

MINISTRY OF
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MONTHLY ENERGY BULLETIN BRAZIL

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Edition

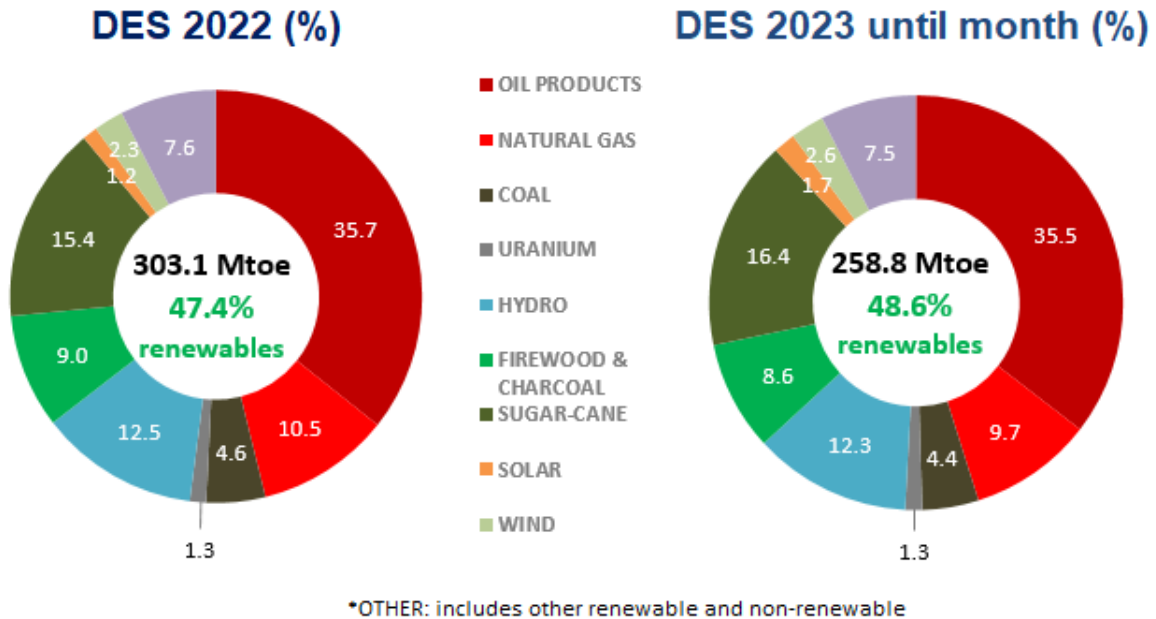
October

DOMESTIC ENERGY SUPPLY

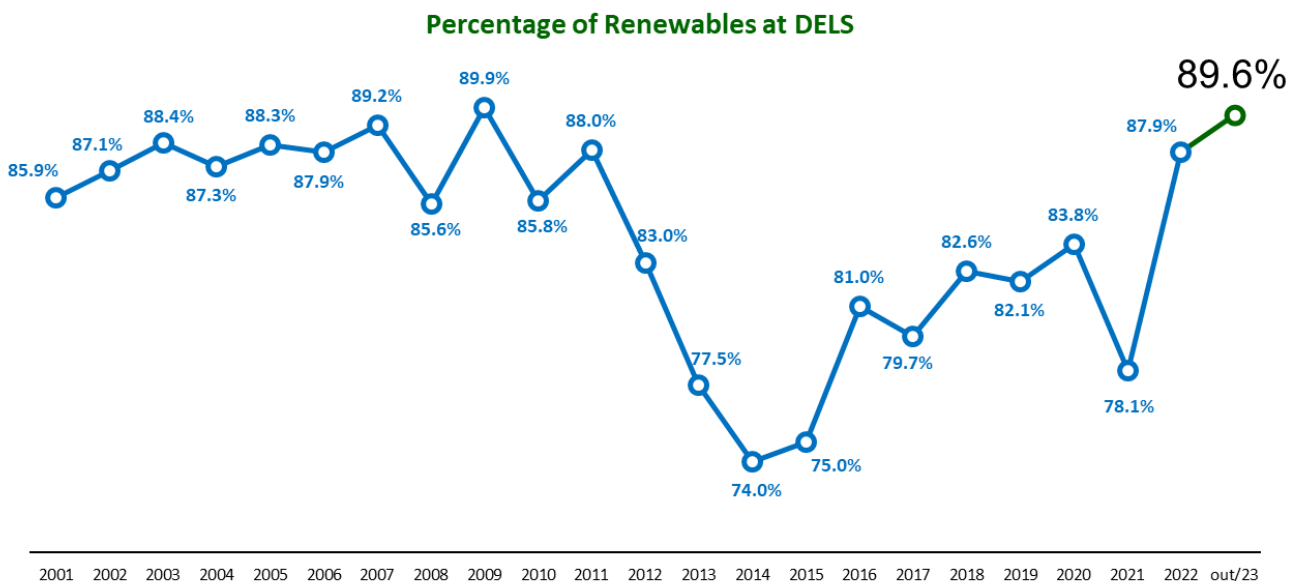
Based on data until October this year, the proportion of renewable sources in the Domestic Energy Supply (DES)* increased to about 48.6%, higher than that calculated last year, 47.4%, mainly due to a greater generation of renewable power energy and a greater demand for sugarcane products and biodiesel .

Regarding sugarcane production, according to the most recent survey by the National Supply Company (Conab), there is an estimated increase of 27.4% compared to the 2022/2023 harvest. For ethanol produced from sugarcane and corn, the forecast is a 9.9% increase in production.

