

MINISTRY OF  
MINES AND ENERGY



# MONTHLY ENERGY BULLETIN BRAZIL

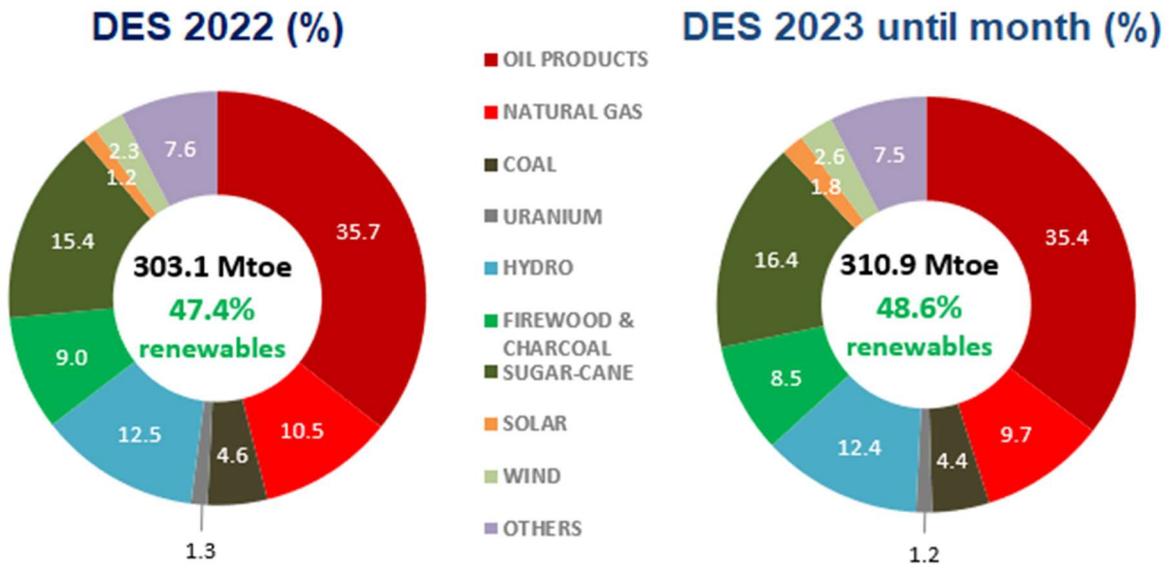
April 2024 Edition  
December 23

# DOMESTIC ENERGY SUPPLY

Regarding the data up to December 2023, renewables share in the Domestic Energy Supply (DES)<sup>1</sup> is expected to increase to 48.6%, higher than last year (47.4%), mainly due to the greater generation of renewable power energy and the greater demand for sugarcane products and biodiesel.

For sugarcane production, according to the most current survey by the Brazilian Supply Company (Conab), it is estimated that there will be an increase of 27.4% in relation to the 2022/2023 harvest. For ethanol produced from sugar cane and corn, is expected an increase of 9.9% in production.

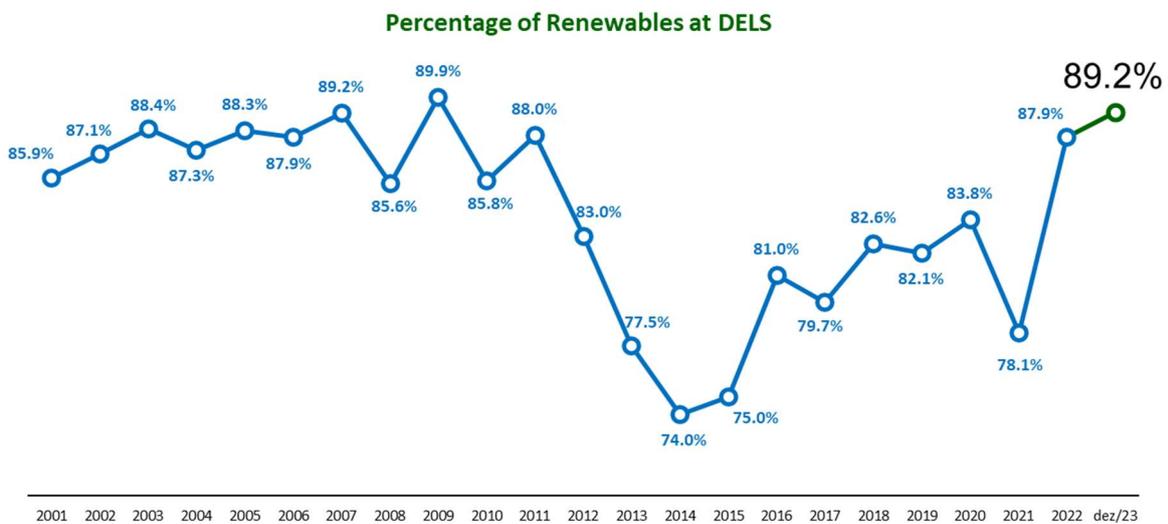
## MORE RENEWABLE DOMESTIC ENERGY SUPPLY IN 2023



