

MINISTRY OF
MINES AND ENERGY



MONTHLY ENERGY BULLETIN BRAZIL

November 2023 Edition

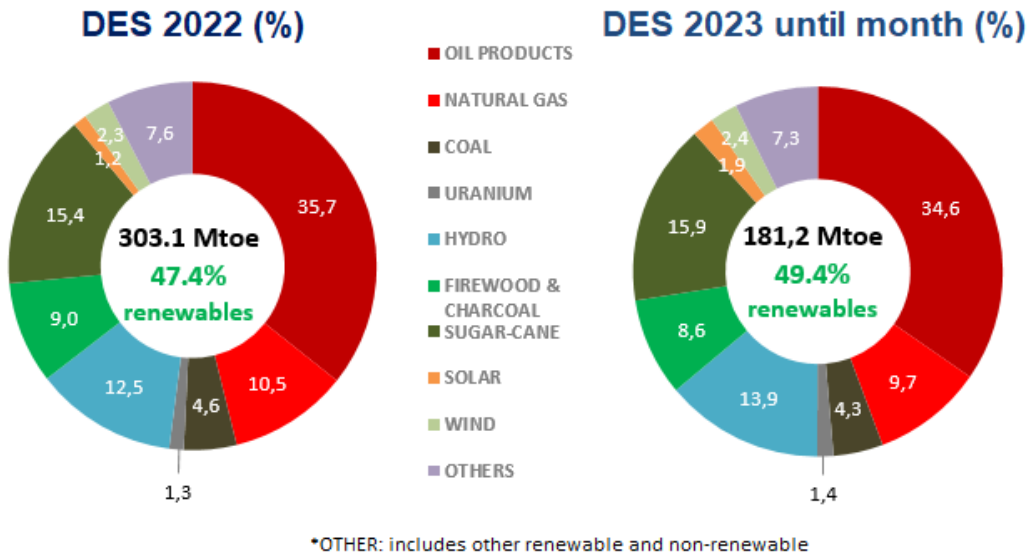
JULY 23

DOMESTIC ENERGY SUPPLY

Based on data up to July of this year, the share of renewables in the Domestic Energy Supply – DES* increased to around 49.4%, therefore, higher than that calculated last year (47.4%), mainly due to the greater generation of hydraulic energy.

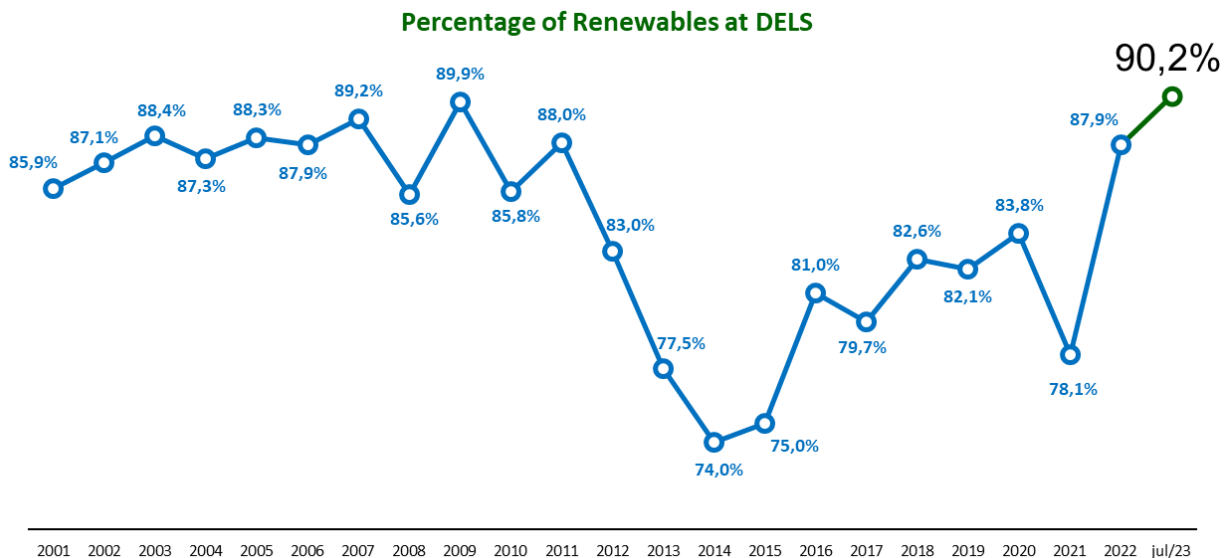
According to the most current survey by the National Supply Company (Conab), sugarcane production has shown a recovery at the end of the last year and it is estimated that there will be a 11.1% increase in its production for the 2022/2023 harvest. For ethanol, produced from sugar cane and corn, the estimated increase is 9.2%.