MORE RENEWABLE DOMESTIC ENERGY SUPPLY IN 2023



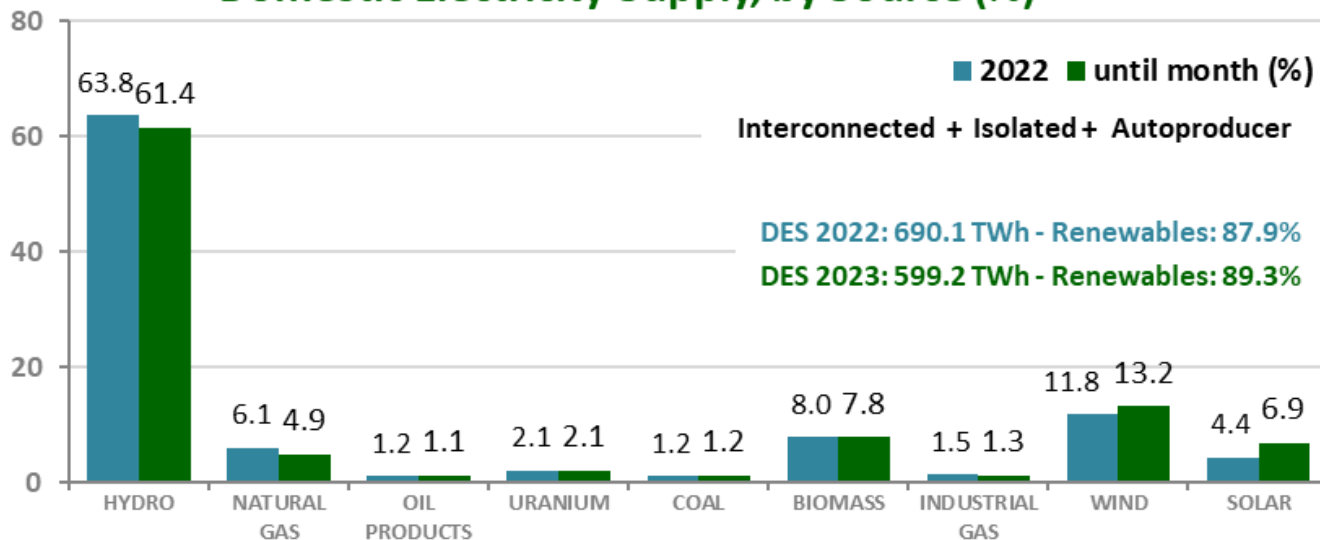
Regarding the proportion of renewables in the Domestic Electricity Supply (DELS)² this year, it was observed that 89.3% was derived from renewable sources up to October, reaching an accumulated value of 599.2 TWh. The figure below highlights the significant proportion of renewables in our DELS, contributing to a cleaner energy generation. This is a result of both favorable hydrological conditions and investments in solar and wind energy.



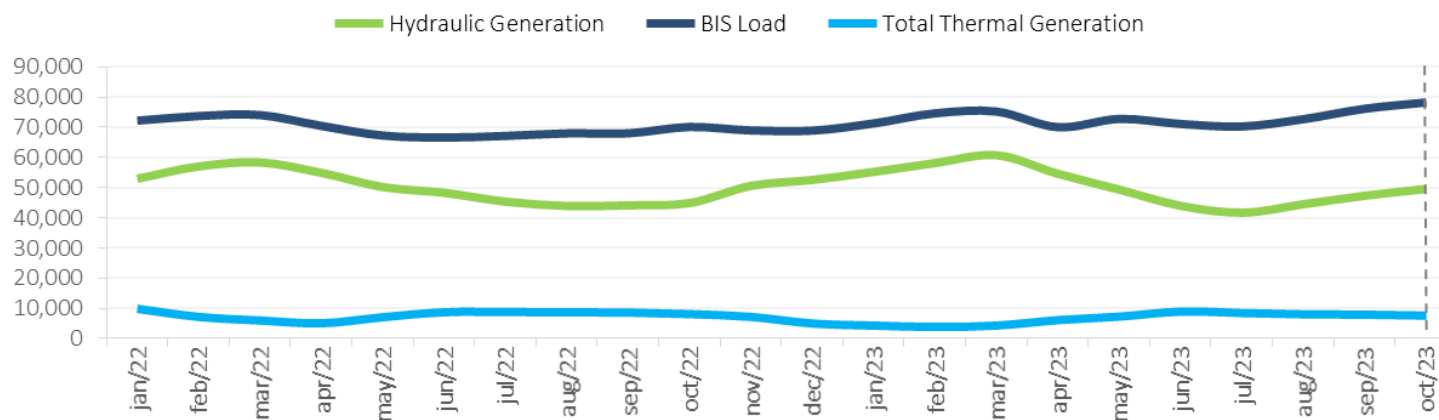
It is important to mention that DELS accounts for the generation portions from Centralized Generation, Distributed Generation (DG), Auto production, Isolated Systems and Electric Energy Exchange.

For the first ten months of the year, in comparison to the same period of the previous year (year to date, YTD, comparing current year and previous year), there was a power generation of 60% in centralized solar photovoltaic and 15% in wind. National hydropower remained steady, with a minor decrease of about 1%. The increase in renewable electricity generation in 2022 and 2023 led to a significant reduction in the share of coal and natural gas-fired power plants in the DELS.

Domestic Electricity Supply, by Source (%)



Generation - BIS¹ Load - Hydraulic - Thermal Total (MWavg)



¹BIS: Brazilian Interconnected System.

Source: National Electric System Operator (ONS)

HIGHLIGHTS IN OCTOBER 2023

Electricity consumption in high

Following the trend observed in the previous month, which was considered by international meteorological organizations to be the hottest September in history, in October, as a result of heat waves that impacted several Brazilian regions, electricity consumption in the Brazilian power system increased by 8.1 % compared to the same month of the previous year, mainly a consequence of the greater use of air conditioning units.

Electricity consumption in the residential sector grew by 13.7% compared to October 2022. Industrial consumption increased by 3.4%, while commercial consumption grew by 12.2%.

Oil and gas growing

Oil and gas production increased, rising 10.8% and 7.6% respectively, YTD / YTD previous year.

