MINISTRY OF
MINES AND ENERGY

BRAZILIAN GOVERNMENT
BRASIL
UNITING AND REBUILDING

MONTHLY ENERGY BULLETIN BRAZIL

december 2023 Edition

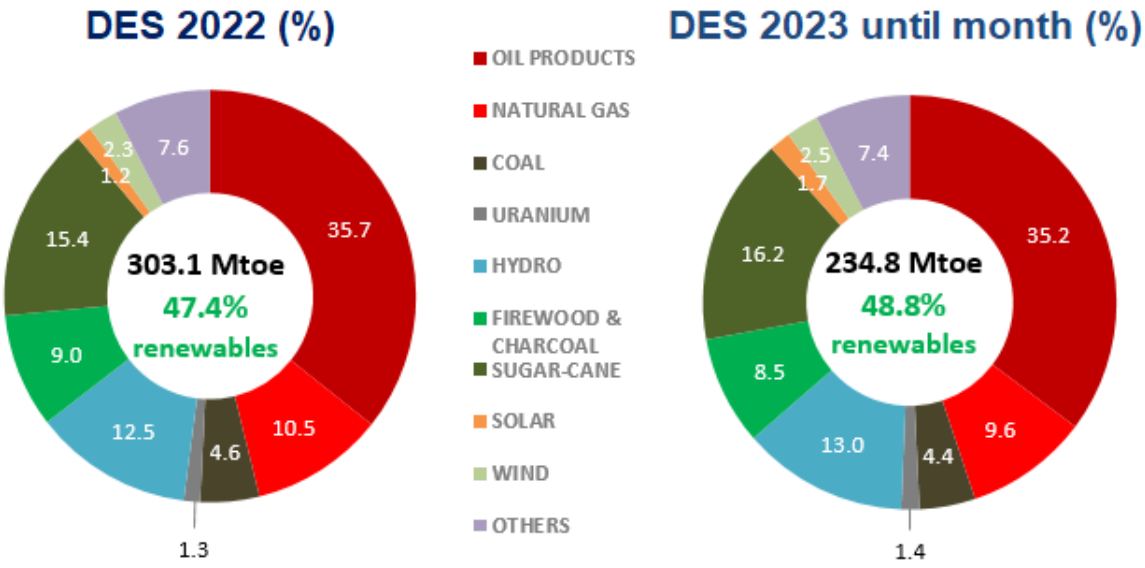
September

DOMESTIC ENERGY SUPPLY

Based on data until September this year, the proportion of renewable sources in the Domestic Energy Supply (DES)* increased to about 48.8%, 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

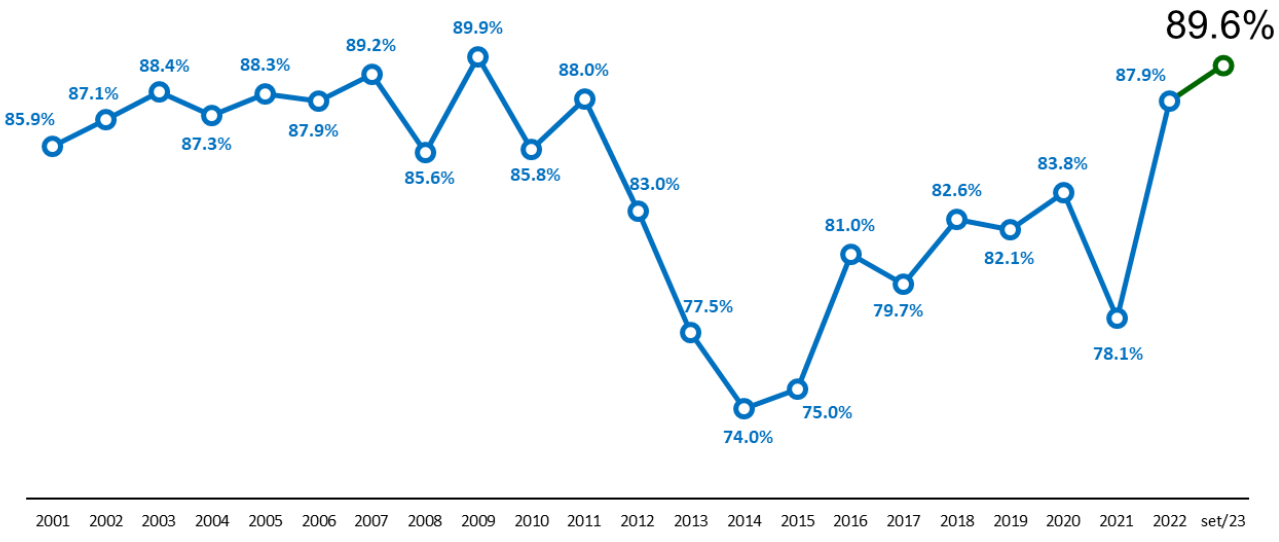


*OTHER: includes other renewable and non-renewable

Regarding the proportion of renewables in the Domestic Electricity Supply (DELS) [2] this year, it was observed that 89.6% was derived from renewable sources up to September, reaching an accumulated value of 557.0 TWh.

