

FUEL OF THE FUTURE: Brazil's Sustainable Fuels Strategy

The sustainable molecules agenda

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The energy transition is attracting capital

Energy Global Investments in 2025 (IEA)

Clean Energy

Fossil Energy

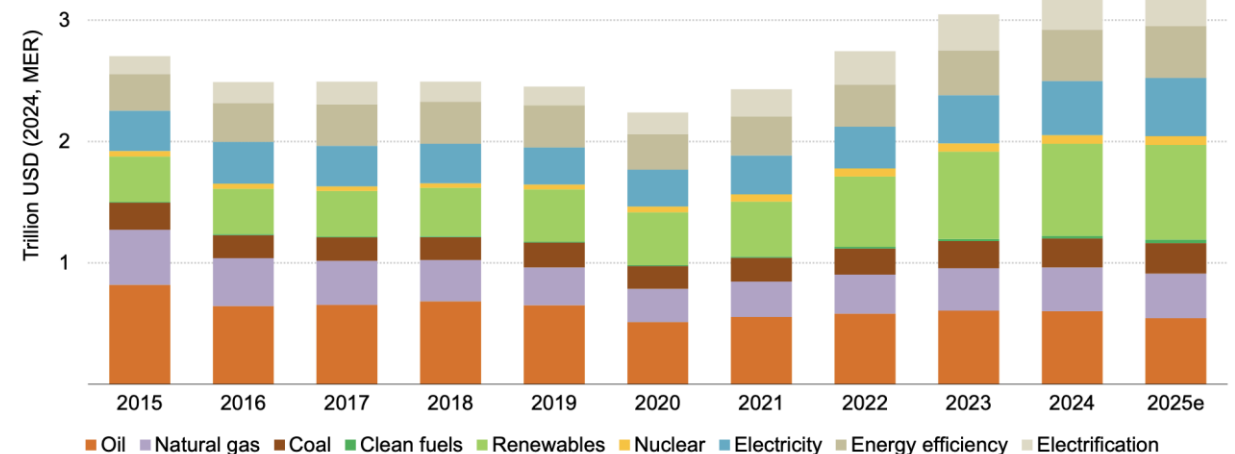
USD

US\$ 2.2 tri

US\$ 1.1 tri

Energy investment continues to rise amid economic uncertainty

Global investment in energy, 2015-2025



IEA. CC BY 4.0.

Global energy investments in 2025 are set to reach USD 3.3 trillion. Clean energy hits a new high of USD 2.2 trillion with record additions of renewables, strong EV sales and rapid deployment of batteries. Fossil fuel investments see the first decline since 2020.

Note: Clean fuels = modern bioenergy, low-emissions H₂ based fuels, and CCUS associated with fossil fuels and also includes direct air capture. 2025e = estimated values for 2025

Clean energy investment is now twice fossil fuel investment.

But the transition is advancing in two diferente speeds!

US\$ 1.5 tri — power
(US\$ 450 bi — solar) \$

**30 x more than
sustainable fuels**

...less than US\$ 30 bi — low carbon fuels \$

Low-emissions fuels account for only 3% of global fuel supply investment.

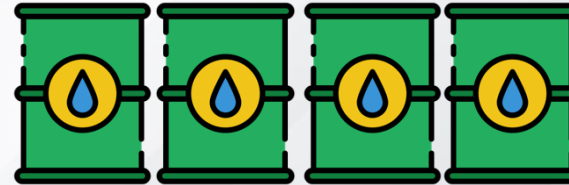
**The world has learned how to finance clean electrons.
It has not yet learned how to finance clean molecules at the same scale.**

Belém 4x: from investment gap to global demand

2024: 1x



2035: at least 4x

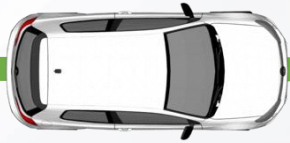


- biofuels;
- biogases;
- hydrogen and derivatives;
- Synthetic fuels.

Quadrupling use requires expanding production, innovation, infrastructure and finance.