Regular gasoline and hydrated ethanol prices continue to fall

Regular gasoline and hydrated ethanol prices decreased by 13.4% and 15.9% respectively, YTD / YTD previous year.

Steel and Mining

Steel production fell by 7.8%, however aluminum production grew by 27.6%, iron ore exports increased by 7.8%, and pellet exports increased by 29.7%, YTD / YTD previous year.

Hydraulic supply growing

The supply of hydraulic energy increased by 1.0% YTD / YTD previous year. The monthly average was 50,565.4 MWavg. Itaipu's supply, for the same period, increased 26.2%.

Wind Supply in high

Wind energy supply, up to October 2023, increased by 15% in the year, as a reflection of the successive increases in installed capacity, which can be observed month by month, and the good results of the average capacity factor achieved in recent months. For the first ten months of 2023, 3,693.5 MW of wind power plants came into operation, a value 63% higher than last year for the same period.

International power energy exchange

In October 2023, Brazil imported 55 MWavg from Argentina and there was no energy trade between Brazil and Uruguay.

Natural gas availability falling

Gas consumption availability fell by 6.8%, YTD / YTD previous year.

Slightly increase on coal for electricity generation

There was a slightly increase of 0.2% for coal public power generation, YTD / YTD previous year.

Apparent consumption of petroleum products on the rise

Apparent consumption of oil derivatives increased by 2.6%, diesel consumption increased by 2.6% and gasoline consumption increased by 9.8%, YTD / YTD previous year. Automotive ethanol consumption increased by 2.4%.

The energy consumption of light Otto-cycle vehicles (gasoline, ethanol, and natural gas) has shown an increase of 5.8%.

Biodiesel production rising

Biodiesel production increased by 16.7%, YTD / YTD previous year.

As a consequence of a resolution taken by the National Energy Policy Council – CNPE in March 20, 2023, increasing the mandatory biodiesel blend content in diesel oil sold to the final consumer to 12%, as well as the progressive evolution of this percentage, which is expected to reach 15% by the year 2026.

In December 2023, CNPE approved the anticipation of the mandate of 14% in the mixture of biodiesel and diesel to March 2024 and 15% to March 2025.

Biodiesel replacing fossil diesel contributes to reducing greenhouse gas emissions, in addition to reducing the need to import fossil fuel.

Electricity tariffs continue to fall

All three tariffs (residential, commercial, and industrial) continue to show a decline compared to the previous year's. The residential tariff dropped by 4.3%, while there was a decrease of 3.3% for the commercial sector and 2.8% for the industrial sector.

Solar distributed generation installed capacity (DG) rising

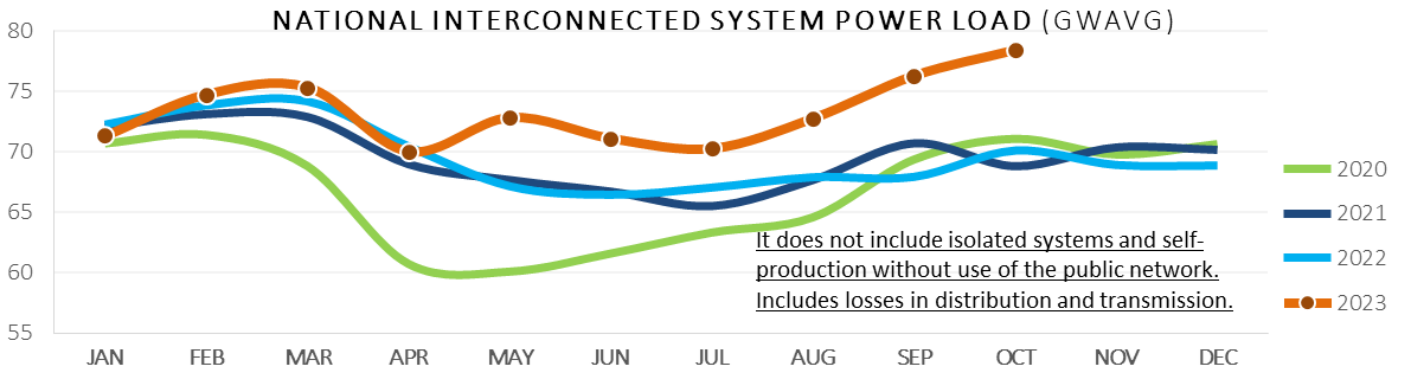
The growing in solar DG installed capacity in Brazil is still a highlight and has increased 64.9% compared to October 2022. The centralized solar installed capacity (non-GD) also increases, with a 60.1% growth compared to October 2022.

For the first ten months of the year, 3,319.6 MW of installed centralized solar capacity came into operation.

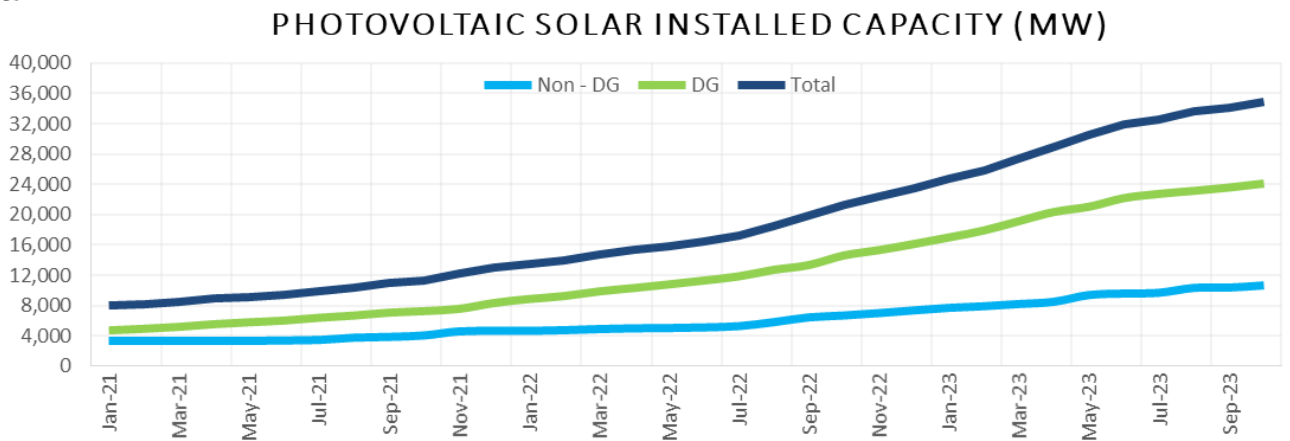
The DG's growth is a reflection of public policies to encourage renewable energy sources and distributed micro and mini-generation, such as Law No. 13,203/2015 and Law No. 14,300/2022, which is considered a legal framework for distributed generation in Brazil.