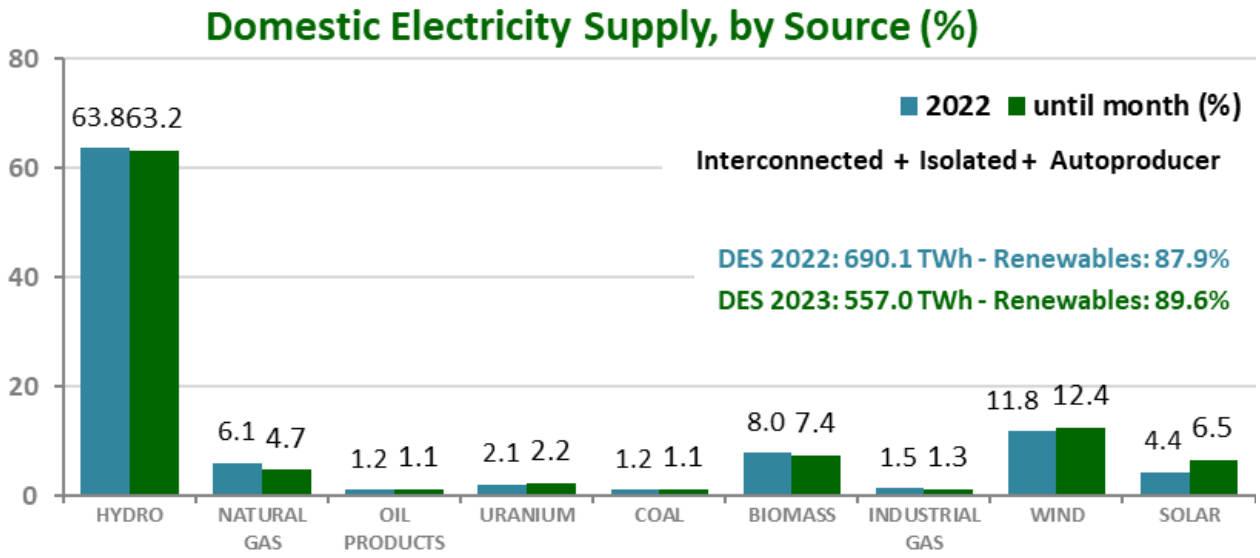
The figure below highlights the significant proportion of renewables in our DESE, contributing to a cleaner energy generation. This is a result of both favorable hydrological conditions and investments in solar and wind energy.

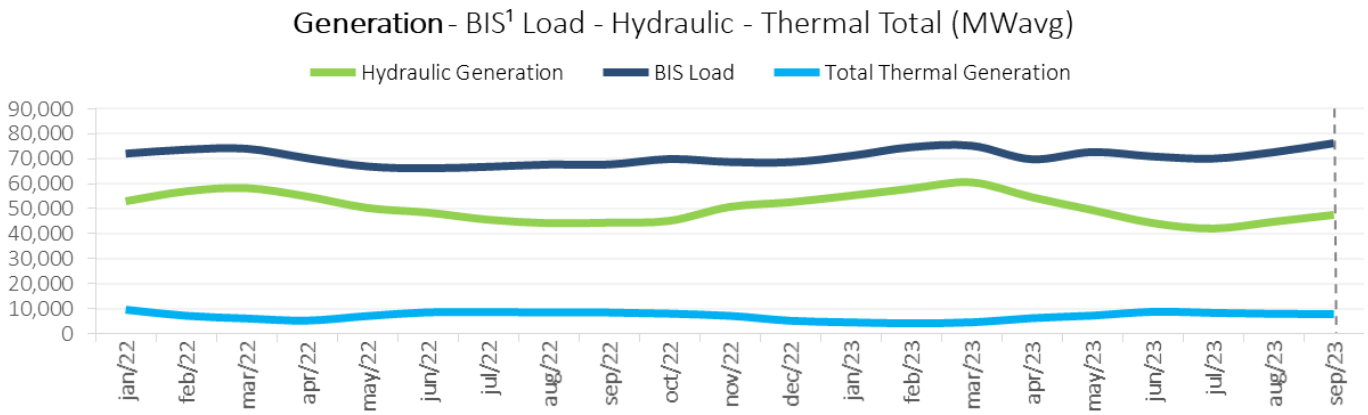
Percentage of Renewables at DELS



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

For the first eight months of the year, in comparison to the same period of the previous year (year-to-date), there was a power generation of 62% in centralized solar photovoltaic and 17% 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.





[1]BIS: Brazilian Interconnected System.

Source: National Electric System Operator (ONS)

HIGHLIGHTS IN SEPTEMBER - 2023

Biodiesel production rising

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, we observed in September 2023 that this biofuel production increased by 16.3% in the year to date.

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.

Oil and gas growing

Oil and gas production increased, rising 11.1% and 8.2% respectively, in the year-to-date.

Regular gasoline and hydrated ethanol prices continue to fall

Regular gasoline and hydrated ethanol prices decreased by 16.0% and 17.4% respectively, in the year-to-date.

Steel and Mining

In the year to date, steel production fell by 7.7%, however aluminum production grew by 39.1% and iron ore exports increased by 6.3%. Pellet exports increased by 22.9% year-to-date.

September

Hydraulic supply stable

The hydraulic energy supply in 2023 was stable. The monthly average was 50,665.0 MWavg. Itaipu´s supply, for the same period, increased 35.0%.

Wind Supply in high

Wind energy supply until September 2023 increased by 17% in the year accumulated, 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 eight months of the year, 3,321.9 MW of wind power plants came into operation, 95% higher than last year for the same period.

International power energy exchange on the rise

Up to April 2022, the historical Brazilian data 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 September this year, Brazil exported 118 MWavg.

In relation to Uruguay, Brazil imported 3 MWavg in September this year.

