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May 2023 Edition

FEBRUARY 23

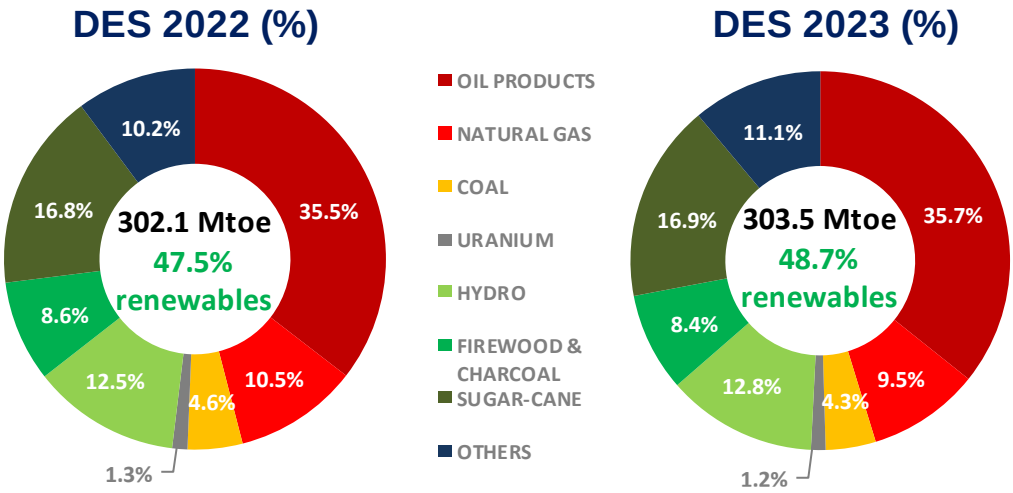
DOMESTIC ENERGY SUPPLY

February data show an increase in the Domestic Energy Supply – DES* estimated for 2023 and in the Final Energy Consumption (CFE), with a reduction in non-renewable energy supply and growth in the renewable energy supply. With the greater use of renewable energy also for electricity generation, losses in accounting for Power Plants, in transformation, are reduced, and so, the tendency is for CFE to grow more than OIE.

Thus, it is estimated that the renewable share in the DES will increase in 2023, reaching about 48.7% of participation (47.5% in 2022 and 44.7% in 2021).

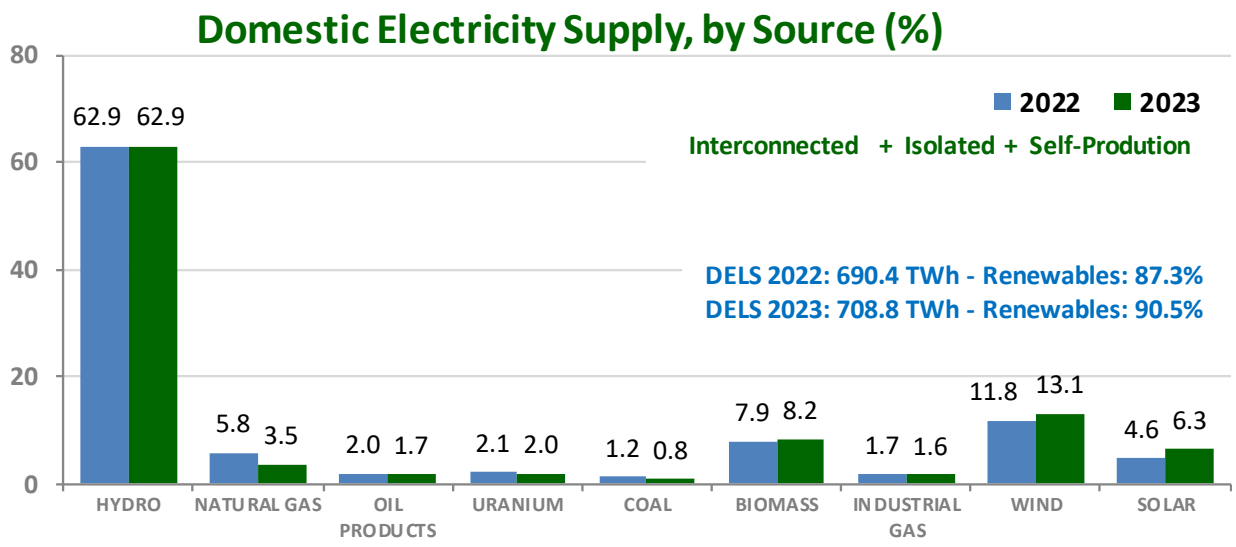
According to the most current survey by the National Supply Company – Conab, sugarcane production has shown a recovery at the end of the last year and it is estimated that there will be a 4.7% increase in its production for the 2022/2023 harvest. For the production of ethanol, by sugar cane and corn,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

