



Brazil's Renewable Fuels Program

10th Annual LCFS and Carbon Markets Workshop

Pietro Mendes – Director of Biofuels



OVERVIEW



A RELEVANT POSITION IN SUPPLY & DEMAND SIDE



3
million b/d

7th
Largest oil **producer** in the World
(USA, Russia, Saudi Arabia, China, Iraq and Canada) (2021)



1.4
million b/d

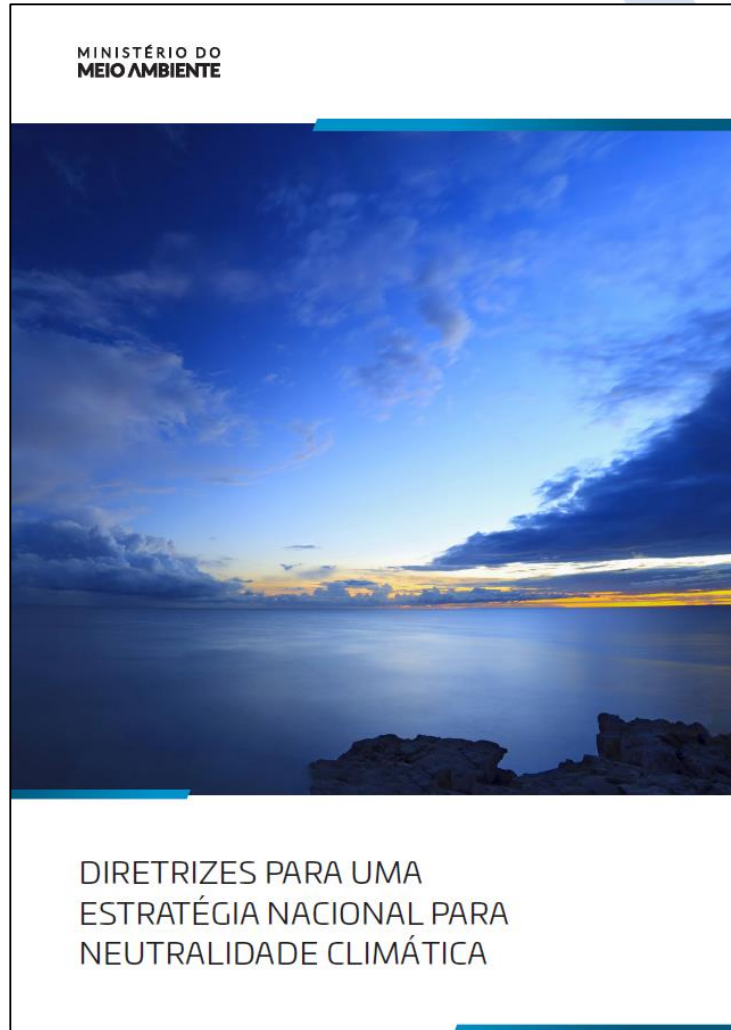
7th
Largest oil **exporter** in the World (Saudi Arabia, Iraq, Canada, USA, Norway and Nigeria) (2021)

2nd
Largest **producer** and **consumer** market of **biofuels** in the World
(USA) - (2019)



4th
Largest **automotive fuel** market in the World (USA, China e India)

Source: (Worldstats, 2021; WE, 2019, IEA, 2019, ADIMB, 2018, ANP, 2019, MME, 2020; Word Mining Congress, 2021).

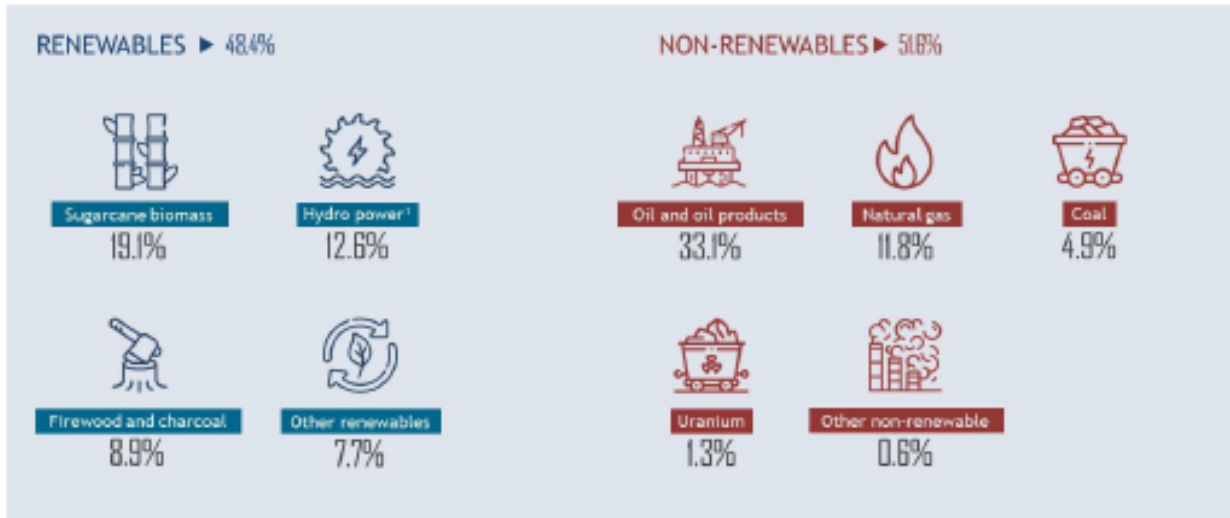


- Brazil intends to reduce greenhouse gas emissions by 50% below 2005 levels in 2030;
- Brazil intends to become carbon neutral in 2050.

