MINISTRY OF
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BRAZILIAN GOVERNMENT

UNITING AND REBUILDING

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September Edition

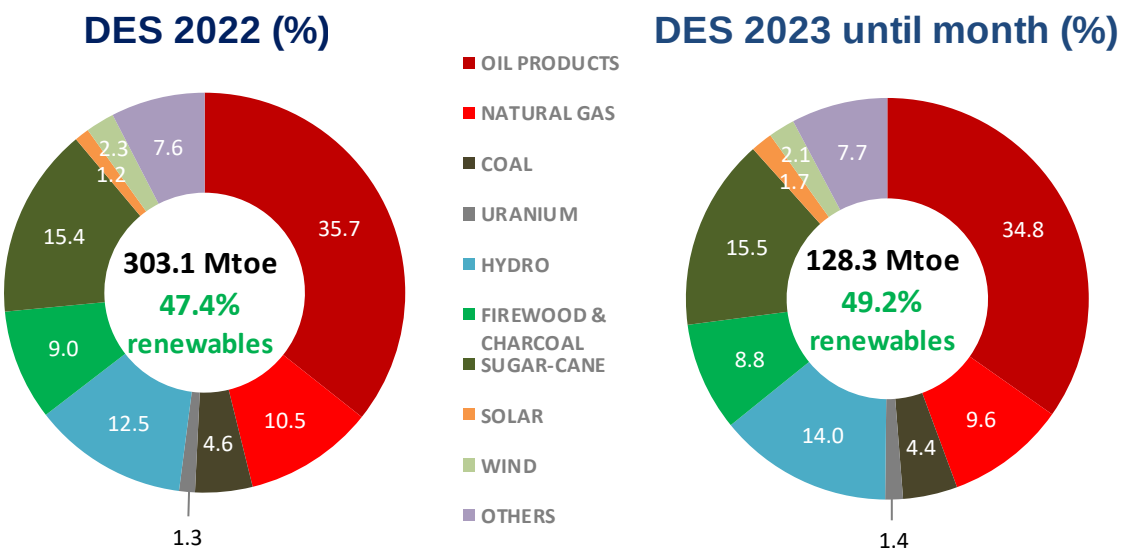
MAY 23

DOMESTIC ENERGY SUPPLY

Based on data up to May of this year, the share of renewables in the Domestic Energy Supply – DES* increased to around 49.2%, 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), is estimated that sugarcane production will have a 11.1% increase in its production for the 2022/2023 harvest. For ethanol, produced from sugar cane and corn, the estimated increase is 9.2%.

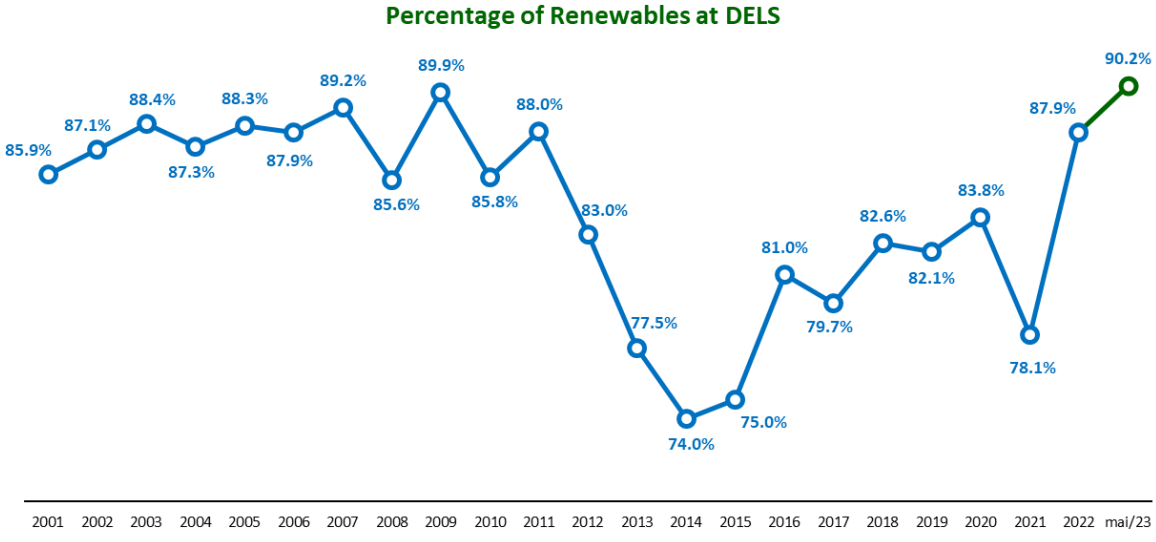
DOMESTIC ENERGY SUPPLY MORE RENEWABLE IN 2023