DOMESTIC ENERGY SUPPLY MORE RENEWABLE IN 2023



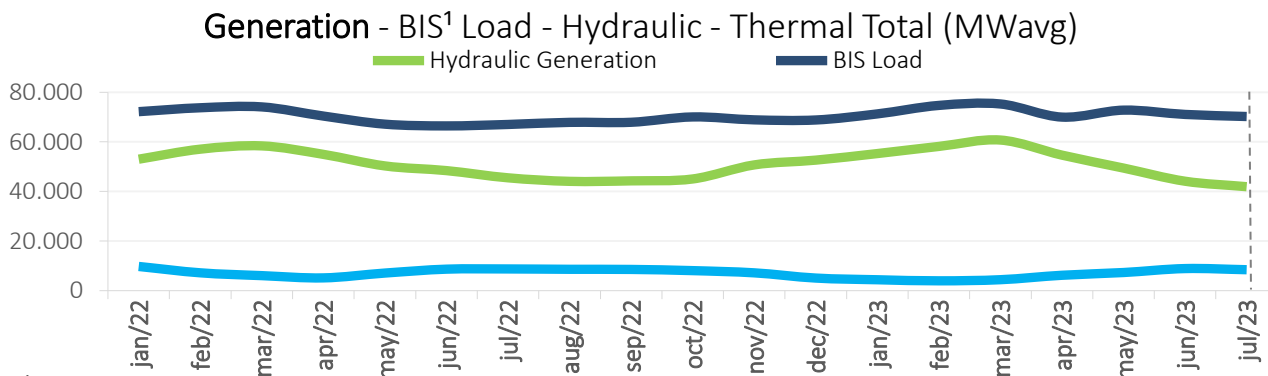
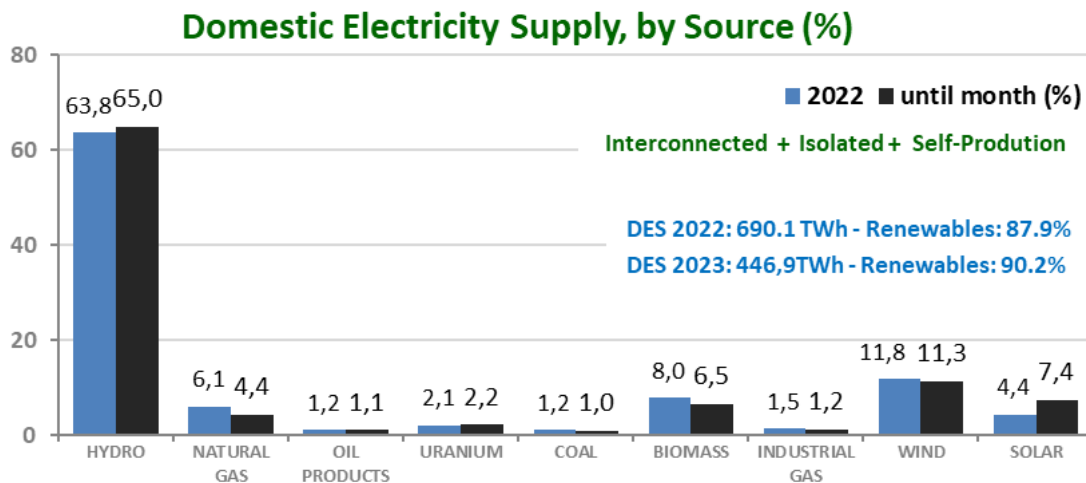
This year, regarding the proportion of renewables in the Domestic Electricity Supply (DELS)², it was verified that 90.2% were obtained through renewable sources, until July, reaching the accumulated value of 446.9 TWh.

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), Autoproducers, Isolated Systems and Electricity Interchange between interconnected Brazilian regions.

For the first seven months of this year, compared to the same period of the previous year (accumulated in the year) there was a 68% increase in generation for centralized solar and 25% for wind. Brazilian hydraulic energy remained stable, with a small drop of around 1%. 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.



¹BIS: Brazilian Interconnected System.

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

HIGHLIGHTS IN JULY 2023

Future Fuel Program

The Future Fuel Technical Committee (CT-CF), made up of fifteen government institutions and coordinated by the Ministry of Mines and Energy, formulated the Future Fuel Program, which aims to promote low-carbon sustainable mobility, sustainable fuel programs aviation and green diesel, as well as the legal framework for CO₂ capture and storage.

The Future Fuel Program was established by the Brazilian Energy Policy Council, with the objective of increasing the use of sustainable and low-carbon fuels, as well as national vehicle technology, with a view to decarbonizing the national transport energy matrix.

Oil and gas growing

Oil and gas production grew this year, showing an increase of 10.3% and 8.3% respectively in the year accumulated.

Regular gasoline and hydrated ethanol prices continue to fall

Regular gasoline and hydrous ethanol prices dropped by 7.6% and 13.4%, respectively, in relation to the same month of the previous year. This is the eleventh consecutive month of decline in this indicator for both fuels.

Steel and Mining

Compared to July 2022, steel production decreased by 4.4% and iron ore exports increased by 1.8%. Pig iron exports increased by 2.8% in the year accumulated.

Hydraulic supply stable

The hydraulic energy supply in 2023 showed a small drop of 0.9% in the year to date. The monthly average was 51,995.7 MWavg. Itaipu's supply, for the same period, increased 41.6%.

Wind Supply in high

Wind energy supply, until July 2023, increased by 25% 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. For the first seven months of the year, 2,715.7 MW of wind power plants came into operation, 114% higher than last year for the same period.

International energy exchange on the rise

Up to April 2022 Brazil was as an energy importer from 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 July this year, Brazil exported 1,045 MWavg.

As of 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 July this year it exported 74 MWavg.

Natural gas availability in fall

Gas consumption availability fell by 7.3% in the year accumulated.

Coal for electricity generation stable

There was a increase of 1.9% for public electricity generation in the year accumulated.

Apparent consumption of petroleum products on the rise

The apparent consumption of petroleum derivatives increased by 3.3% in the year, with diesel decreasing by 1.7% and regular gasoline consumption increasing by 15.6%. Automotive ethanol consumption increased by 0.2%.

