Zero Carbon Analytics

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Oil and gas fuelling extreme weather in Brazil

Key points:

- Attribution studies in Brazil confirm the impact of fossil fuel-driven climate change on the intensity and frequency of recent droughts and floods.
- Fossil fuels trail agriculture and land use in terms of Brazil's greenhouse gas emissions, but oil companies continue to expand production with government support.
- Estimations of the financial responsibility of fossil fuel firms for the impact of climate change find that damages from Petrobras' activities in 2018-2023 are worth USD 500 billion.
- Government policies for net zero focus on increasing wind and solar power to lessen the current reliance on hydropower.

Fossil fuels impact on Brazilian weather events

At least six attribution studies have been made in Brazil across recent droughts (four studies) and floods (two studies). The unprecedented April-May 2024 floods in Rio Grande do Sul affected over 90% of the state, displacing over 600,000 people and causing 183 deaths. A World Weather Attribution (WWA) study assessed four-day and 10-day periods during the heavy rainfall, finding that both were made more likely by over a factor of 2 and 6-9% more intense due to the burning of fossil fuels.

Brazil has also experienced severe droughts in the Amazon river basin since mid-2023, when river levels were reported to be at their lowest in 120 years. The WWA found that the agricultural drought between June and November was made 30 times more likely due to climate change. Climate scientist Dr Fredi Otto who co-founded the WWA has raised concerns for the country, saying "If we continue burning oil, gas and coal, very soon, we'll reach 2°C of warming and we'll see similar Amazon droughts about once every 13 years".

Whether deforestation is rising or falling is the main factor affecting Brazil's levels of emissions from agriculture and land use change. The Amazon and other forested areas can act either as a major source of emissions or as carbon sinks.

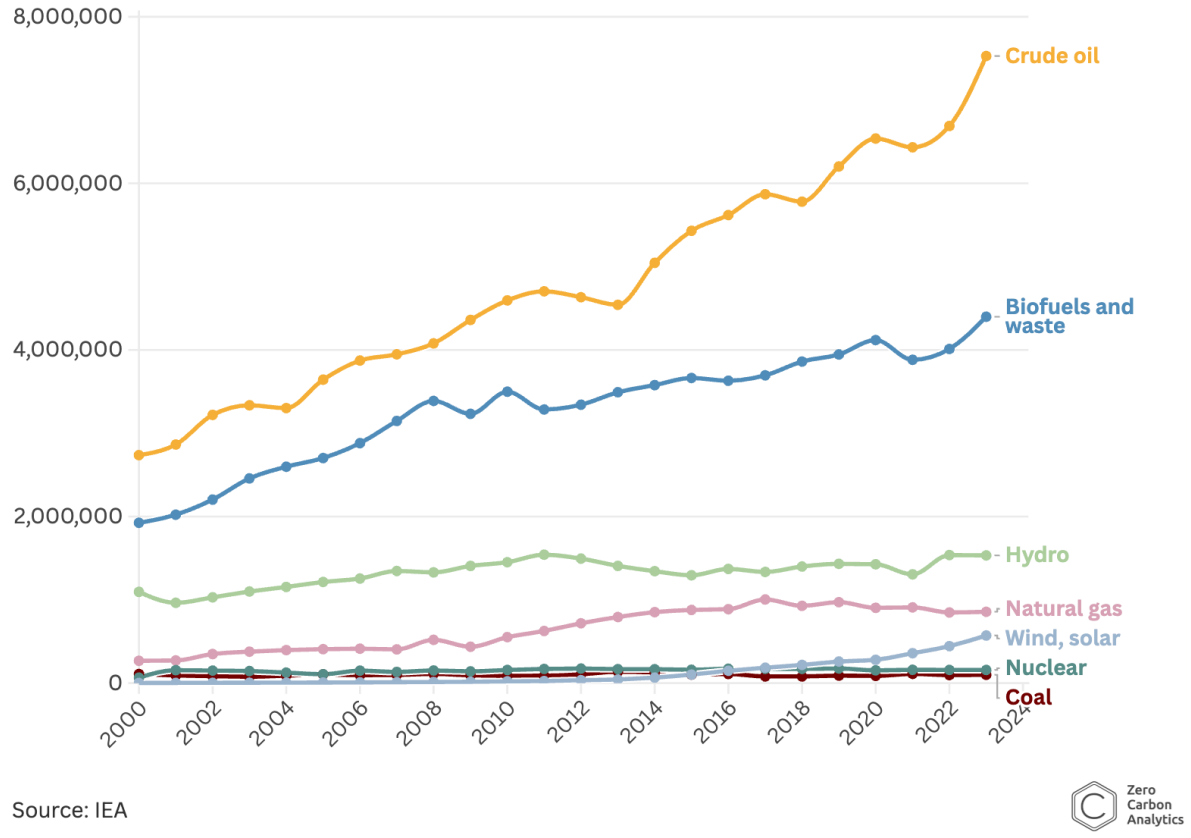
Role and responsibility of Brazil's oil and gas industry