*OTHER: includes other renewable and non-renewable

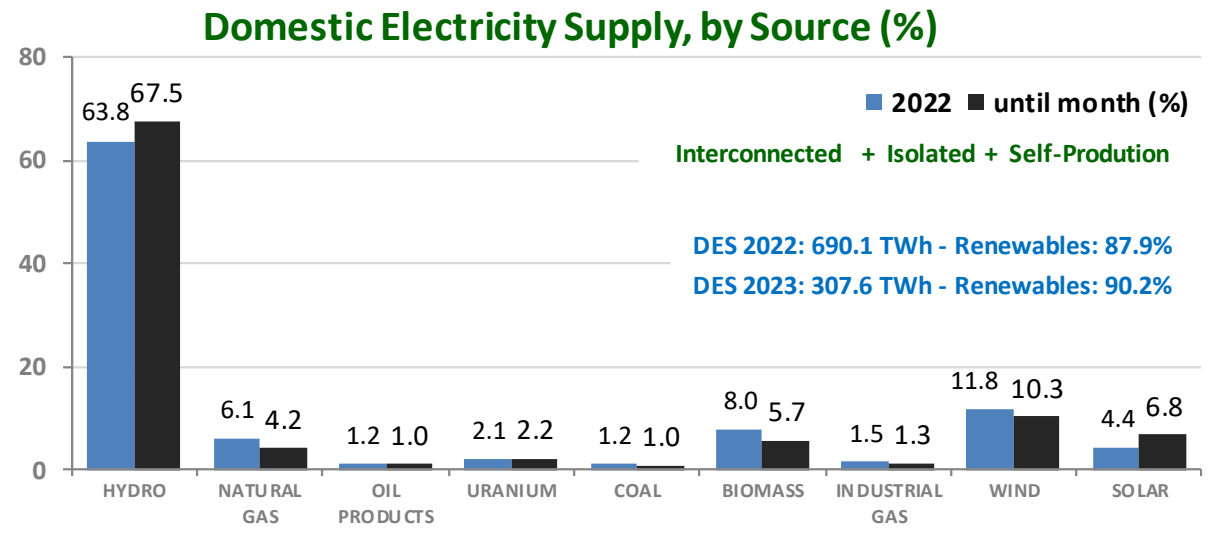
This year, regarding the proportion of renewables in the Domestic Electricity Supply (DELS)[2], it was verified that 90.2% were obtained through renewable sources, until May, reaching the accumulated value of 307.6 TWh.

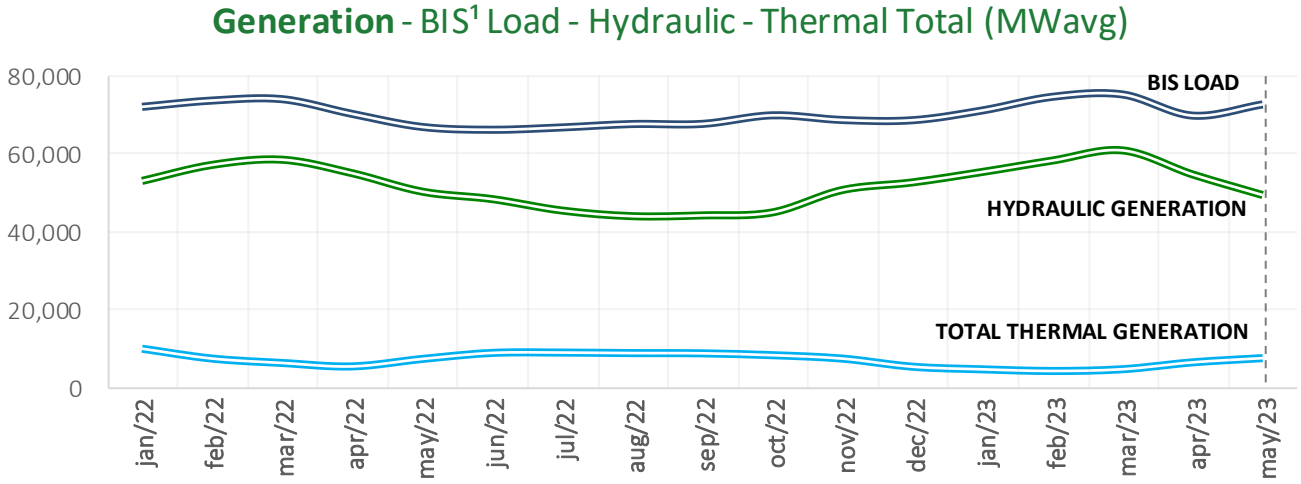
It can be seen, in the figure below, that in the first months of this year, the proportion of renewables in the OIEE is surpassing the annual results achieved throughout this century, providing cleaner energy generation, a consequence both of a favorable water regime, as well as investments in solar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

For the first five 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 23% for wind. Brazilian hydro energy also grew, by around 2%. 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) - from 04/29/23, the estimated value of MMGD was incorporated

HIGHLIGHTS IN MAY 2023

Solar and wind generation on the rise

In the month in which World Energy Day is celebrated, which aims to raise awareness in society about the use of renewable energy, Brazil recorded an increase of 69% in centralized solar power generation and 23% in wind electrical generation, in relation to the same period of the previous year (year accumulated).

This movement is a consequence of several measures adopted by the Brazilian government and the National Congress, aiming to further increase the share of renewable energy in the national energy matrix.

Entry of solar and wind installed capacity on the rise

For the first five months of the year, 2,035.2 MW of installed centralized solar capacity and 2,008.8 MW of wind plants came into operation. For solar, the value was more than five times what entered in the same period last year (5.5), and for wind, it was around twice (2.1).