Brazil has been building this solution for 50 years

1975

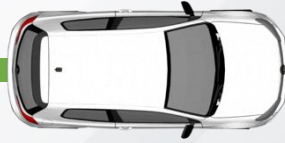


Flex
Fuel

2003

2005

BIODIESEL LAW



2017

RenovaBio

Law 14.092/2024 Green
mobility and Innovation
Program (Mover)

2024

2025

E30

2026



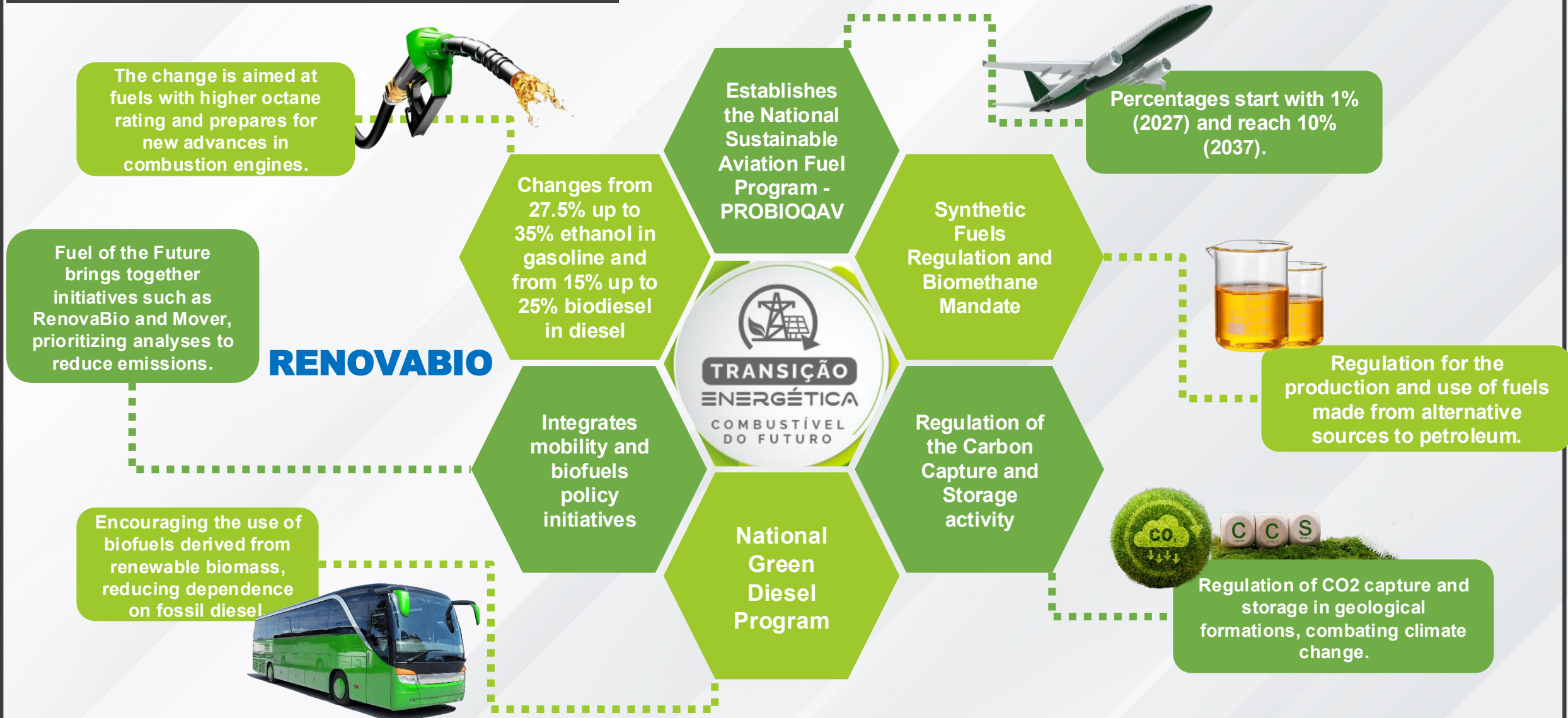
Law 14.993/2024 Fuel
of the Future

E32

PROALCOHOL PROGRAM



FUEL OF THE FUTURE



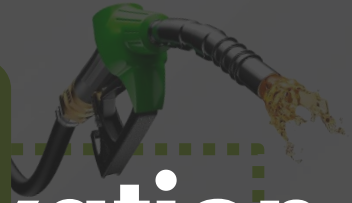
A platform for sustainable fuels, mobility and carbon management

