MINISTRY OF
MINES AND ENERGY

BRAZILIAN GOVERNMENT
BRASIL
UNITING AND REBUILDING

MONTHLY ENERGY BULLETIN BRAZIL

June 2023 Edition

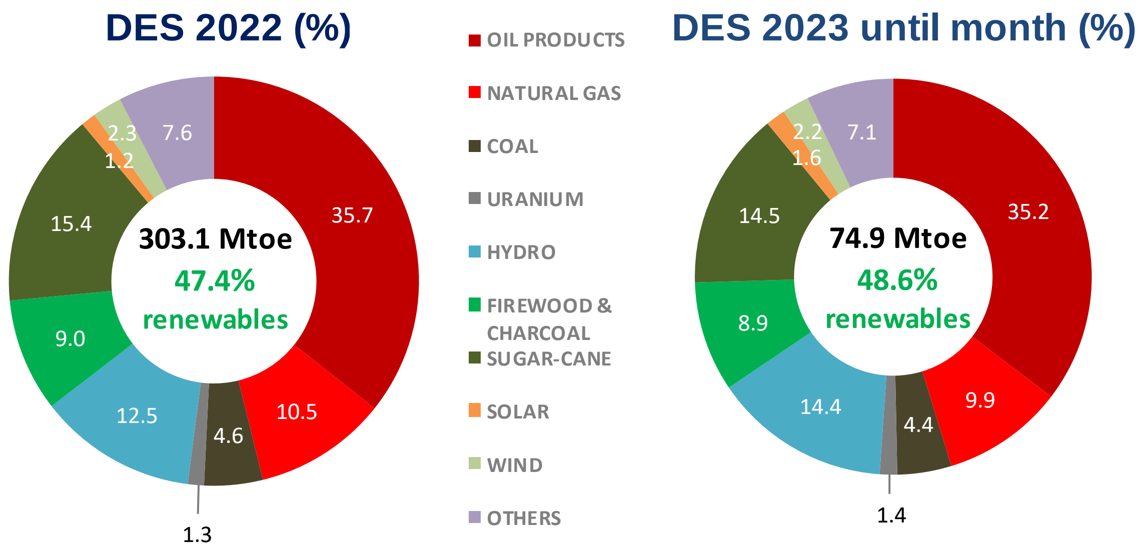
MARCH 23

DOMESTIC ENERGY SUPPLY

Based on data up to March of this year, the share of renewables in the Domestic Energy Supply – DES* increased to around 48.6%, therefore, higher than that calculated last year (47.4%), mainly due to the greater generation of hydraulic energy.

According to the most current survey by the National Supply Company (Conab), sugarcane production has shown a recovery at the end of the last year and it is estimated that there will be a 4.7% increase in its production for the 2022/2023 harvest. For ethanol, produced from sugar cane and corn, the estimated increase is 5.9%.

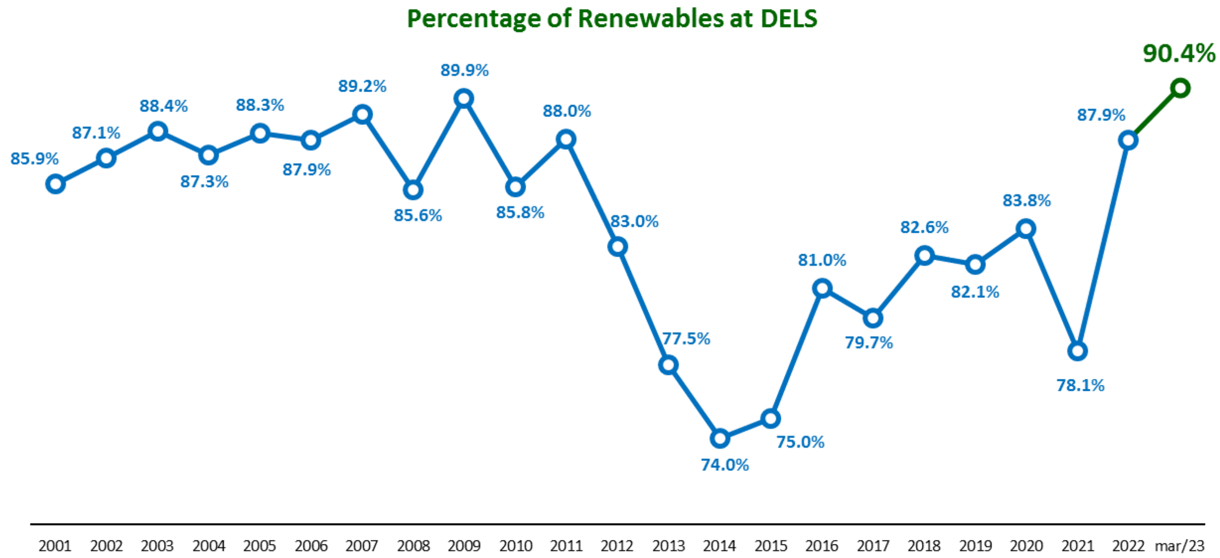
DOMESTIC ENERGY SUPPLY MORE RENEWABLE IN 2023



