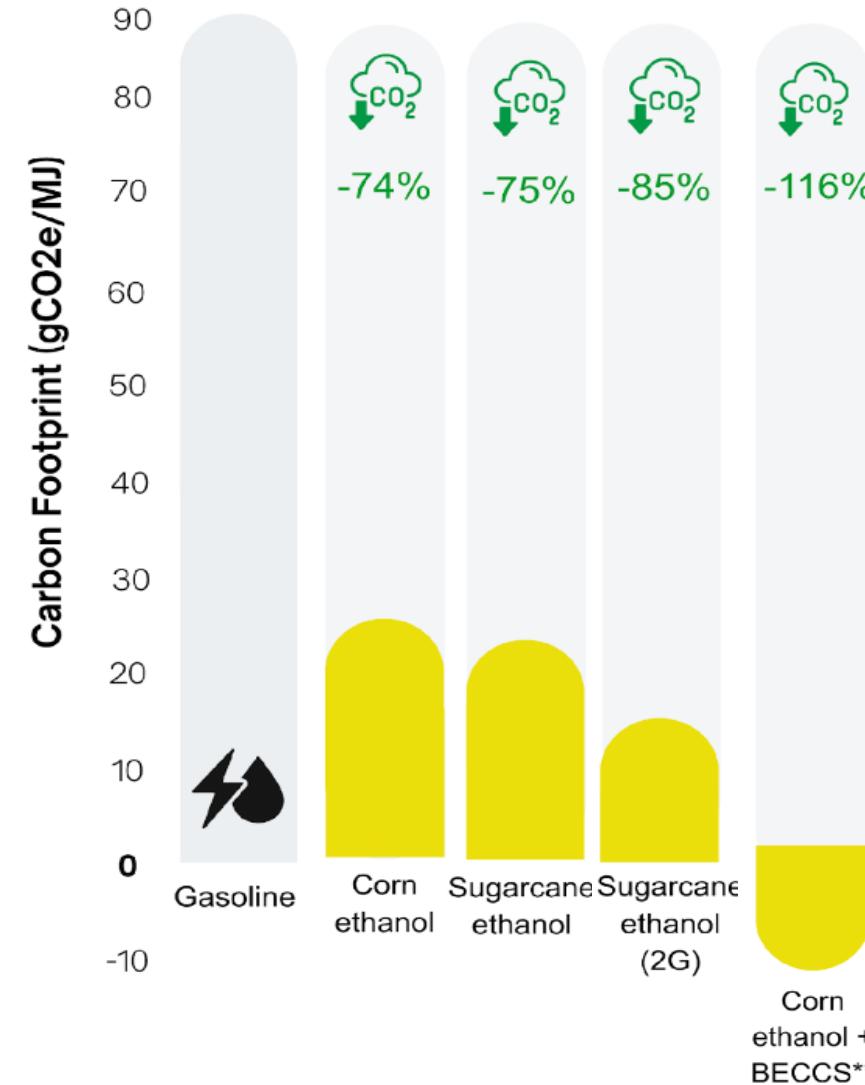
Ethanol replacement  
over petrol in Brazil

SINCE 2003  
ETHANOL  
PREVENTED  
THE EMISSION OF

>730 million  
tonnes of CO<sub>2eq</sub>

Source: IEA

# CARBON FOOTPRINT AND EMISSIONS REDUCTIONS OF BRAZILIAN ETHANOL COMPARED TO GASOLINE (LCA)



Brazilian second-generation (2G) sugarcane ethanol is a low-emission option and a strong candidate for unlocking a new generation of advanced biofuels, as well as the use of BECCS.