\*OTHER: includes other renewable and non-renewable

Until December of this year, it was observed that the renewable share is 89.2% of the Brazilian Electricity Matrix, or Domestic Electricity Supply (DELS)<sup>2</sup>, reaching an accumulated value of 725.1 TWh.

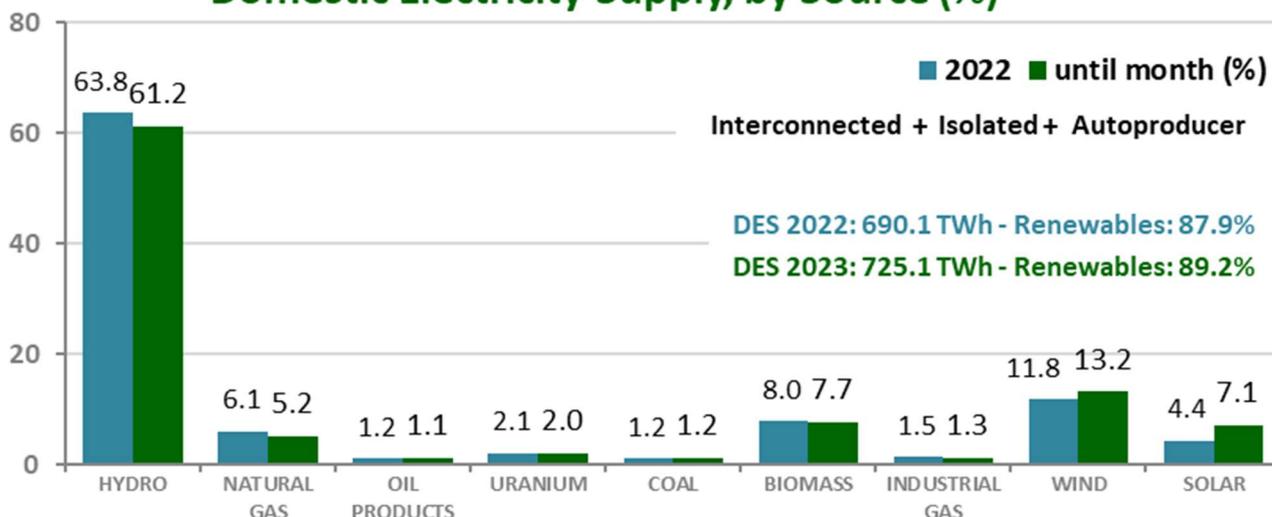
The figure below highlights the significant proportion of renewables in our DELS, contributing to a cleaner energy generation. This is a result of both favorable hydrological conditions and investments in solar and wind energy.