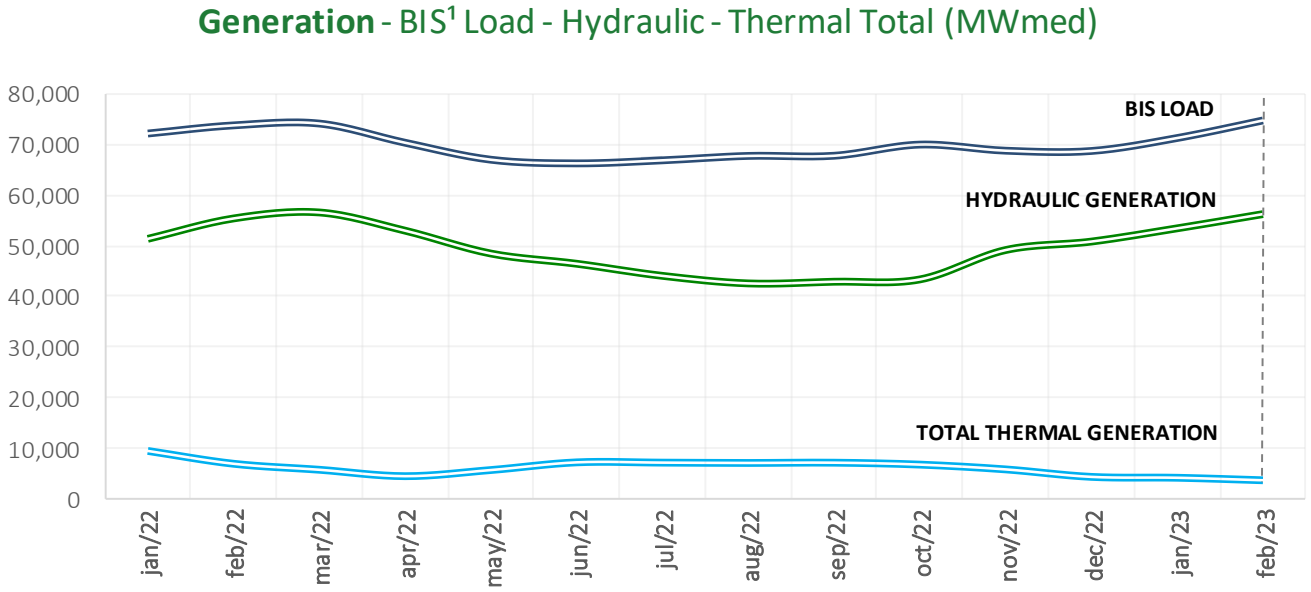
DOMESTIC ENERGY SUPPLY TENDS TO BE MORE RENEWABLE IN 2023



For the Domestic Electricity Supply (DELS)[2] of 2023, an increase of 2.7% over the previous year is expected, reaching 708.8 TWh, with 90.5% obtained through renewable sources. It should be noticed that DELS accounts for Centralized Generation, Distributed Generation (GD), Self-Production of Energy (APE) and Isolated Systems.

Solar and wind generation should continue to grow in the year. For the first two months of 2023, compared to the same period of the previous year (accumulated), there was an increase in generation of 73% for centralized solar and 44% for wind, as a result of both the increase in installed capacity, as well as, according to data from the National Electric System Operator (ONS), by verifying a better average capacity factor of these sources recorded in January and February. Brazilian hydraulic energy also grew by around 3%. The increase in renewable electricity generation in 2022 and early 2023 caused a large reduction in coal and gas thermoelectric plants participation in the DELS.





[1]BIS: Brazilian Interconnected System.

HIGHLIGHTS IN FEBRUARY 2023

Oil and gas growing

Oil and gas production grew this year, showing an increase of 9.0% and 6.9% respectively in the year accumulated.

Regular gasoline and hydrous ethanol prices continue to fall

The prices of regular gasoline and hydrous ethanol fell 22.9% and 23.0% respectively in relation to the same month of the previous year. This is the seventh 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 February 2022, steel production decreased by 6.8%, and iron ore exports increased by 25.8%. Pig iron exports dropped by 11.2% in the year accumulated.

Hydraulic supply on the rise

Hydraulic energy supply in 2023 increased by 2.8% in the year. This corresponds to a monthly average of 54,896.8 MWavg. Itaipu's supply for the same period increased by 65.2%.

Wind supply on the rise

Wind energy generation increased by more than 40% in the accumulated result for the year, reflecting both the successive increases in installed capacity and, according to ONS data, a better average capacity factor registered in the months of January and February, that is, there was an improvement in the quality of the winds. In the first two months of 2023, came into operation a power of 1,134.8 MW from wind farms.

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 830 med MWavg from May to December 2022. In January 2023, 1,134 MWavg were exported and in February, 1,087 MWavg were exported, an increase of almost 34%.

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 February this year it exported 353 MWavg.

Natural gas availability in fall

The availability of natural gas for consumption fell by 21.6% in the year, mainly due to a reduction in imports.

Coal for electricity generation in decline

There was a decrease of 38.8% for public electricity generation in the year accumulated.

Apparent consumption of petroleum products on the rise

The apparent consumption of petroleum derivatives increased by 5.0% in the year, with diesel decreasing by 5.5% while consumption of regular gasoline increased by 14.7%. Automotive ethanol consumption increased by 6.2%.