*OTHER: includes other renewable and non-renewable

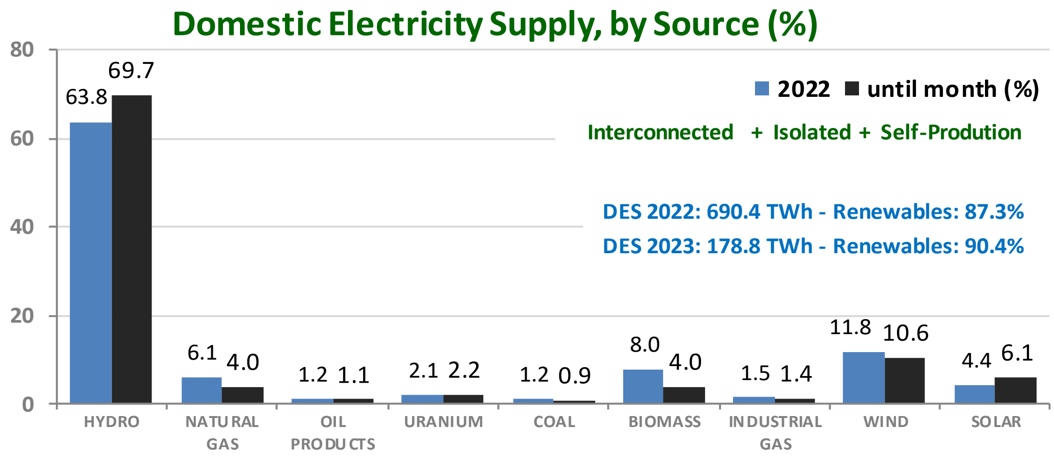
This year, regarding the proportion of renewables in the Domestic Electricity Supply (DELS)[2], it was verified that 90.4% were obtained through renewable sources, until March, reaching the accumulated value of 178.8 TWh.

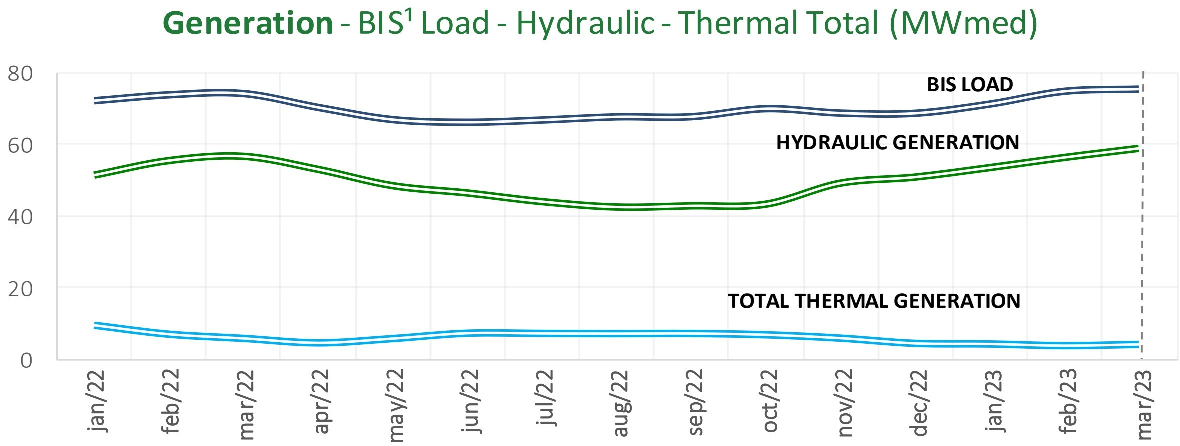
It can be seen, in the figure below, that in the first months of this year, the proportion of renewables in the OIEE is surpassing the annual results achieved throughout this century, providing cleaner energy generation, a consequence both of a favorable water regime, as well as investments in solar and wind energy.



It should be noted that the DELS accounts for the generation portions based on Centralized Generation, Distributed Generation (GD), Autoproducer, Isolated Systems and Electricity Interchange.

For the first three months of the year, compared to the same period of the previous year (accumulated in the year) there was a 69% increase in generation for centralized solar and 33% for wind. Brazilian hydro energy also grew, by around 3%. The increase in renewable electricity generation in 2022 and early 2023 has contributed to the reduction in the participation of coal and gas thermoelectric plants in the DELS.





[1]BIS: Brazilian Interconnected System.

Source: National Electric System Operator (ONS)

HIGHLIGHTS IN MARCH 2023

Oil and gas growing

Oil and gas production grew this year, showing an increase of 7.1% and 5.6% respectively in the year accumulated.

In relation to February 2023, gas production presented a drop of 5.5%, which according to the Brazilian Agency of Petroleum, Natural Gas and Biofuels (ANP), was a consequence of programmed stoppages in units of production, emphasizing that these actions are expected due to maintenance, entry into operation and cleaning of wells, commissioning etc., and that they aim at both the stability of the operation and the gradual increase in production.

Regular gasoline and hydrous ethanol prices continue to fall

The prices of regular gasoline and hydrous ethanol fell 21.3% and 18.8% respectively in relation to the same month of the previous year. This is the eighth consecutive month of fall in this indicator for both fuels.

The price drops are a direct effect of Complementary Law No. 194, of June 23, 2022, which defined that, for the purposes of levying the tax provided for in the Brazilian Constitution, fuels, natural gas, electricity, communications and public transport are considered essential and indispensable goods and services, which cannot be treated as superfluous.

Steel and Mining

Compared to March 2022, steel production decreased by 11.7%, and iron ore exports increased by 9.5%. Pig iron exports increased by 7.2% in the year accumulated.

