

The role of renewable transport fuels in reaching GHG emission reduction targets

The case of Brazil

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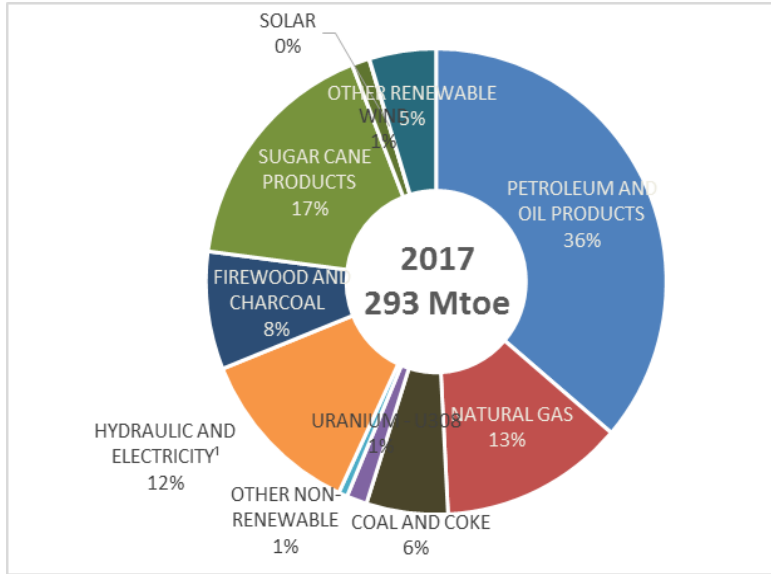
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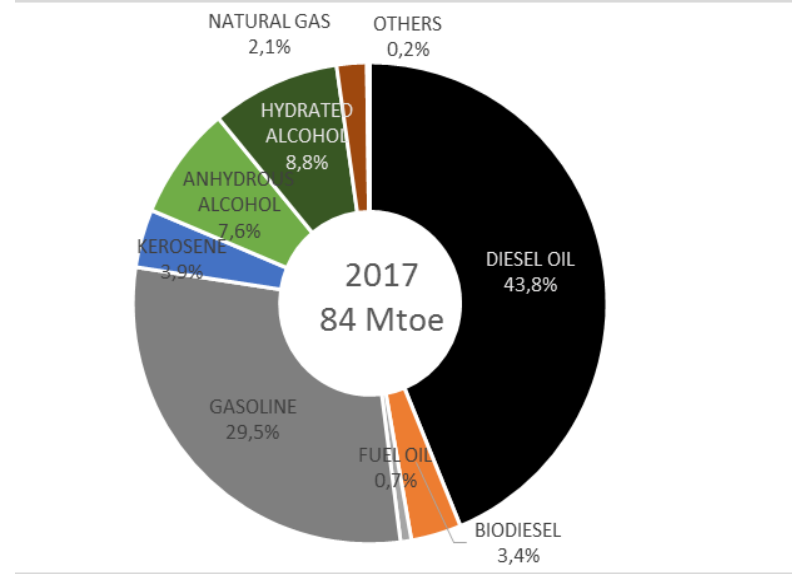


PÁTRIA AMADA
BRASIL
GOVERNO FEDERAL

The Brazilian energy matrix



Brazilian Primary Energy Supply



Transport Sector

The Brazilian energy matrix

*Fossil fuels still represent 54.9% of the total domestic energy supply, and 77.8% of transport sector, while **biofuels are already 19.7% of the transport sector in 2017** (21,1% for road transport) (EPE, 2019a), and **going to rise to 27.9% by 2029** (31,8% for road transport) (EPE, 2019c).*

Ethanol

- *Use of biofuels, notably ethanol, since 1975 (Proalcool)*
- *E100 distribution network and a mainly locally produced car fleet*
- *2003: launch of flex vehicles (can operate on gasoline or E100 according to the preferences of the consumer)*
- *More than 90 % of new car sales / 74 % of Otto cycle fleet.*
- *27% share of anhydrous ethanol*

Ethanol

- *Roughly 370 sugar mills (2017)*
- *2 industrial scale cellulosic ethanol plants using bagasse*
- *6 operating plants of corn ethanol (most co-located with sugarcane mills and operating also in the off-season and some stand-alone plants).*
- *Installed capacity: 40 billion litres of hydrous ethanol and 20 billion litres of anhydrous ethanol.*
- *The actual split between sugar and ethanol is typically 40/60, but this ratio is adjusted each season.*

