Deep Decarbonization Pathways - DDP Report 2025
A decade of national climate action: Stocktake and the Road Ahead

Insights from the Brazil's chapter

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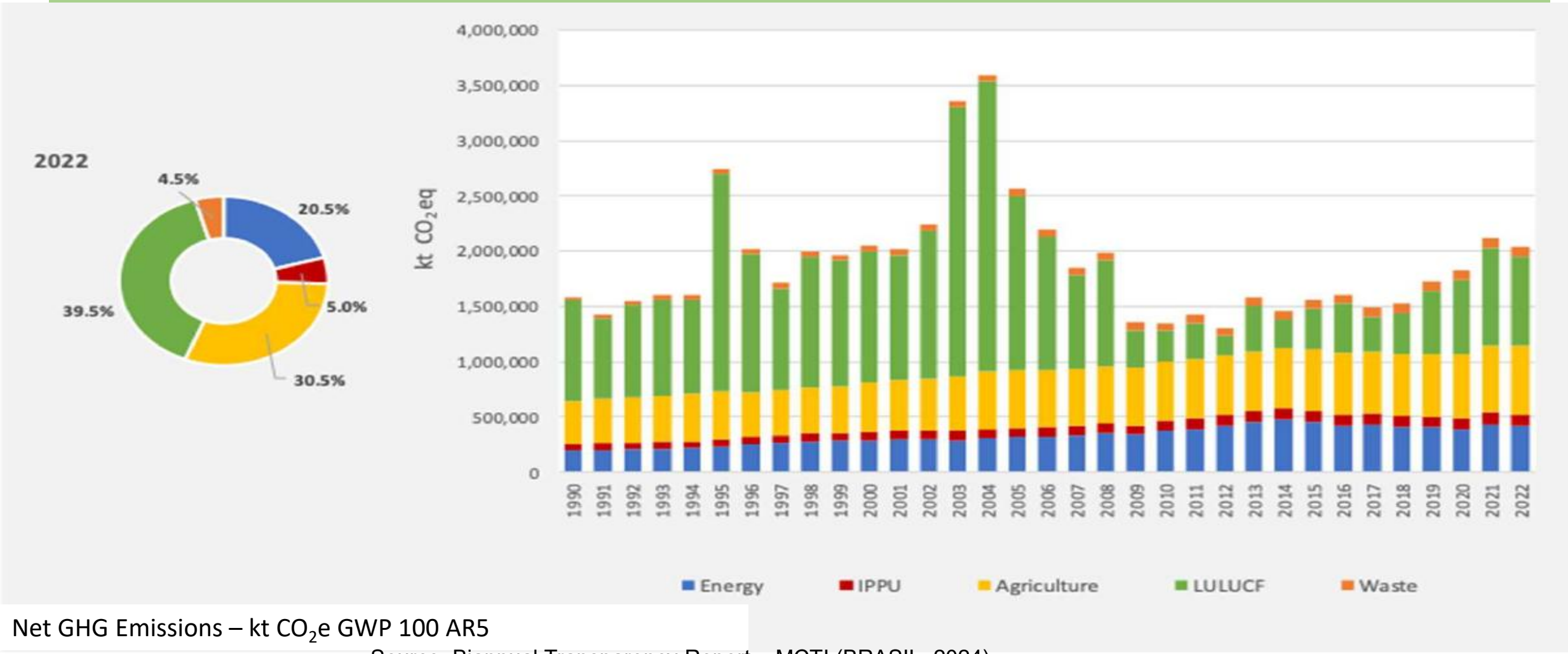
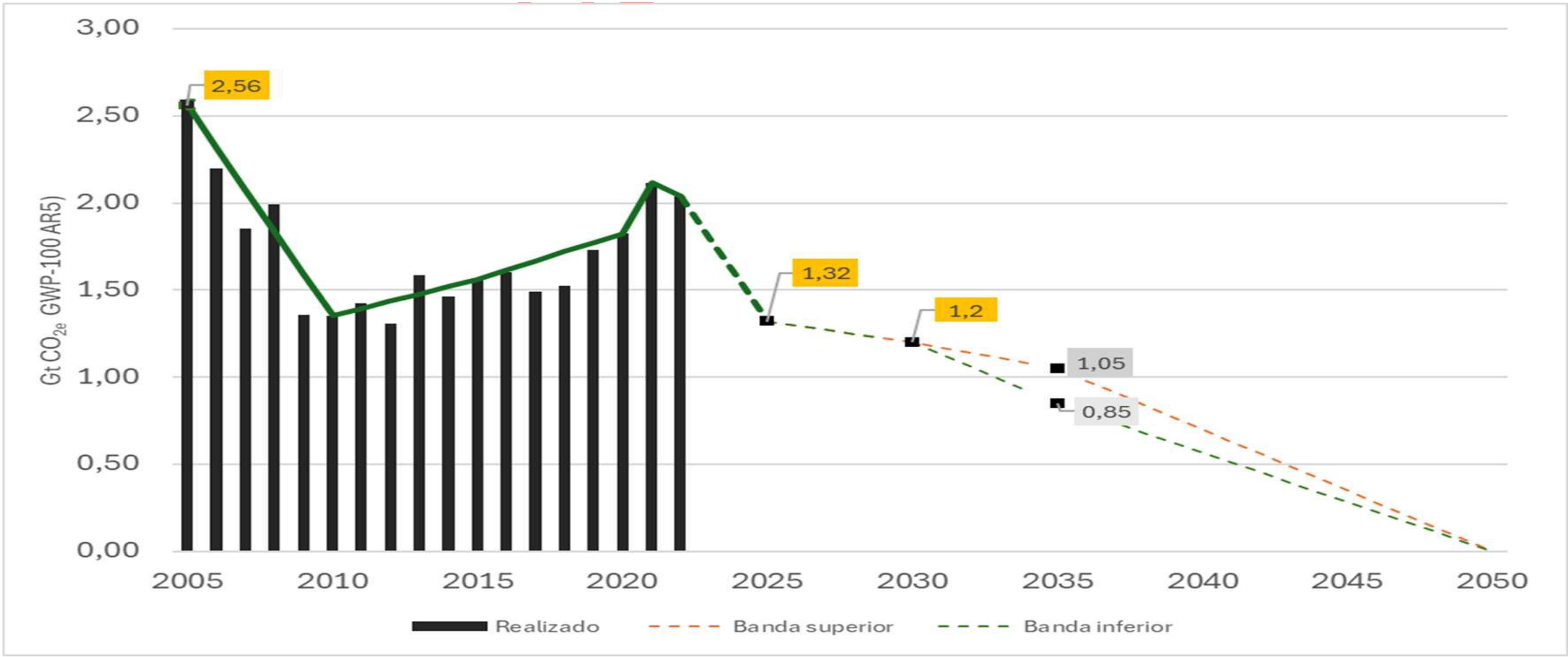
AFOLU: main GHG emissions source in Brazil = 70% of economy-wide GHG emissions in 2022
Deforestation is the main source of LULUCF GHG emissions (CO2) = Around 40%
Enteric Fermentation is the main GHG emissions source (CH4) from Agriculture = 30% of total
50% of overall energy mix = renewables, 88% of power generation = non-fossil => Energy = 20% of total GHG emissions