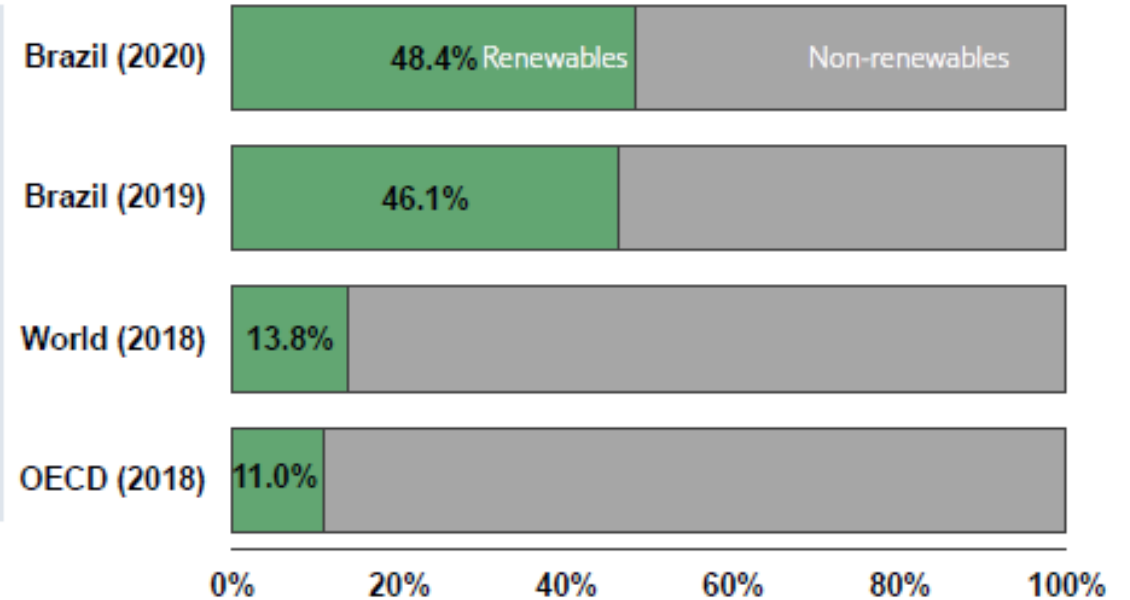
ENERGY MATRIX

The Brazilian energy sector is low carbon

Breakdown of total energy supply - TES in 2020



Brazil's TES in comparison to world



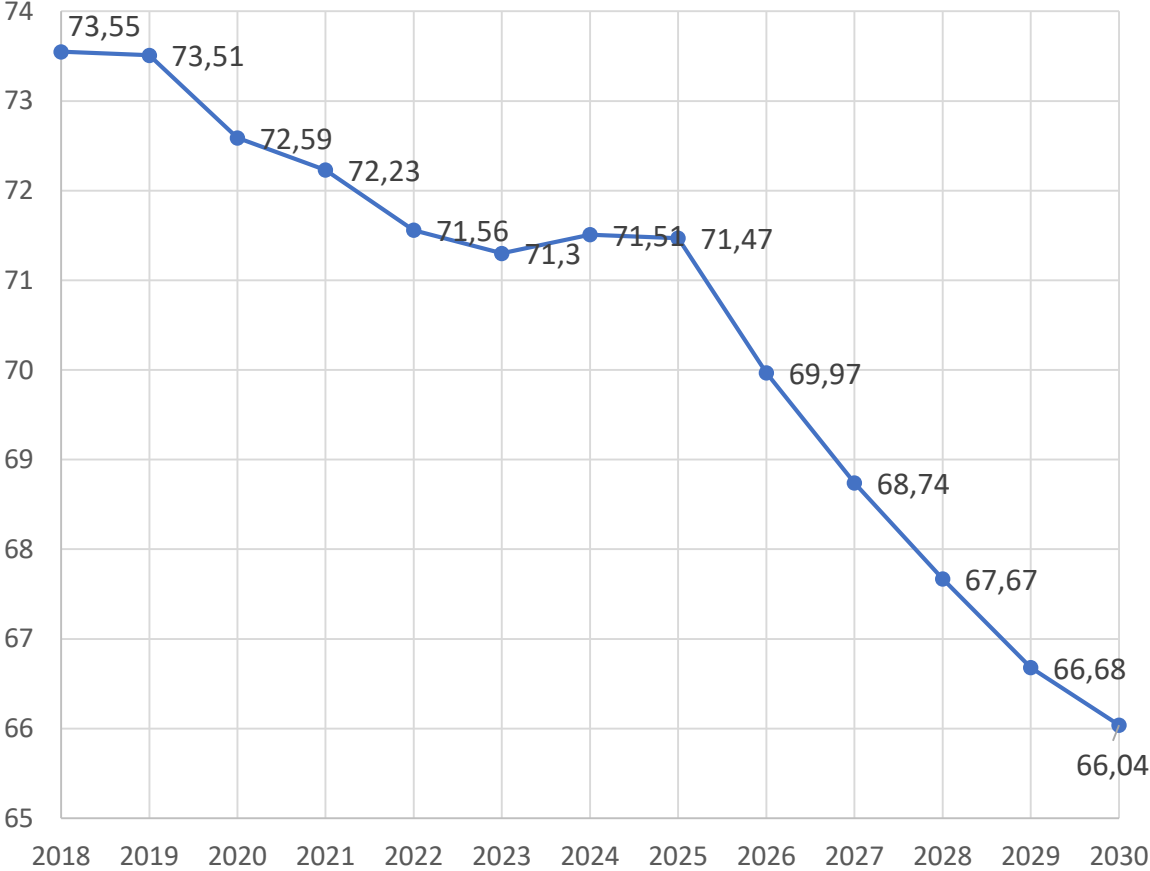
Renewables reached 85% in the Brazilian electricity mix in 2020, in comparison to 23% in World and 27% in OECD (2018-2019).

Brazil's per capita carbon emissions related to energy is 1/3 of European Union and China and 1/7 of USA

UN HIGH LEVEL DIALOGUE ON ENERGY

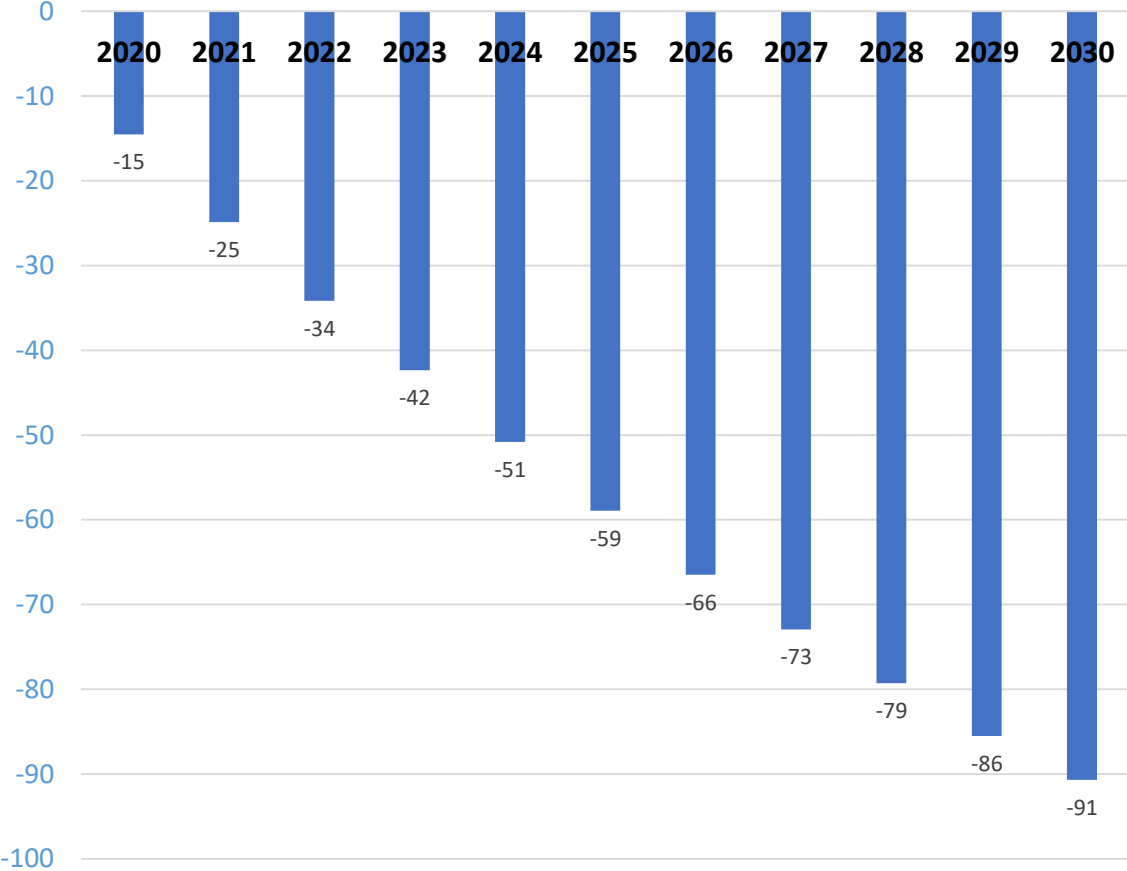


CI (gCO2eq/MJ)



Target: Reduction of 10% in our carbon intensity.