Biodiesel

- The National Biodiesel Production Program: 2004
- It has a **social element** to alleviate and reduce regional economic differences by supporting family-operated farms.
- There are some 50 licensed biodiesel plants (soy-bean oil, 70 %; tallow, 17 %).
- Overall production: 4.3 billion liters in 2017 (EPE, 2019a). In 2016, new legal mandate: 8% in 2017, rising to 10% in 2018, reaching 11% in September 2019. Enables an increase of biodiesel in the blend up to reach 15 % (2023)

The Paris Agreement

- *Brazil is the only major developing economy to have adopted unconditional **absolute GHG reduction targets**: a 37 % reduction by in 2025 (reference: 2005).*
- *Further actions (already achieved!):*
 - *increasing the share of sustainable bioenergy in the Brazilian energy mix to approximately 18% by 2030;*
 - *achieving 45% of renewables in the energy mix by 2030.*

RenovaBio

Ethanol Savings and CO2 Avoided (1970-2018)

**2.15 billion
BOE**

Barrels of Oil
Equivalent
saved (2 years of
Brazil's oil
production)

**1.34
billion
Tons of
CO_{2eq}**

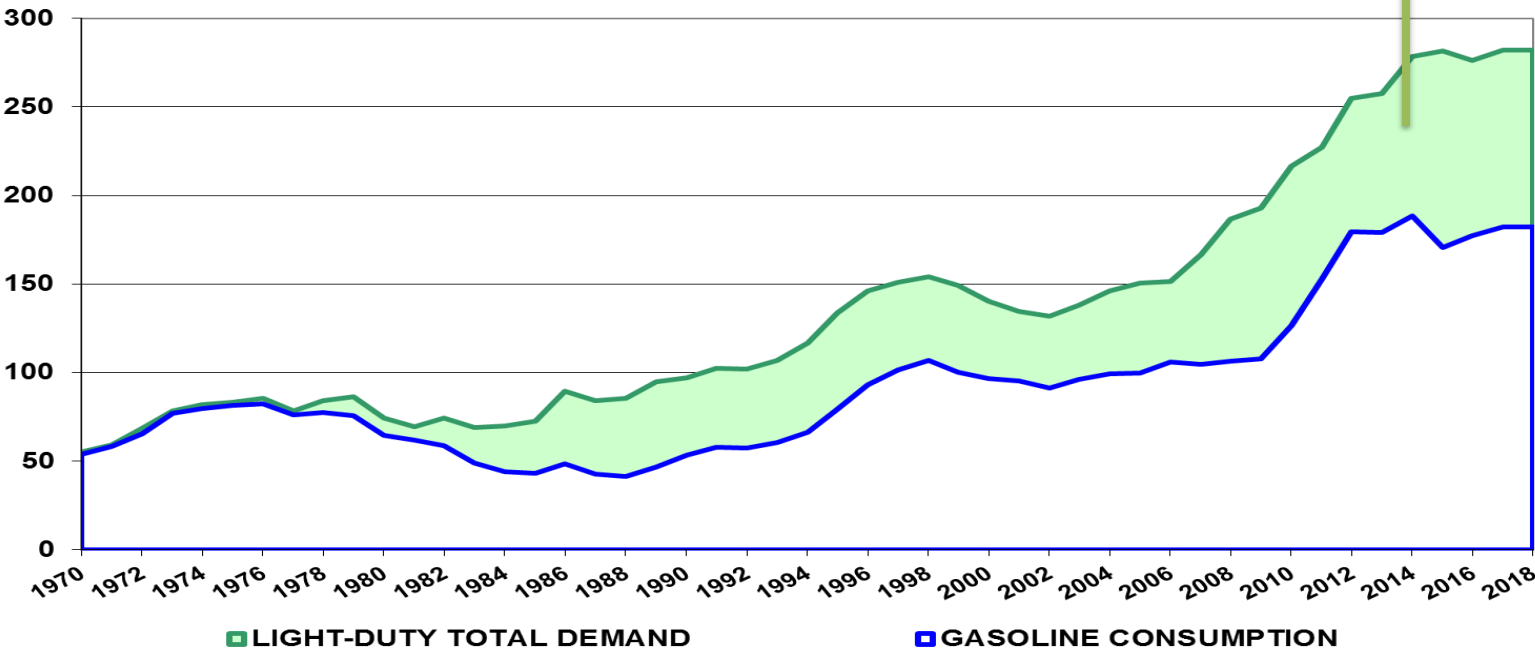
Avoided
Emissions

US\$ 125 Bi

Total Economy
(2018 USD)