Net GHG Emissions – kt CO_2e GWP 100 AR5

Source: Biannual Transparency Report – MCTI (BRASIL, 2024)


3,00
2,50
2,00
1,50
1,00
0,50
0,00
Gt CO2e GWP-100 AR5)
2,56
1,32
1,2
1,05
0,85
2005
2010
2015
2020
2025
2030
2035
2040
2045
2050
Realizado
Banda superior
Banda inferior

Analysis of the Brazilian transition towards a net-zero economy: historical record

- **Brazil is already halfway in its energy transition mainly due to past energy and economic security concerns:**
  - started in the 60's with the building of large hydropower dams due to power shortage
  - accelerated in the 70's due to the vulnerability of the trade balance to oil price shocks -> launch of large-scale biofuel programs (bioethanol today > gasoline, sugarcane bagasse, biodiesel)
  - consolidated in the XXIth century thanks to the sharp cost decrease of wind and PV solar power

- **Command-and-control (enforcing environmental laws and regulations) and economic policy tools** (public credit conditional to environmental constraints) -> cut down annual deforestation rates and country's total emissions from over 3.5 $GtCO_2e/y$ in 2004 to around 1.3 $GtCO_2e/y$ in 2012 and from 2.0 $GtCO_2e/y$ in 2022 to around 1.7 $GtCO_2e/y$ today.