Oil and gas growing

Oil and gas production grew this year, showing an increase of 7.3% and 6.0% respectively in the year accumulated.

Regular gasoline and hydrated ethanol prices continue to fall

Regular gasoline and hydrous ethanol prices dropped by 25.5% and 20.1%, respectively, in relation to the same month of the previous year. This is the tenth consecutive month of decline in this indicator for both fuels.

Steel and Mining

Compared to May 2022, steel production decreased by 5.1%, and iron ore exports increased by 41.5%. Pig iron exports increased by 8.8% in the year accumulated.

Hydraulic supply on the rise

Hydraulic energy supply in 2023 increased by 1.7% in accumulated in the year. This corresponds to a monthly average of 55,621.7 MWavg. Itaipu's supply for the same period increased by 49.4%.

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 April 2023, Brazil exported 1,249 MWavg and in May, 693 MWavg.

Since February, Brazil also began to export energy to Uruguay, in a more significant way. While last year Brazil exported, on average, 0.6 MWavg to Uruguay, in May this year it exported 333 MWavg.

Natural gas availability in fall

The availability of natural gas for consumption fell by 10.5% in the year, mainly due to a reduction in imports.

Coal for electricity generation declining

There was a decrease of 2.7% 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 2.9% in the year, with diesel increasing by 0.5% and with regular gasoline consumption increasing by 16.5%. Automotive ethanol consumption increased by 0.5%.

The energy consumption of light Otto-cycle vehicles (gasoline, ethanol, and natural gas) has shown an increase of 7.9% in accumulated in the year.

Electricity consumption growing

Residential sector electricity consumption grew by 6.4% compared to May 2022. Industrial consumption increased by 2.2% while commercial consumption grew by 3.2%.

Biodiesel production rising

Biodiesel production increased 9.2 % in accumulated in the year.

From April this year, the mandatory blending content of biodiesel in diesel oil was increased to 12%, as well as the progressive evolution of this percentage, which should reach 15% by the year 2026. A law of March 2023 established new guidelines for the evolution of the mandatory addition of biodiesel to diesel oil sold to the end consumer.

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 tenth consecutive month. The declines were 2.6% for the residential sector, 2.0% for the commercial sector and 2.4% 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

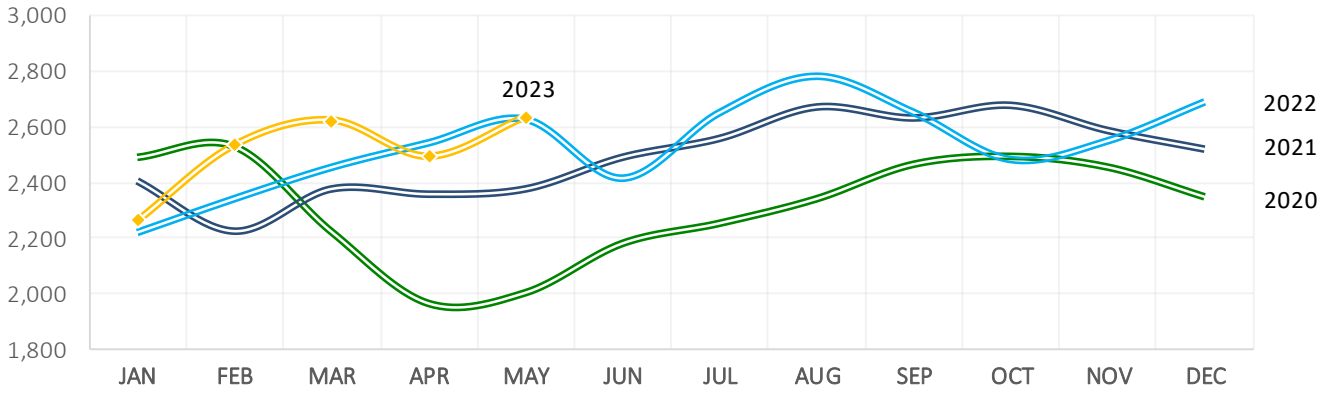
The growth of solar DG installed capacity in Brazil is still a highlight and has increased 94.9% compared to May 2022. The centralized solar installed capacity (non-GD) also increases, with a 87.8% growth compared to May 2022.

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 ensured exemption from the Distribution System Use fee (TUSD) until the year 2045 for systems implemented or with access requests filed until january 07, 2023, allowing also, partial exemption for systems implemented until December 31, 2028, according to the transition rule.