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

Electricity consumption growing

Residential sector electricity consumption grew by 4.6% compared to July 2022. Industrial consumption increased by 1.3% while commercial consumption grew by 1.9%.

Biodiesel production rising

Biodiesel production increased 14.4 % in the year accumulated.

As of 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 March 2023 law 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 twelfth consecutive month. Residential tariff fell by 9.8%, while there was a drop of 8.9% for the commercial sector and 8.5% 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.

Solar distributed generation installed capacity (DG) growing

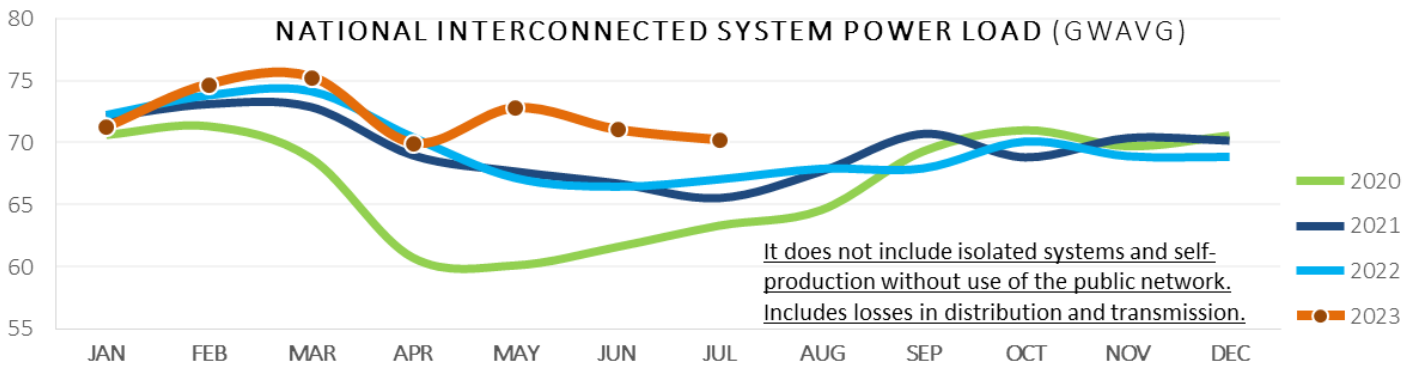
The growing in solar DG installed capacity in Brazil is still a highlight and has increased 91.8% compared to July 2022. The centralized solar installed capacity (non-GD) also increases, with a 84.5% growth compared to July 2022.

For the first seven months of the year, 2,304.9 MW of installed centralized solar capacity came into operation.

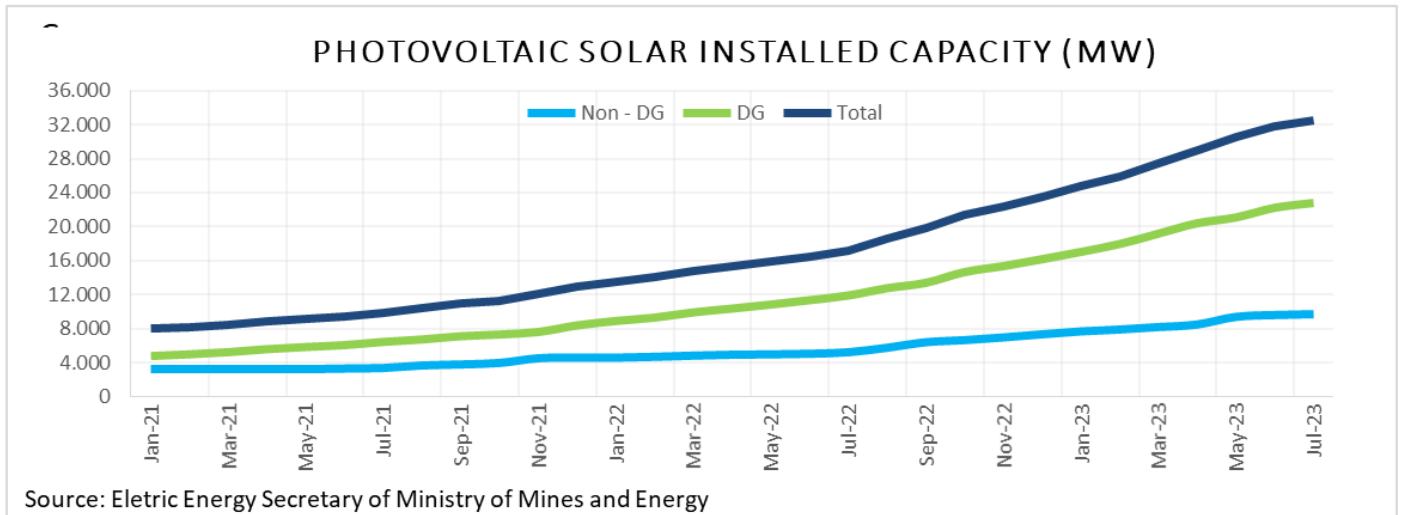
The DG's growth is a reflection of public policies to encourage renewable energy sources and distributed micro and mini-generation, such as Law No. 13,203/2015 and Law No. 14,300/2022.