MM gCO2eq



Avoiding emissions of 620 million tons of CO₂.

BRAZILIAN POLICIES FOR RENEWABLE FUELS

POLICIES FOR
RENEWABLE
FUELS



Mandates



RenovaBio

FUEL OF THE
FUTURE



+



PNH₂



BIOFUELS

2

A decorative graphic on the right side of the page. It features a large, bold blue number '2' centered within a circular frame. The frame is composed of several thick, dark blue curved lines that are not fully closed, creating a sense of motion or a stylized '2'. The background behind the graphic consists of several light blue, semi-transparent curved lines that sweep across the page from the top left towards the bottom right.

BIOFUELS INDUSTRY IN BRAZIL - 2021

Ethanol

Ethanol Plants

361

Authorized Capacity

132,000 m³/d (Anhydrous)

244,000 m³/d (Hydrous)

Biodiesel

Biodiesel Plants

52

Authorized Capacity

32,912 m³/d

Biomethane

Biomethane Plants

4

Authorized Capacity

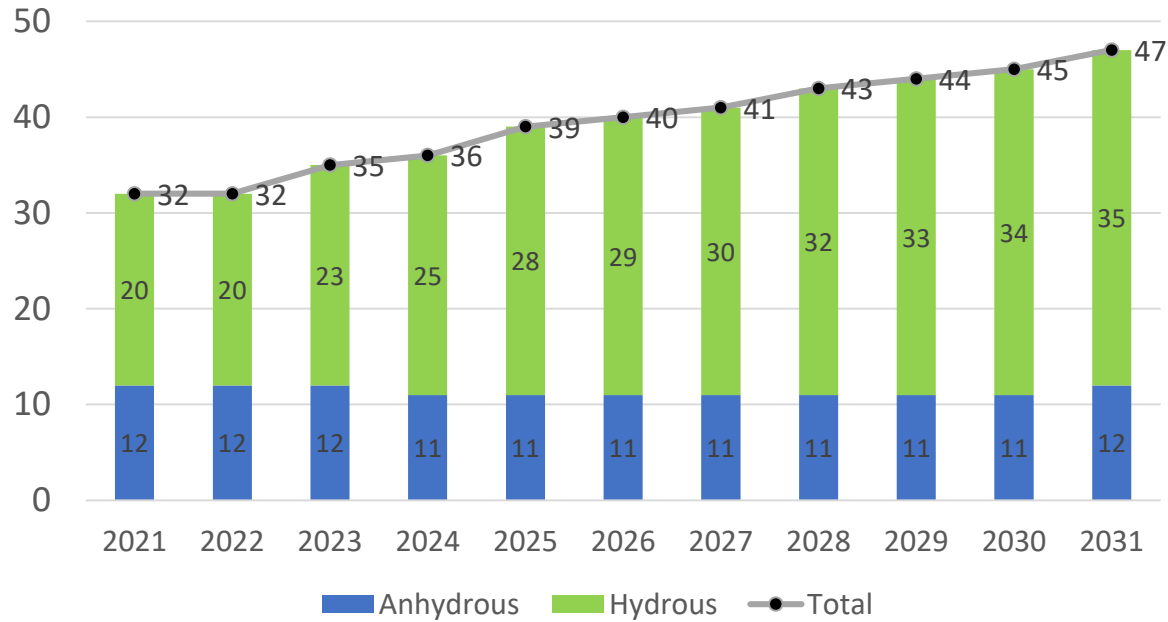
360,000 Nm³/d



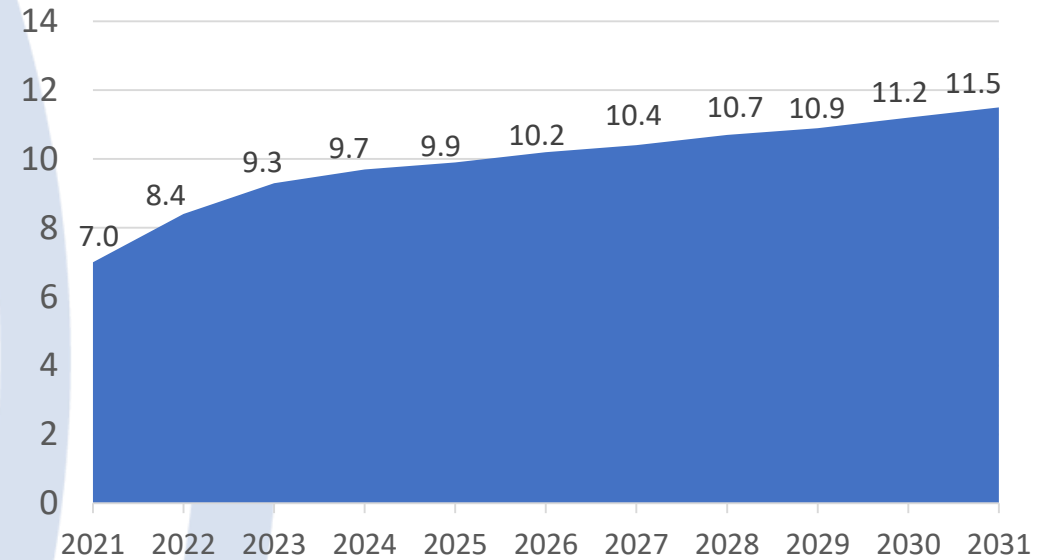
BIOFUELS FORECAST



Ethanol Production (billion liters)



Biodiesel Production (billion liters)



RENOVABIO



PUBLIC POLICY - RENOVABIO



RenovaBio is the National Biofuels Policy, implemented through Law No. 13,576/2017

Main objective

Promote the expansion of the production and use of biofuels in Brazil's transportation matrix

- One **CBIO** is equivalent to one ton of **CO2eq** avoided into the atmosphere;
- It is traded by the biofuel **producers** in the Brazilian stock exchange market (B3);
- Fuel **distributors** must buy CBio in order to comply their individual targets; otherwise they are liable to penalties and sanctions.