The energy consumption of light Otto-cycle vehicles (gasoline, ethanol, and natural gas) has shown an increase of 8.3% year-to-date.

Electricity consumption rising

Residential sector electricity consumption grew by 4.4% compared to February 2022. Industrial consumption increased by 1.7% while commercial consumption grew by 2.4%.

Biodiesel production in fall

Biodiesel production reduced 3.7% in the year accumulated.

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 seventh consecutive month. The declines were 16.9% for the residential sector, 16.9% for the commercial sector and 17.3% 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

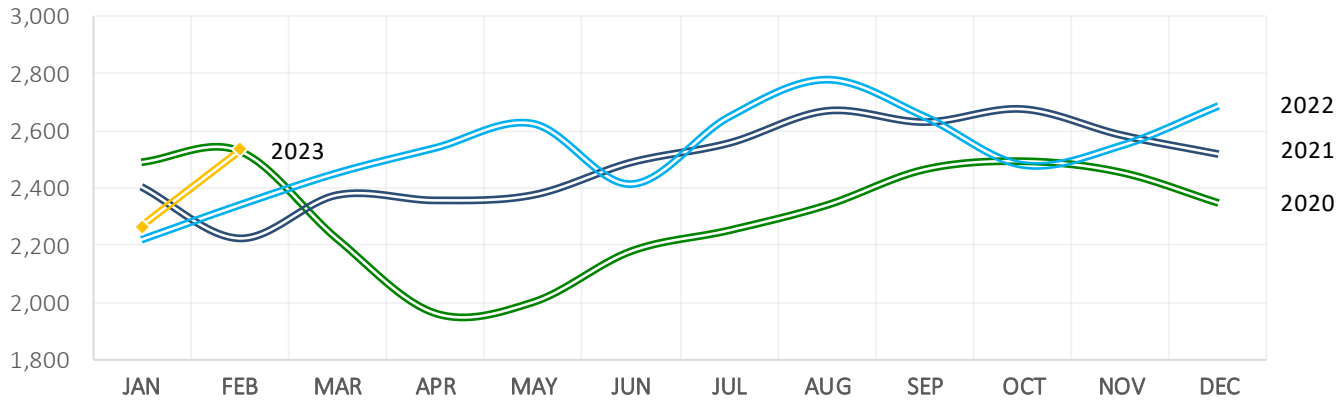
The growth of solar DG installed capacity in Brazil is still a highlight, increasing by 93.7% compared to February 2022. The centralized solar installed capacity (non-GD) also increases, with a 67.8% growth compared to February 2022.

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.