SPECIFICATION	MAY IN THE MONTH			ACCUMULATED IN THE YEAR		
	2023	2022	Δ% 23/22	2023	2022	Δ% 23/22
OIL						
PRODUCTION - with Shale Oil and NGL(10^3 b/d)	3,286	*2,960*	11.0	3,278	*3,056*	7.3
IMPORTS AVERAGE PRICE (US$/bbl FOB)	81.33	*112.14*	-27.5	83.97	*96.92*	-13.4
OIL PRODUCTS						
TOTAL CONSUMPTION (10^3 b/day)	2,634	*2,626*	0.3	2,509	*2,438*	2.9
hereof: DIESEL with biodiesel - (10^3 b/day)	1,174	*1,116*	5.2	1,088	*1,083*	0.5
hereof: GASOLINE C (10^3 b/day)	846	*695.0*	21.7	803	*689*	16.5
CONSUMER PRICE - DIESEL (R$/l)	5.37	*6.89*	-22.1	5.88	*6.17*	-4.8
CONSUMER PRICE - GASOLINE C (R$/l)	5.39	*7.24*	-25.5	5.31	*6.95*	-23.5
CONSUMER PRICE - LPG (R$/13 kg)	107.29	*112.58*	-4.7	107.72	*108.07*	-0.3
NATURAL GAS (d)						
PRODUCTION (10^6 m^3/day)	144	*132*	9.6	143	*135*	6.0
IMPORTS (10^6 m^3/day)	15.7	*21.5*	-26.9	18.2	*29.5*	-38.3
NON-UTILIZED AND REINJECTION (10^6 m^3/day)	77.3	*72.1*	7.2	77.0	*70.4*	9.4
AVAILABILITY FOR CONSUMPTION (10^6 m^3/day)	82.9	*81.2*	2.1	84.0	*93.9*	-10.5
INDUSTRIAL CONSUMPTION (10^6 m^3/day) **(c)**	40.5	*41.8*	-3.1	40.9	*41.1*	-0.7
POWER GENERATION CONS. (10^6 m^3/day) **(c)**	9.4	*8.7*	7.3	9.9	*18.7*	-46.9
INDUSTRIAL PRICE SE **(b)** (US$/MMBtu) - consumption range of 20,000 m^3/day **(c)**	22.09	*22.08*	0.1	21.51	*19.95*	7.8
MOTOR PRICE SE (US$/MMBtu) **(c)**	27.88	*22.46*	24.1	27.64	*20.51*	34.8
RESIDENTIAL PRICE SE (US$/MMBtu) **(c)**	53.06	*50.83*	4.4	51.63	*46.25*	11.6
ELECTRICITY						
NATIONAL INTERCONNECTED SYSTEM	72,806	*67,154*	8.4	72,801	*71,494*	1.8
SOUTHEAST/MIDWEST POWER LOAD (MWavg)	41,084	*38,842*	5.8	41,572	*41,720*	-0.4
SOUTH POWER LOAD (MWavg)	*12,247*	*11,387*	7.6	12,732	*12,640*	0.7
NORTHEAST POWER LOAD (MWavg)	*12,273*	*10,916*	12.4	11,794	*11,337*	4.0
NORTH POWER LOAD (MWavg)	*7,202*	*6,009*	19.9	6,703	*5,798*	15.6
TOTAL CONSUMPTION (TWh) **(d)**	43.2	*42.0*	2.8	43.8	*42.7*	2.5
RESIDENTIAL	13.1	*12.3*	6.4	13.6	*13.0*	4.4
INDUSTRIAL	15.8	*15.4*	2.2	15.3	*15.0*	2.3
COMMERCIAL	7.9	*7.6*	3.2	8.2	*8.0*	2.4
OTHER SECTORS	6.5	*6.7*	-2.7	6.6	*6.6*	-0.5
PLANTS ENTRY INTO OPERATING (MW)	1286	*606*	112.1	4,617	*2,175*	112.3
RESIDENTIAL PRICE (R$/MWh)	833	*855*	-2.6	812	*945*	-14.0
COMMERCIAL PRICE (R$/MWh)	800	*817*	-2.0	778	*903*	-13.9
INDUSTRIAL PRICE (R$/MWh)	774	*793*	-2.4	750	*868*	-13.5
ETHANOL AND BIODIESEL						
BIODIESEL PRODUCTION (10^3 b/d)	133	*109*	21.8	111	*102*	9.2
MOTOR ETHANOL CONSUMPTION (10^3 b/d)	460	*453*	1.7	456	*453*	0.5
ETHANOL EXPORTS (10^3 b/d)	19	*15*	23.9	36	*23*	59.9
HYDRATED ETHANOL PRICE (R$/l)	3.97	*4.97*	-20.1	3.91	*4.99*	-21.6
COAL						
ELECTRICITY GENERATION (MWavg)	683	*682*	0.1	696	*716*	-2.7
IMPORT PRICE (US$ FOB/t)	241.39	*415.09*	-41.8	253.05	*290.39*	-12.9
NUCLEAR ENERGY						
ELECTRICITY GENERATION - (GWh)	2009	*1939*	3.6	1,882	*1,962*	-4.1
INDUSTRIAL SECTORS						
STEEL PRODUCTION (10^3 t/day)	91	*96*	-5.1	89	*96*	-7.8
ALUMINIUM PRODUCTION (10^3 t/day) **(a)**	2.7	*2.1*	25.6	2.7	*1.9*	40.2
IRON ORE EXPORTS (10^3 t/day)	1,062	*750*	41.5	831	*759*	9.4
PELLETS EXPORTS (10^3 t/day)	71	*70*	2.8	65	*52*	25.0
BIG IRON EXPORTS (10^3 t/day)	13.5	10.3	31.0	10.0	9.2	8.8
PAPER PRODUCTION (10^3 t/day)	29.2	*29.9*	-2.3	29.3	*29.8*	-1.6
PULP PRODUCTION (10^3 t/day) **(c)**	75.9	*64.4*	18.0	74.1	*65.8*	12.5
SUGAR PRODUCTION (10^3 t/day)	173.0	*125.0*	38.4	55.8	*38.7*	44.3
SUGAR EXPORTS (10^3 t/day)	78	*50*	53.9	55	*49*	13.4