\*\*BECCS - Bioenergy with carbon capture and storage



# São Paulo: The 6th largest city in population in the world

**Ranking of the most polluted  
cities in the world**

0 . 0 0 0

**World's most polluted cities (2024)**

Source: <https://www.iqair.com/>

# ETHANOL BLENDING: WORLD SCENARIO



The benefit of using bioethanol blends is to reduce emissions from current vehicle fleets

# ROAD TRANSPORTATION

**1.6**  
billion cars



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**2025**

**+70%**  
increase

**16%** of total  
emissions

**2.7**  
billion cars  
(estimate)

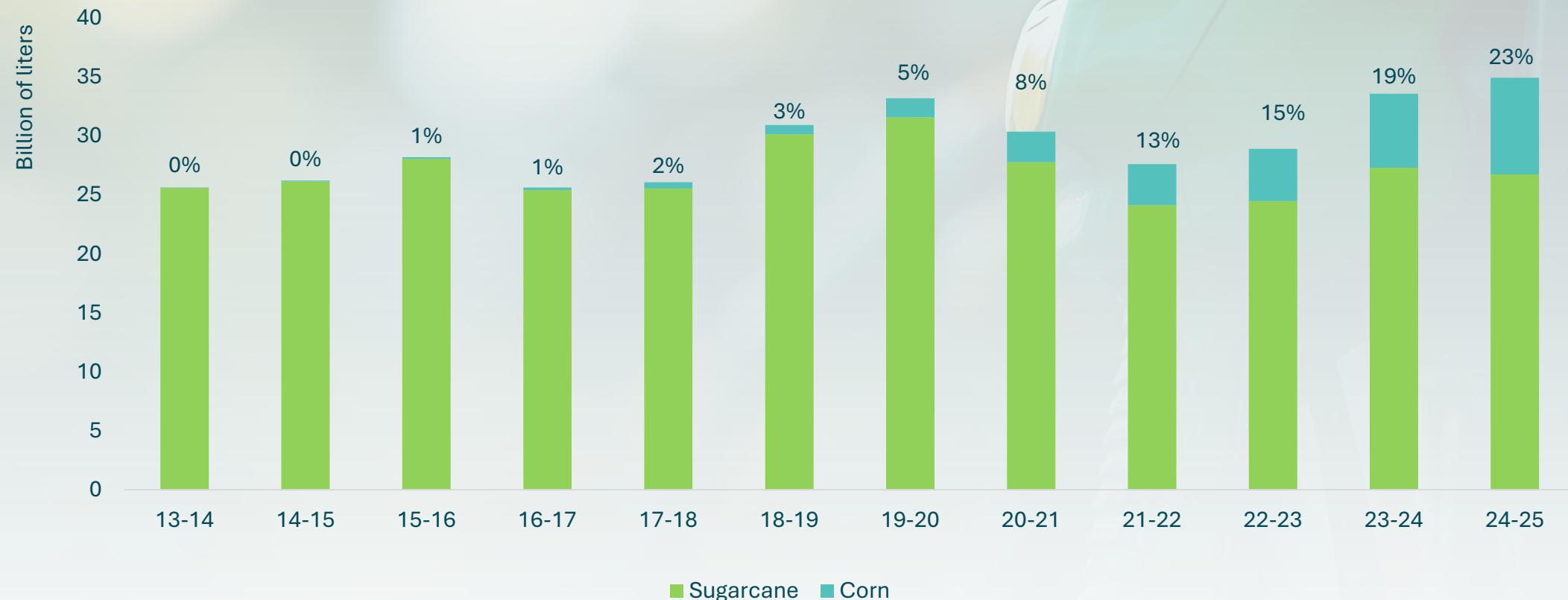


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**2050**

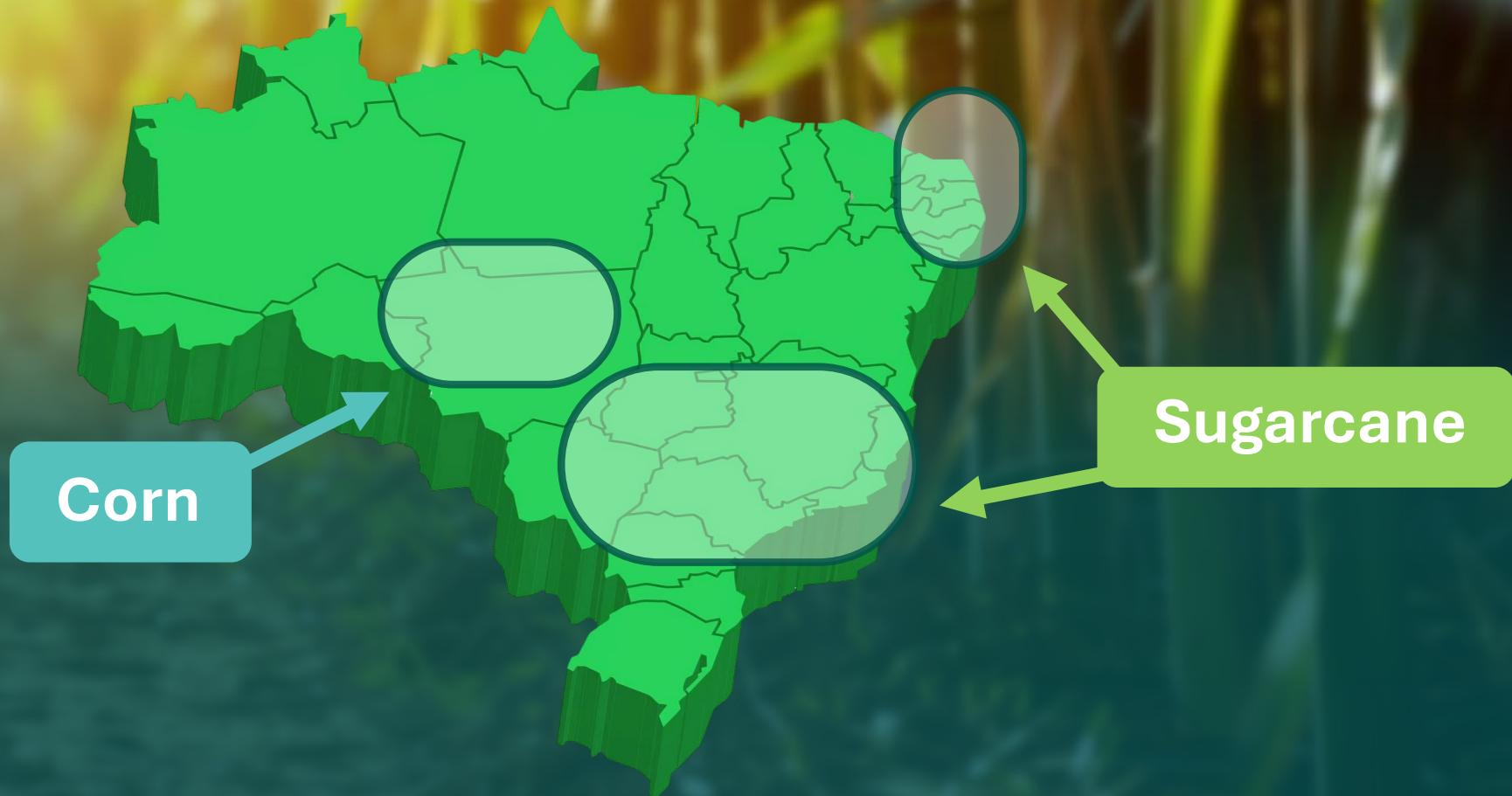
# BRAZIL ETANOL: FEEDSTOCKS (DIVERSIFICATION)