Agriculture and land use change are the main sources of emissions in Brazil, with deforestation levels being a key factor affecting rising or falling emissions. Within the energy sector the largest source is transport, which relies heavily on oil.

Brazil's majority state-owned petroleum company Petrobras operates more than 90% of oil and gas production and self-reports its emissions from those oil and gas operations as having fallen by 24% between 2015 and 2023. However, its overall emissions – from production and products it has sold – have not declined as quickly, based on data from the Carbon Majors database, which reports a fall of just 2.7% between 2015 and 2022 (in part due to the Covid-19 pandemic), the latest available data. Oil production continued to grow in 2023 and 2024 continued to grow.

The majority of production is concentrated offshore in the Campos Basin and Santos Basin, both close to cities such as São Paulo and Rio de Janeiro. Production from these offshore areas has skyrocketed since the discoveries in the mid-2000s. Oil and gas firms continue to expand production in Brazil, with plans to explore for oil at the mouth of the Amazon River and in Rio Grande do Sul – an agricultural and industrial centre severely affected by flooding in spring 2024.

Fig. 1: Evolution of domestic energy production in Brazil, 2000-2022 (TJ)



Source: IEA

Climate damages owed by fossil fuel firms in Brazil

There are a range of firms operating in Brazil, but the most active is Petrobras. The Brazilian player is among the 25 Carbon Majors identified by climate science and policy think tank Climate Analytics as being the world's largest emitters. Based on a conservative assumption that producers are responsible for one-third of damages caused by fossil fuels and a social cost of carbon at USD 185 per tonne, the damages for emissions between 2018 and 2023 owed by these firms is estimated at USD 20 trillion, against earnings of USD 30 trillion. Of this, Petrobras is responsible for USD 500 billion in damages, against USD 700 billion in financial gains.

Lobbying for continued exploitation of resources

Brazil's oil and gas firms and trade associations lobby the government to reinforce the production of oil and gas. Petrobras is recognised as having particularly strong lobbying power. Meanwhile, the Brazilian Petroleum and Gas Institute (IBP) recognises the issue of climate change and highlights the role of oil and gas companies in the development of offshore wind energy. However, this trade association also emphasises that the energy transition should be gradual and continues to lobby for more oil and gas in areas such as the mouth of the Amazon River, which is a priority for Petrobras.

The government continues to be supportive of increasing production, which brings in royalties and other revenue. This support has seen the country become a major producer, and led to it joining the OPEC+ Charter of Cooperation at the start of 2024 to coordinate on supply levels with other producers.

Towards accountability

In response to growing exploration and extraction, civil society groups have filed lawsuits with the government to try and slow this down. For example, in late 2023 the non-governmental organisation Institute Arayara filed an environmental class action challenging an auction for new oil exploration blocks in the Amazon on the grounds it was illegal to allow oil production in conservation areas. In March 2024 the federal government and its agencies responded that environmental impacts will be addressed in the environmental licensing phase. The case is ongoing.

Fossil fuels must be phased out to slow temperature rises

Supply of fossil fuels

According to the 2023 UN Production Gap report, the government plan up to 2032 is to increase production of oil by 63% and gas by 124%. The government continues to incentivise exploration and production through USD 8.6 billion in tax expenditures and direct budgetary transfers. Overall, federal fossil fuel subsidies for oil, gas and coal reached USD 14.56 billion in 2022.

Climate Action Tracker gives Brazil an overall rating of Insufficient, the middle out of the five ratings. The ranking is due to its policies (including its voluntary emissions reductions submitted as part of the UN Climate Change negotiations) are considered insufficient in their contribution to limit temperature rises in line with climate science.