FROM LAW TO IMPLEMENTATION

Innovation must cross four bridges

Technology → Technical validation → Regulation → Scale

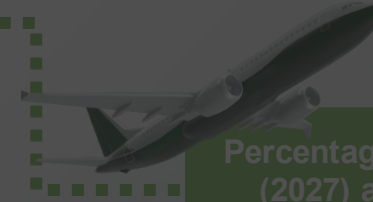
The change is aimed at fuels with higher octane rating and prepares for new advances in combustion engines.



Changes from 27.5% up to 35% ethanol in gasoline and from 15% up to 25% biodiesel in diesel

Establishes the National Sustainable Aviation Program - PROBIOQAV

Percentages start with 1% (2027) and reach 10% (2035)



Synthetic Fuels Regulation and Biomethane Mandate



Regulation of the production and use of fuels made from alternative sources to petroleum.

Integrates mobility and biofuels policy initiatives

Regulation of the Carbon Capture and Storage activity

National Green Diesel Program

Regulation of CO2 capture and storage in geological formations, combating climate change.



CCS

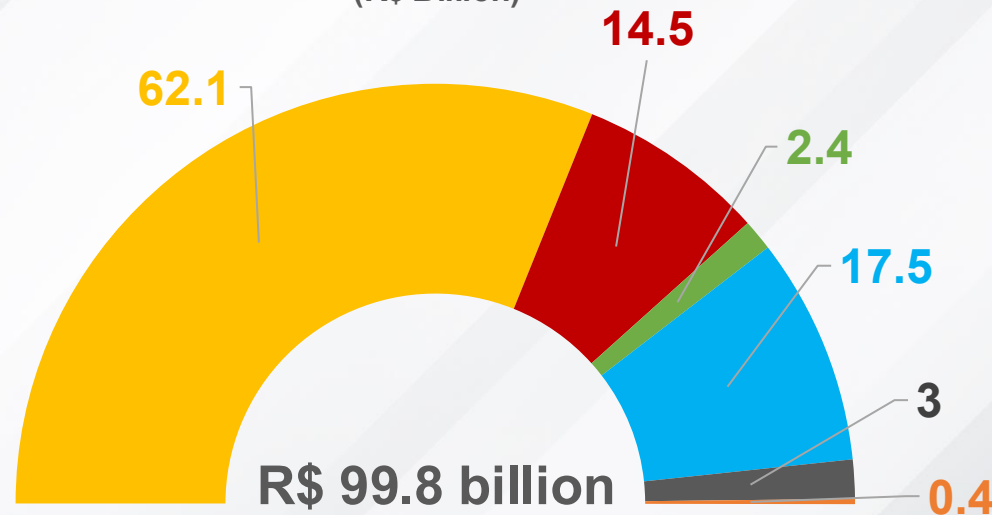
Encouraging the use of biofuels derived from renewable biomass, reducing dependence on fossil diesel



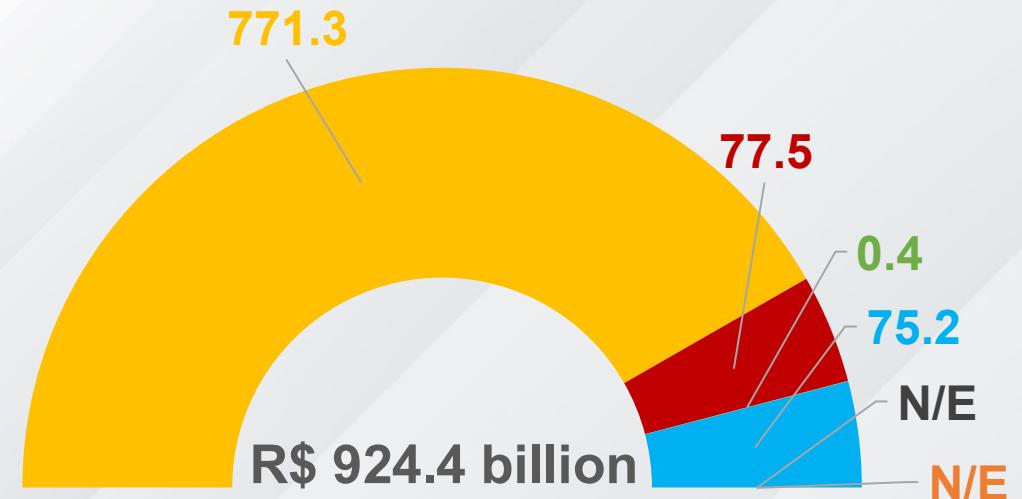
A platform for sustainable fuels, mobility and carbon management