Natural gas availability falling

Gas consumption availability fell by 6.6% in the year accumulated.

Coal for electricity generation decreasing

There was an decrease of 0.7% for coal public electricity generation in the year accumulated.

Apparent consumption of petroleum products on the rise

Apparent consumption of oil derivatives increased by 2.6% year-to-date, diesel consumption increased by 2.7% and gasoline consumption increased by 11.5%. Automotive ethanol consumption increased by 1.5%.

The energy consumption of light Otto-cycle vehicles (gasoline, ethanol, and natural gas) has shown an increase of 6.3%.

Electricity consumption in high

Residential sector electricity consumption grew by 9.1% compared to September 2022. Industrial consumption increased by 3.5% while commercial consumption grew by 8.5%.

Electricity tariffs continue to fall

All three tariffs (residential, commercial, and industrial) continue to show a decline compared to the previous year's cumulative. The residential tariff dropped by 5.8%, while there was a decrease of 4.8% for the commercial sector and 4.4% for the industrial sector.

Solar distributed generation installed capacity (DG) rising

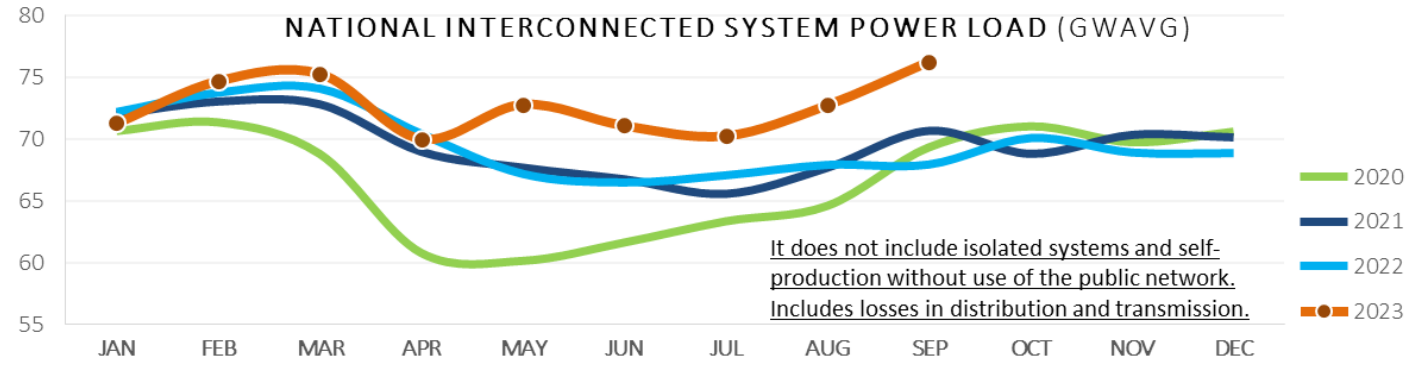
The growing in solar DG installed capacity in Brazil is still a highlight and has increased 76.7% compared to September 2022. The centralized solar installed capacity (non-GD) also increases, with a 61.6% growth compared to September 2022.

For the first seven months of the year, 3,073.4 MW of installed centralized solar capacity came into operation.

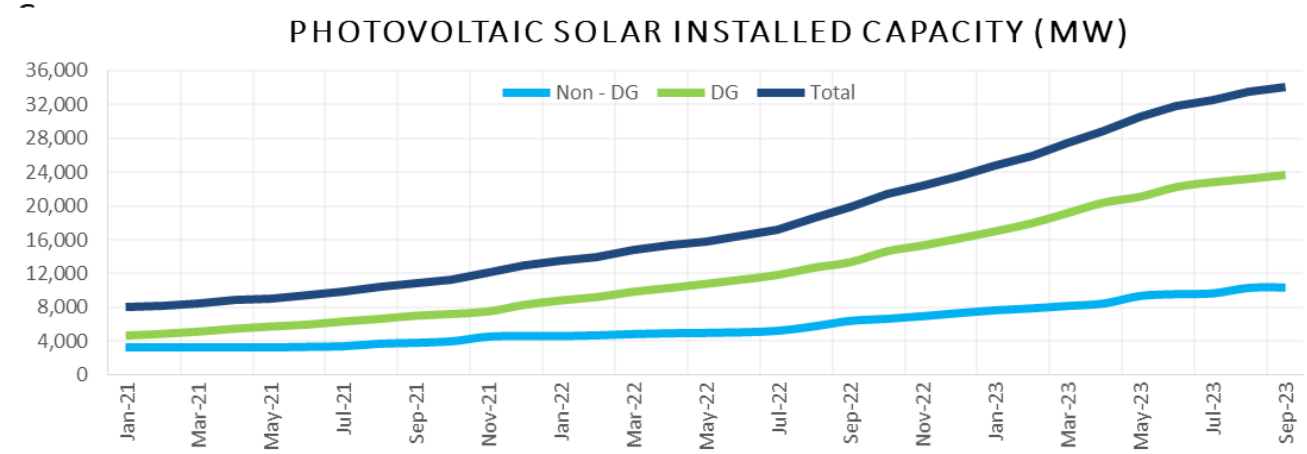
The DG's growth is a reflection of public policies to encourage renewable energy sources and distributed micro and mini-generation, such as Law No. 13,203/2015 and Law No. 14,300/2022, which is considered a legal framework for distributed generation in Brazil.