SPECIFICATION	JULY					
	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)	3,593	3,056	17.6	3,347	3,036	10.3
IMPORTS AVERAGE PRICE (US\$/bbl FOB)	79.32	111.98	-29.2	79.66	100.60	-20.8
OIL PRODUCTS						
TOTAL CONSUMPTION (10 ³ b/day)	2,690	2,649	1.5	2,547	2,465	3.3
hereof: DIESEL with biodiesel - (10 ³ b/day)	1,193	1,157	3.2	1,116	1,098	1.7
hereof: GASOLINE C (10 ³ b/day)	769	723.5	6.3	798	690	15.6
CONSUMER PRICE - DIESEL (R\$/l)	4.94	7.46	-33.8	5.62	6.50	-13.6
CONSUMER PRICE - GASOLINE C (R\$/l)	5.59	6.05	-7.6	5.36	6.86	-21.9
CONSUMER PRICE - LPG (R\$/13 kg)	101.87	112.07	-9.1	106.27	109.28	-2.8
NATURAL GAS (d)						
PRODUCTION (10 ⁶ m ³ /day)	154	136	13.6	146	135	8.3
IMPORTS (10 ⁶ m ³ /day)	16.0	19.8	-19.0	18.3	27.7	-34.2
NON-UTILIZED AND REINJECTION (10 ⁶ m ³ /day)	82.3	70.5	16.7	78.3	69.9	12.0
AVAILABILITY FOR CONSUMPTION (10 ⁶ m ³ /day)	87.8	84.9	3.5	85.7	92.5	-7.3
INDUSTRIAL CONSUMPTION (10 ⁶ m ³ /day) (d)	38.5	42.3	-8.9	39.8	41.5	-4.1
POWER GENERATION CONS. (10 ⁶ m ³ /day) (d)	16.2	11.7	37.9	12.1	17.1	-29.4
INDUSTRIAL PRICE SE (b) (US\$/MMBtu) - consumption range of 20,000 m ³ /day (d)	22.02	21.09	4.4	21.56	20.39	5.7
MOTOR PRICE SE (US\$/MMBtu) (d)	27.23	20.12	35.3	27.38	20.75	31.9
RESIDENTIAL PRICE SE (US\$/MMBtu) (d)	55.27	49.27	12.2	52.78	47.27	11.6
ELECTRICITY						
NATIONAL INTERCONNECTED SYSTEM	70,244	67,036	4.8	72,183	70,128	2.9
SOUTHEAST/MIDWEST POWER LOAD (MWavg)	39,484	38,435	2.7	41,032	40,695	0.8
SOUTH POWER LOAD (MWavg)	12,061	11,588	4.1	12,556	12,378	1.4
NORTHEAST POWER LOAD (MWavg)	11,581	10,708	8.2	11,781	11,142	5.7
NORTH POWER LOAD (MWavg)	7,118	6,305	12.9	6,814	5,914	15.2
TOTAL CONSUMPTION (TWh) (a)	41.9	41.2	1.9	43.3	42.2	2.7
RESIDENTIAL	12.5	12.0	4.6	13.3	12.7	4.8
INDUSTRIAL	15.7	15.5	1.3	15.4	15.1	2.3
COMMERCIAL	7.3	7.2	1.9	8.0	7.8	2.8
OTHER SECTORS	6.4	6.5	-1.6	6.6	6.6	-0.5
PLANTS ENTRY INTO OPERATING (MW)	532	737	-27.8	5,692	3,070	85.4
RESIDENTIAL PRICE (R\$/MWh)	839	785	6.8	819	908	-9.8
COMMERCIAL PRICE (R\$/MWh)	812	748	8.6	787	864	-8.9
INDUSTRIAL PRICE (R\$/MWh)	776	716	8.4	757	827	-8.5
ETHANOL AND BIODIESEL						
BIODIESEL PRODUCTION (10 ³ b/d)	146	115	26.7	120	105	14.4
MOTOR ETHANOL CONSUMPTION (10 ³ b/d)	443	464	-4.6	457	456	0.2
ETHANOL EXPORTS (10 ³ b/d)	62	36	68.8	37	28	32.9
HYDRATED ETHANOL PRICE (R\$/l)	3.77	4.36	-13.4	3.87	4.88	-20.7
COAL						
ELECTRICITY GENERATION (MWavg)	1128	971	16.2	803	787	1.9
IMPORT PRICE (US\$ FOB/t)	197.99	350.57	-43.5	240.45	316.49	-24.0
NUCLEAR ENERGY						
ELECTRICITY GENERATION - (GWh)	1976	857	130.6	1,914	1,669	14.7
INDUSTRIAL SECTORS						
STEEL PRODUCTION (10 ³ t/day)	87	91	-4.4	88	96	-8.3
ALUMINIUM PRODUCTION (10 ³ t/day) (c)	2.6	2.1	21.6	2.7	2.0	35.3
IRON ORE EXPORTS (10 ³ t/day)	951	969	-1.8	884	828	6.8
PELLETS EXPORTS (10 ³ t/day)	73	58	26.7	66	51	27.6
BIG IRON EXPORTS (10 ³ t/day)	12.2	9.1	34.7	10.1	9.8	2.8
PAPER PRODUCTION (10 ³ t/day)	19.4	30.4	-36.2	27.9	30.0	-7.0
PULP PRODUCTION (10 ³ t/day) (d)	66.4	73.4	-9.5	66.1	67.3	-1.8
SUGAR PRODUCTION (10 ³ t/day)	226.9	204.0	11.2	97.5	79.7	22.3
SUGAR EXPORTS (10 ³ t/day)	95	93	2.2	68	59	14.9