CAPEX and OPEX estimates for biofuels between 2025 and 2034

Investments – CAPEX
(R\$ Billion)



Operating Costs – OPEX
(R\$ Billion)



Source: EPE. Energy Research Company, 2025

● Ethanol ● Biodiesel ● Biomethane ● SAF / Green Diesel
● Vegetable Oil Co-processing ● BIO-CCS

Brazil will exceed **R\$ 1 trillion**
(USD 176 bi) in resources
for biofuels in the next 10 years

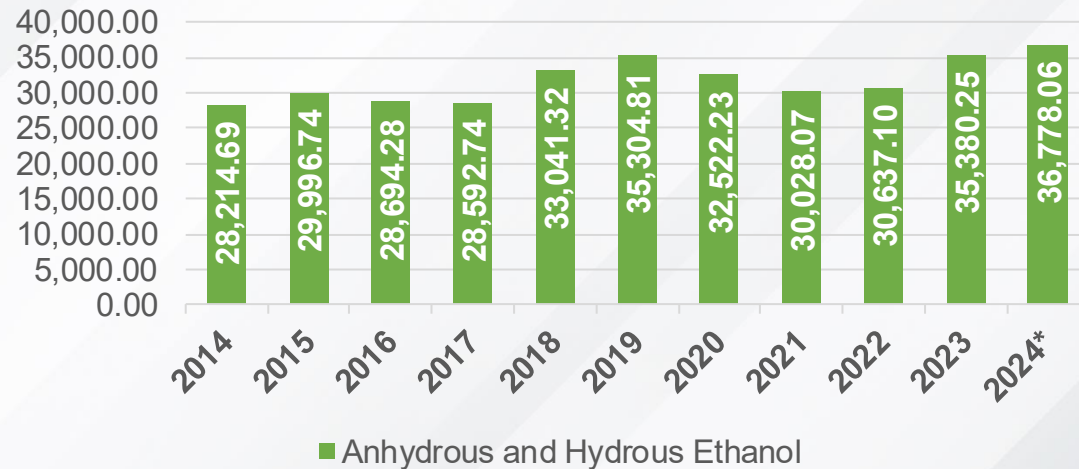
IEA: Brazil's Fuel of the Future Law could
unlock up to USD 4 billion in average
annual investment over the next decade.