Hydraulic supply on the rise

Hydraulic energy supply in 2023 increased by 3.2% in accumulated in the year. This corresponds to a monthly average of 56,269.5 MWavg. Itaipu's supply for the same period increased by 54.3%.

Wind supply on the rise

The wind energy supply, until March 2023, increased by 33% in accumulated in the year, as a reflection of the successive increases in installed capacity that can be observed month by month and the improvement in the average capacity factor at the beginning of the year. For the first three months of the year, 1,478.8 MW of power from wind farms came into operation, 91% higher than last year for the same period.

International energy exchange on the rise

Up to April 2022 Brazil was as an energy importer for Argentina, however this has changed. Since May 2022, Brazil has exported more than it imported, with a monthly average of 829.5 MWavg from May to December 2022. In February 2023, 1,087 MWavg were exported and in March, 1,313 MWavg were exported, an increase of almost 21%.

In February, Brazil also becomes an energy exporter to Uruguay, in a more significant way. While last year Brazil exported, on average, 0.6 MWavg to Uruguay, in March this year it exported 449 MWavg.

Natural gas availability in fall

The availability of natural gas for consumption fell by 17.5% in the year, mainly due to a reduction in imports.

Coal for electricity generation in decline

There was a decrease of 21.7% for public electricity generation in accumulated in the year.

Apparent consumption of petroleum products on the rise

The apparent consumption of petroleum derivatives increased by 5.6% in the year, with diesel decreasing by 0.7% and with regular gasoline consumption increasing by 15.8%. Automotive ethanol consumption increased by 2.2%.

The energy consumption of light Otto-cycle vehicles (gasoline, ethanol, and natural gas) has shown an increase of 9.2% in accumulated in the year.

Electricity consumption rising

Residential sector electricity consumption grew by 2.2% compared to March 2022. Industrial consumption increased by 0.7% while commercial consumption grew by 2.3%.

Biodiesel production rising slightly

Biodiesel production reduced 0.6 % in accumulated in the year.

At the end of March, Resolution CNPE No. 3 of 03/20/2023, of the National Council for Energy Policy (CNPE), was published, which established a 12% mandatory blend of biodiesel in diesel oil from April 2023 and the progressive evolution of this percentage, which should reach 15% by the year 2026. It was also established as of interest to the National Energy Policy the effective values destined to the promotion and acquisitions from the Social Biofuel Seal Program for the North, Northeast Regions and Semiarid, which aims to reduce the emission of gases that cause the greenhouse effect, to generate jobs and income for small producers, in addition to contributing to the reduction of imports of the fossil product.

Electricity tariffs continue to fall

All three tariffs (residential, commercial and industrial) fell in relation to the same month of the previous year, for the nineth consecutive month. The declines were 15.6% for the residential sector, 16.0% for the commercial sector and 15.2% for the industrial sector.

The price drops are a direct effect of Complementary Law No. 194, of June 23, 2022, which defined that, for the purpose of levying the tax dealt with in the Brazilian Constitution, fuels, natural gas, electricity, communications and public transport are considered essential and indispensable goods and services, which cannot be treated as superfluous.

Distributed generation installed capacity (DG) solar grows strongly

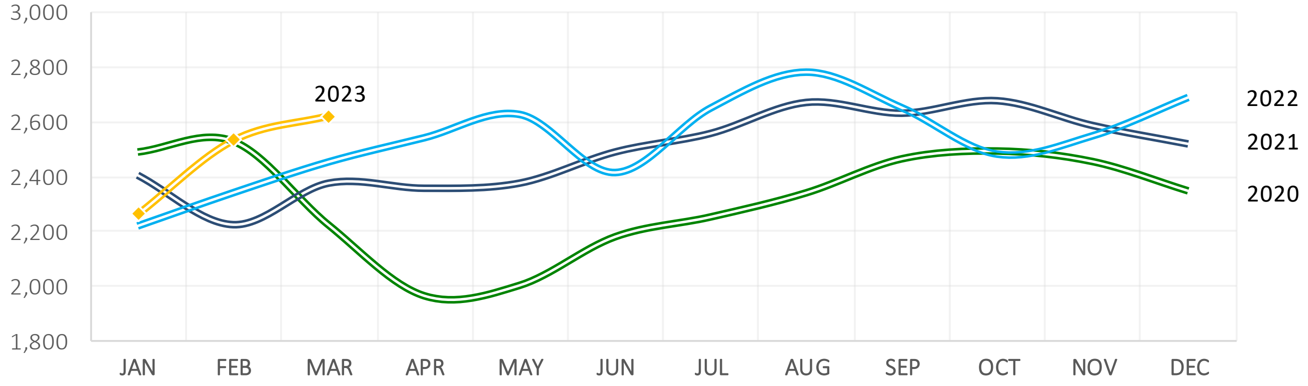
The growth of solar DG installed capacity in Brazil is still a highlight and has increased 93.9% compared to March 2022. The centralized solar installed capacity (non-GD) also increases, with a 68.8% growth compared to March 2022.

The growth of DG 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. Considered a GD legal framework, this last law generated a “race” in the sector, by ensuring an exemption from a portion of the Tariff for the Use of the Distribution System (TUSD) until 2045.