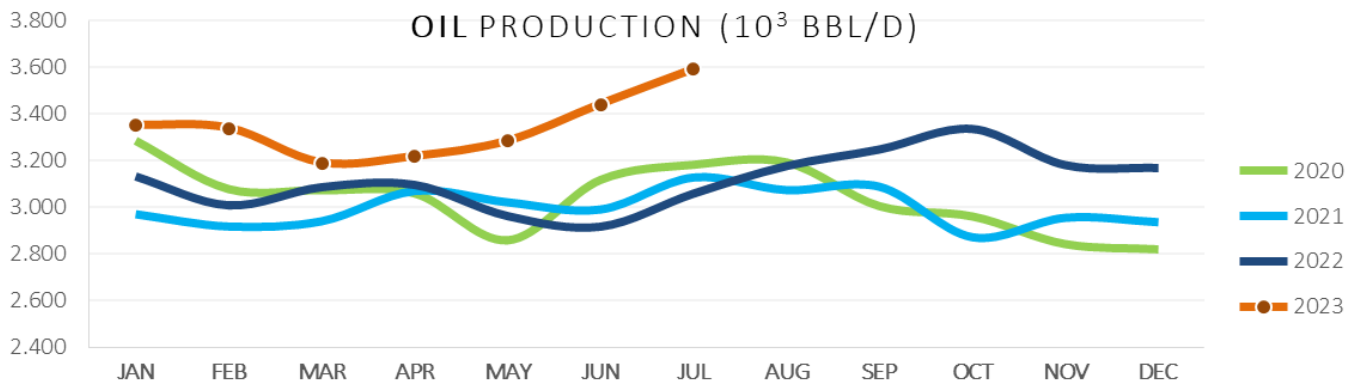
(a) The traditional autoproducers (consumers that do not use public grid) is not included. (b) SE is the acronym of Southeast
(c) Estimated Data (d) Last month data



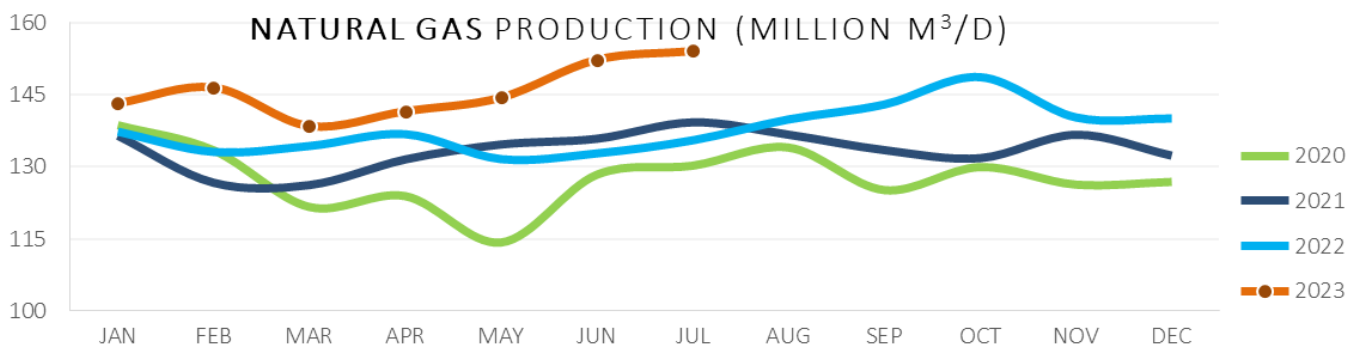
Source: National Electric System Operator (ONS) - from 04/29/23, the estimated value of MMGD was