Fuel of the Future can unlock a new investment cycle

Brazil has scale — and demand is still growing

Anhydrous and Hydrus Ethanol Production

Billions of Liters

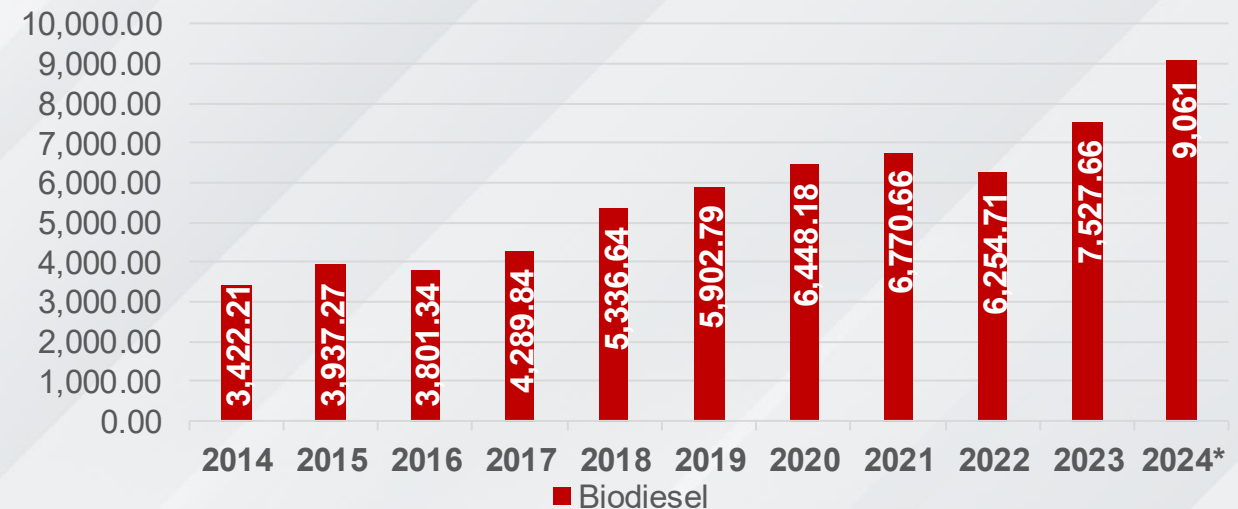


Together, ethanol and biodiesel totaled almost **43 billion liters produced**
~ 11,4 bi gallons

Biofuel production has reached **historical record of the last 10 years**

Biodiesel Production

Billions of Liters



*Preliminary Data

Source: Brazilian Statistical Yearbook of Petroleum, Natural Gas and Biofuels 2024, released by the National Agency of Petroleum, Natural Gas and Biofuels (ANP)

SAF: the clearest example of the scale challenge

Ethanol: 2nd biggest producer in the world

Biodiesel: One of the biggest producers in the world



3 pathways with the greatest potential for SAF production in Brazil:



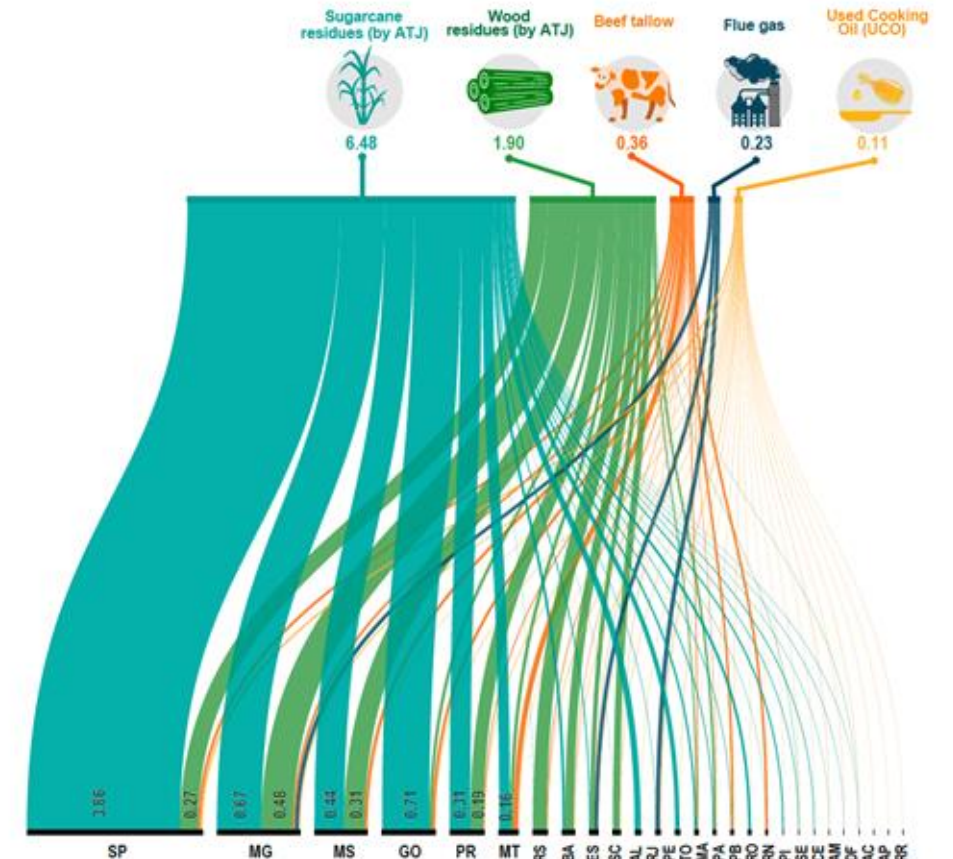
ATJ, FT and HEFA

- Potential for SAF production from the mapped residues in Brazil is up to
- **9 billion** liters, which is around 125% of the current fossil kerosene (Jet A) consumption in Brazil.