For the twelve months of the year, YTD, there was a power generation increase of 61% in centralized solar photovoltaic, 17% in wind energy and 1% in hydropower energy. The increase in renewable

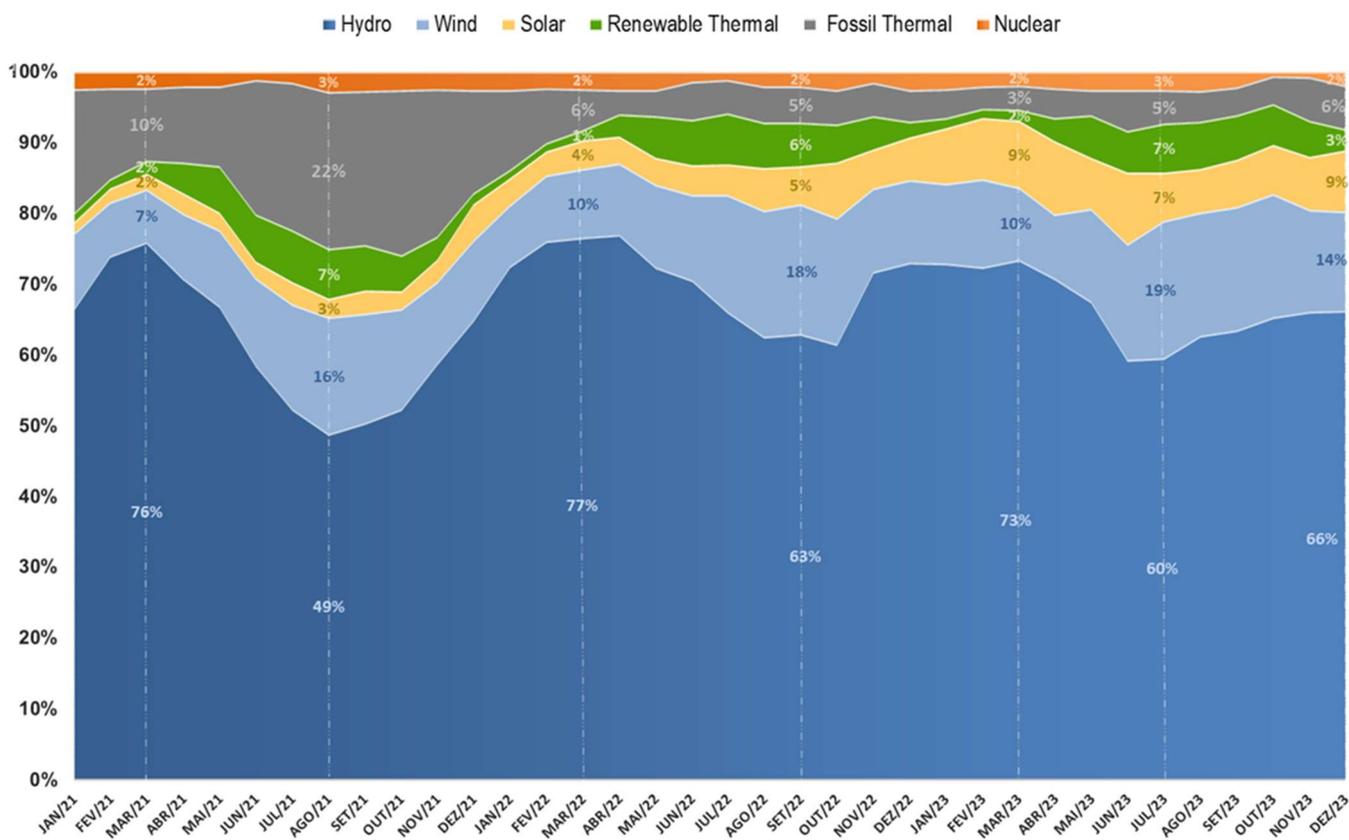
electricity generation in 2022 and 2023 led to a significant reduction in the share of natural gas-fired power plants in the DELS.

### Domestic Electricity Supply, by Source (%)



The last two years were more favorable for hydropower generation, compared to 2021, when there was a scenario of water scarcity. The following figure shows how each source participated in monthly power generation. When there was a reduction in hydropower share, biomass and wind sources, mostly, increased their share, in order to meet the Brazilian electricity demand. Wind and solar shares has increased over the years, due to an increase in installed capacity, mainly due to in solar distributed generation.