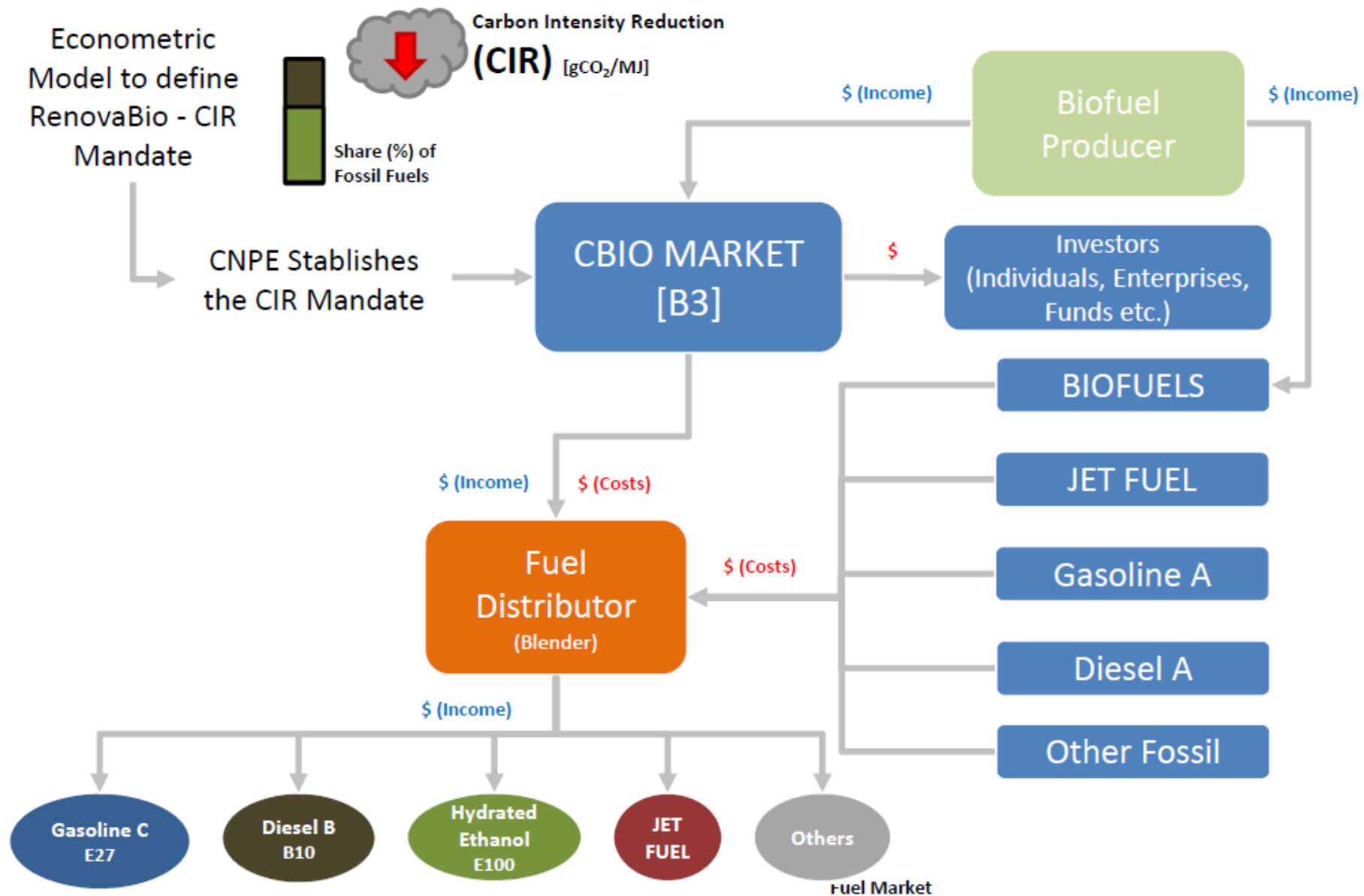
2021 Results (until Nov):

- ✓ **CBIOs issued + stock: 32.00 million**
- ✓ **CBIOs traded: 26.04 million**
- ✓ **CBIOs target: 24.86 million**
- ✓ **Financial Volume: US\$ 171 million**
- ✓ **Av price: US\$ 6.6/CBIO**

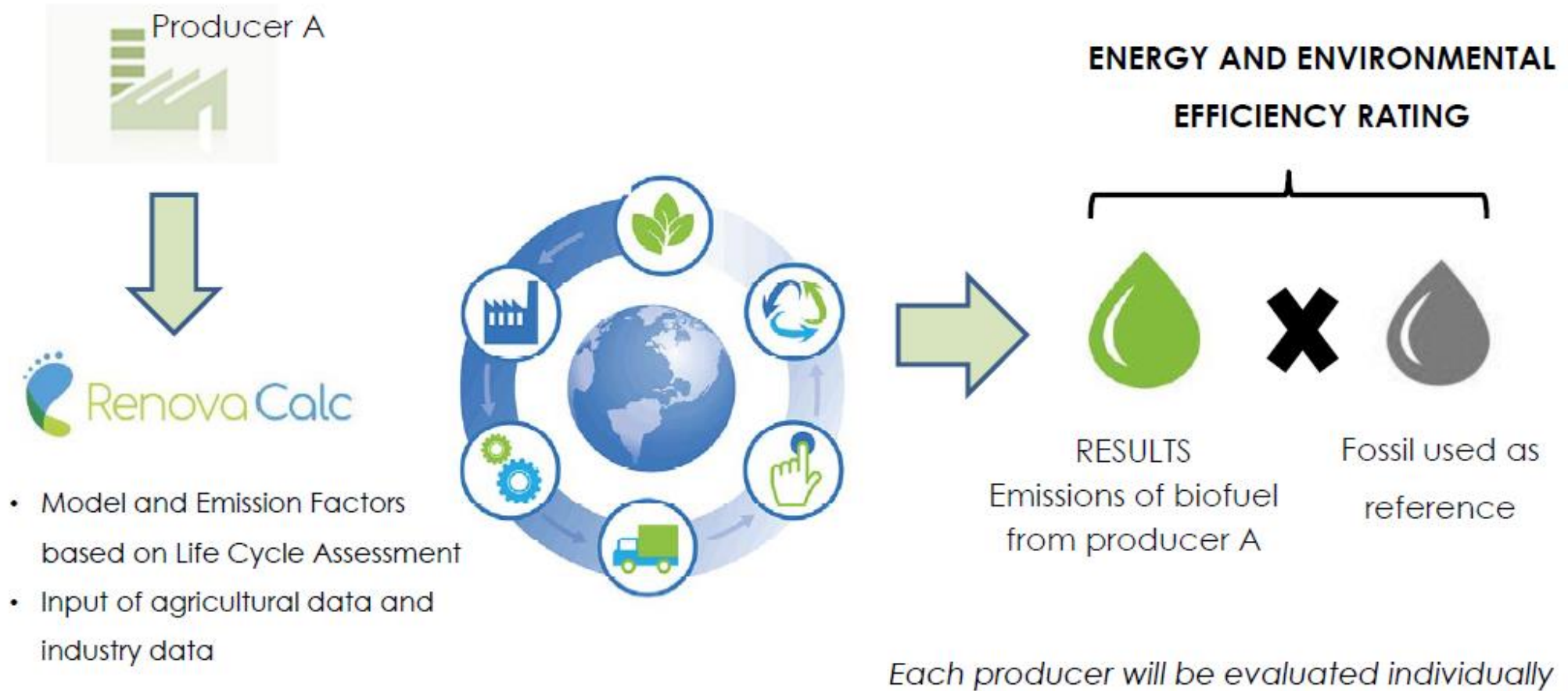
ANNUAL COMPULSORY TARGETS FOR REDUCING GREENHOUSE GAS EMISSIONS

YEAR	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Goal (Millions CBIOs)	35,98	42,35	50,81	58,91	66,49	72,93	79,29	85,51	90,67	95,67