Source: Electric Energy Secretary of Ministry of Mines and Energy

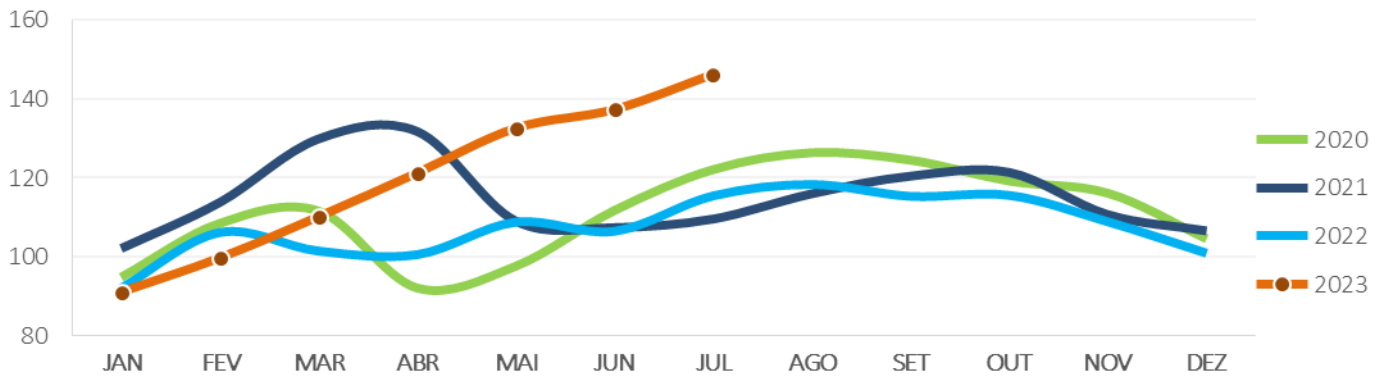


Source: National Petroleum Agency



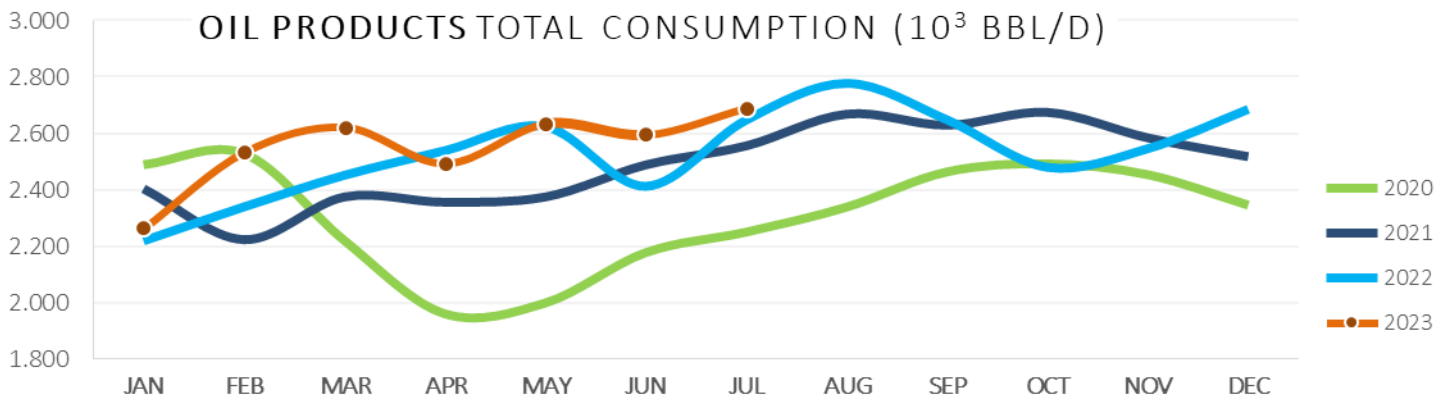
Source: National Petroleum Agency

BIODIESEL PRODUCTION(10³ BBL/D)



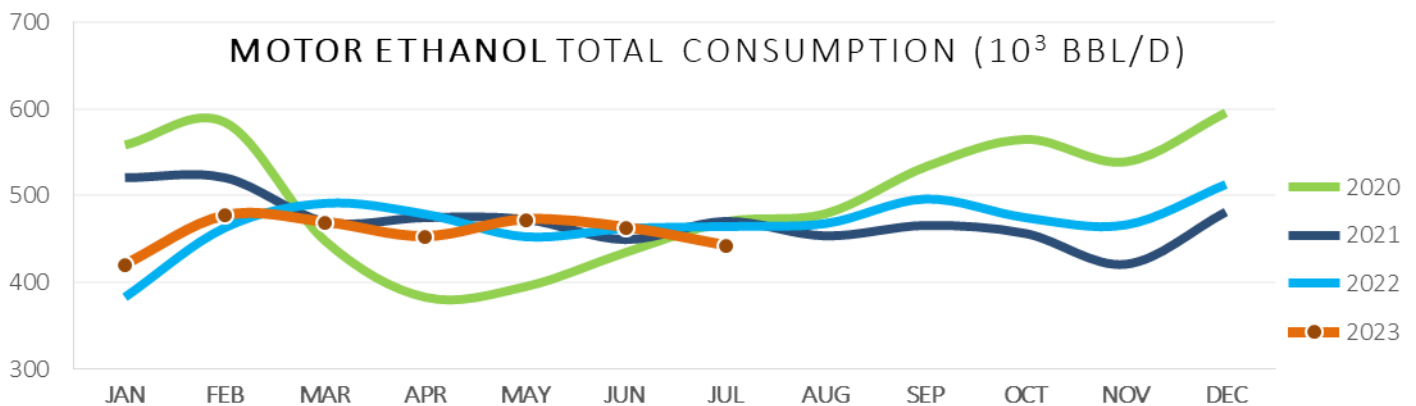
Source: National Petroleum Agency

OIL PRODUCTS TOTAL CONSUMPTION (10³ BBL/D)



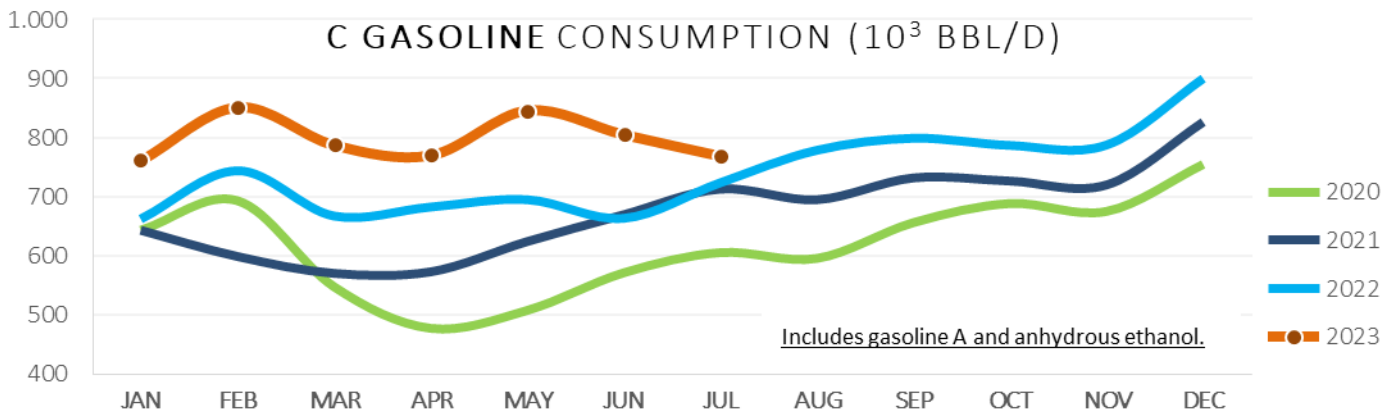
Source: National Petroleum Agency

MOTOR ETHANOL TOTAL CONSUMPTION (10³ BBL/D)