SPECIFICATION	October					
	IN THE MONTH			YTD / YTD Previous Year		
	2023	2022	Δ% 23/22	2023	2022	Δ% 23/22
OIL						
PRODUCTION - with Shale Oil and NGL(10 ³ b/d)	3,612	3,333	8.4	3,435	3,101	10.8
IMPORTS AVERAGE PRICE (US\$/bbl FOB)	93.69	95.82	-2.2	82.53	101.31	-18.5
OIL PRODUCTS						
TOTAL CONSUMPTION (10 ³ b/day)	2,541	2,482	2.4	2,582	2,517	2.6
hereof: DIESEL with biodiesel - (10 ³ b/day)	1,199	1,171	2.4	1,155	1,125	2.6
hereof: GASOLINE C (10 ³ b/day)	753	786.7	-4.3	790	720	9.8
CONSUMER PRICE - DIESEL (R\$/l)	6.08	6.56	-7.3	5.70	6.60	-13.6
CONSUMER PRICE - GASOLINE C (R\$/l)	5.73	4.89	17.2	5.48	6.33	-13.4
CONSUMER PRICE - LPG (R\$/13 kg)	101.76	109.74	-7.3	104.82	109.87	-4.6
NATURAL GAS (d)						
PRODUCTION (10 ⁶ m ³ /day)	153	149	2.5	148	137	7.6
IMPORTS (10 ⁶ m ³ /day)	16.2	18.4	-12.0	17.3	25.3	-31.7
NON-UTILIZED AND REINJECTION (106 m ³ /day)	87.6	79.3	10.6	80.0	71.4	12.0
AVAILABILITY FOR CONSUMPTION (10 ⁶ m ³ /day)	81.1	87.9	-7.8	85.2	91.4	-6.8
INDUSTRIAL CONSUMPTION (10 ⁶ m ³ /day) (d)	38.9	42.3	-8.0	39.8	41.5	-3.9
POWER GENERATION CONS. (10 ⁶ m ³ /day)	9.7	13.0	-25.3	11.2	15.8	-29.2
INDUSTRIAL PRICE SE (b) (US\$/MMBtu) - consumption range of 20,000 m ³ /day (d)	21.99	21.09	4.3	21.56	20.39	5.7
MOTOR PRICE SE (US\$/MMBtu) (d)	29.56	20.12	46.9	27.71	20.75	33.5
RESIDENTIAL PRICE SE (US\$/MMBtu) (d)	56.36	49.27	14.4	52.94	47.27	12.0
ELECTRICITY						
NATIONAL INTERCONNECTED SYSTEM	78,374	70,068	11.9	73,272	69,675	5.2
SOUTHEAST/MIDWEST POWER LOAD (MWavg)	44,630	40,152	11.2	41,658	40,215	3.6
SOUTH POWER LOAD (MWavg)	12,747	11,334	12.5	12,553	12,085	3.9
NORTHEAST POWER LOAD (MWavg)	13,272	11,787	12.6	11,999	11,216	7.0
NORTH POWER LOAD (MWavg)	7,725	6,795	13.7	7,062	6,160	14.6
TOTAL CONSUMPTION (TWh) (a)	45.9	42.5	8.1	43.7	42.2	3.6
RESIDENTIAL	14.3	12.6	13.7	13.4	12.6	6.4
INDUSTRIAL	16.2	15.7	3.4	15.6	15.2	2.4
COMMERCIAL	8.4	7.5	12.2	8.0	7.7	4.5
OTHER SECTORS	7.0	6.7	4.0	6.6	6.7	0.0
PLANTS ENTRY INTO OPERATING (MW)	639	941	-32.1	7,913	6,048	30.8
RESIDENTIAL PRICE (R\$/MWh) (e)	864	777	11.2	831	868	-4.3
COMMERCIAL PRICE (R\$/MWh) (e)	830	741	12.0	799	826	-3.3
INDUSTRIAL PRICE (R\$/MWh) (e)	801	705	13.6	767	789	-2.8
ETHANOL AND BIODIESEL						
BIODIESEL PRODUCTION (10 ³ b/d)	139	116	20.6	126	108	16.7
MOTOR ETHANOL CONSUMPTION (10 ³ b/d)	522	474	10.1	474	463	2.4
ETHANOL EXPORTS (10 ³ b/d)	47	72	-34.7	42	39	7.6
HYDRATED ETHANOL PRICE (R\$/l)	3.60	3.56	1.1	3.80	4.51	-15.9
COAL						
ELECTRICITY GENERATION (MWavg)	997	926	7.7	847	846	0.2
IMPORT PRICE (US\$ FOB/t)	202.57	220.86	-8.3	221.65	298.56	-25.8
NUCLEAR ENERGY						
ELECTRICITY GENERATION - (GWh)	485	2008	-75.8	1,758	1,682	4.5
INDUSTRIAL SECTORS						
STEEL PRODUCTION (10 ³ t/day)	86	93	-8.0	88	95	-7.8
ALUMINIUM PRODUCTION (10 ³ t/day) (c)	2.7	2.6	7.3	2.7	2.1	27.6
IRON ORE EXPORTS (10 ³ t/day)	1,010	827	22.2	947	879	7.8
PELLETS EXPORTS (10 ³ t/day)	77	35	120.5	66	51	29.7
BIG IRON EXPORTS (10 ³ t/day)	15.4	9.2	67.6	10.8	10.3	5.4
PAPER PRODUCTION (10 ³ t/day)	29.5	30.0	-1.5	28.5	30.1	-5.3
PULP PRODUCTION (10 ³ t/day)	64.4	68.4	-5.9	66.0	67.8	-2.6
SUGAR PRODUCTION (10 ³ t/day)	172.5	147.0	17.3	130.9	105.9	23.6
SUGAR EXPORTS (10 ³ t/day)	127	108	17.5	89	72	23.9