10⁶ BOE

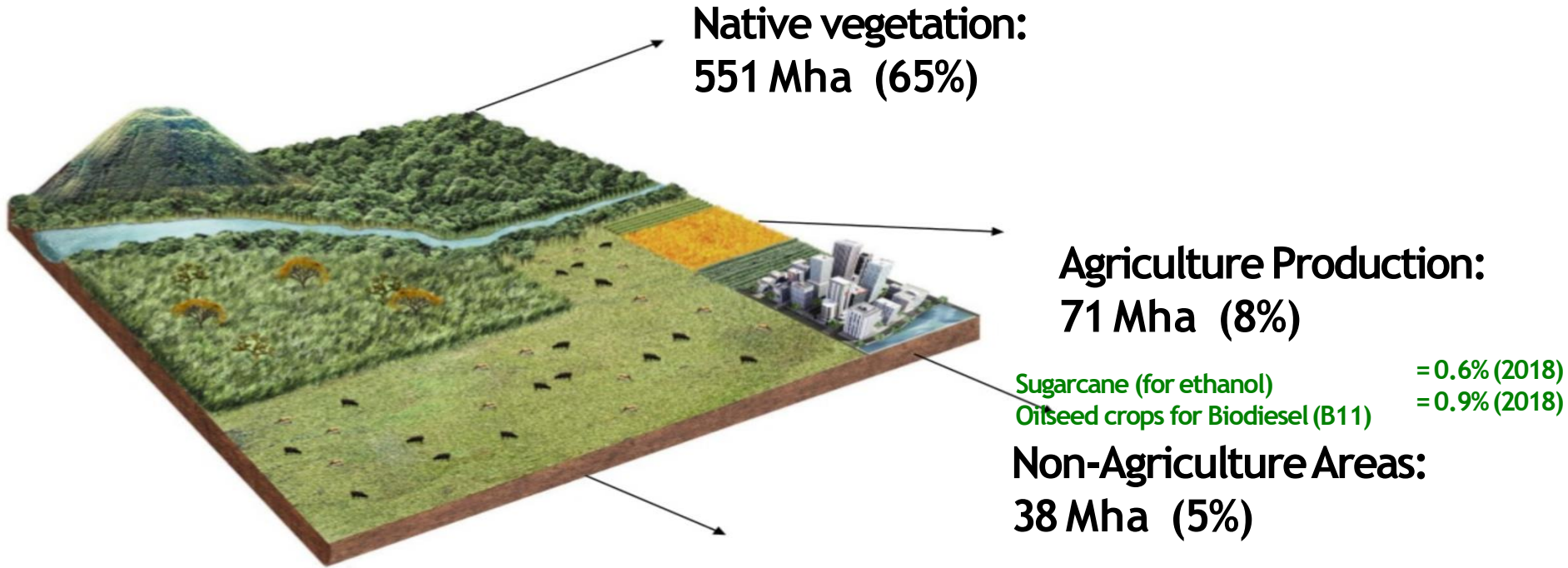
OTTO-CYCLE FUEL DEMAND IN BRAZIL



■ LIGHT-DUTY TOTAL DEMAND

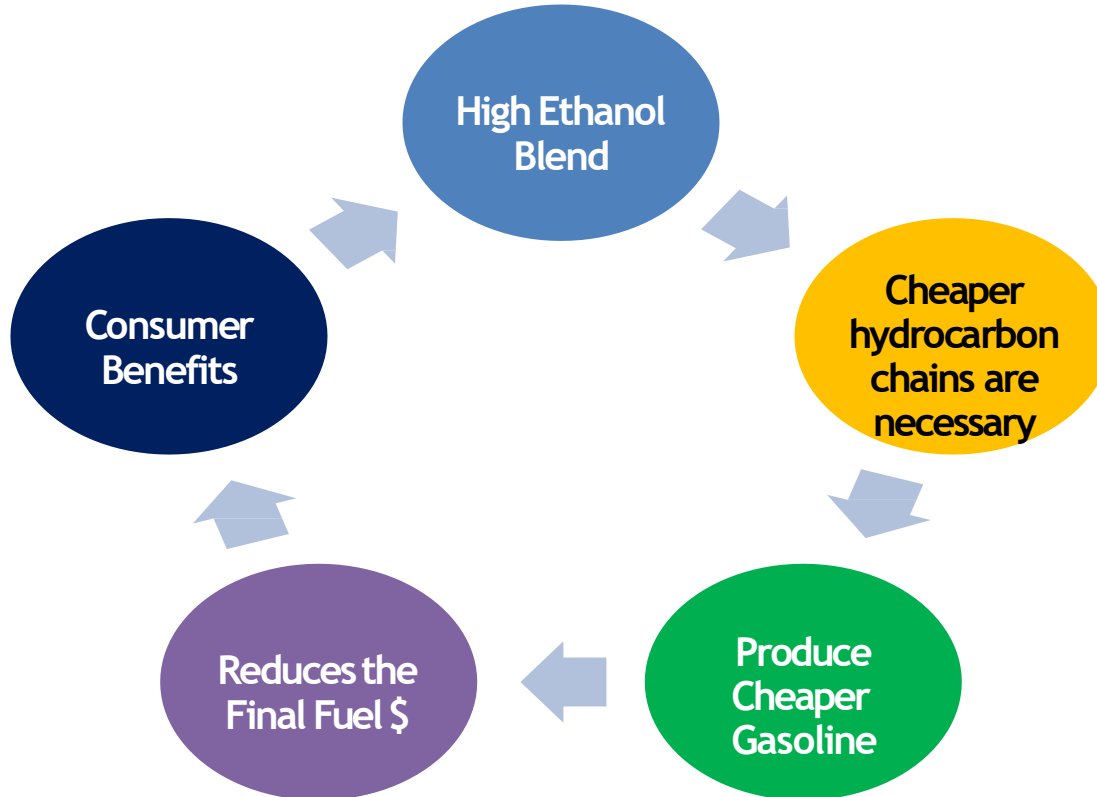
■ GASOLINE CONSUMPTION

Land Use in Brazil





Gasoline benefits from E27



Economics

+

**Environmental
Benefits**

Complimentary solutions for necessary changes

CHANGES



FUEL

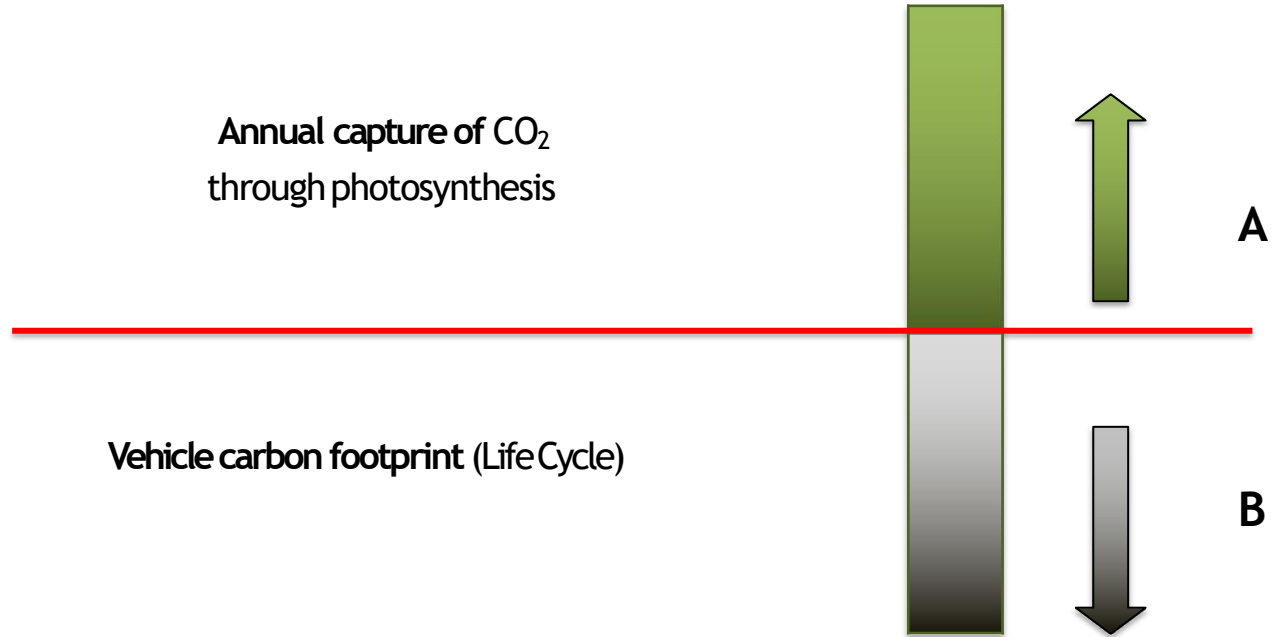
Less Fossils