*Corn ethanol as a share of total ethanol production*

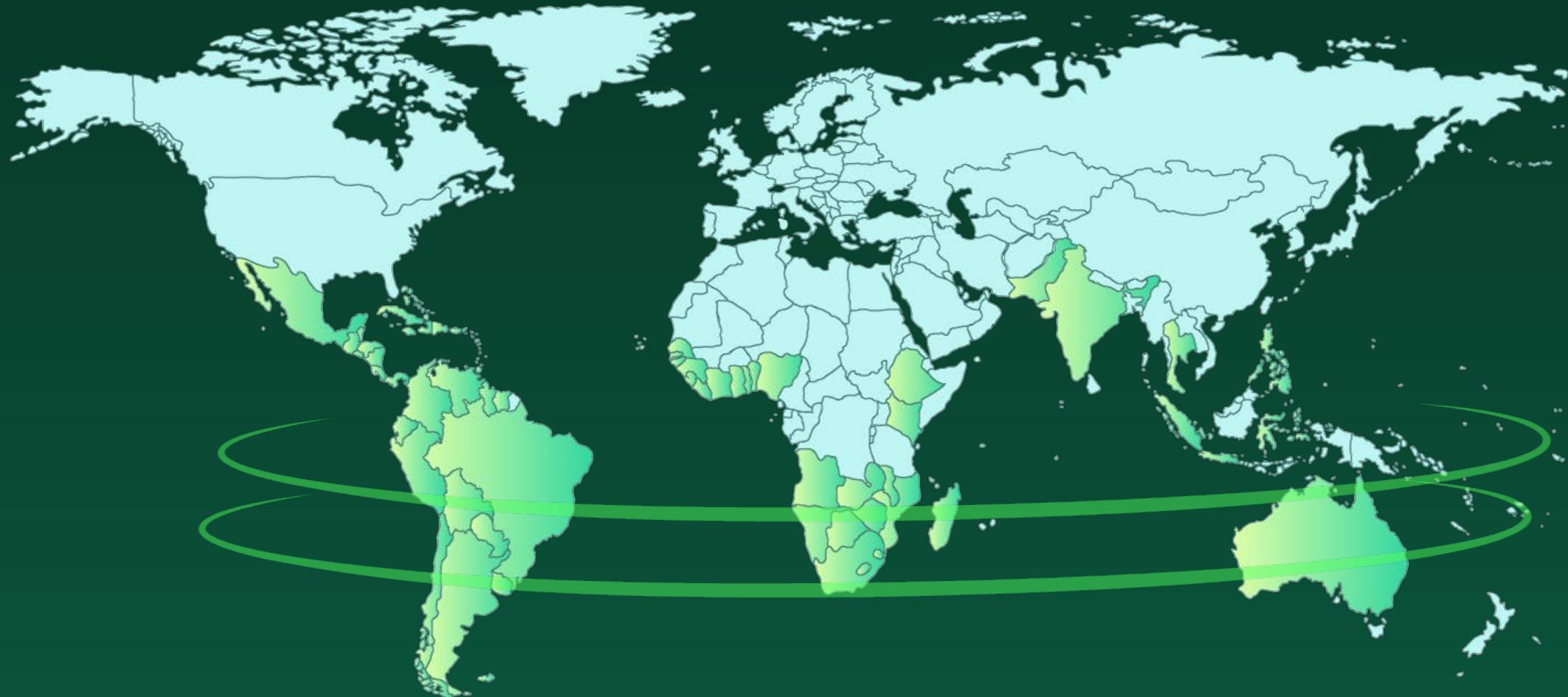


Source: MAPA e UNICA.

# GEOGRAPHIC DIVERSIFICATION COMPLEMENTARITY (DIFFERENT HARVEST SEASONS)



# Ethanol green belt



# Mobility challenges

unica

## Biobunker

350 million tons by  
2050 (IEA)

=

660 billion liters of  
ethanol equivalent



## SAF

450 billion liters by  
2050 (IATA)

=

765 billion liters of  
ethanol equivalent



## BIOGAS BUS



## BIOGAS BUS

## Biomethane

150 billion m<sup>3</sup> by 2050 (IEA)

=

250 billion liters of ethanol equivalent



# POWER OF PUBLIC POLICIES: Current Regulatory and Policy Framework

- **FEDERAL TAX DIFFERENTIAL**
- **ETHANOL BLEND MANDATE IN GASOLINE INCREASED TO 30% (2025).**
- **NEW MANDATE FOR BIOMETHANE IN BRAZIL'S NATURAL GAS SECTOR (2026)**
- **NEW AUTOMOTIVE POLICY RECOGNIZES ETHANOL AS A LOW-CARBON FUEL (2025)**
- **RENOVABIO: 95% OF ETHANOL SUPPLY CERTIFIED**
- **NEW SAF MANDATE FOR DOMESTIC FLIGHTS (2027)**



## MAIN CONCLUSIONS

- Decarbonization is one of the defining challenges of this century.
- Addressing transport is essential — on land, in the air (SAF), and at sea.
- Biofuels, including ethanol, are a proven and scalable part of the solution.
- Feedstock diversification and geographic dispersion enhance complementarity and provides greater supply security.
- Success depends on clear, stable, and long-term policies

The background image is an aerial photograph of a road winding through a dense forest. The trees are a mix of green and yellow, suggesting a transition between seasons. A single car is visible on the road, which has a white dashed line. The overall scene is peaceful and natural.

# THANK YOU!

**Eduardo Leao de Sousa**

UNICA – Director of Strategic  
Development and New Markets