- **Paris Agreement:** not the main driver but important to make the government and mainly the private sector believe that sooner or later the transition to climate neutrality is really going to happen.

Insights from the Brazilian case: Challenges and Opportunities Ahead

- **Challenges**

  - Continuity of climate policy and governance may be jeopardized by political shifts

  - Huge oil&gas resources -> Brazil has joined OPEC+: a shortcut to prosperity is to accelerate O&G production and exports of oil products, together with agricultural and mineral commodities**.**

- **Opportunities**

  - Huge mitigation investment opportunities at **low cost (forestry, renewables)**

  - Domestic **cap-and-trade** domestic emissions system approved by law and starting implementation

  - Competitive advantages in some promising industrial sectors under a global energy transition: critical minerals; batteries and its components; hybrid and electrical vehicles; sustainable aviation and maritime fuels; low-carbon steel; green fertilizers; bioeconomy; and the already established wind power generators manufacturing (long-term public soft loans conditions have allowed to reach a 85-95% national content)

  - Ecological Transformation Plan - ETP launched by the Ministry of Finance at COP 29: Brazilian Investment Platform; Eco-Invest; Brazilian Sustainable Taxonomy; Emission of sovereign green bonds; Green Tax Reform: initiatives to mobilize private domestic and international capital at lower cost to foster the transition.

  - International cooperation: Amazon Fund, Tropical Forests Forever Fund, new climate finance.

Priority Short-term Policies to Enable Key Transformations

- Resuming policies successfully adopted in the recent past (2004-2012 and 2022-2025) to sharply **reduce annual deforestation rates: both command-and-control and economic instruments.**
- Relying in the **AFOLU sector to reduce and capture the largest share of emissions** in the first half of the century helps to reduce overall costs for Brazil to get to the net-zero target by 2050 and provides sufficient time for disruptive technologies to become economically viable: enforcement of the Forest Code -> restore the vegetation cover of 20 Mha; protect 50 Mha of public forests in the Amazon with no use defined yet; reforest public degraded land in the Amazon (>60 Mha).
- Developing **smart financial mechanisms** to reduce risks and the cost of capital, fostering the funding of investments in mitigation actions, and mainly in forest cover restoration and low-carbon infrastructure.
- **Carbon Pricing**: provide a long-term, stable signal to induce economic agents to choose low-carbon technologies through a well-structured cap-and-trade scheme; and implement **complementary policies to ensure a just transition:** e.g. recycling a share of carbon pricing revenues to foster employment and to social transfers to low-income households.
- Increase of storage capacity in the national power grid to **avoid "curtailment"** of excess wind and solar power through the combined effect of more transmission lines and the use of hydropower reservoirs and batteries.

Requirements for Building a Long-term Brazilian Green Economy

- Reverse the deindustrialization of the Brazilian economy (from 36% of GDP in 1985 to 13% in 2022) but focusing on the **promising industrial sectors** under a **global energy transition** where Brazil has a competitive advantage: use the New Industry Brazil - NIB Plan tools (e.g. public procurement) towards this goal
- **Greening the agricultural commodities supply chain**: enforcement of certification for compliance with the European Union Deforestation Regulation – EUDR (e.g. soybeans, beef) and reducing its carbon footprint to remain competitive under the Carbon-based Adjustment Mechanism - CBAM (e.g. tracking and reducing Scope 3 GHG emissions from the beef production chain: more intensive ranching increasing the average number of heads of cattle per hectare from 1.3 in 2020 to 2.0 by 2050; ensuring that pastureland is not a result of illegal deforestation; and supplying appropriate feeding to reduce cattle lifetime from 37 to 27 months in 2020-2050, allowing to reduce the current livestock of 239 million heads of cattle)
- Use the **oil&gas sector as an effective facilitator** of the transition, providing resources to progressively convert from oil&gas to renewable economic activities, and ensure a just transition for workers and regions affected.
- Ensure the **governance alignment** and consistency **across multiple Governmental Plans**: ETP, NIB, Pluriannual Plan (PPA), Growth Acceleration Plan (PAC), Climate Plan, 2055 Energy Plan, among others
- Launch a stakeholder engagement process to design and implement the **Brazilian Long-term Low Emissions Development Strategy - LT-LEDS**.