More Bio



PLATFORM

more efficient platforms
Electric Cars on Ehtanol

BECCS - Bioenergy with Carbon Capture and Storage



RenovaBio: What is it?

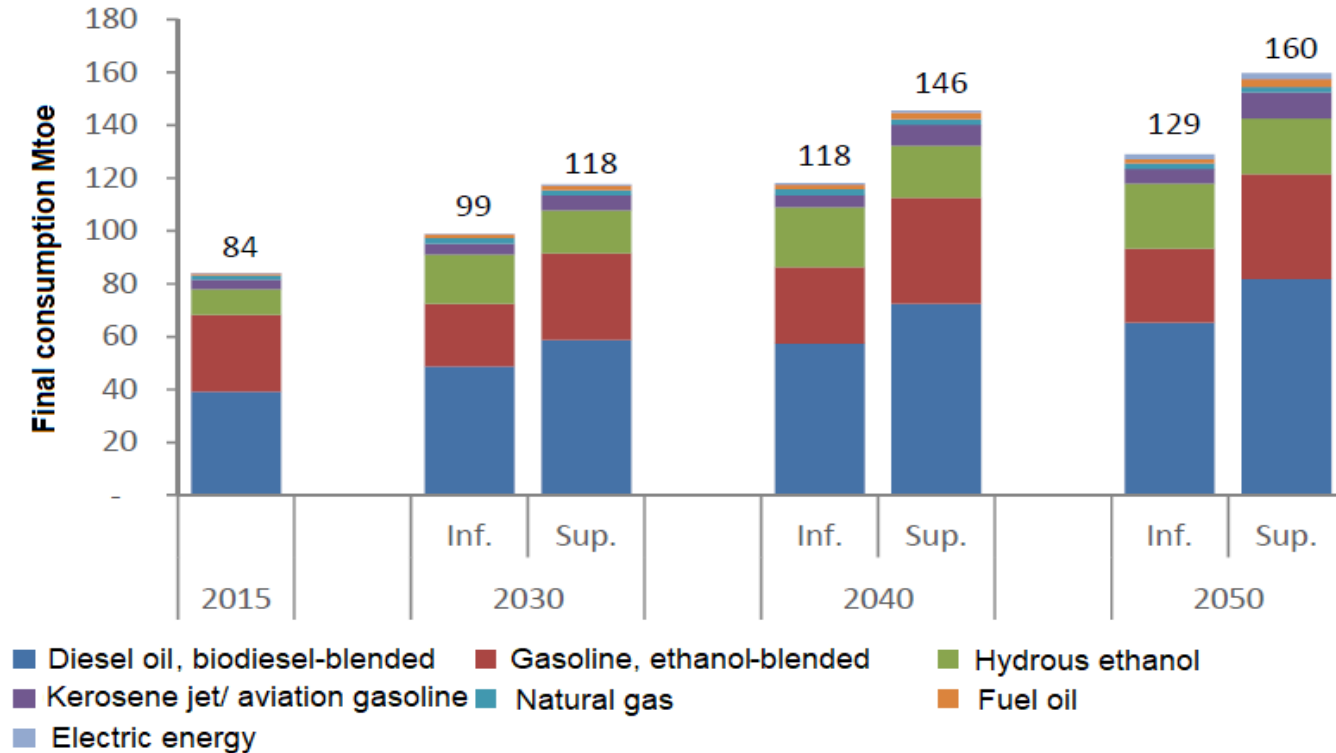
- It is the Brazilian National Biofuels Policy with a **strategic** role for the bioenergy
- Sustainable environment for **investments** up to US\$ 300 billions until 2030
- Creates the “**Carbon Capture Machine**” per unit of energy increasing efficiency in the production of biofuels
- Creates an **integrative** agenda with the automotive industry (ethanol electrification) and the petroleum industry (smooth transition)
- Creates **competition** in the fuel market benefiting the consumers, which will pay less for fuels
- **Reduces** the growing national **deficit** with fuel imports