SPECIFICATION	MARCH IN THE MONTH 2023	2022	Δ% 23/22	ACCUMULATED IN THE YEAR 2023	2022	Δ% 23/22
OIL						
PRODUCTION - with Shale Oil and NGL(10^3 b/d)	3,192	*3,084*	3.5	3,295	*3,076*	7.1
IMPORTS AVERAGE PRICE (US$/bbl FOB)	82.20	*88.29*	-6.9	85.37	*84.77*	0.7
OIL PRODUCTS						
TOTAL CONSUMPTION (10^3 b/day)	2,622	*2,454*	6.9	2,471	*2,339*	5.6
hereof: DIESEL with biodiesel - (10^3 b/day)	1,211	*1,124*	7.8	1,068	*1,075*	-0.7
hereof: GASOLINE C (10^3 b/day)	787	*667.3*	18.0	798	*689*	15.8
CONSUMER PRICE - DIESEL (R$/l)	5.88	*6.29*	-6.5	6.09	*5.79*	5.2
CONSUMER PRICE - GASOLINE C (R$/l)	5.52	*7.01*	-21.3	5.22	*6.75*	-22.7
CONSUMER PRICE - LPG (R$/13 kg)	107.56	*109.31*	-1.6	107.91	*104.76*	3.0
NATURAL GAS (d)						
PRODUCTION (10^6 m^3/day)	139	*134*	3.0	143	*135*	5.6
IMPORTS (10^6 m^3/day)	19.4	*24.7*	-21.6	18.6	*36.2*	-48.7
NON-UTILIZED AND REINJECTION (10^6 m^3/day)	74.8	*68.6*	9.1	77.4	*69.8*	11.0
AVAILABILITY FOR CONSUMPTION (10^6 m^3/day)	83.1	*90.6*	-8.3	83.8	*101.5*	-17.5
INDUSTRIAL CONSUMPTION (10^6 m^3/day) **(c)**	39.4	*39.1*	0.8	41.4	*40.2*	3.0
POWER GENERATION CONS. (10^6 m^3/day) **(f)**	8.7	*17.0*	-48.6	10.7	*25.1*	-57.5
INDUSTRIAL PRICE SE **(b)** (US$/MMBtu) - consumption range of 20,000 m^3/day **(e)**	21.59	*17.97*	20.1	21.19	*17.81*	19.0
MOTOR PRICE SE (US$/MMBtu) **(e)**	27.65	*19.24*	43.7	27.98	*18.51*	51.1
RESIDENTIAL PRICE SE (US$/MMBtu) **(e)**	51.13	*43.08*	18.7	50.85	*41.06*	23.8
ELECTRICITY						
NATIONAL INTERCONNECTED SYSTEM	75,291	*74,116*	1.6	73,733	*73,347*	0.5
SOUTHEAST/MIDWEST POWER LOAD (MWavg)	43,318	*44,242*	-2.1	42,245	*42,752*	-1.2
SOUTH POWER LOAD (MWavg)	*13,568*	*12,894*	5.2	13,280	*13,437*	-1.2
NORTHEAST POWER LOAD (MWavg)	*11,716*	*11,309*	3.6	11,713	*11,443*	2.4
NORTH POWER LOAD (MWavg)	*6,689*	*5,671*	18.0	6,495	*5,716*	13.6
TOTAL CONSUMPTION (TWh) **(a)**	44.7	*44.1*	1.4	43.3	*42.8*	1.3
RESIDENTIAL	14.2	*13.9*	2.2	13.8	*13.3*	3.2
INDUSTRIAL	15.0	*15.1*	-0.7	14.7	*14.7*	-0.2
COMMERCIAL	8.6	*8.4*	2.3	8.3	*8.1*	1.8
OTHER SECTORS	6.8	*6.7*	2.1	6.6	*6.6*	-0.1
PLANTS ENTRY INTO OPERATING (MW)	713	*347*	105.5	2,735	*1,346*	103.3
RESIDENTIAL PRICE (R$/MWh)	819	*971*	-15.6	802	*969*	-17.3
COMMERCIAL PRICE (R$/MWh)	782	*930*	-16.0	768	*928*	-17.2
INDUSTRIAL PRICE (R$/MWh)	754	*889*	-15.2	742	*891*	-16.8
ETHANOL AND BIODIESEL						
BIODIESEL PRODUCTION (10^3 b/d)	110	*101*	8.5	100	*100*	0.6
MOTOR ETHANOL CONSUMPTION (10^3 b/d)	470	*491*	-4.3	455	*445*	2.2
ETHANOL EXPORTS (10^3 b/d)	40	*36*	10.6	40	*25*	64.3
HYDRATED ETHANOL PRICE (R$/l)	3.93	*4.84*	-18.8	3.87	*4.88*	-20.7
COAL						
ELECTRICITY GENERATION (MWavg)	902	*792*	13.9	658	*840*	-21.7
IMPORT PRICE (US$ FOB/t)	275.51	*268.12*	2.8	253.11	*245.33*	3.2
NUCLEAR ENERGY						
ELECTRICITY GENERATION - (GWh)	1720	*1986*	-13.4	1,823	*1,959*	-7.0
INDUSTRIAL SECTORS						
STEEL PRODUCTION (10^3 t/day)	85	*96*	-11.7	87	*96*	-9.5
ALUMINIUM PRODUCTION (10^3 t/day) **(d)**	2.7	*2.1*	26.5	2.7	*2.1*	26.5
IRON ORE EXPORTS (10^3 t/day)	806	*891*	-9.5	771	*761*	1.3
PELLETS EXPORTS (10^3 t/day)	71	*32*	120.4	65	*43*	51.6
BIG IRON EXPORTS (10^3 t/day)	14.0	10.3	36.0	9.8	9.1	7.2
PAPER PRODUCTION (10^3 t/day)	28.7	*30.3*	-5.2	29.5	*30.1*	-1.9
PULP PRODUCTION (10^3 t/day)	74.8	*65.3*	14.6	72.4	*65.8*	10.0
SUGAR PRODUCTION (10^3 t/day)	15.0	*5.7*	161.0	15.0	*9.9*	51.0
SUGAR EXPORTS (10^3 t/day)	59	*46*	27.0	55	*50*	10.9