SAF PRODUCTION POTENTIAL

Potential production of SAF in Brazilian states from each feedstock (in billions of litres).



Conexão SAF (SAF Connection)

Conexão SAF is an informal forum that aims to bring together public and private actors to identify and **develop proposals and solutions** that allow the Brazilian aviation sector to achieve decarbonization through the use of SAF.

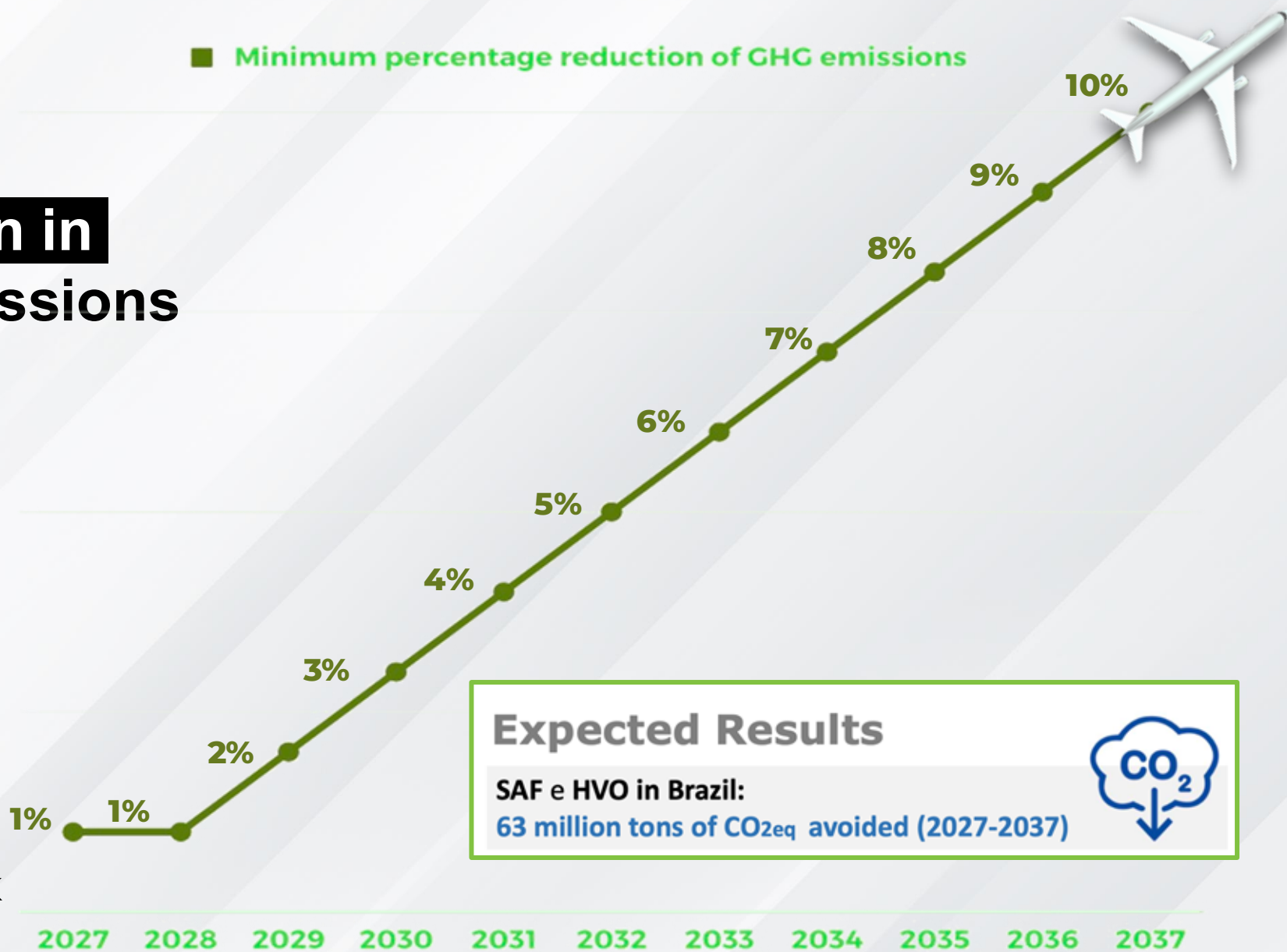
This initiative seeks to promote continuous and structured debate in order to identify the **technical, regulatory, production and logistical challenges for the production and consumption of SAF** in Brazil, proposing alternatives and initiatives to make these fuels economically viable.