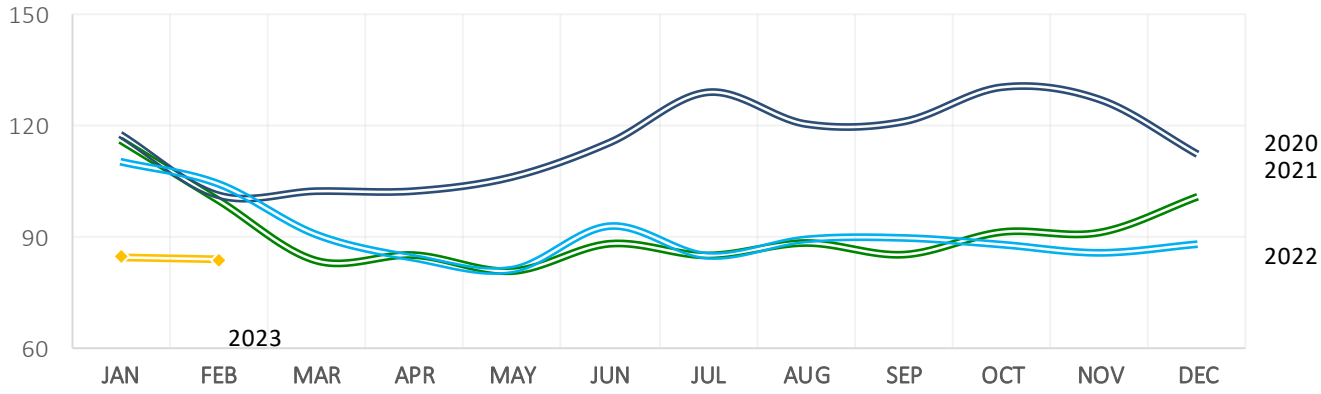
SPECIFICATION	FEBRUARY					
	IN THE MONTH			ACCUMULATED IN THE YEAR		
	2023	2022	Δ% 23/22	2023	2022	Δ% 23/22
OIL						
PRODUCTION - with Shale Oil and NGL(10^3 b/d)	3,341	*3,006*	11.1	3,348	*3,071*	9.02
IMPORTS AVERAGE PRICE (US$/bbl FOB)	83.57	*83.31*	0.3	86.96	*83.02*	4.75
OIL PRODUCTS						
TOTAL CONSUMPTION (10^3 b/day)	2,533	*2,342*	8.2	2,391	*2,278*	4.96
DIESEL with biodiesel - (10^3 b/day)	1,114	*1,139*	-2.3	992	*1,050*	-5.46
GASOLINE C (10^3 b/day)	851	*743.8*	14.4	804	*701*	14.74
CONSUMER PRICE - DIESEL (R$/l)	6.06	*5.59*	8.4	6.20	*5.54*	11.78
CONSUMER PRICE - GASOLINE C (R$/l)	5.09	*6.60*	-22.9	5.07	*6.62*	-23.38
CONSUMER PRICE - LPG (R$/13 kg)	107.89	*102.52*	5.2	108.08	*102.48*	5.46
NATURAL GAS (d)						
PRODUCTION (10^6 m^3/day)	147	*133*	10.0	145	*135*	6.92
IMPORTS (10^6 m^3/day)	18.2	*40.0*	-54.5	18.2	*42.3*	-57.00
NON-UTILIZED AND REINJECTION (10^6 m^3/day)	81.0	*69.0*	17.5	78.8	*70.4*	11.95
AVAILABILITY FOR CONSUMPTION (10^6 m^3/day)	83.7	*104.2*	-19.7	84.2	*107.3*	-21.57
INDUSTRIAL CONSUMPTION (10^6 m^3/day) **(c)**	39.4	*39.1*	0.8	41.4	*40.2*	3.03
POWER GENERATION CONS. (10^6 m^3/day) **(c)**	13.9	*41.7*	-66.7	15.3	*42.9*	-64.34
INDUSTRIAL PRICE SE (US$/MMBtu) **(a) (c)**	18.38	*15.66*	17.4	20.73	*13.97*	48.37
MOTOR PRICE SE (US$/MMBtu) **(c)**	19.41	*17.04*	13.9	20.59	*15.25*	35.03
RESIDENTIAL PRICE SE (US$/MMBtu) **(c)**	49.09	*28.35*	73.2	48.73	*33.38*	46.00
ELECTRICITY						
NATIONAL INTERCONNECTED SYSTEM LOAD (MWavg)	74,713	*73,771*	1.3	72,938	*72,943*	-0.01
SOUTHEAST/MIDWEST POWER LOAD (MWavg)	43,040	*42,541*	1.2	41,682	*41,969*	-0.68
SOUTH POWER LOAD (MWavg)	*13,276*	*13,660*	-2.8	13,129	*13,722*	-4.32
NORTHEAST POWER LOAD (MWavg)	*11,931*	*11,806*	1.1	11,711	*11,513*	1.72
NORTH POWER LOAD (MWavg)	*6,466*	*5,764*	12.2	6,393	*5,740*	11.38
TOTAL CONSUMPTION (TWh) **(b)**	42.9	*41.8*	2.6	42.6	*42.1*	1.18
RESIDENTIAL (TWh)	13.6	*13.0*	4.4	13.5	*13.0*	3.45
INDUSTRIAL (TWh)	14.6	*14.4*	1.7	14.5	*14.5*	0.01
COMMERCIAL (TWh)	8.2	*8.0*	2.4	8.1	*8.0*	1.54
OTHER SECTORS (TWh)	6.4	*6.4*	0.2	6.5	*6.6*	-1.16
PLANTS ENTRY INTO OPERATING (MW)	748	*516*	44.9	2,022	*999*	102.50
RESIDENTIAL PRICE (R$/MWh)	799	*962*	-16.9	793	*969*	-18.16
COMMERCIAL PRICE (R$/MWh)	766	*921*	-16.9	761	*926*	-17.81
INDUSTRIAL PRICE (R$/MWh)	736	*890*	-17.3	736	*892*	-17.55
ETHANOL AND BIODIESEL						
BIODIESEL PRODUCTION (10^3 b/d)	100	*106*	-6.1	95	*99*	-3.66
MOTOR ETHANOL CONSUMPTION (10^3 b/d)	477	*463*	3.0	447	*421*	6.16
ETHANOL EXPORTS (10^3 b/d)	28	*16*	73.4	41	*19*	118.61
HYDRATED ETHANOL PRICE (R$/l)	3.88	*5.04*	-23.0	3.88	*5.04*	-23.05
COAL						
ELECTRICITY GENERATION (MWavg)	528	*783*	-32.6	529	*865*	-38.84
IMPORT PRICE (US$ FOB/t)	236.73	*234.67*	0.9	241.91	*233.94*	3.41
NUCLEAR ENERGY						
ELECTRICITY GENERATION - (MWavg)	1732	*1887*	-8.2	1,876	*1,945*	-3.51
INDUSTRIAL SECTORS						
STEEL PRODUCTION (10^3 t/day)	90	*97*	-6.8	90	*96*	-5.83
ALUMINIUM PRODUCTION (10^3 t/day) **(d)**	2.7	*2.1*	26.5	2.7	*2.1*	26.48
IRON ORE EXPORTS (10^3 t/day)	765	*608*	25.8	752	*693*	8.59
PELLETS EXPORTS (10^3 t/day)	69	*58*	18.6	62	*48*	27.45
BIG IRON EXPORTS (10^3 t/day)	7.4	9.0	-17.2	7.5	8.5	-11.16
PAPER PRODUCTION (10^3 t/day)	30.4	*30.5*	-0.5	29.9	*29.9*	-0.17
PULP PRODUCTION (10^3 t/day) **(c)**	64.7	*60.3*	7.3	68.1	*61.6*	10.53
SUGAR PRODUCTION (10^3 t/day)	13.5	*11.3*	19.4	14.9	*12.1*	23.55
SUGAR EXPORTS (10^3 t/day)	41	*61*	-33.5	54	*52*	3.29