### Energy Sources in Electric Generation in Brazil - 2020 to 2023



## HIGHLIGHTS IN DECEMBER 2023

### The Procel seal has completed 30 years

In December we celebrated the 30th anniversary of the Brazilian Energy Conservation Program (Procel) seal, which for three decades has been present in the lives of Brazilians, in refrigerators, microwaves, fans, air conditioners etc. As previously reported, the Procel's bulb-shaped sticker produced savings of 215 billion KWh in power energy.

### Oil and gas growing

In 2023 will be seen a record in oil and gas productions. Oil reached a total volume of around 197 million cubic meters, and natural gas was around 54.7 billion cubic meters.

Compared to the previous record, achieved in 2022, oil production increased by 11.8% and natural gas production increased by 8.6%.

Given the exports amount, oil has contributed positively to the Brazilian trade balance.

### Regular gasoline and hydrated ethanol prices continue to fall

Regular gasoline and hydrated ethanol prices decreased by 9.9% and 14.8% respectively, YTD.

### Steel and Mining

Steel production fell by 6.2%, however aluminum production grew by 26.7%, iron ore exports increased by 8.8% and pellet exports increased by 33.8%, YTD.

### Hydro energy supply growing

Hydro energy supply increased by 0.9% YTD. The monthly average was 50,803.5 MWavg. Itaipu's supply, for the same period, increased 33.8%.

### Wind Supply in high

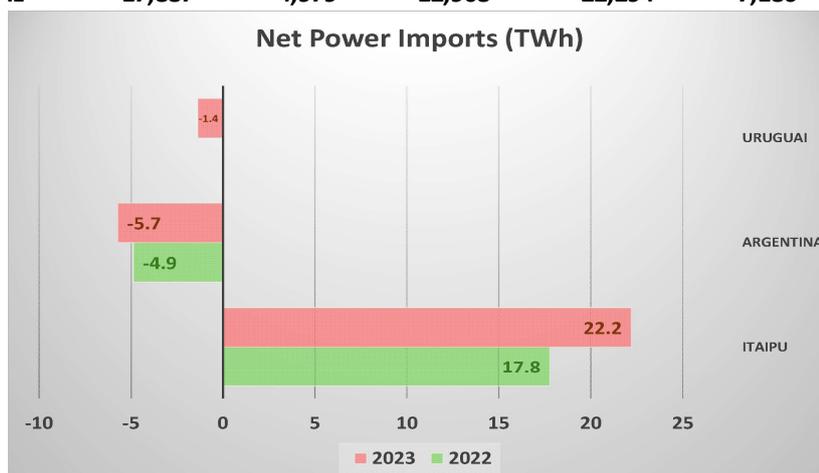
Wind energy supply, up to December 2023, increased by 17% YTD, as a reflection of the successive increases in installed capacity, which can be observed month by month.

For the twelve months of 2023 5,022.7 MW of wind power plants came into operation. Itaipu's supply rose 21.7% in the same period.

### International power energy exchange

In December 2023, Brazil exported 3 MWavg to Argentina and 11 MWavg to Uruguay. As we can see in the graph below, in 2023 there was an increase in net energy exports to Uruguay and Argentina.

	2022			2023		
	Imports	Exports	Net Imports	Imports	Exports	Net Imports
<i>Itaipu</i>	17,781	-	17,781	22,203	-	22,203
<i>Argentina</i>	28	4,896	-4,868	76	5,802	-5,726
<i>Uruguai</i>	77	83	-5	15	1,384	-1,369
<b>TOTAL</b>	<b>17,887</b>	<b>4,979</b>	<b>12,908</b>	<b>22,294</b>	<b>7,186</b>	<b>15,108</b>



### **Biomass production rising**

Biomass power production in 2023 increased by around 9.5% compared to the previous year, going from around 22 thousand GWh in 2022 to near 24 thousand GWh in 2023, according to the Brazilian Operator System (ONS) data.

### **Natural gas availability falling**

Gas consumption availability fell by 5.1% YTD.

### **Power generation Coal**

There was an increase of 10.1% for coal public power generation YTD.