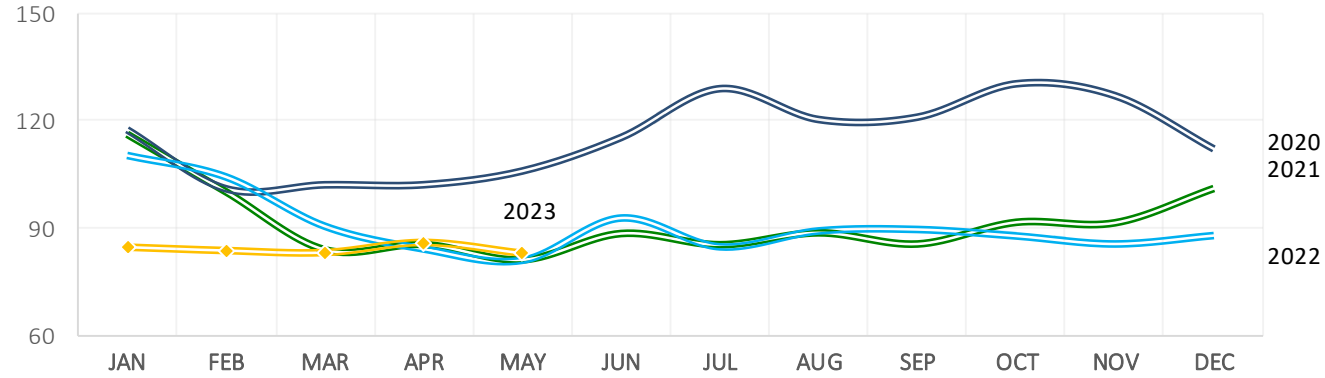
(a) April data.
(b) SE is the acronym of Southeast
(c) March data.
(d) The traditional self-producers (consumers that do not use public grid) is not included.

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



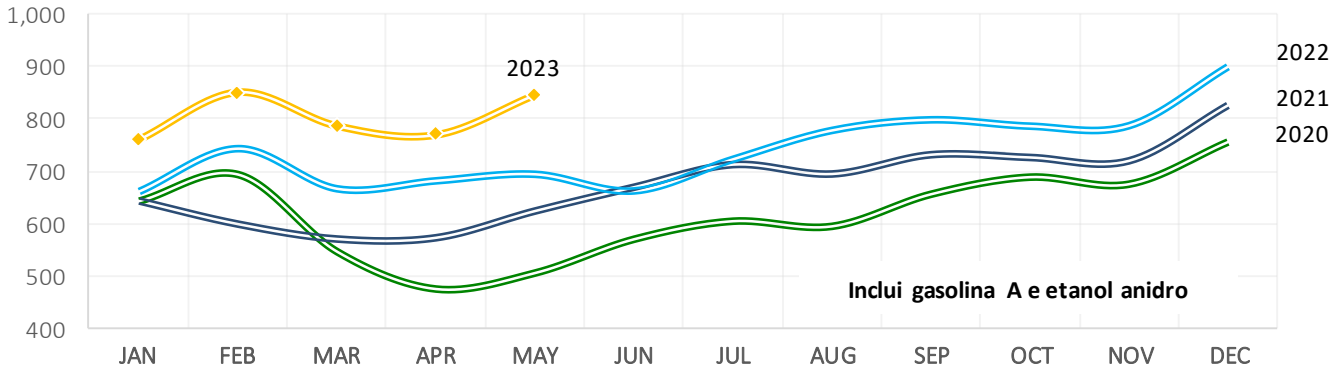
Source: National Petroleum Agency (ANP)

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



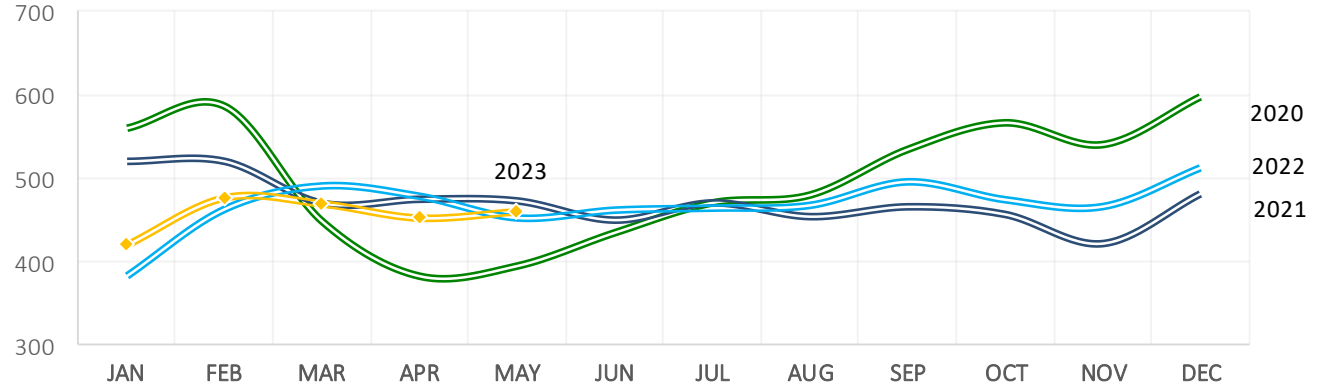
Sources: National Petroleum Agency (ANP) and National Electric System Operator (ONS)