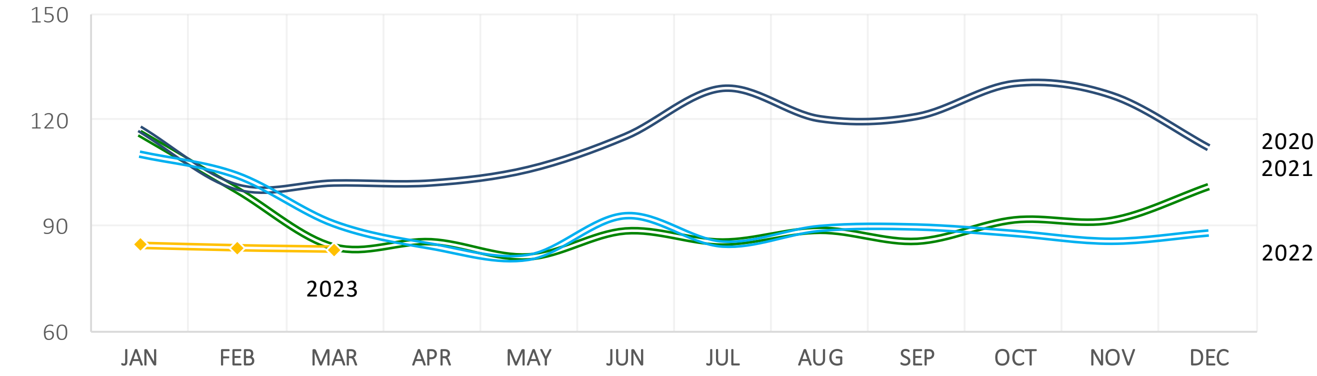
(a) The traditional self-producers (consumers that do not use public grid) is not included.
(b) SE is the acronym of Southeast
(c) december data.
(d) January data.
(e) February data.
(f) Estimated

Oil Products Total Consumption (10^3 bbl/d)



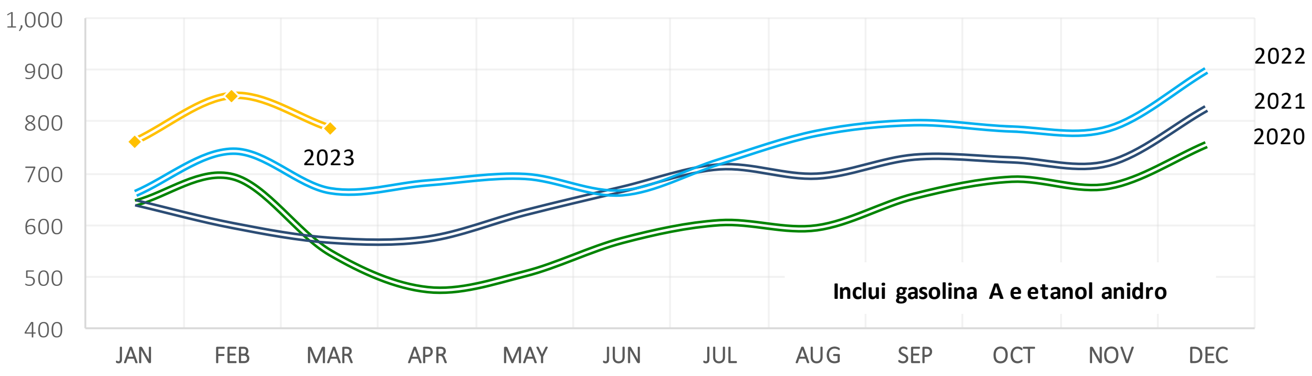
Source: National Petroleum Agency (ANP)

Natural Gas Total Demand (million m^3/d)



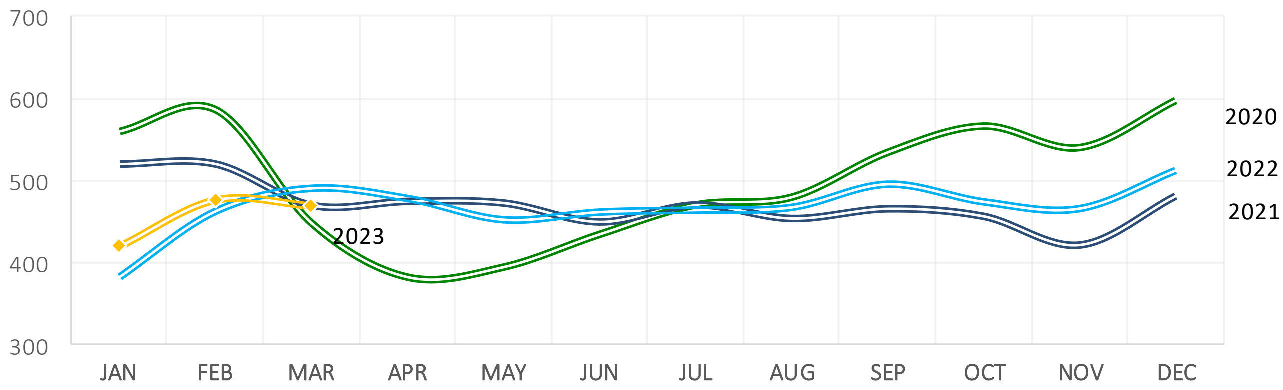
Sources: National Petroleum Agency (ANP) and National Electric System Operator (ONS)