(a) Consumption range = 20,000 m^3/day
(b) Not included traditional self-producer (who not use public grid)
(c) December data
(d) January data

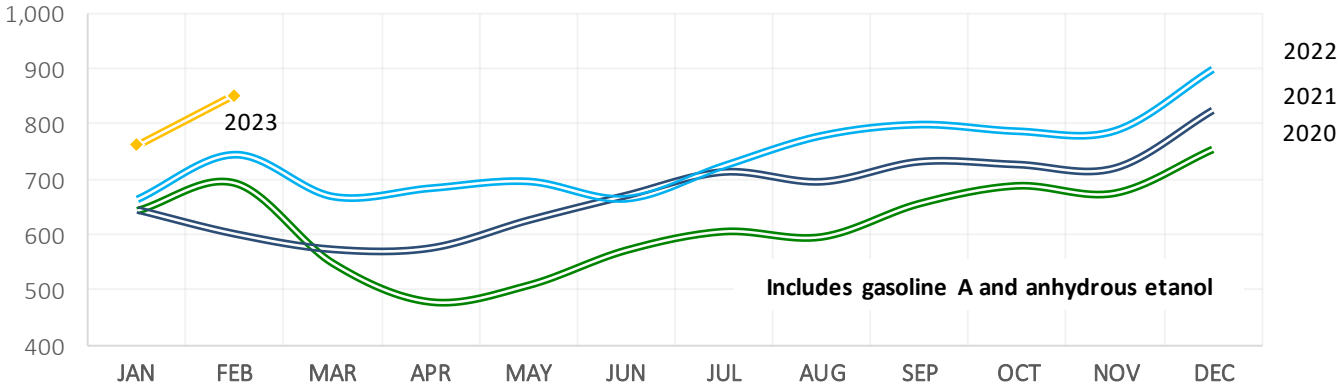
Oil Products Total Consumption (10^3 bbl/d)



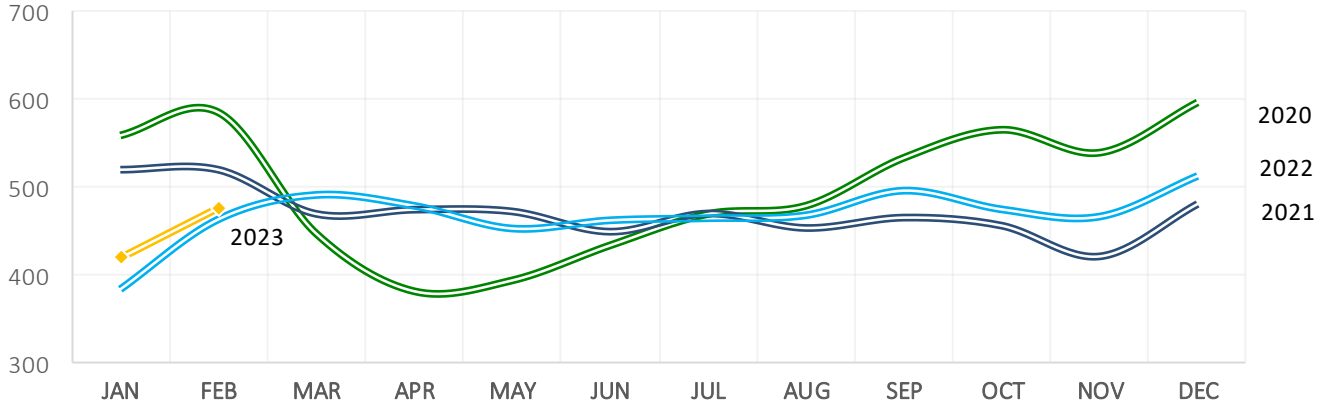
Natural Gas Total Demand (million m^3/d)