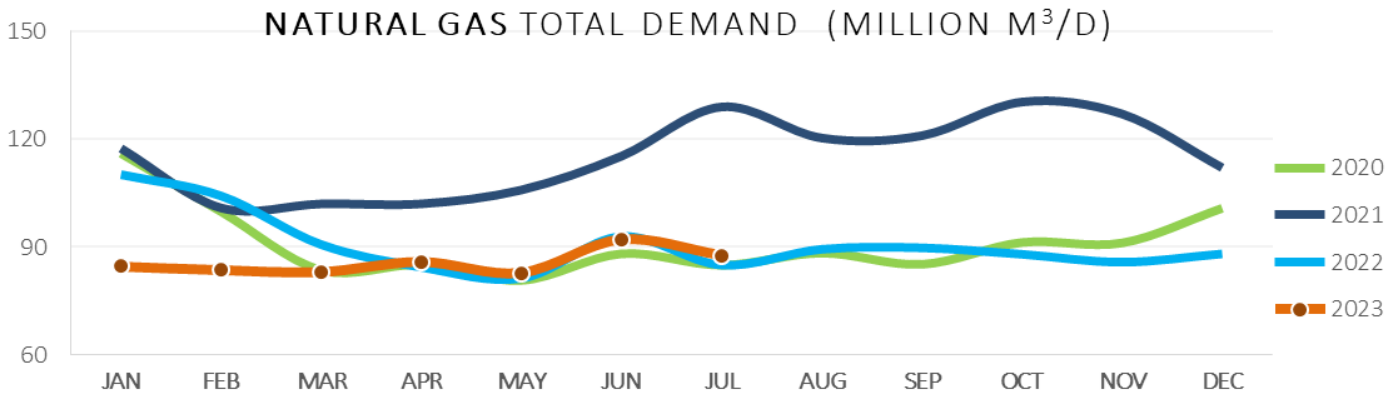
Source: National Petroleum Agency

C GASOLINE CONSUMPTION (10³ BBL/D)

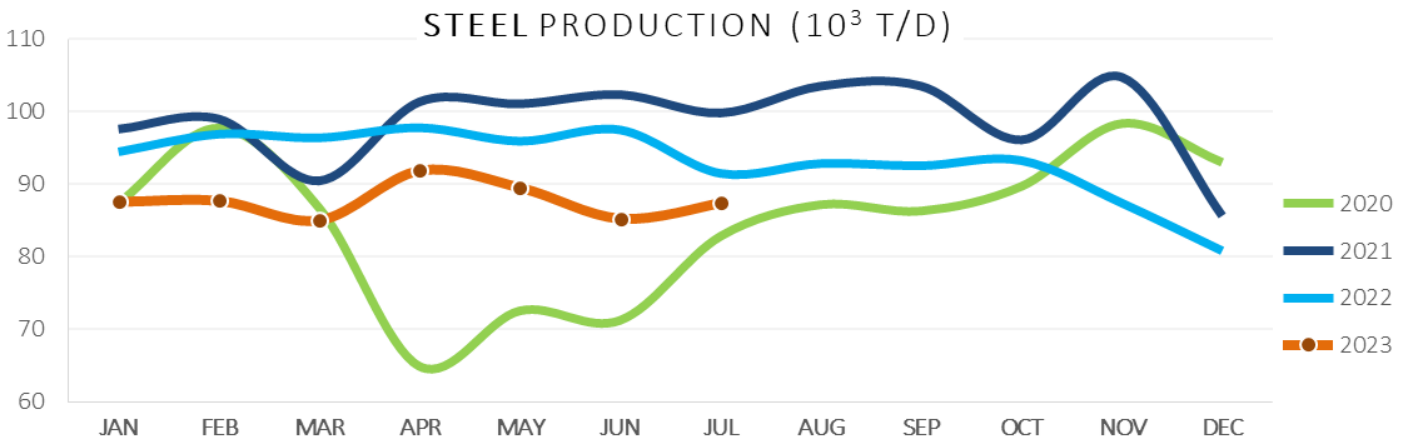


Source: National Petroleum Agency

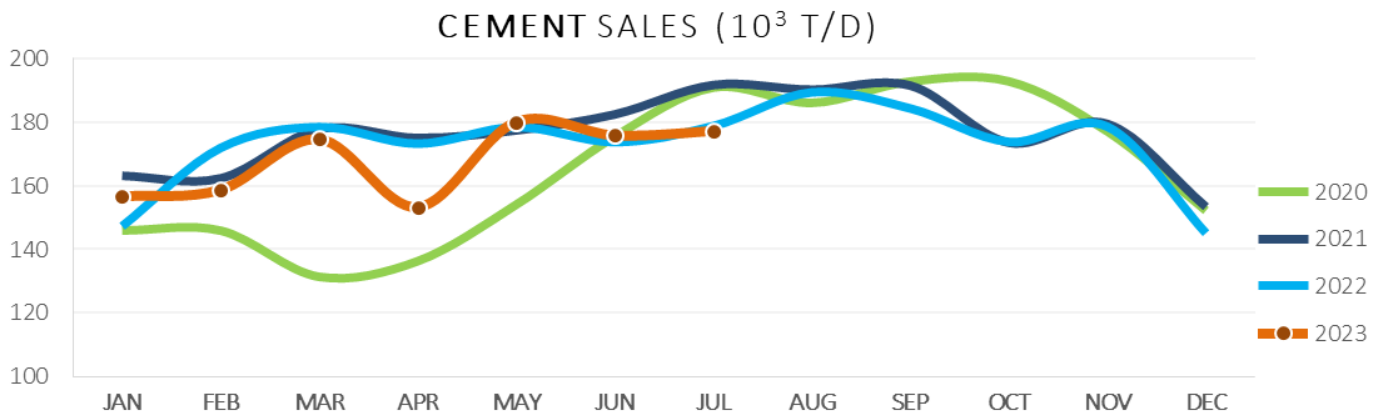
Includes gasoline A and anhydrous ethanol.