C Gasoline Consumption (10^3 bbl/d)



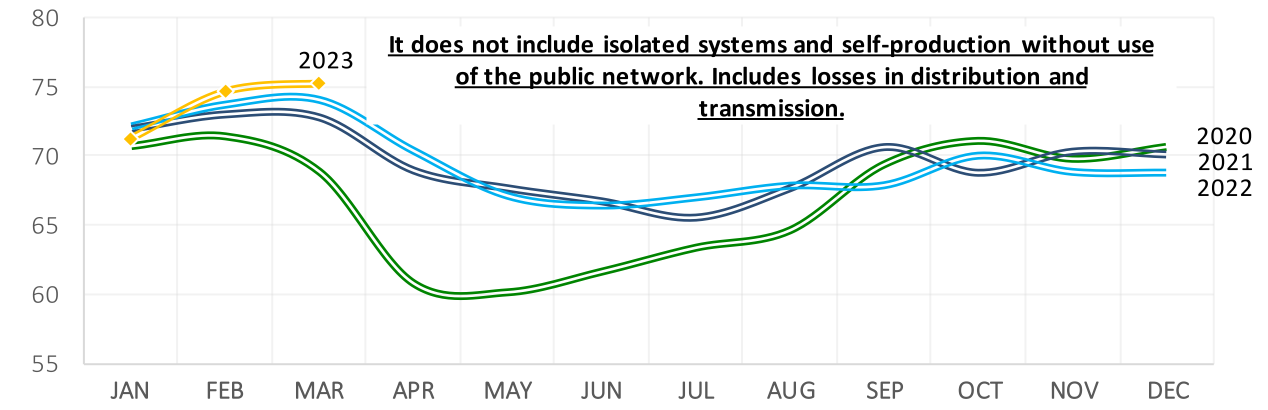
Source: National Petroleum Agency (ANP)

Motor Ethanol Total Consumption (10^3 bbl/d)



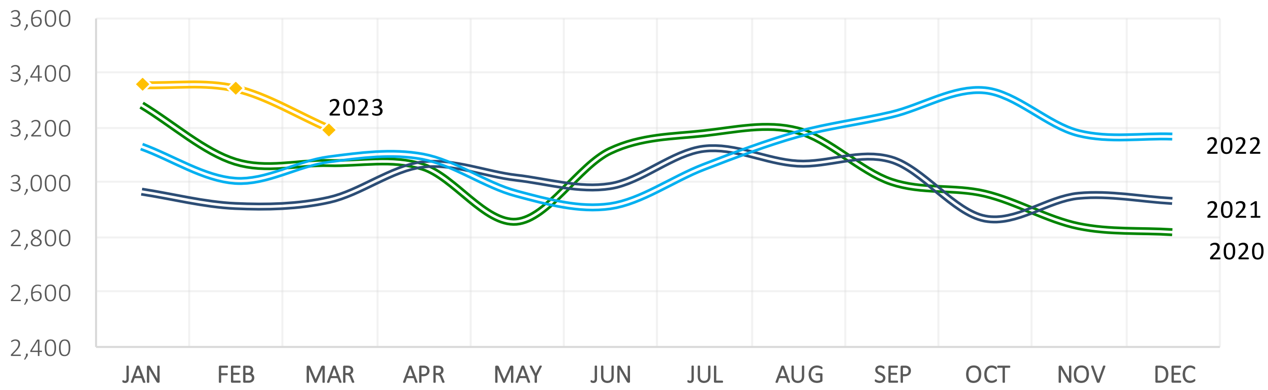
Source: National Petroleum Agency (ANP)

National Interconnected System Power Load (GWavg)



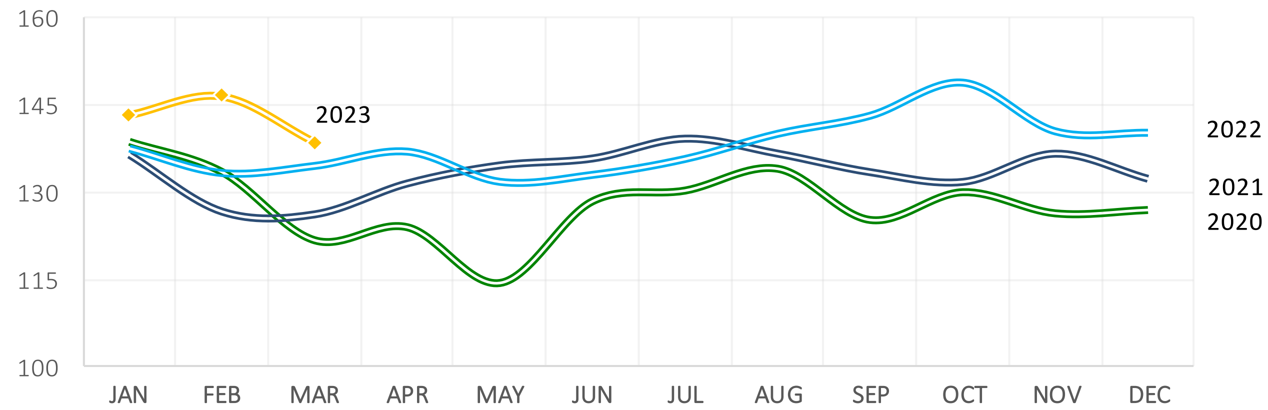
Source: National Electric System Operator (ONS)