C Gasoline Consumption (10^3 bbl/d)



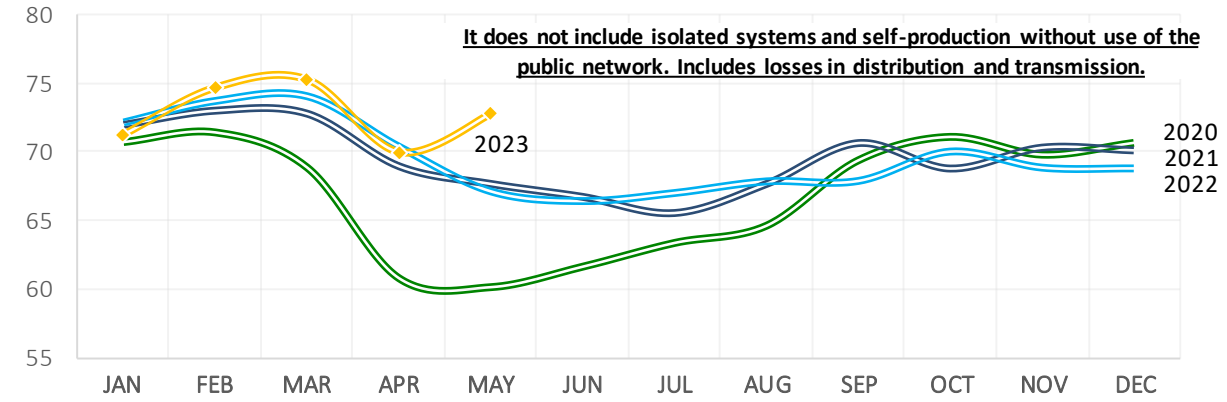
Source: National Petroleum Agency (ANP)

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



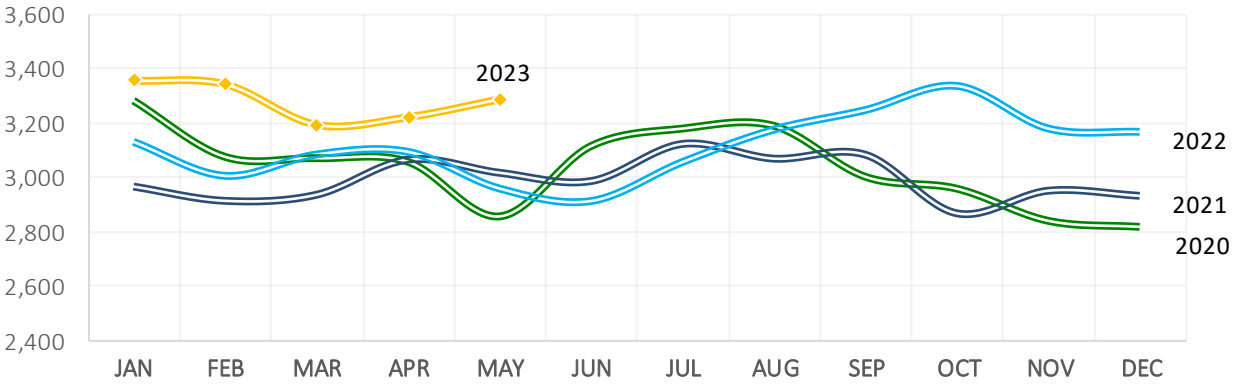
Source: National Petroleum Agency (ANP)

National Interconnected System Power Load (GWavg)



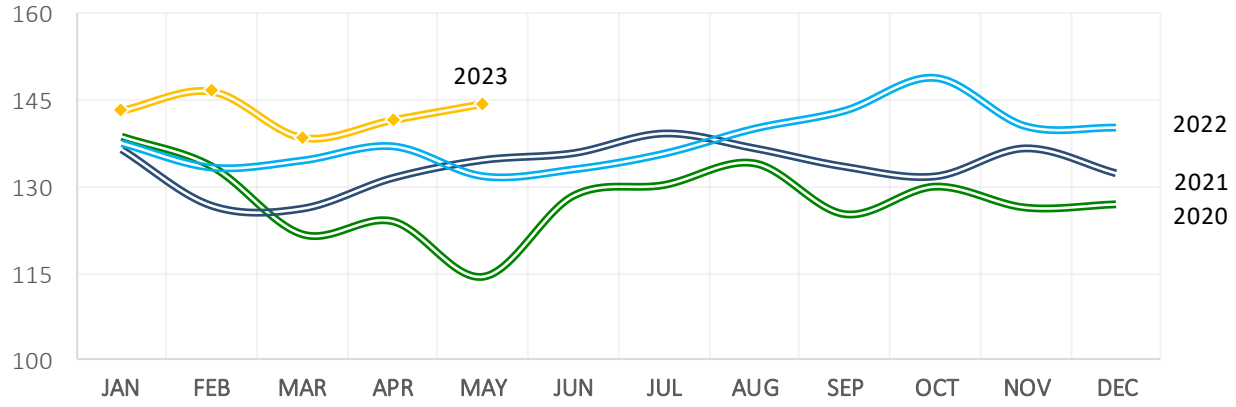
Source: National Electric System Operator (ONS) - from 04/29/23, the estimated value of MMGD was incorporated