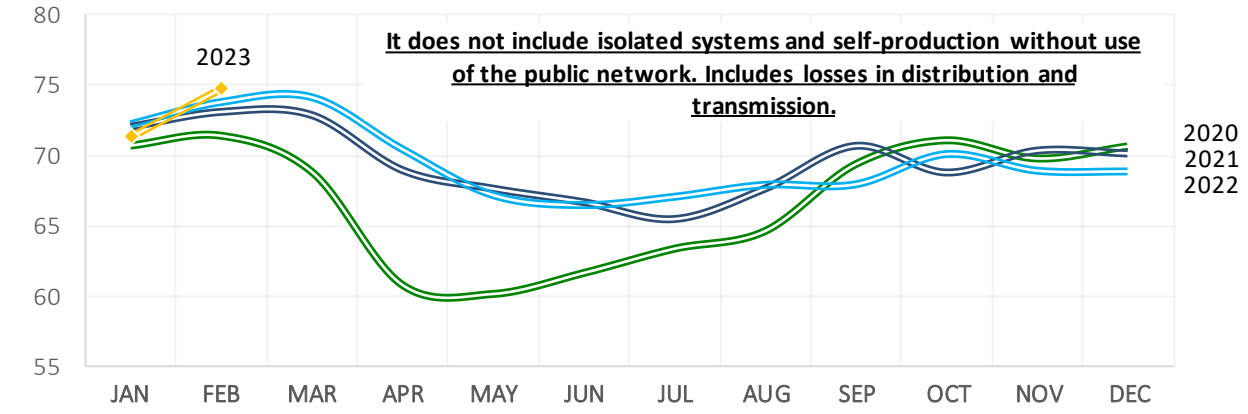
C Gasoline Consumption (10^3 bbl/d)



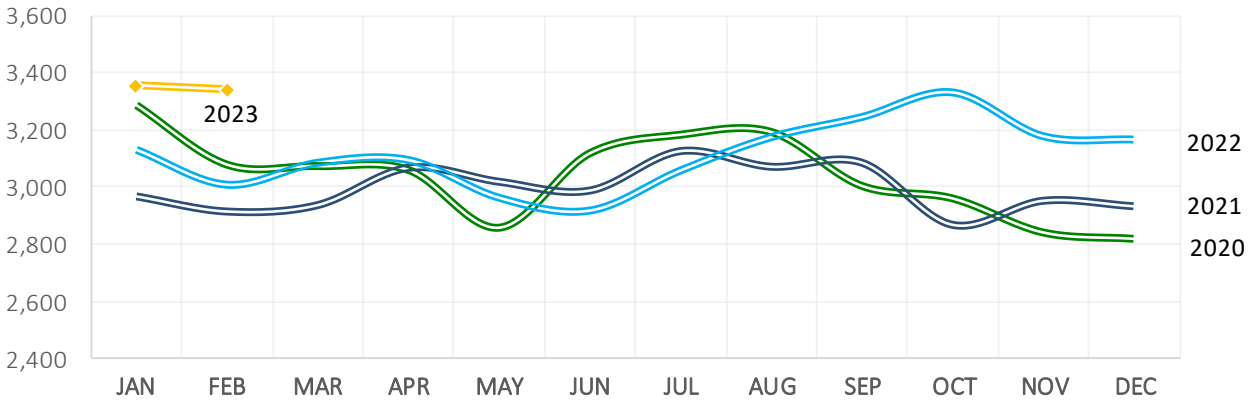
Motor Ethanol Total Consumption (10^3 bbl/d)



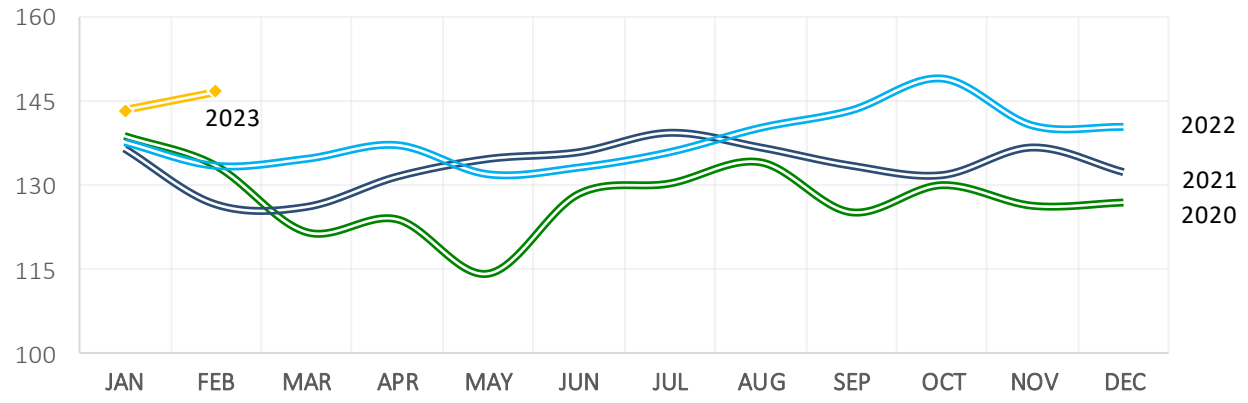
National Interconnected System Power Load (GWavg)