SPECIFICATION	September					
	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)	3,757	*3,246*	15.8	3,414	*3,075*	11.1
IMPORTS AVERAGE PRICE (US$/bbl FOB)	89.28	*101.63*	-12.1	81.29	*101.92*	-20.2
OIL PRODUCTS						
TOTAL CONSUMPTION (10^3 b/day)	2,706	*2,650*	2.1	2,587	*2,521*	2.6
hereof: DIESEL with biodiesel - (10^3 b/day)	1,238	*1,182*	4.7	1,150	*1,120*	2.7
hereof: GASOLINE C (10^3 b/day)	775	*798.8*	-3.0	795	*712*	11.5
CONSUMER PRICE - DIESEL (R$/l)	6.08	*6.85*	-11.2	5.66	*6.61*	-14.3
CONSUMER PRICE - GASOLINE C (R$/l)	5.83	*5.00*	16.6	5.45	*6.49*	-16.0
CONSUMER PRICE - LPG (R$/13 kg)	101.41	*112.36*	-9.7	105.16	*109.88*	-4.3
NATURAL GAS (d)						
PRODUCTION (10^6 m^3/day)	158	*143*	10.4	147	*136*	8.2
IMPORTS (10^6 m^3/day)	14.9	*18.7*	-20.2	17.4	*26.1*	-33.3
NON-UTILIZED AND REINJECTION (10^6 m^3/day)	83.6	*72.1*	15.9	79.1	*70.5*	12.2
AVAILABILITY FOR CONSUMPTION (10^6 m^3/day)	89.3	*89.7*	-0.4	85.7	*91.8*	-6.6
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)	10.5	*13.5*	-22.0	11.2	*16.1*	-30.4
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$/MMBtu) **(d)**	56.36	*49.27*	14.4	52.94	*47.27*	12.0
ELECTRICITY						
NATIONAL INTERCONNECTED SYSTEM	76,257	*67,918*	12.3	72,693	*69,631*	4.4
SOUTHEAST/MIDWEST POWER LOAD (MWavg)	43,541	*38,632*	12.7	41,321	*40,222*	2.7
SOUTH POWER LOAD (MWavg)	*12,618*	*11,274*	11.9	12,531	*12,170*	3.0
NORTHEAST POWER LOAD (MWavg)	*12,425*	*11,238*	10.6	11,855	*11,151*	6.3
NORTH POWER LOAD (MWavg)	*7,673*	*6,774*	13.3	6,987	*6,088*	14.8
TOTAL CONSUMPTION (TWh) **(a)**	44.5	*42.0*	5.8	43.5	*42.2*	3.1
RESIDENTIAL	13.6	*12.5*	9.1	13.3	*12.6*	5.5
INDUSTRIAL	16.0	*15.4*	3.5	15.6	*15.2*	2.3
COMMERCIAL	8.0	*7.4*	8.5	8.0	*7.7*	3.7
OTHER SECTORS	6.8	*6.7*	1.9	6.6	*6.6*	-0.5
PLANTS ENTRY INTO OPERATING (MW)	224	*1387*	-83.9	7,274	*5,107*	42.4
RESIDENTIAL PRICE (R$/MWh)	862	*778*	10.9	827	*878*	-5.8
COMMERCIAL PRICE (R$/MWh)	830	*739*	12.3	795	*835*	-4.8
INDUSTRIAL PRICE (R$/MWh)	785	*697*	12.5	763	*798*	-4.4
ETHANOL AND BIODIESEL						
BIODIESEL PRODUCTION (10^3 b/d)	142	*115*	22.8	125	*107*	16.3
MOTOR ETHANOL CONSUMPTION (10^3 b/d)	522	*496*	5.2	469	*462*	1.5
ETHANOL EXPORTS (10^3 b/d)	62	*64*	-3.4	41	*35*	17.6
HYDRATED ETHANOL PRICE (R$/l)	3.64	*3.48*	4.6	3.82	*4.62*	-17.4
COAL						
ELECTRICITY GENERATION (MWavg)	805	*995*	-19.1	830	*836*	-0.7
IMPORT PRICE (US$ FOB/t)	152.93	*244.40*	-37.4	223.78	*307.19*	-27.2
NUCLEAR ENERGY						
ELECTRICITY GENERATION - (GWh)	1704	*1532*	11.2	1,902	*1,645*	15.6
INDUSTRIAL SECTORS						
STEEL PRODUCTION (10^3 t/day)	86	*93*	-7.4	88	*95*	-7.7
ALUMINIUM PRODUCTION (10^3 t/day) **(c)**	2.7	*2.1*	25.2	2.7	*2.0*	39.1
IRON ORE EXPORTS (10^3 t/day)	1,126	*1,123*	0.3	940	*884*	6.3
PELLETS EXPORTS (10^3 t/day)	61	*81*	-24.0	65	*53*	22.9
BIG IRON EXPORTS (10^3 t/day)	8.4	13.2	-36.6	10.3	10.4	-0.8
PAPER PRODUCTION (10^3 t/day)	30.4	*30.7*	-1.1	28.4	*30.2*	-5.7
PULP PRODUCTION (10^3 t/day)	62.2	*66.1*	-5.9	66.2	*67.8*	-2.3
SUGAR PRODUCTION (10^3 t/day)	224.3	*163.7*	37.0	126.2	*101.2*	24.7
SUGAR EXPORTS (10^3 t/day)	150	*101*	48.9	85	*68*	25.1