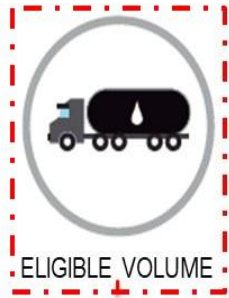
RENOVABIO MARKET



CERTIFICATION OF CARBON FOOTPRINT OF BIOFUELS



ELIGIBILITY OF BIOMASS AND PATHWAYS



Risk management and prevention of LUC

Zero deforestation



Legal environmental regularization

Compliance with the Rural Environmental Registry (CAR)



Agricultural aptitude and planning of expansion

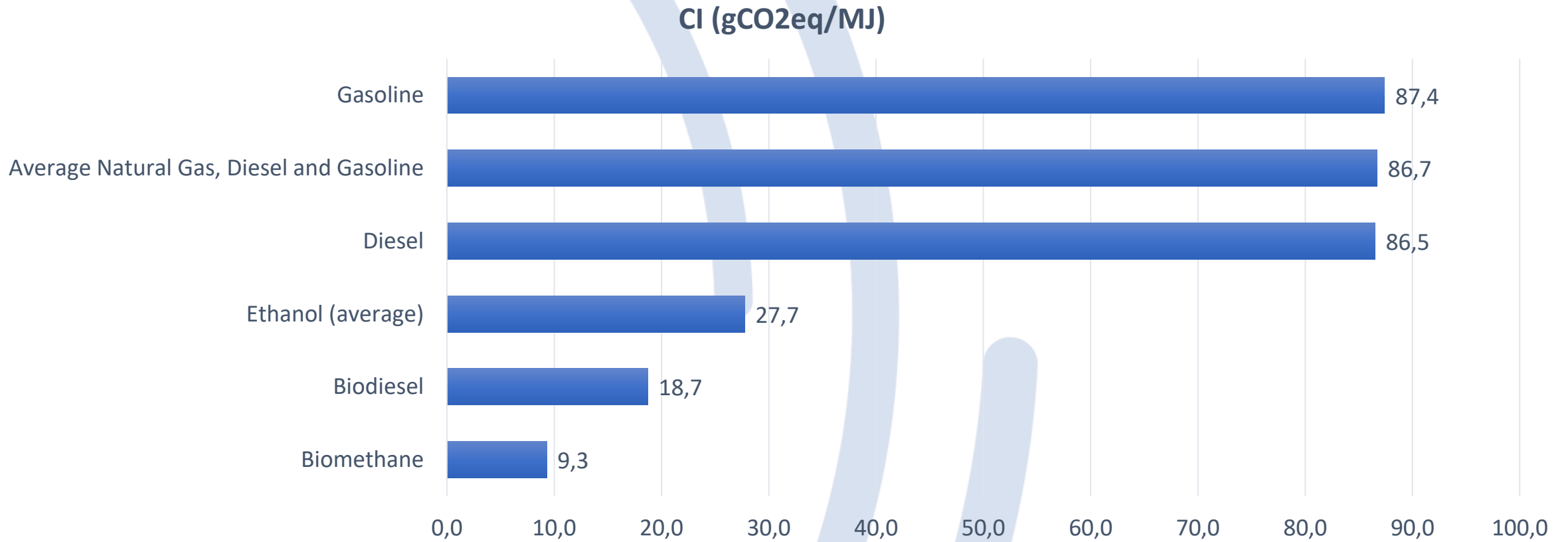
compliance with current agroecological zoning (ZAE)

links CBIO to sustainable land use

E1GC	Sugarcane ethanol (1G)	E1G2G	Integrated Mill - 1G2G ethanol
E1GM	Standalone corn ethanol	BioM	Waste biomethane
E1GFlex	"flex mill" ethanol	BioD	Biodiesel
E1GMI	Imported corn ethanol	BioQAV	HEFA bioquerosene
E2G	Second generation ethanol (2G)		

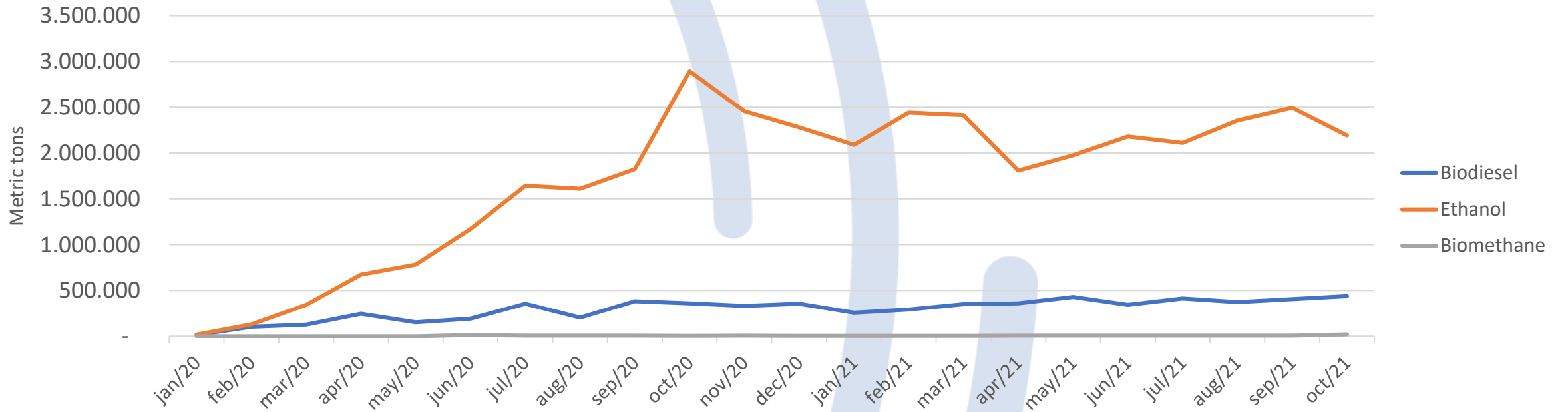


CARBON INTENSITY (CI)