RenovaBio

- Consumer benefits from biofuels usage
- Biofuels reduce fuel prices
- Blends with biofuels reduce emissions (particulates, CO₂, GHG)
- Give value to the environmental service provided by biofuels
- Oil industry benefits from biofuels by making it more sustainable
- Industrial production of food increases;

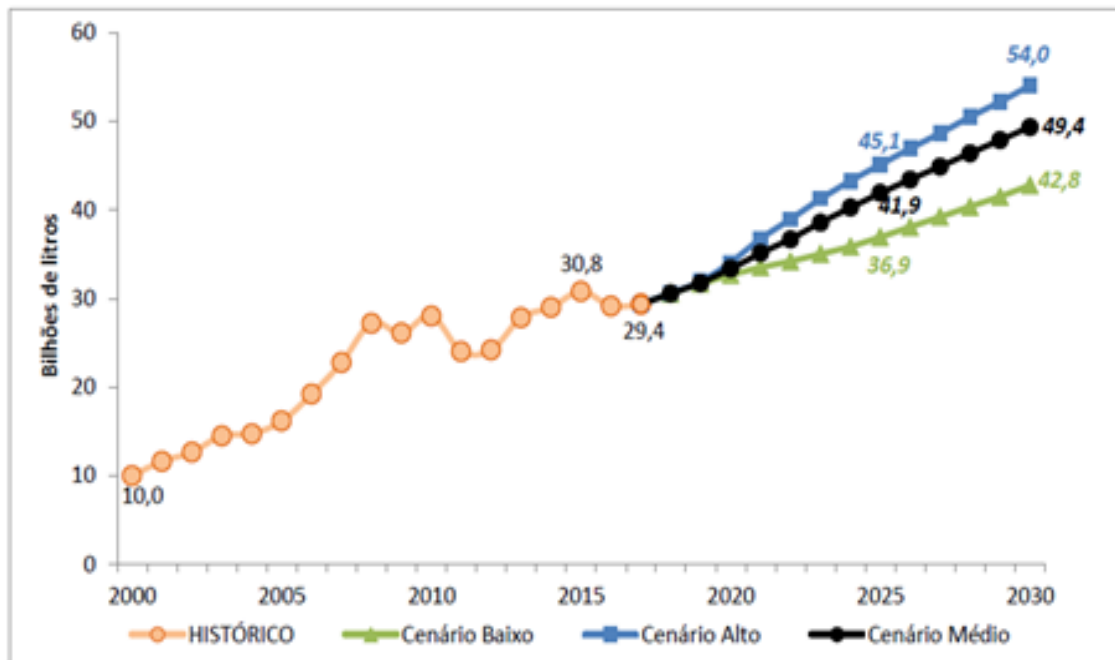
Projections