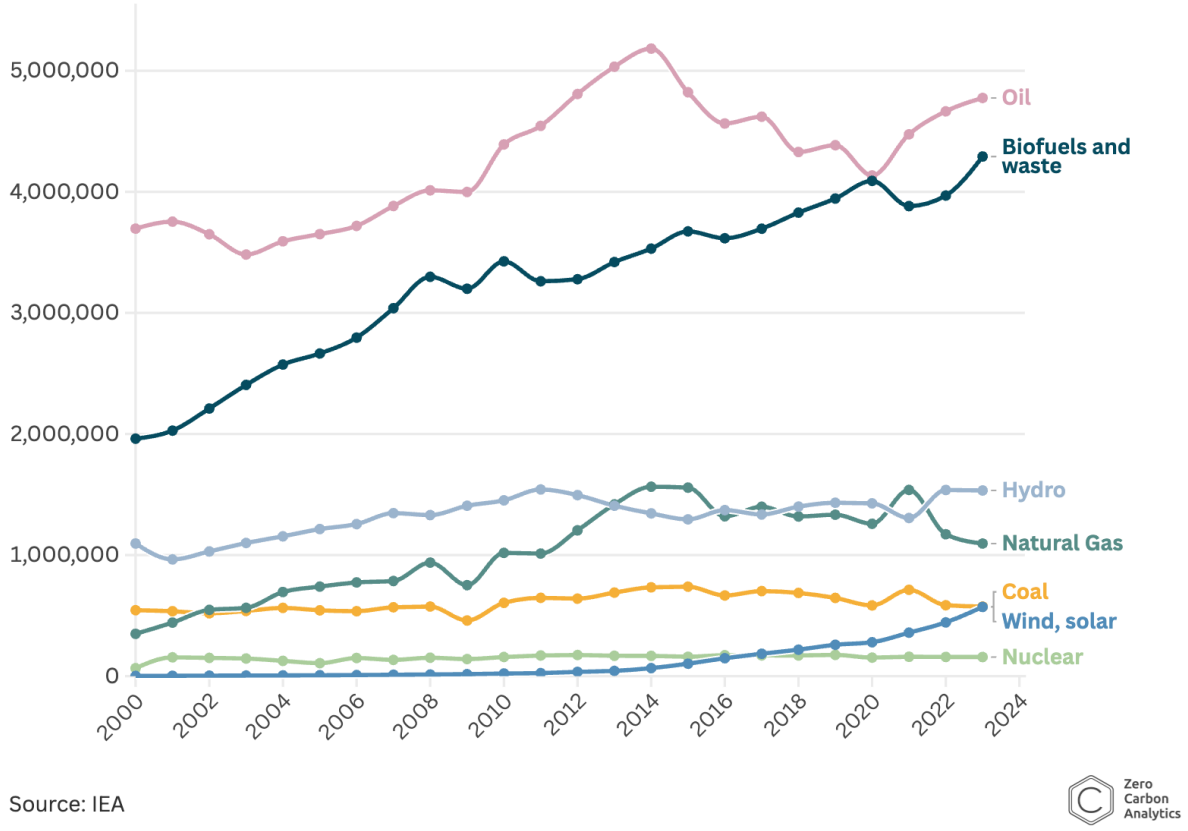
Reducing demand for fossil fuels

In 2023 the country reaffirmed its goal to reach net-zero emissions by 2050 and in 2024 presented its updated Nationally Determined Contribution (NDC) pledging to reduce emissions by up to 67% by 2035 based on 2005 levels. The NDC makes several references to gradually reducing the use of fossil fuels and increasing electrification. However, research from Oil Change International projects that Brazil's oil and gas production will increase by 36% by 2035.

Energy

In 2023, 60% of Brazil's electricity generation came from hydropower, which has long been a major energy source in the country. In an effort to strengthen energy security due to issues from overreliance on hydropower the government introduced subsidies and auctions in the early 2000s to increase the amount of wind energy. This historic and ongoing support has contributed to wind increasing its share of electricity generation from 1% in 2013 to 13% in 2023. The government has also supported solar energy, which has grown in use, especially in the distributed power sector. Solar makes up just over 7% of Brazil's electricity mix.

Fig. 2: Energy supply in Brazil, 2000-2022 (TJ)



Source: IEA

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Transport

A major policy focus to reduce consumption of oil by successive governments has been to increase the use of biofuels. The number of EVs remains low. In 2021 just 0.5% of vehicles sold were plug-in hybrids or battery electric vehicles. In 2024 import taxes on electric vehicles were introduced which drove a surge in sales before the new tax was imposed. Auto industry lobbying pushed for these import taxes.