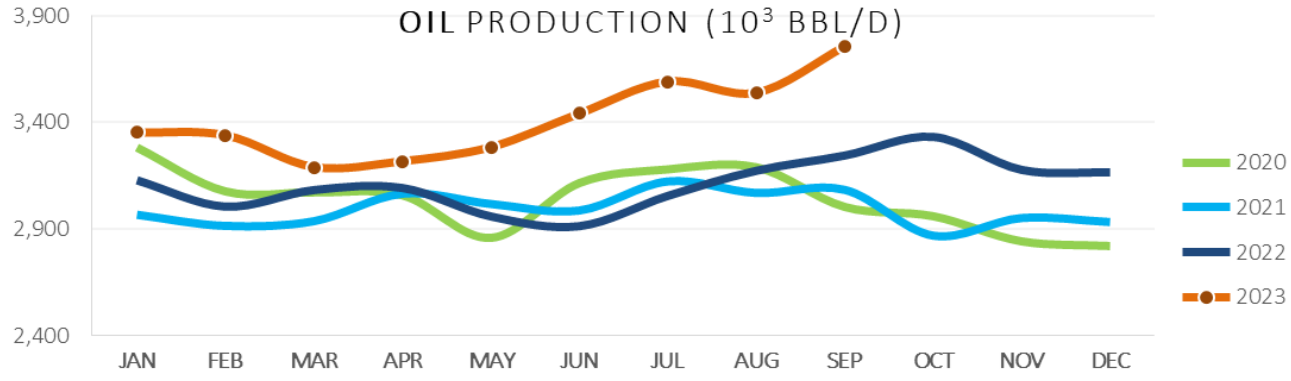
(a) The traditional autoproducers (consumers that do not use public grid) is not included. (b) SE is the acronym of Southeast
(c) june Data (d) July Data



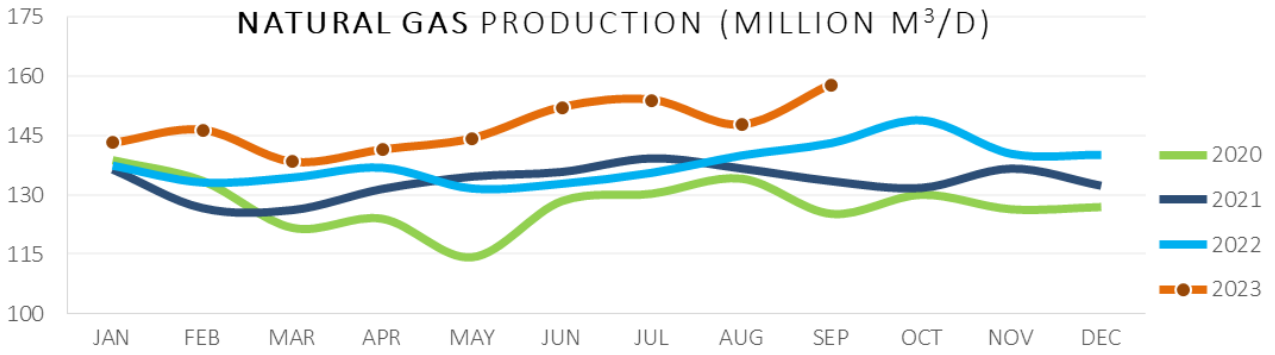
Source: National Electric System Operator (ONS)



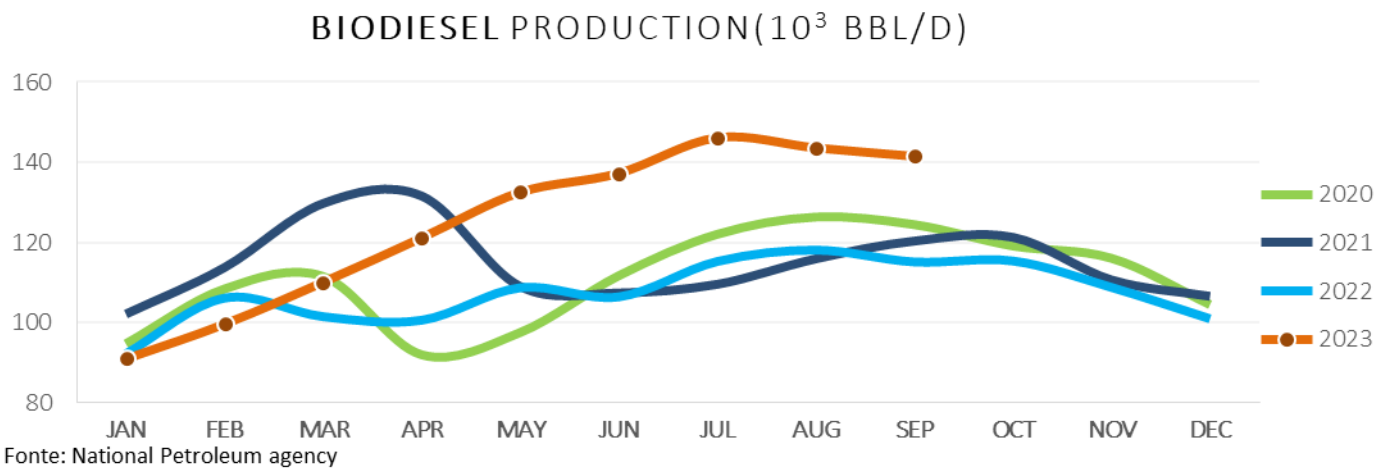
Source: Eletric Energy Secretary of Ministry of Mines and Energy