The idea is to **bring together** all institutions that are interested in participating in this debate on how to promote the production and consumption of SAF in Brazil.



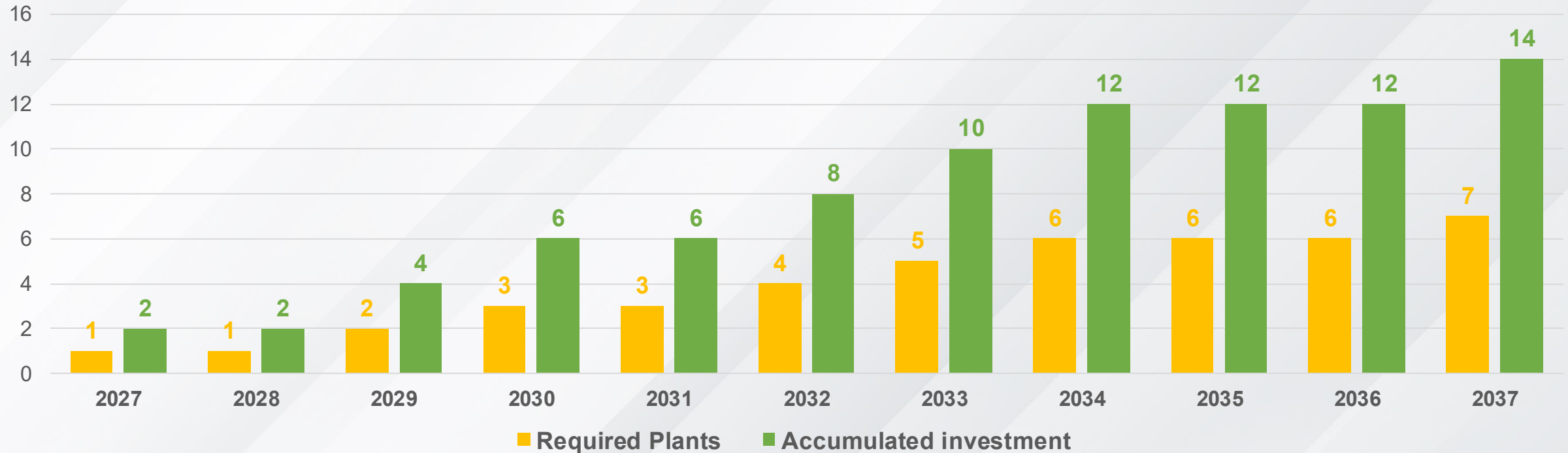
Minimum annual percentage reduction in greenhouse gas emissions (GHG) for domestic operations by air operators

Brazil has feedstock, technology routes and demand. The missing link is investment at scale.



Plants and Investments

SAF and HVO



Data: PDE 2032 Investments

1 BioQAV/HVO plant

Projects: 1 plant of 500 million liters/year

Investments: BRL 2 billion

Data: Be8

1 BioQAV/HVO plant

Projects: 1 plant of 820-950 million liters/year

Investments: BRL 2 billion

The next frontier of the energy transition is sustainable fuels

**Demand creates markets.
Regulation creates confidence.
Innovation creates solutions.
Investment creates scale.**

SECRETARIA NACIONAL DE
PETRÓLEO, GÁS NATURAL
E BIOCOMBUSTÍVEIS

MINISTÉRIO DE
MINAS E ENERGIA