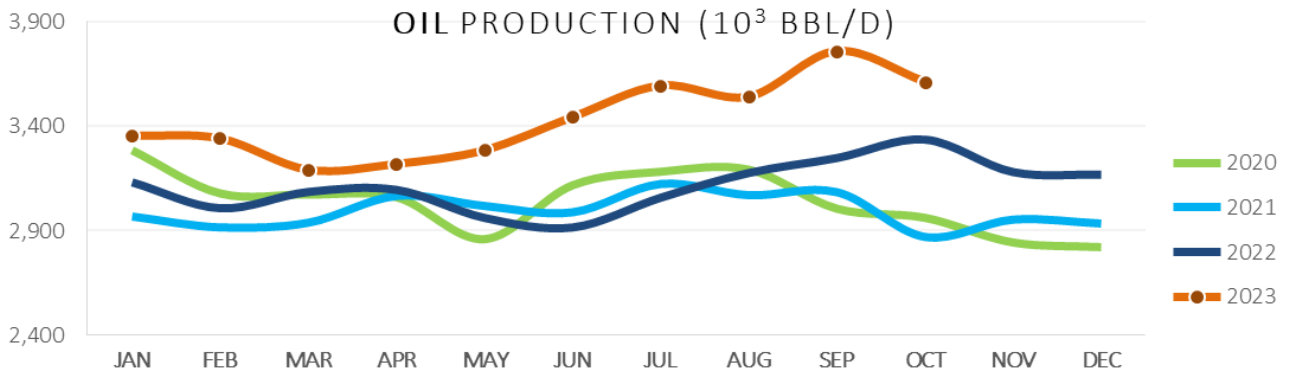
(a) The traditional autoproducers (consumers that do not use public grid) is not included. (b) SE is the acronym of Southeast
(c) September Data (d) Estimated



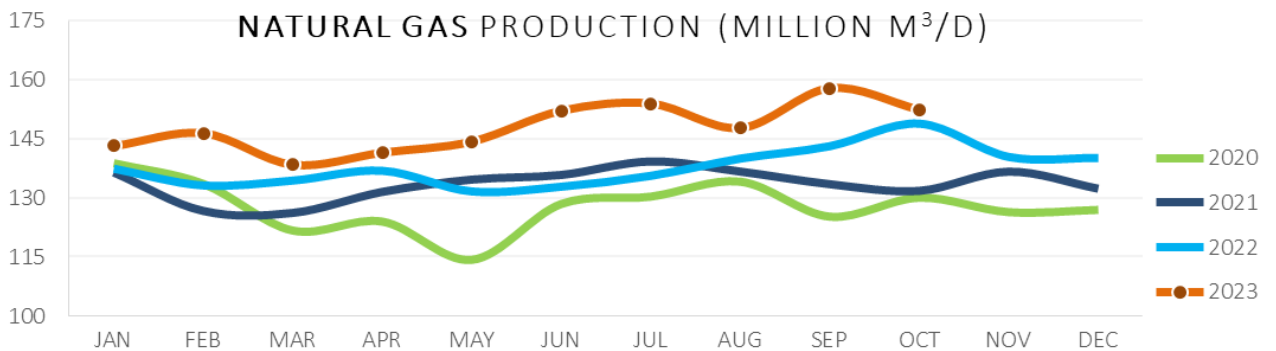
Source: National Electric System Operator (ONS)