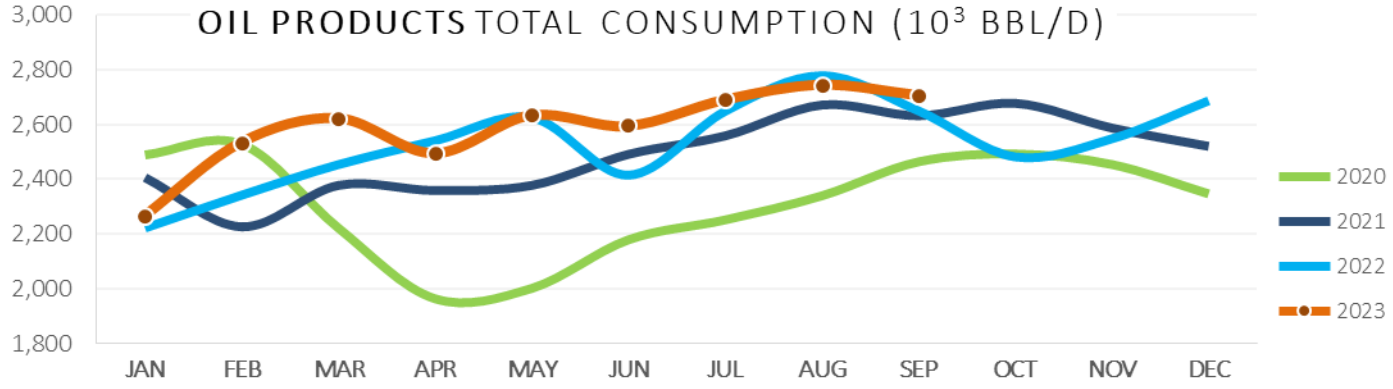
Source: National Petroleum Agency



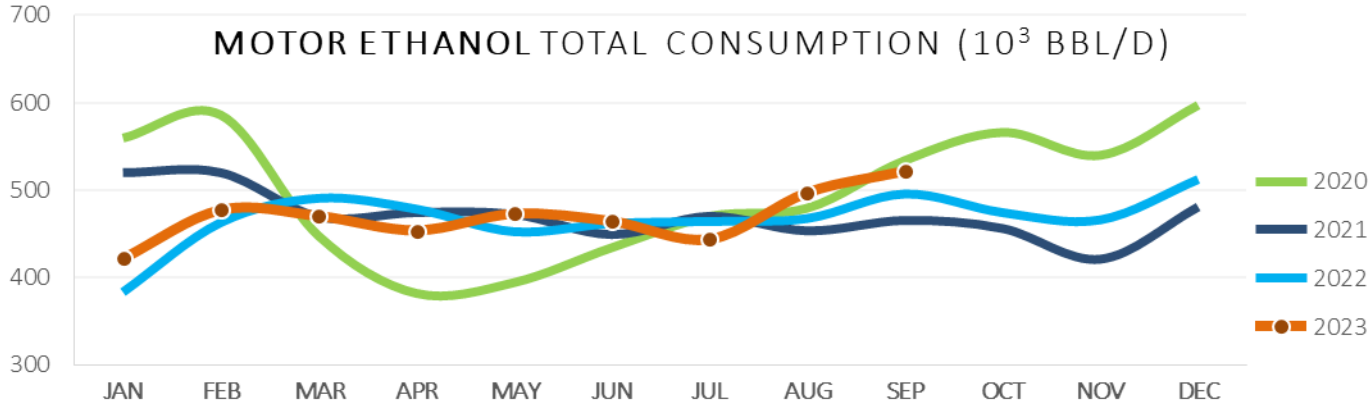
Source: National Petroleum Agency



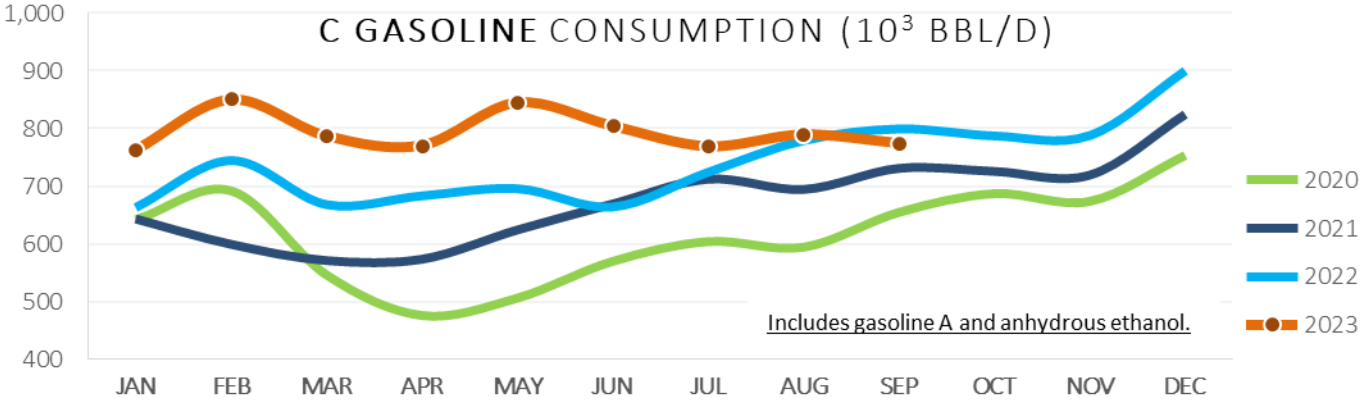
Fonte: National Petroleum agency



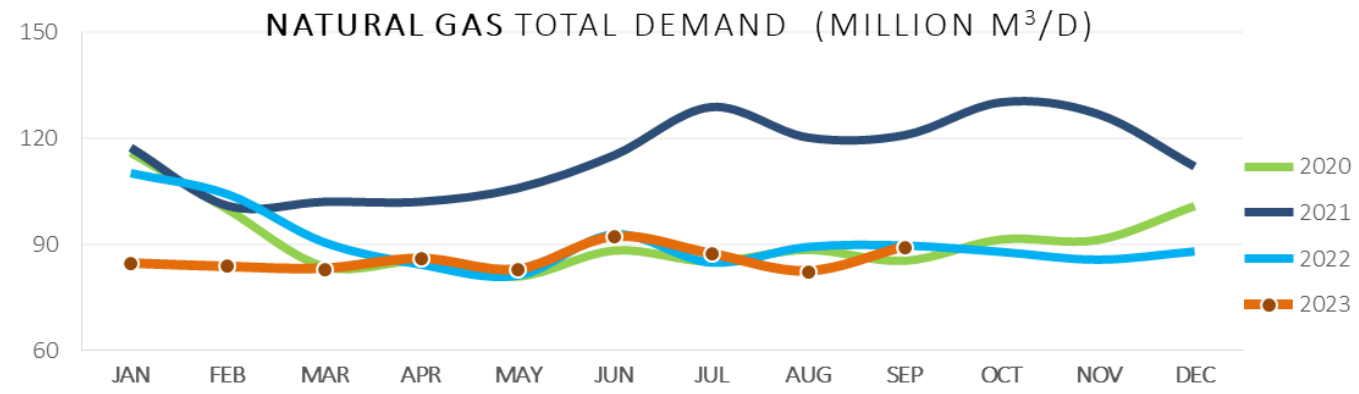