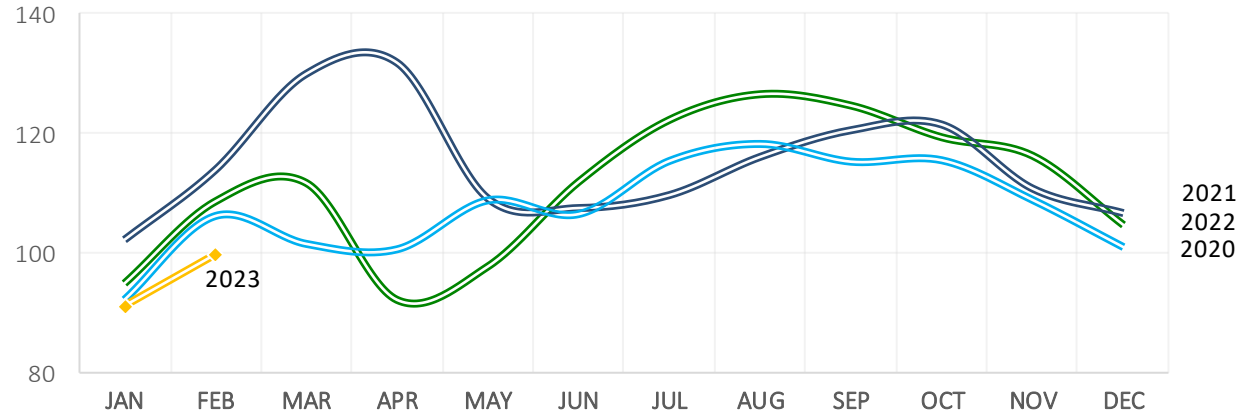
Oil Production (10^3 bbl/d)



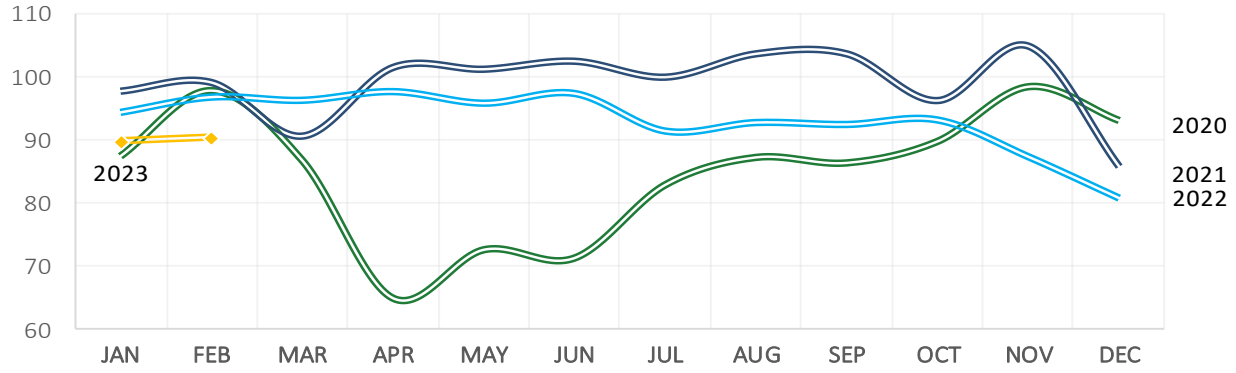
Natural Gas Production (million m^3/d)



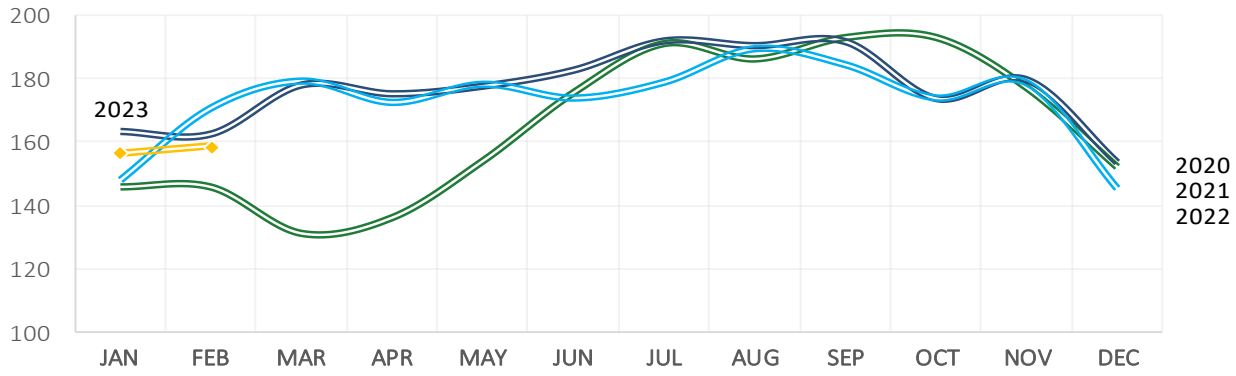
Biodiesel Production (10^3 bbl/d)