Source: Electric Energy Secretary of Ministry of Mines and Energy

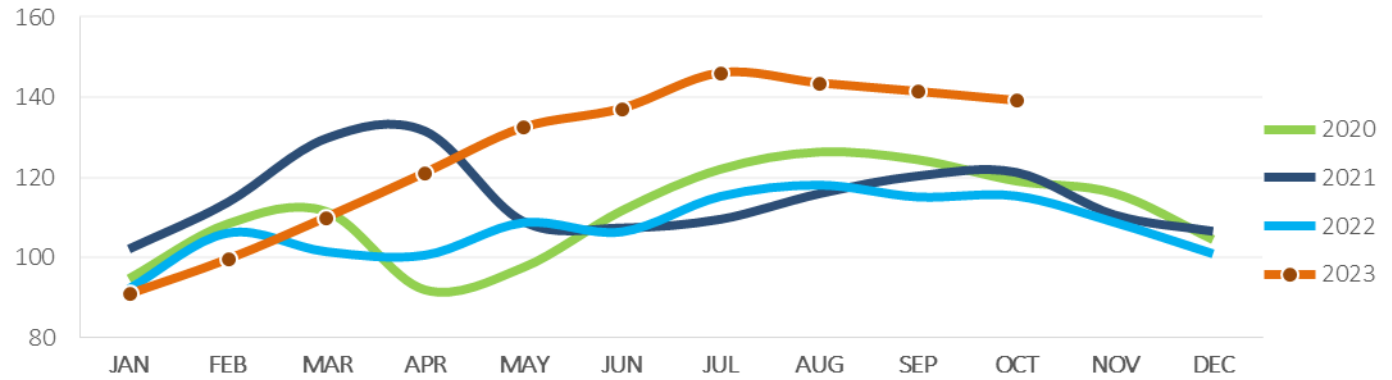


Source: National Petroleum Agency



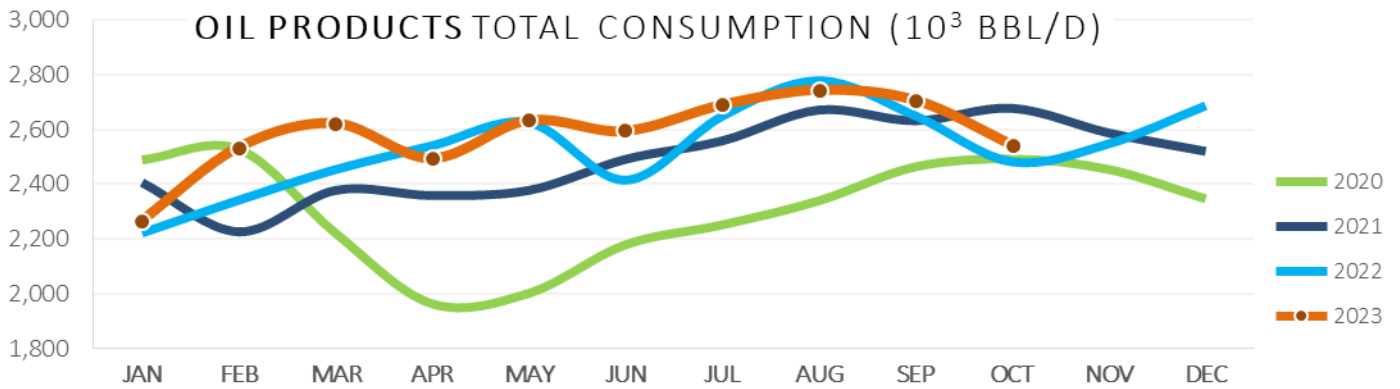
Source: National Petroleum Agency

BIODIESEL PRODUCTION (10³ BBL/D)



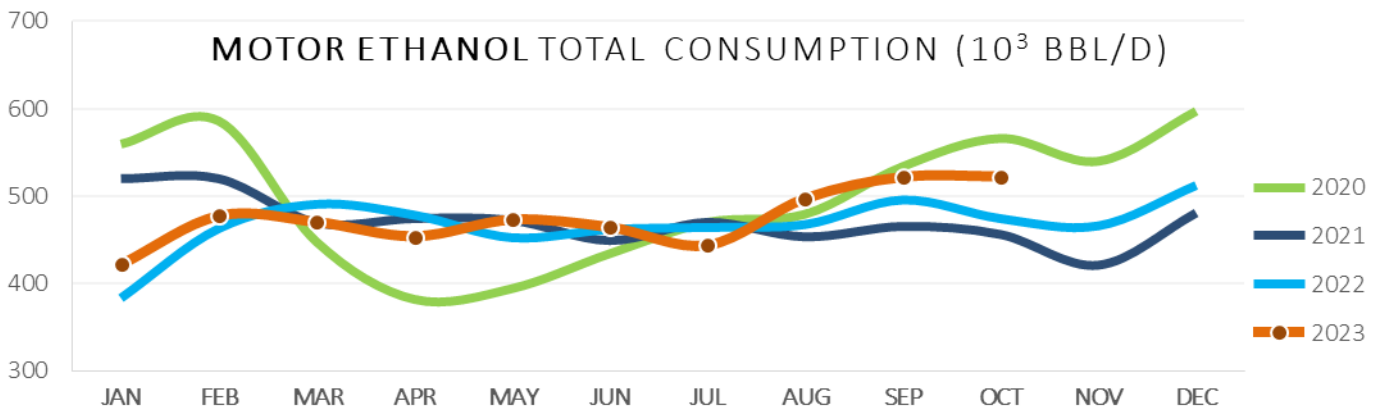
Fonte: National Petroleum agency

OIL PRODUCTS TOTAL CONSUMPTION (10³ BBL/D)



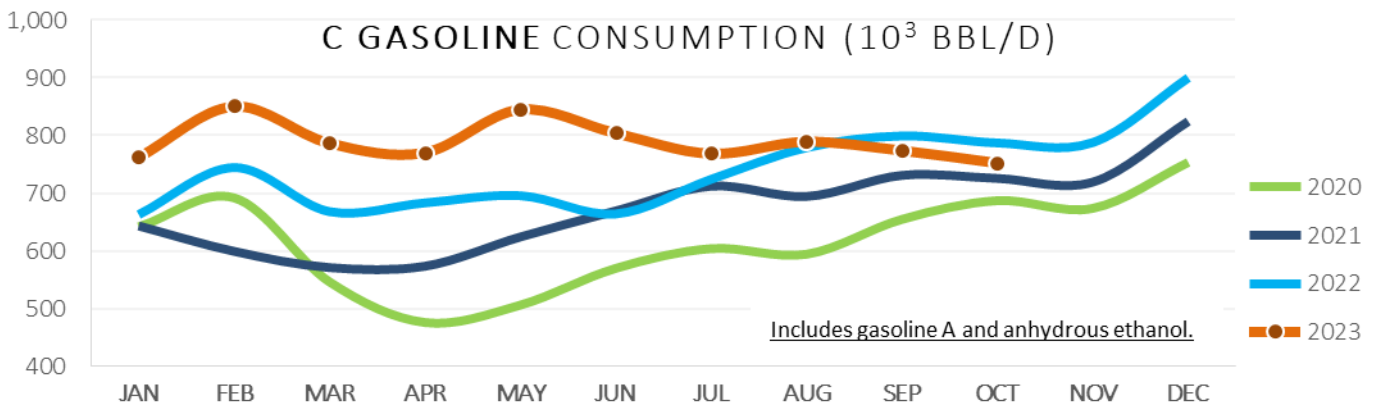
Source: National Petroleum Agency

MOTOR ETHANOL TOTAL CONSUMPTION (10³ BBL/D)