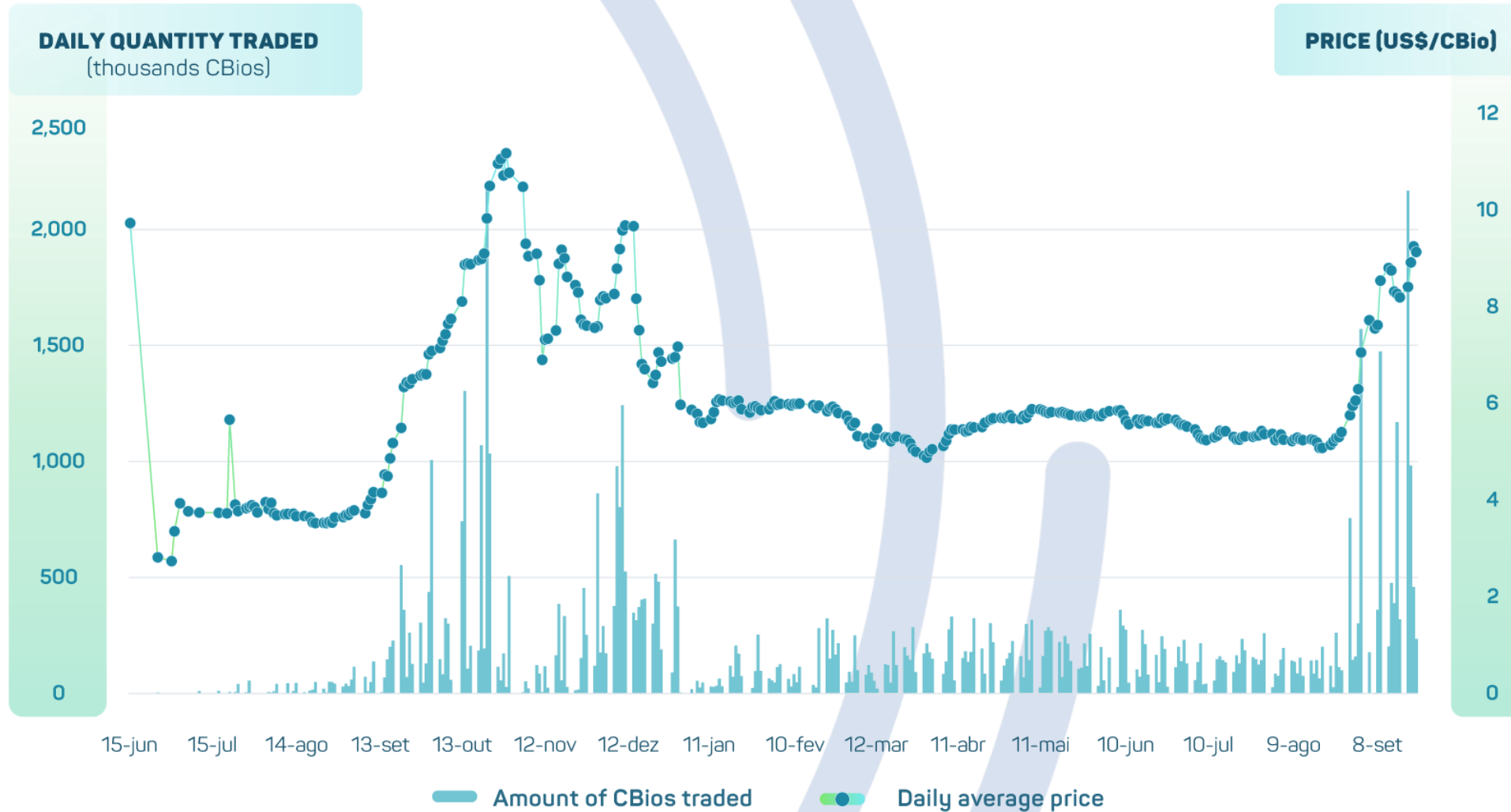


CBIOS BY FUEL TYPE

Credits (CBIOs) by Fuel Type



CBIO MARKET



Source: UNICA, 2021.

**CHANGES IN
BIODIESEL MARKET**

4

The image features a decorative graphic on the right side. It consists of several overlapping, curved lines in shades of blue and light blue. A large, bold, blue number '4' is centered within a circular arrangement of these lines. The overall design is clean and modern, with a focus on the number '4'.

PETROBRAS REFINING DIVESTMENT



**8 refineries
in divestment**

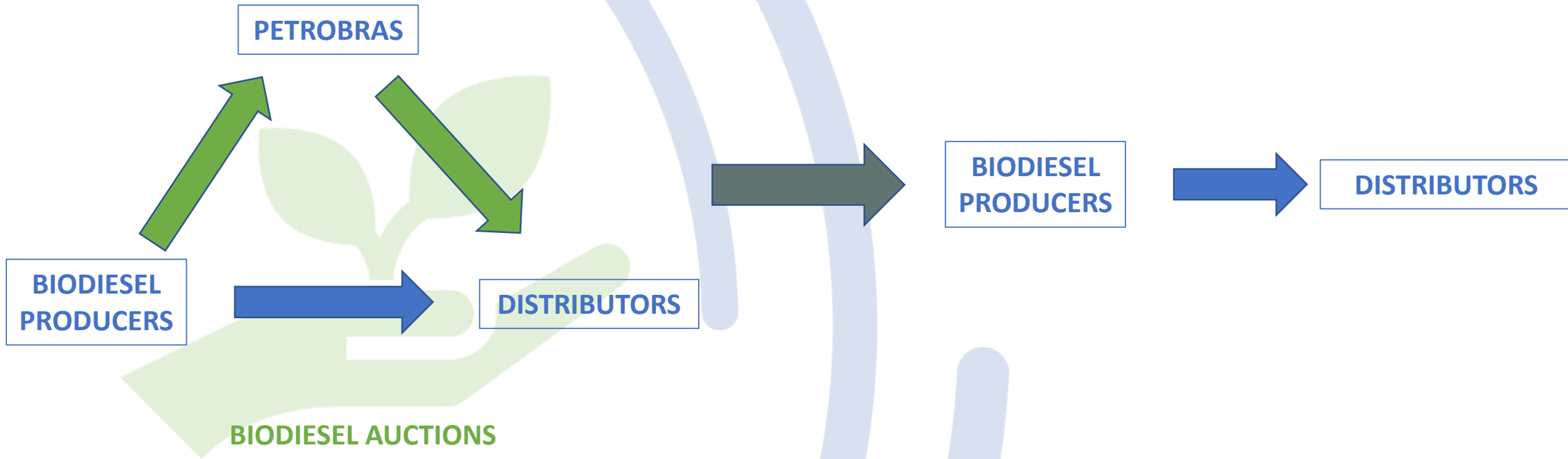


Petrobras signs agreement for the sale of the RLAM refinery to Mubadala Capital for US\$ 1.65 billion and REMAN refinery to ATEM for US\$ 189,5 million.



The competitive processes for the sale of the others refining assets are still in progress aiming at the signing of the purchase and sale agreements.

BIODIESEL AUCTIONS AND NEW COMMERCIALIZATION MODEL



WORKING GROUP TO ANALYZE INCLUSION OF DIESEL CYCLE BIOFUELS IN NATIONAL ENERGY POLICY

Members:

- (i) Ministry of Mines and Energy, which was responsible to coordinate the working group;
- (ii) Civil House of the Presidency;
- (iii) Ministry of Economy;
- (iv) Ministry of Environment;
- (v) Ministry of Infrastructure;
- (vi) Ministry of Agriculture, Livestock and Supply;
- (vii) Ministry of Foreign Affairs;
- (viii) Ministry of Science, Technology and Innovations;
- (ix) Ministry of Regional Development;
- (x) National Agency of Petroleum, Natural Gas and Biofuels;
- (xi) Energy Research Company;
- (xii) Administrative Council of Economic Defense; and
- (xiii) National Forum of Mines and Energy Secretariats.