Source: National Petroleum Agency



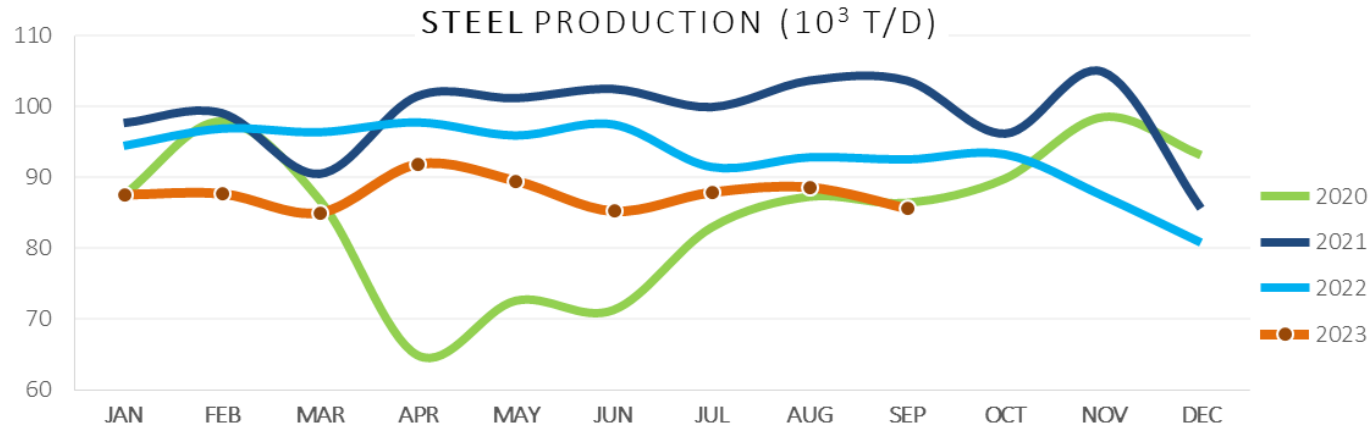
Source: National Petroleum Agency



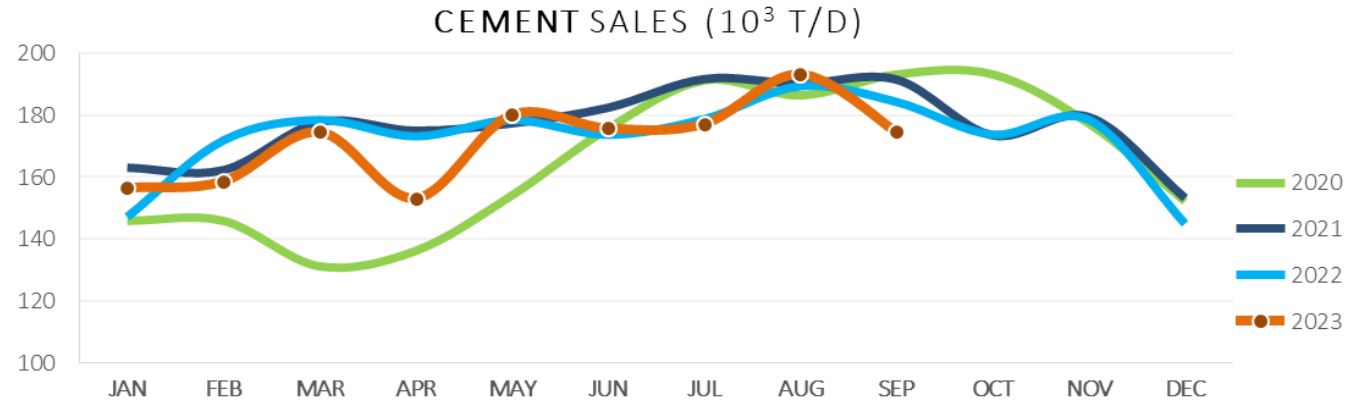
Source: National Petroleum Agency



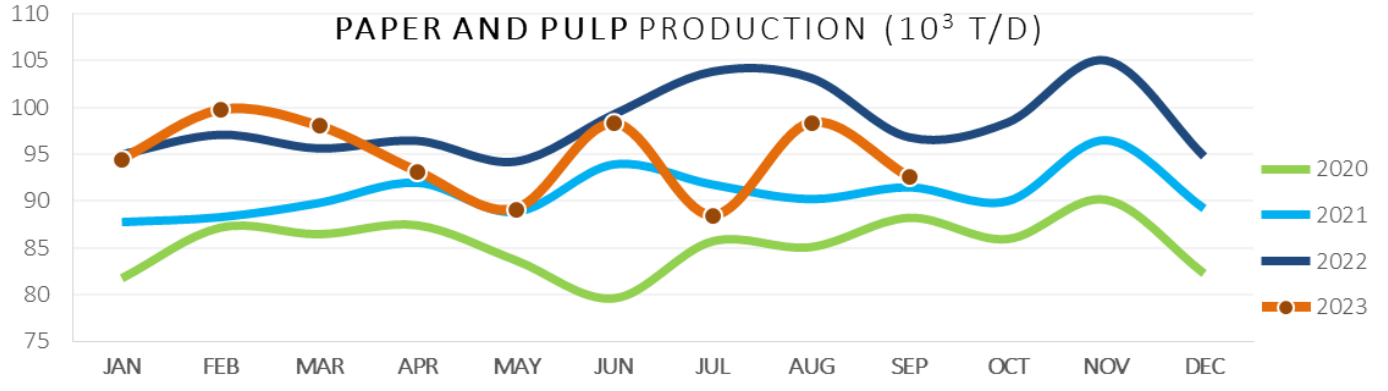
Sources: National Petroleum Agency (ANP) and National Electric System Operator (ONS)