Oil Production (10^3 bbl/d)



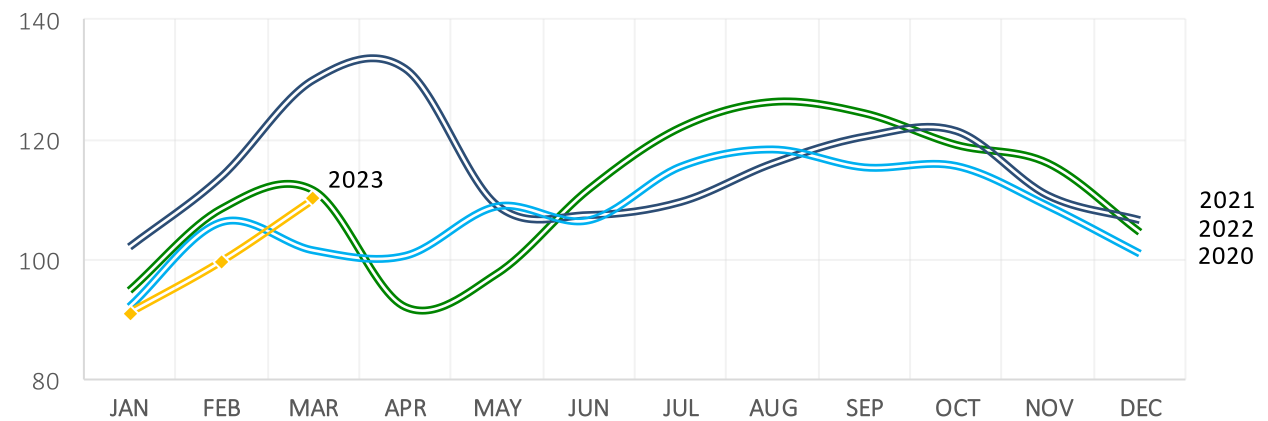
Source: National Petroleum Agency(ANP)

Natural Gas Production (million m^3/d)



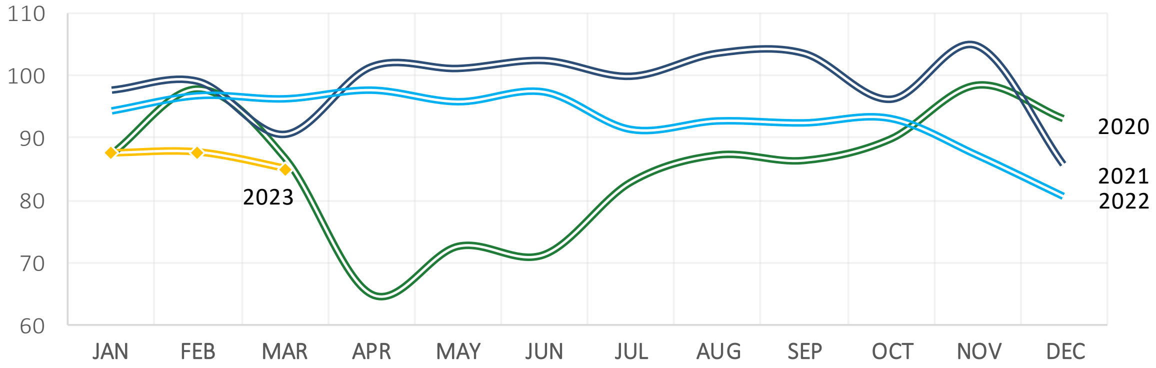
Source: National Petroleum Agency (ANP)

Biodiesel Production (10^3 bbl/d)



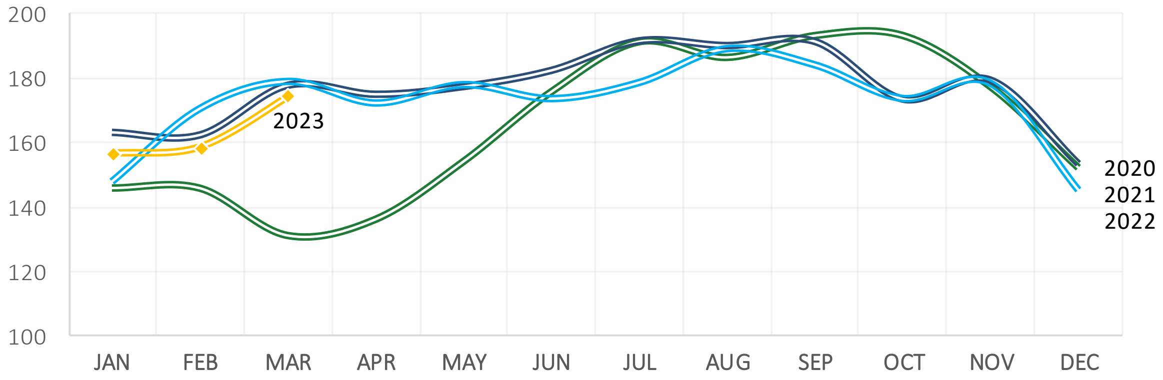
Source: National Petroleum Agency (ANP)