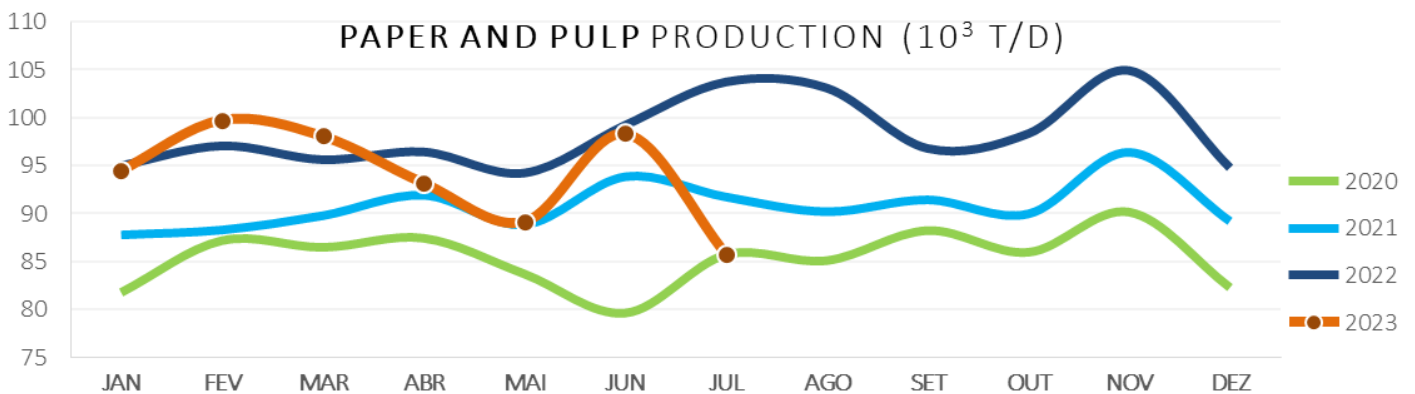
Sources: National Petroleum Agency (ANP) and National Electric System Operator (ONS)



Source: Brazil Steel Institute

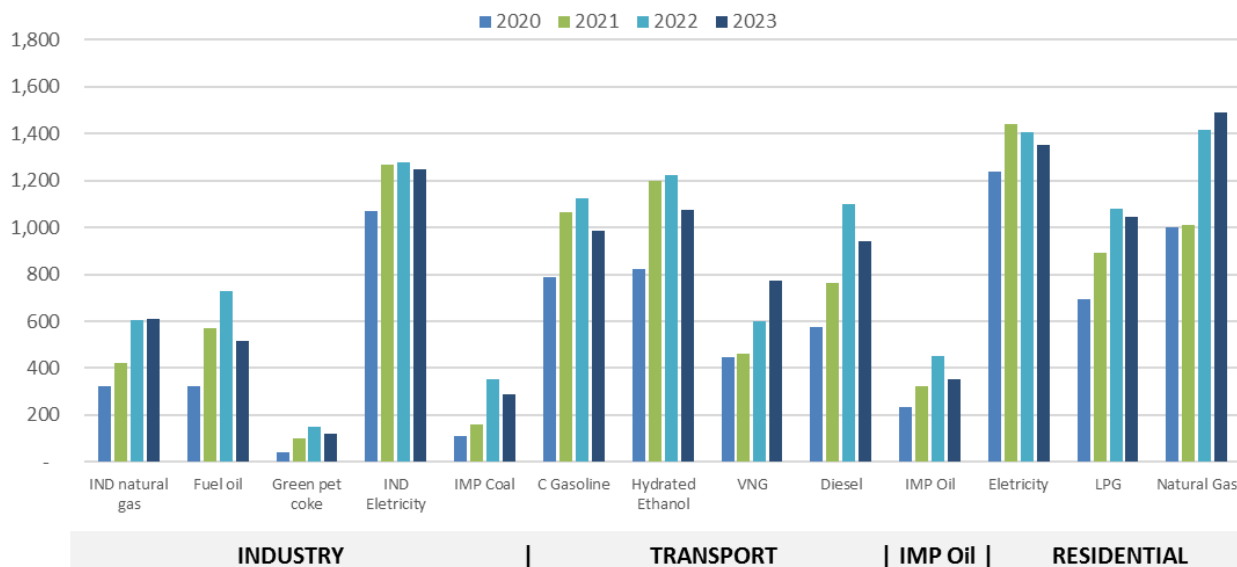


Source: National Cement Industry Union



Source: Brazilian Tree Industry (IBA)

Consumer Prices - Average from 2020 to July 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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