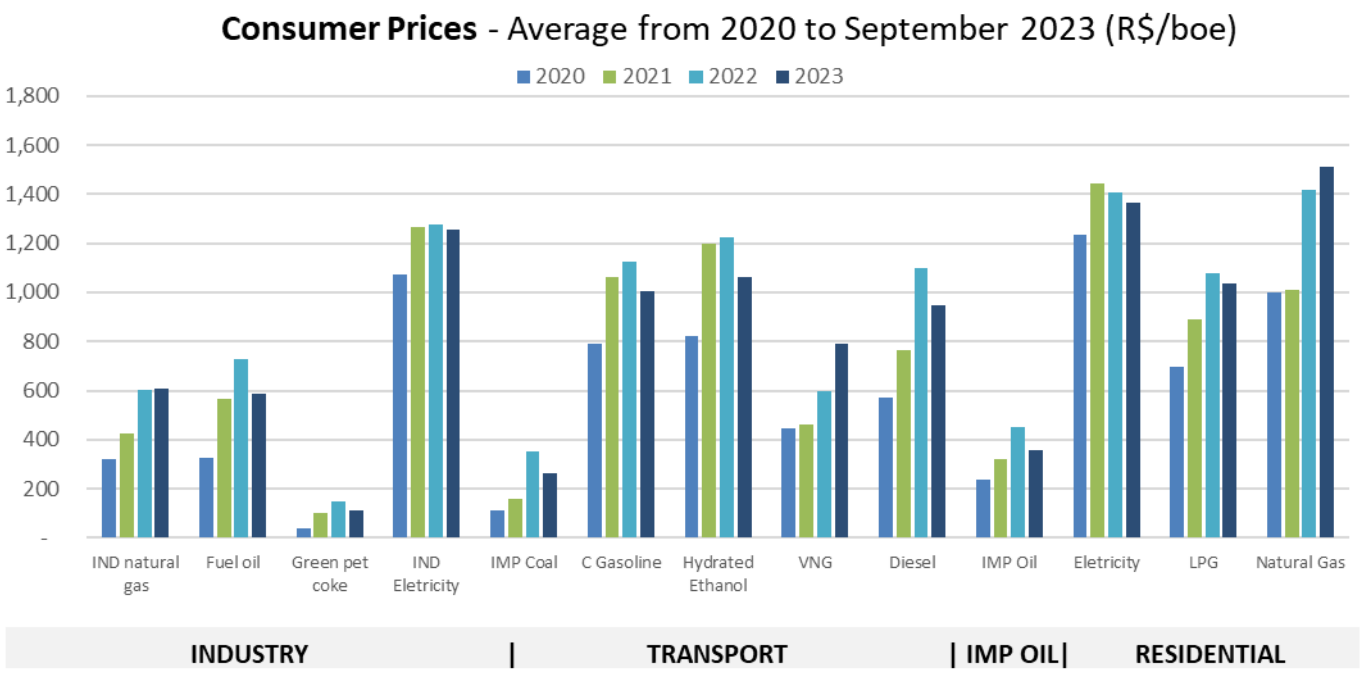
Source: Brazil Steel Institute



Source: National Cement Industry Union



Source: Brazilian Tree Industry (IBA)



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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