Steel Production (10^3 t/d)



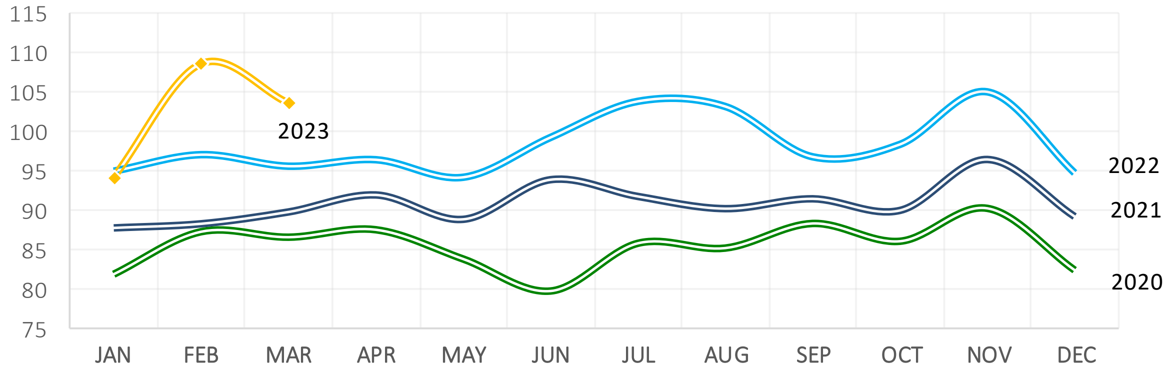
Source: Brazil Steel Institute

Cement Sales (10^3 t/d)



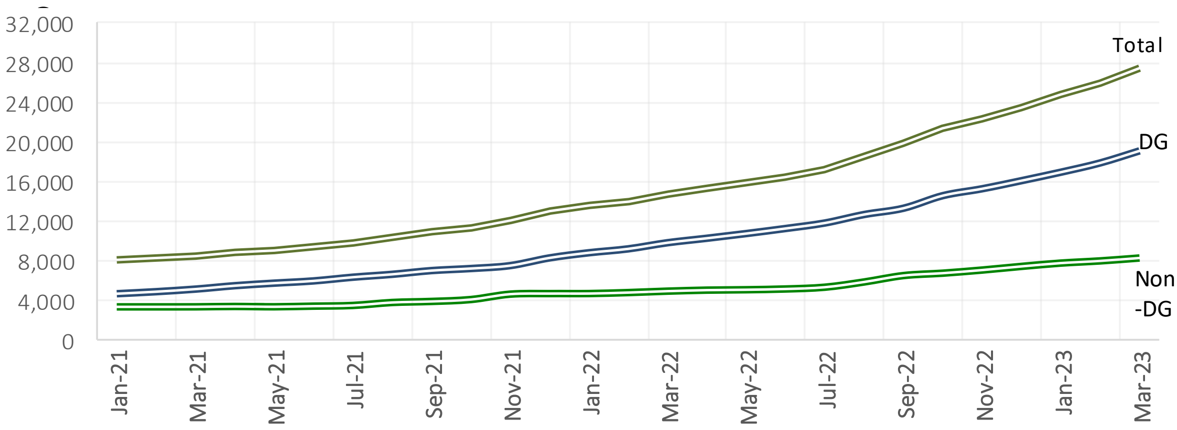
Source: National Cement Industry Union

Paper and Pulp Production (10^3 t/d)



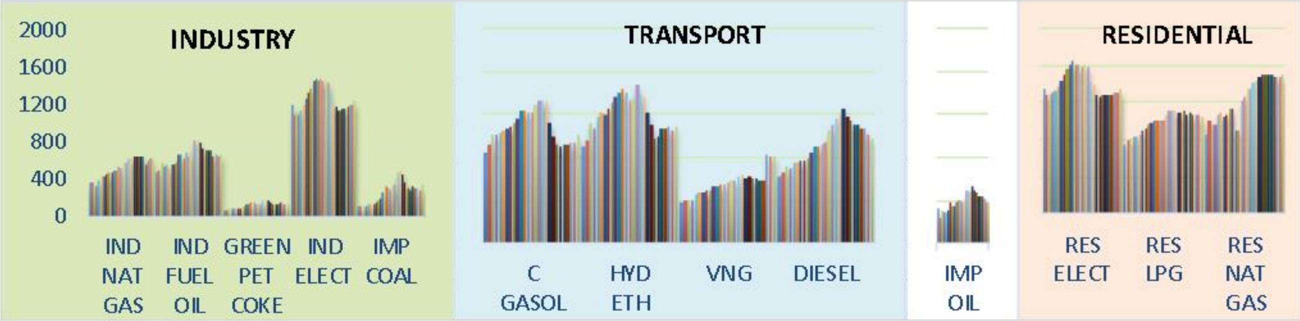
Source: Brazilian Tree Industry (IBA)

Photovoltaic Solar Installed Capacity (MW)



Source: Eletric Energy Secretary of Ministry of Mines and Energy

Consumer Prices - Jan 2021 to Mar 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), or Total Energy Demand, represents the energy necessary to move the economy of a country or region over a period. Includes final energy consumption in the residential sector and in the other economic sectors, including losses in transmission and distribution, losses on power transformation, and the own consumption of the energy sector.

[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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