Key subjects in discussion:

- Green diesel can be commercialized in Brazil according Resolution ANP n° 842/2021;
- Green diesel and renewable share of coprocessed diesel in biodiesel mandate;
- Generation of CBIOS by green diesel and renewable share of coprocessed diesel.

FUEL OF THE FUTURE

5

The image features a large, stylized number '5' in a bold, blue font, centered within a blue circular outline. The circle is composed of several thick, blue curved segments that do not fully connect, creating a sense of motion or a partial circle. In the background, there are several light blue, curved lines that sweep across the frame, adding a dynamic and futuristic feel to the design.

FUEL OF THE FUTURE

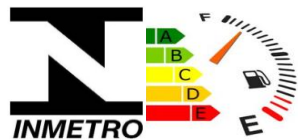
Policy
Integration



National Program for Production and Use of
Biodiesel



Rota 2030



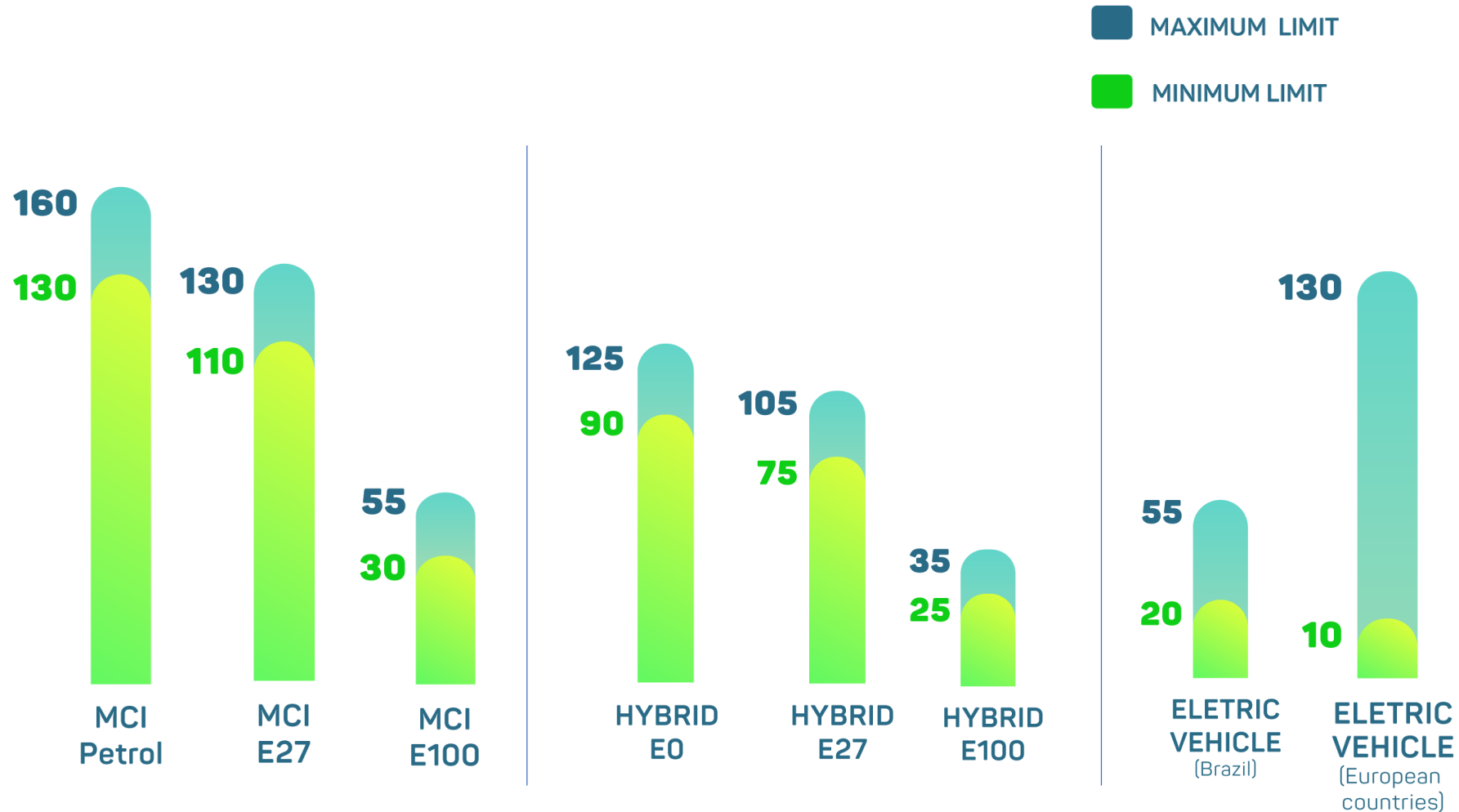
Program of Energy Labeling



National Programme for Energy Efficient Use of
Petroleum and Natural Gas Derivatives -
CONPET

Life Cycle Assessment (well-to-wheel)