Oil Production (10^3 bbl/d)



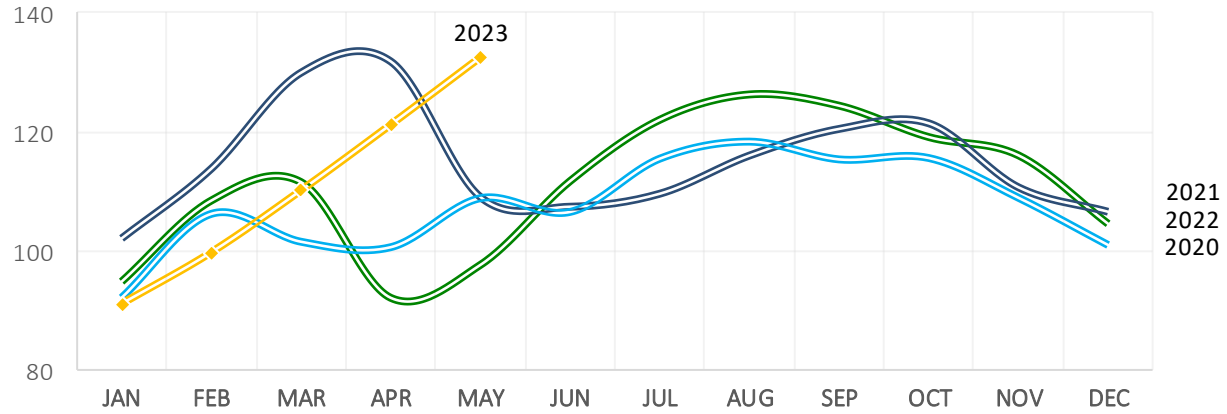
Source: National Petroleum Agency(ANP)

Natural Gas Production (million m^3/d)



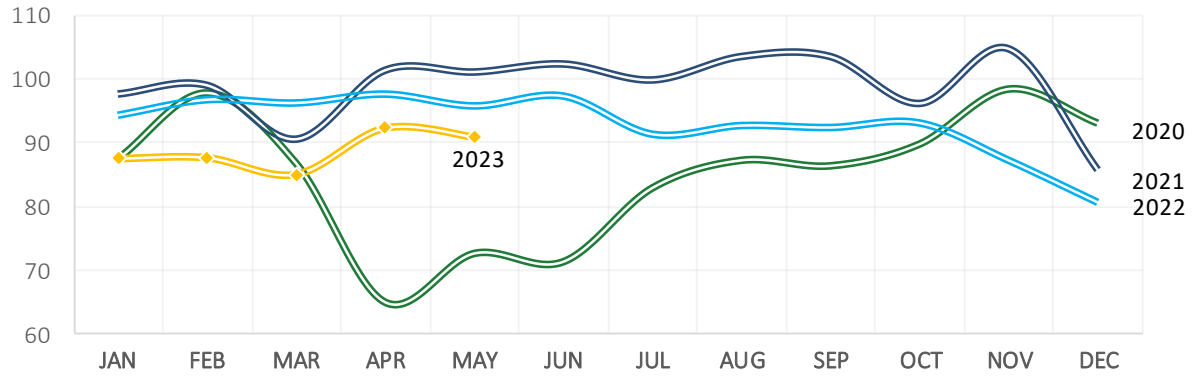
Source: National Petroleum Agency (ANP)

Biodiesel Production (10^3 bbl/d)



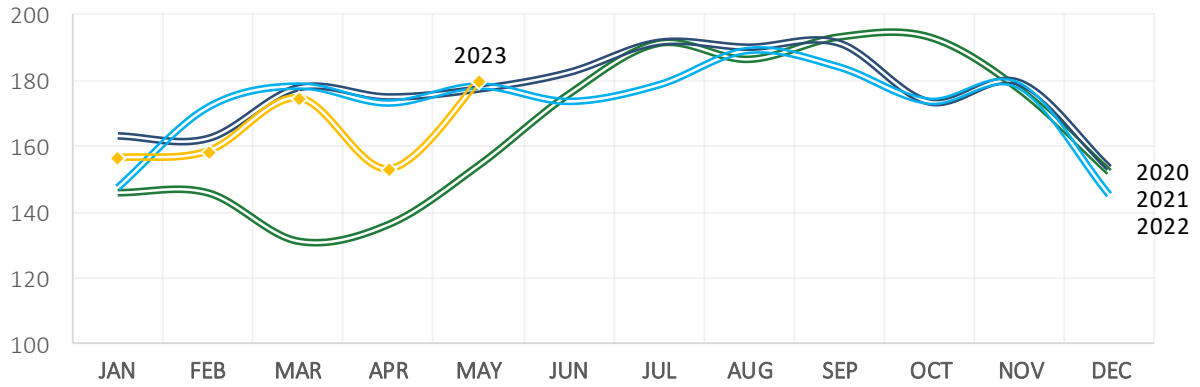
Source: National Petroleum Agency (ANP)