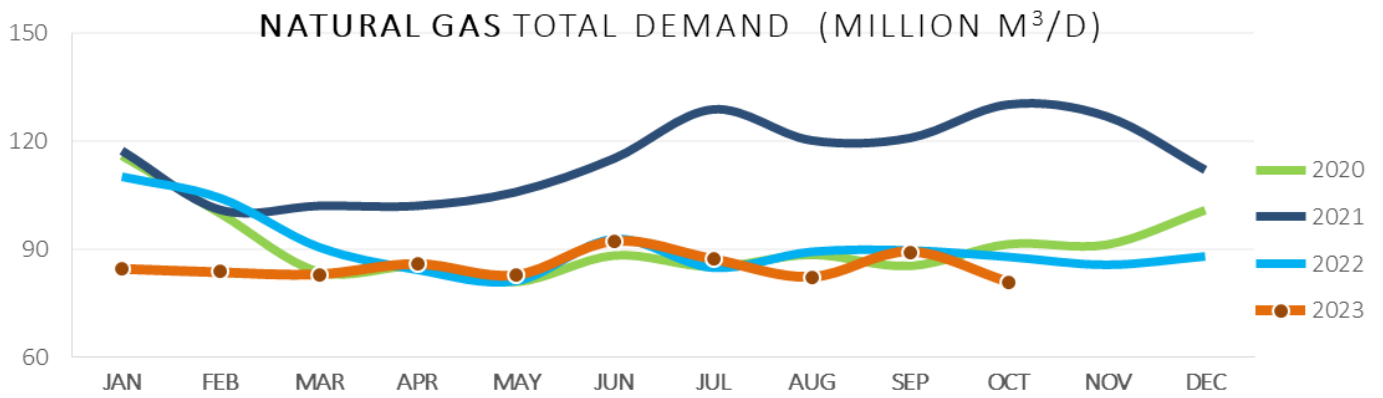
Source: National Petroleum Agency

C GASOLINE CONSUMPTION (10³ BBL/D)

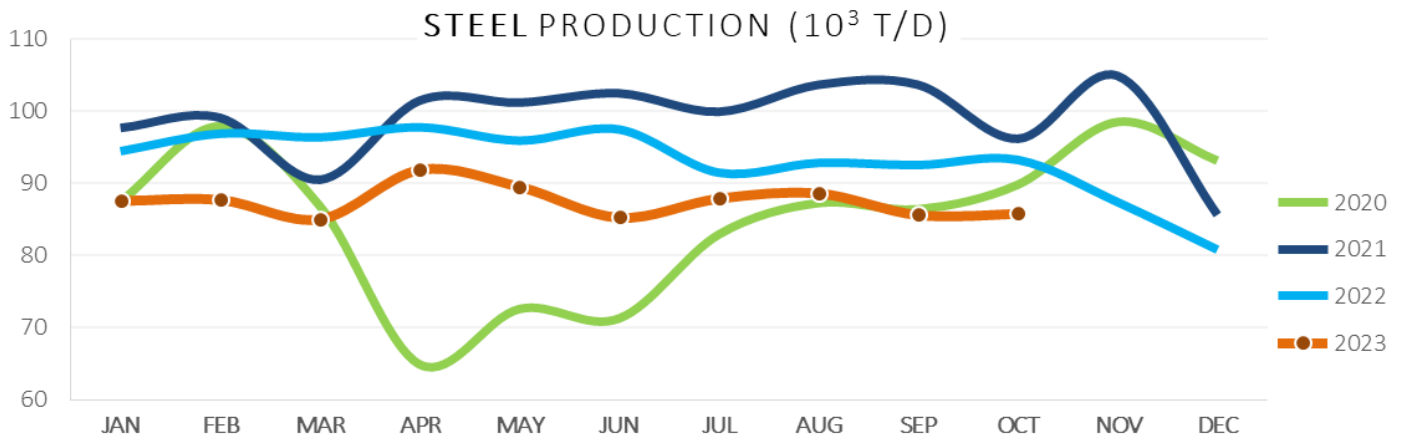


Includes gasoline A and anhydrous ethanol.