The projected energy usage in transport to 2050

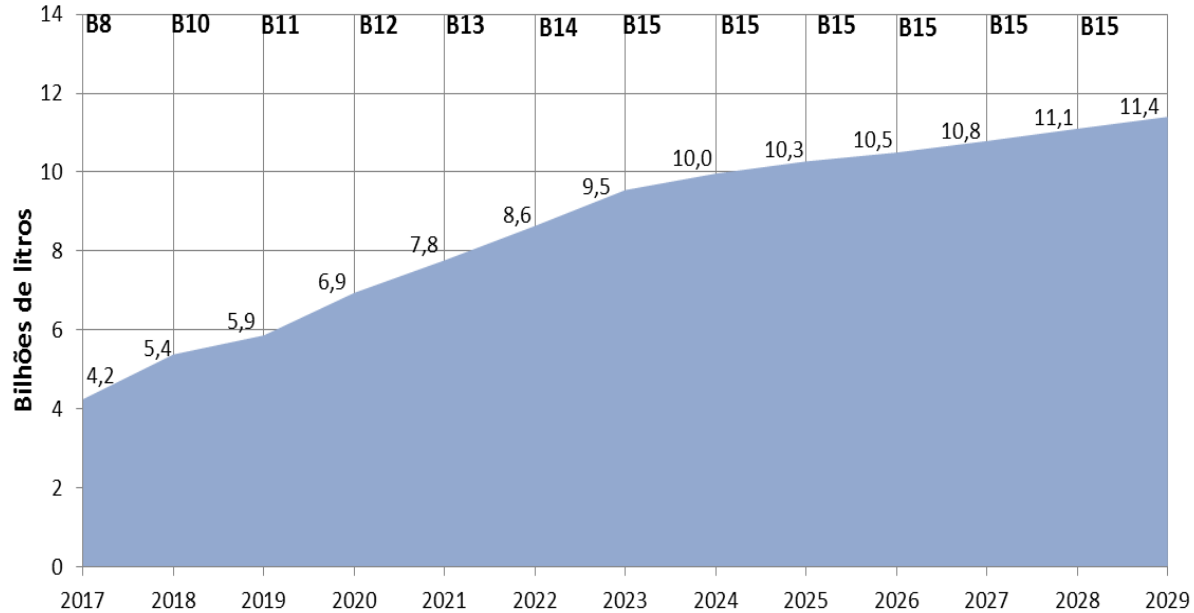


Ethanol Supply by 2030

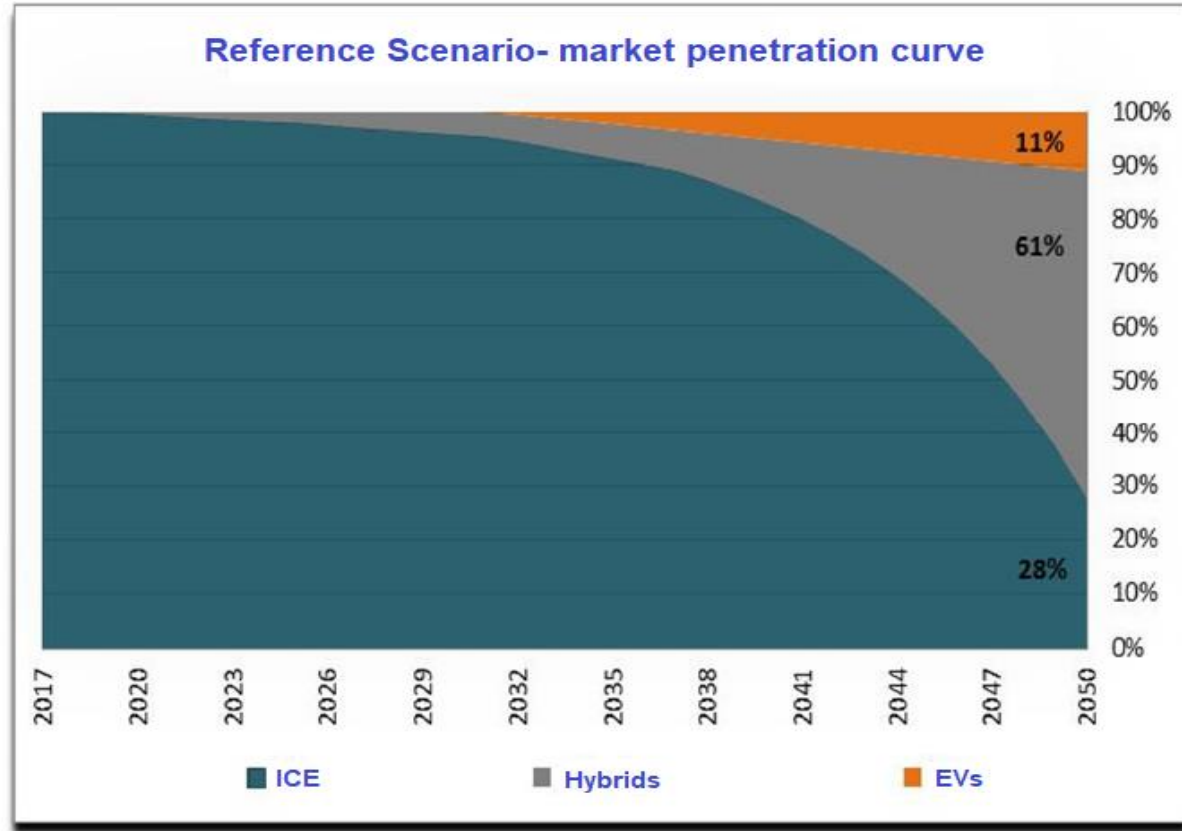
Gráfico 12 - Oferta Total de Etanol



Biodiesel production to 2029



Market penetration of hybrid and EV light duty vehicles (EPE, 2018)



OBRIGADO!!

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