Steel Production (10^3 t/d)



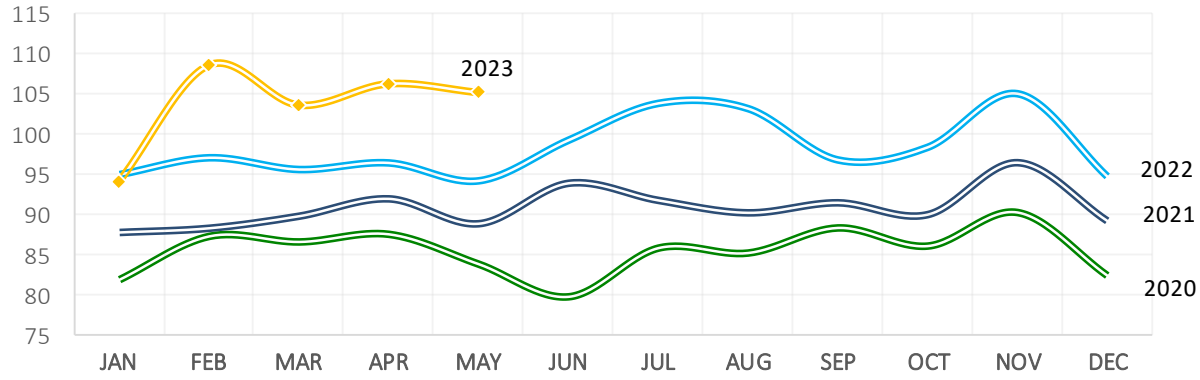
Source: Brazil Steel Institute

Cement Sales (10^3 t/d)



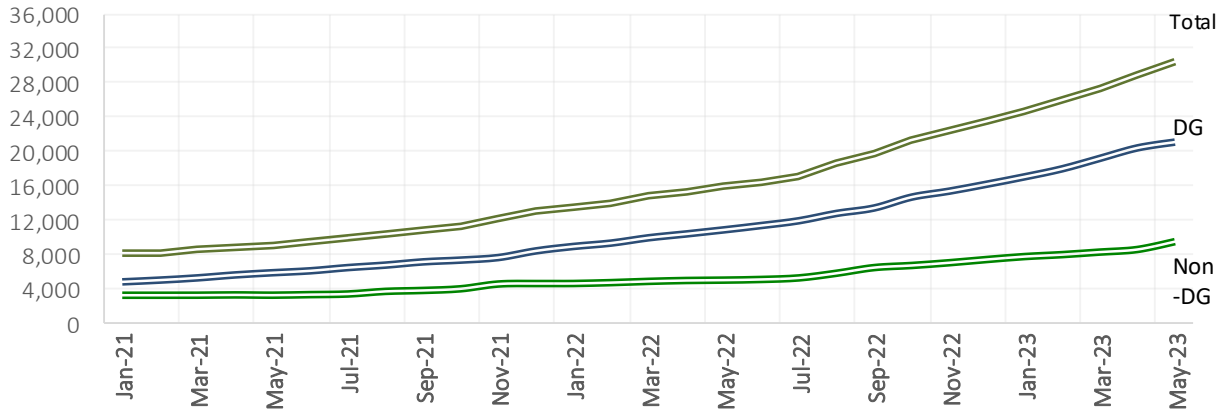
Source: National Cement Industry Union

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



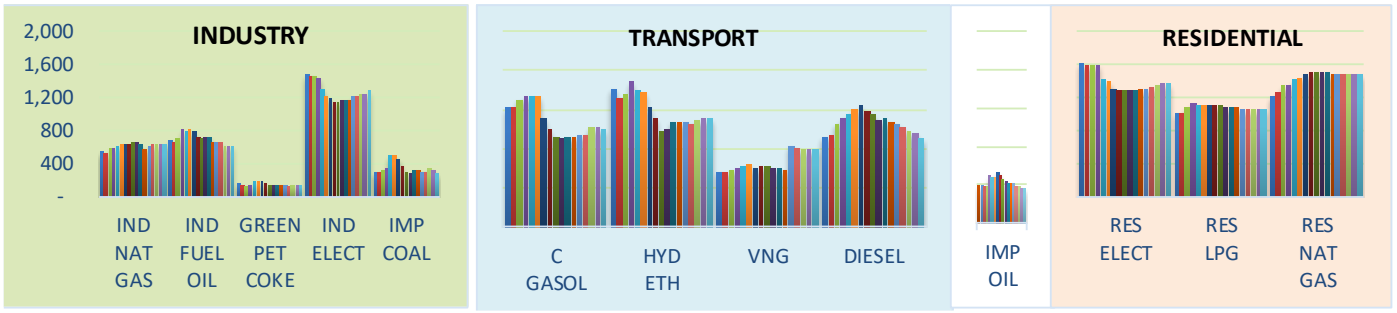
Source: Brazilian Tree Industry (IBA)

Photovoltaic Solar Installed Capacity (MW)



Source: Eletric Energy Secretary of Ministry of Mines and Energy

Consumer Prices - Jan 2022 to May 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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