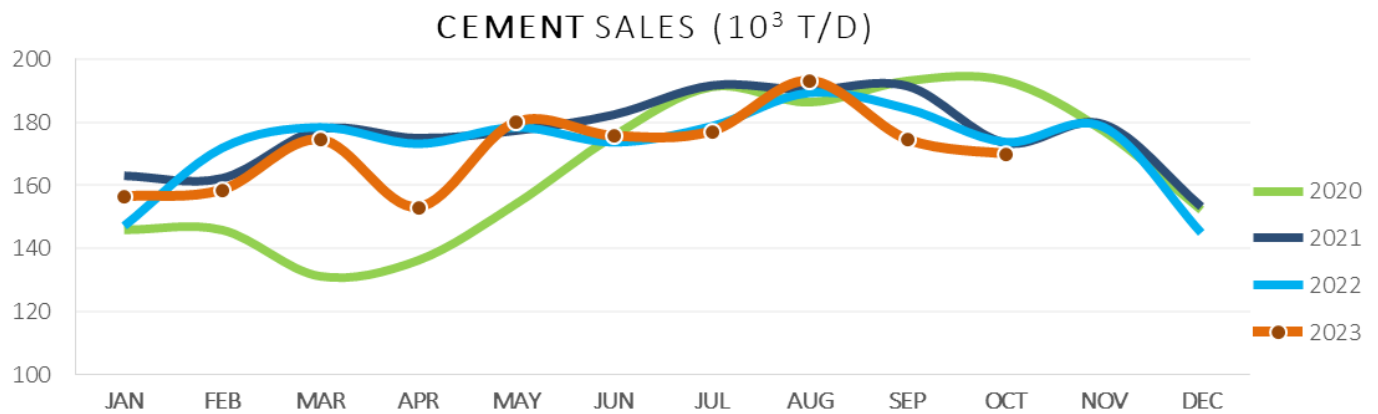
Source: National Petroleum Agency



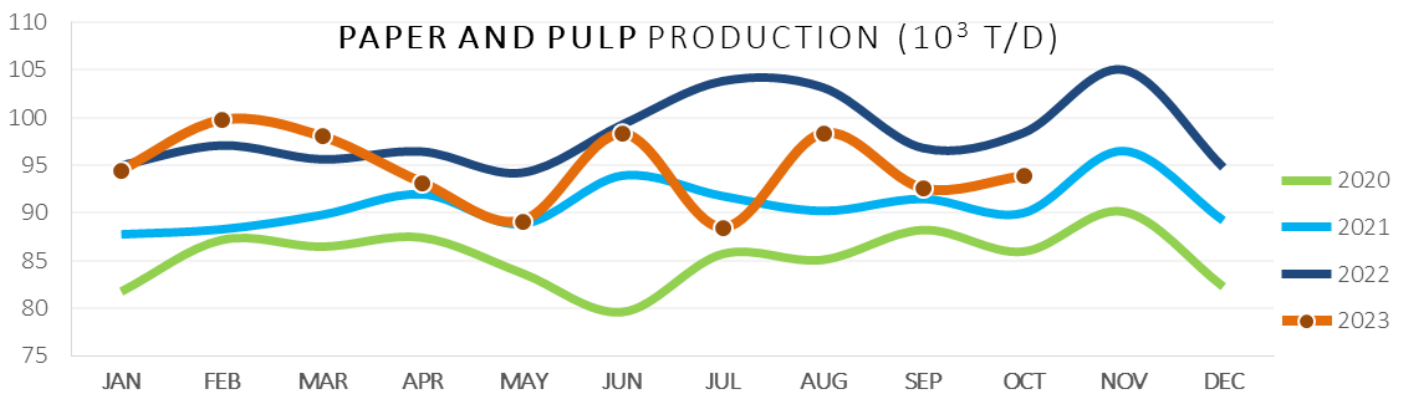
Sources: National Petroleum Agency (ANP) and National Electric System Operator (ONS)



Source: Brazil Steel Institute

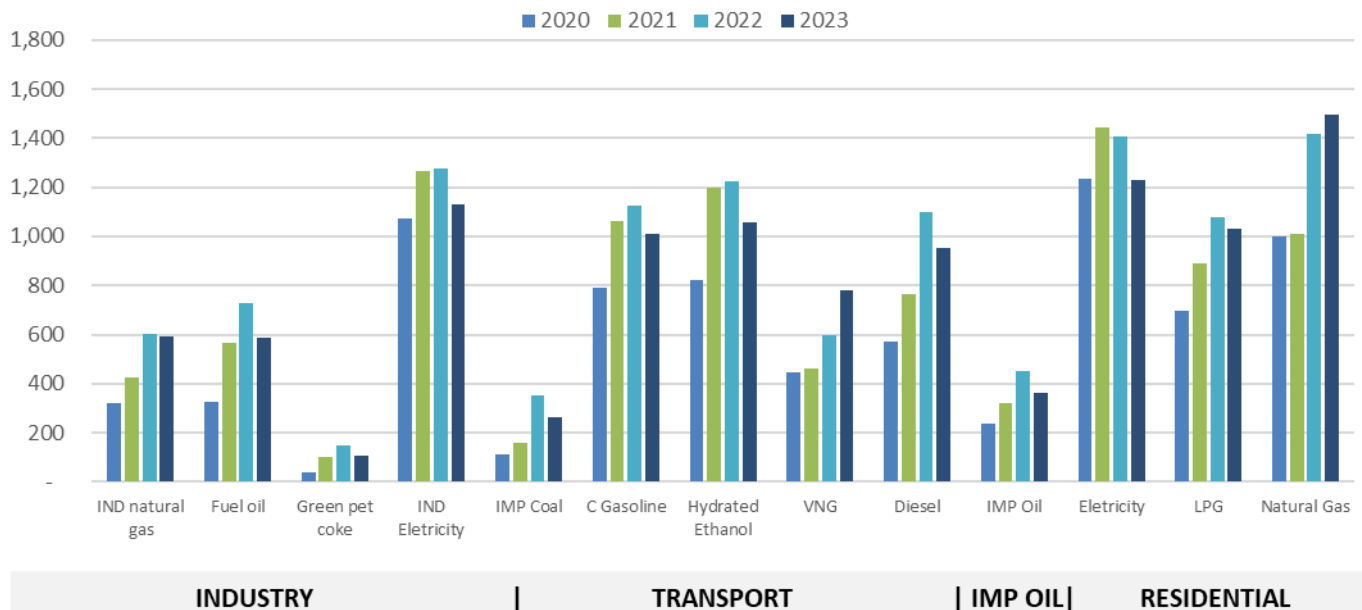


Source: National Cement Industry Union



Source: Brazilian Tree Industry (IBA)

Consumer Prices - Average from 2020 to October 2023 (R\$/boe)



METHODOLOGICAL NOTES

The bulletin reports the monitoring of energy and non-energy variables that allow estimating the monthly and accumulated behavior of the total energy demand in Brazil.

Total gas demand = domestic production (+) import (-) unused (-) reinjection.

¹ Domestic Energy Supply (DES), represents all the energy made available to meet the national demand for energy.

² The 2022 data from the DES and DELS were consolidated by the 2023 National Energy Balance.

The Monthly Energy Bulletin uses information and data obtained in the Brazilian energy sector to calculate and estimate the behavior of relevant energy indicators, and its data have a lag of up to three months.



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William de Oliveira Medeiros

Department of Information, Studies and Energy Efficiency – DIEE/SNTEP/MME

diee@mme.gov.br | +55 61 2032.5986