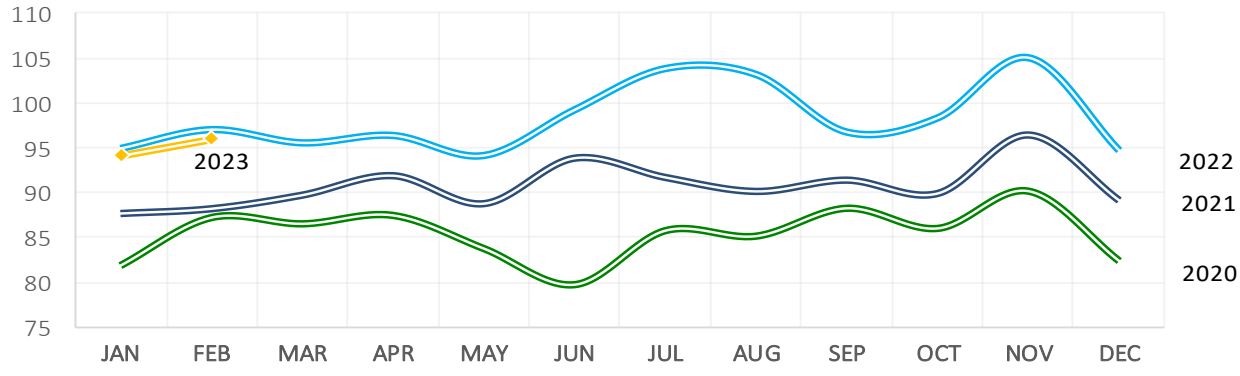
Steel Production (10^3 t/d)



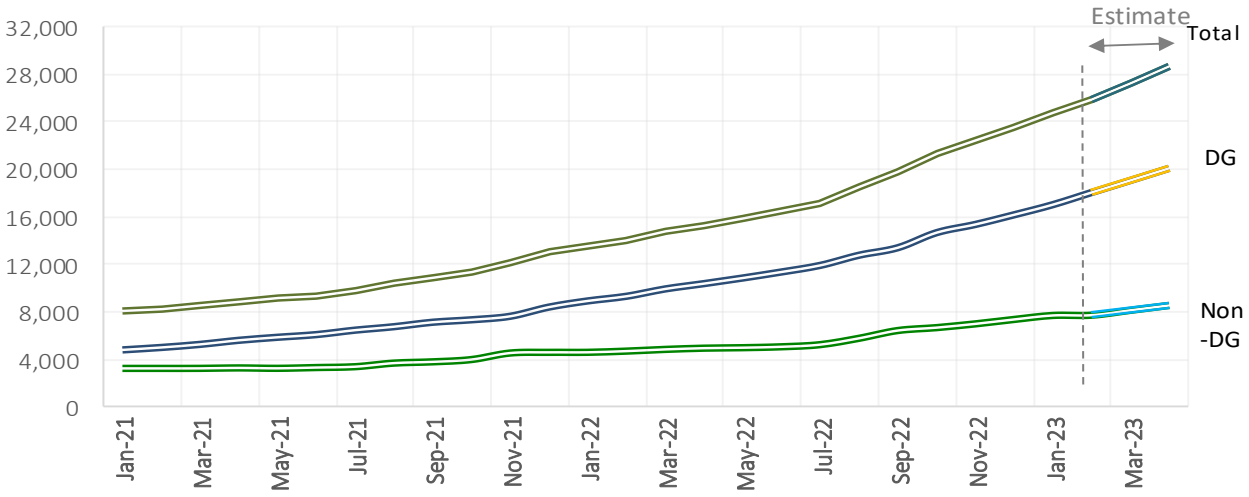
Cement Sales (10^3 t/d)



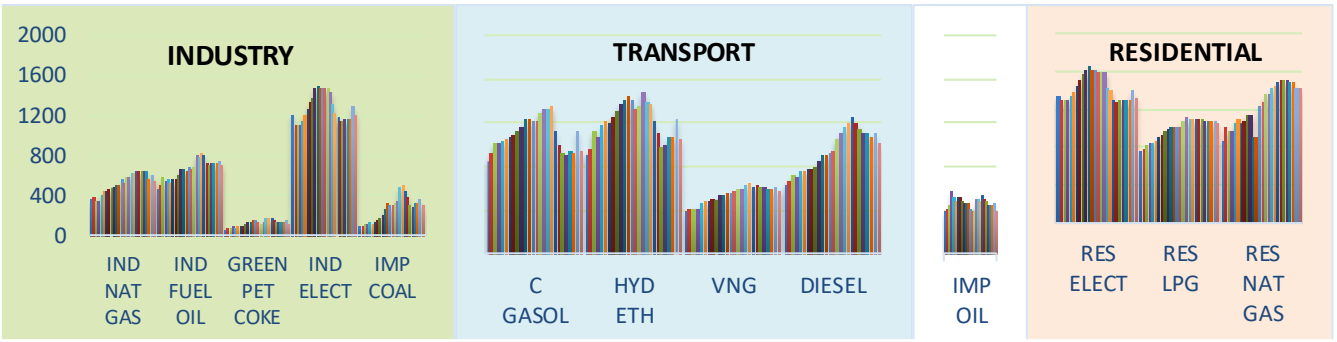
Paper and Pulp Production (10^3 t/d)



Photovoltaic Solar Installed Capacity (MW)



Consumer Prices - Jan 2021 to Feb 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] OIE and OIEE 2022 data are still preliminary. In June, the National Energy Balance (BEN) data should be finalized, being updated by the Energy Research Company (EPE) with a partnership with DIEE/SNTPE/MME, companies and agencies of the Brazilian energy sector.

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

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