FUEL OF THE FUTURE



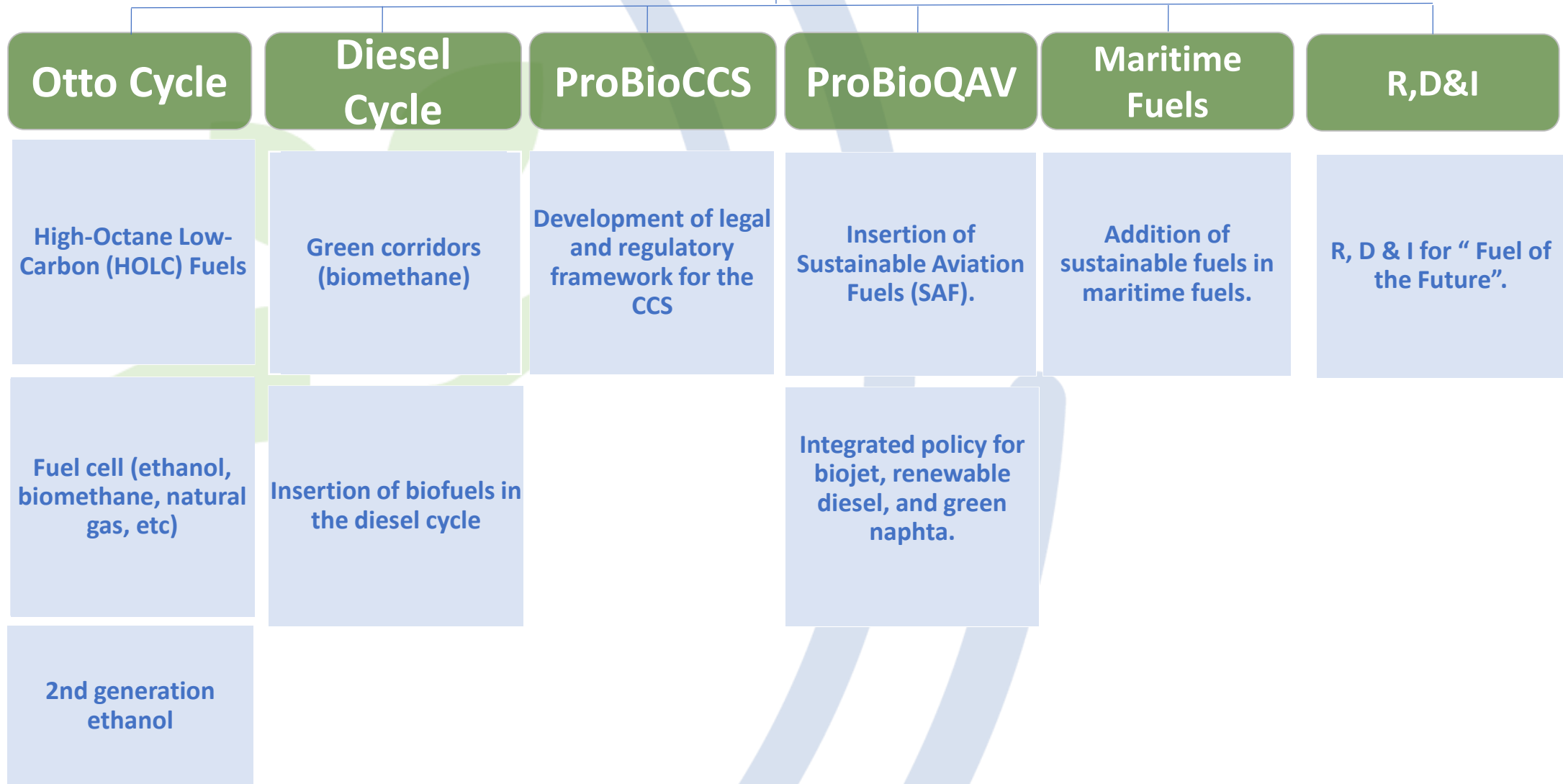
Emissions patterns examples gCO₂/km

The best technology must be selected according to the characteristics of each region (production potential, infrastructure availability, job generation, economic conditions, etc.)

Source: IEA (2019), Weisser (2007), IPCC (2013), INMETRO (2021), Ecoinvent 3.5. Note: Efficiency and emissions levels depend on several parameters. The data presented should be seen as indicative reference values.

FUEL OF THE FUTURE

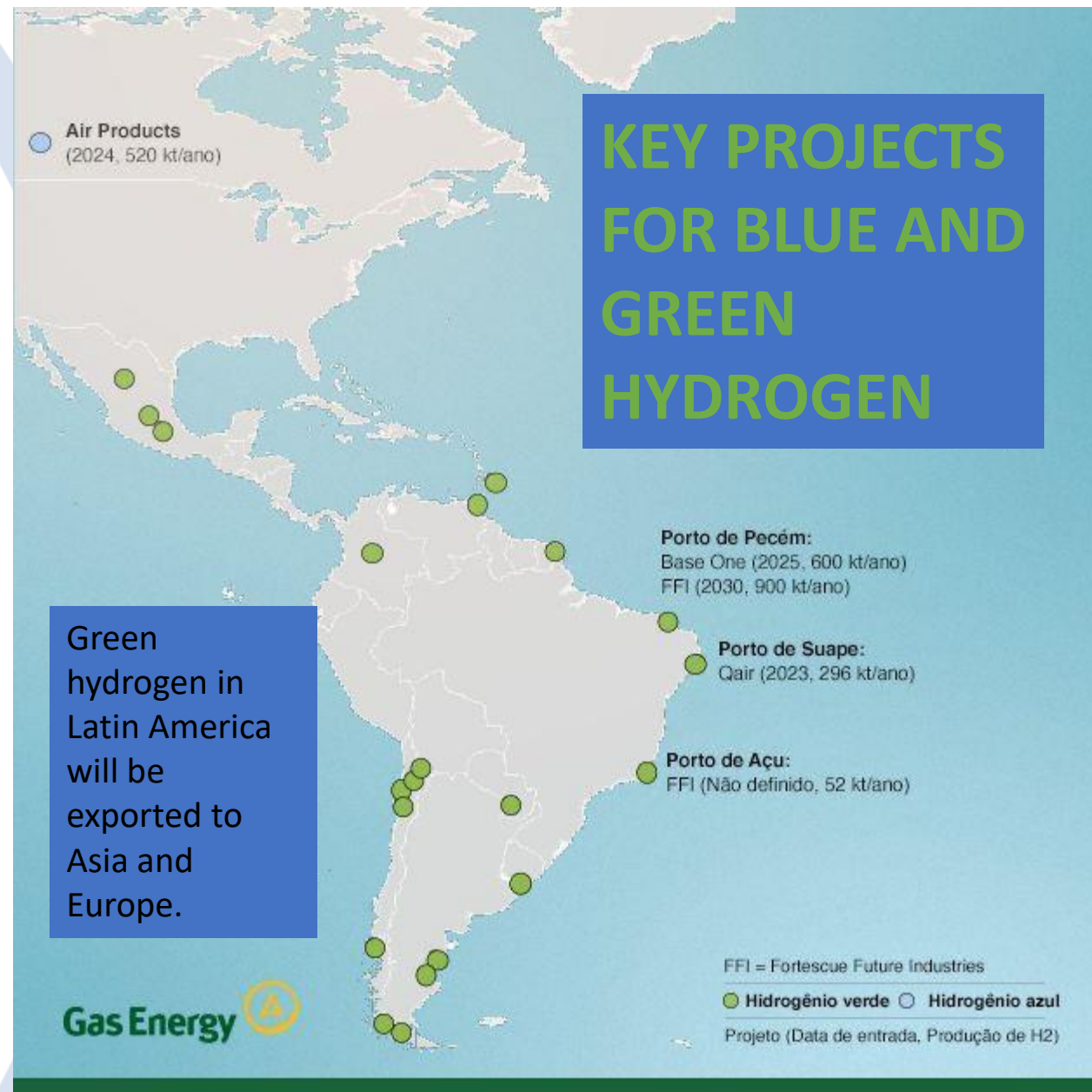
Technical Committee– Fuel of the Future(CT-CF)



**NATIONAL
PROGRAM FOR H2**



NATIONAL PROGRAM FOR H2



NATIONAL PROGRAM FOR H2 AND FUEL OF THE FUTURE



Nissan, IPEN, Unicamp and USP are working together to develop e-Bio Fuel-Cell.



Brazil and Germany are working together to develop production of SAF using green hydrogen and CO2 from CCS.

FINAL REMARKS

- ✓ Brazil is committed to reduce GHG emissions from transport sector;
- ✓ There are many initiatives to boost use of renewable fuels;
- ✓ Biofuels have a key role in strategy for carbon neutrality in 2050.

Thank you!

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SECRETARIA DE
PETRÓLEO, GÁS NATURAL
E BIOCOMBUSTÍVEIS

MINISTÉRIO DE
MINAS E ENERGIA



PÁTRIA AMADA
BRASIL
GOVERNO FEDERAL