### **Oil derivatives apparent consumption on the rise**

Apparent consumption of oil derivatives increased by 1.8% YTD. Diesel consumption increased by 3.1% and regular gasoline consumption increased by 6.9%. Automotive ethanol consumption increased by 4.9%.

The energy consumption of light Otto-cycle vehicles (gasoline, ethanol, and natural gas) has shown an increase of 5.3%.

### **Biodiesel Production Rising**

Biodiesel production increased by 19.7% YTD.

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 resolution of the Brazilian Council for Energy Policy (CNPE) published in March 2023 that established new guidelines for the evolution of the mandatory biodiesel addition to diesel oil sold to the end consumer.

In December CNPE approved a mandate anticipation of 14% in biodiesel blend with diesel to March 2024 and 15% to March 2025. Biodiesel replacing fossil diesel contributes to the reduction of greenhouse gas emissions, in addition to reducing the need to import fossil fuel.

### **Electricity consumption in high**

Electricity consumption in the residential sector grew 11.7% compared to December 2022. Industrial consumption increased by 4.9% while commercial consumption grew 11.1%.

### **Power tariffs continue to fall**

All three tariffs (residential, commercial, and industrial) continue to show a decline compared to the previous YTD. Residential tariff dropped by 1.8%, while there was a decrease of 0.7% for the commercial sector and a 0.2% decrease 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 58.2% compared to December 2022. The centralized solar installed capacity (non-GD) also increases, with a 55.3% growth compared to December 2022.

For the first twelve months of the year, 3,940 MW of installed centralized solar capacity came into operation.

The DG's growth is a result 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	December					
	IN THE MONTH			YTD / YTD Previous Year		
	2023	2022	Δ% 23/22	2023	2022	Δ% 23/22
<b>OIL</b>						
PRODUCTION - with Shale Oil and NGL(10 <sup>3</sup> b/d)	3,667	3,166	15.8	3,481	3,113	11.8
IMPORTS AVERAGE PRICE (US\$/bbl FOB)	87.71	92.46	-5.1	83.71	99.86	-16.2
<b>OIL PRODUCTS</b>						
TOTAL CONSUMPTION (10 <sup>3</sup> b/day)	2,567	2,687	-4.5	2,580	2,534	1.8
hereof: DIESEL with biodiesel - (10 <sup>3</sup> b/day)	1,115	1,049	6.4	1,154	1,119	3.1
hereof: GASOLINE C (10 <sup>3</sup> b/day)	836	899.8	-7.1	792	741	6.9
CONSUMER PRICE - DIESEL (R\$/l)	5.92	6.36	-6.9	5.75	6.58	-12.6
CONSUMER PRICE - GASOLINE C (R\$/l)	5.60	4.97	12.7	5.50	6.11	-9.9
CONSUMER PRICE - LPG (R\$/13 lg)	100.93	109.18	-7.6	104.21	109.84	-5.1
<b>NATURAL GAS (d)</b>						
PRODUCTION (10 <sup>6</sup> m <sup>3</sup> /day)	157	140	11.8	150	138	8.6
IMPORTS (10 <sup>6</sup> m <sup>3</sup> /day)	19.2	21.0	-8.6	17.7	24.6	-28.0
NON-UTILIZED AND REINJECTION (106 m <sup>3</sup> /day)	89.0	73.2	21.6	81.5	71.9	13.4
AVAILABILITY FOR CONSUMPTION (10 <sup>6</sup> m <sup>3</sup> /day)	86.8	88.0	-1.3	86.0	90.6	-5.1
INDUSTRIAL CONSUMPTION (10 <sup>6</sup> m <sup>3</sup> /day) (e)	39.7	41.3	-3.7	39.7	41.5	-4.5
POWER GENERATION CONS. (10 <sup>6</sup> m <sup>3</sup> /day)(d)	19.6	13.9	41.3	12.5	15.3	-18.2
INDUSTRIAL PRICE SE (b) (US\$/MMBtu) - consumption range of 20,000 m <sup>3</sup> /day (e)	19.10	22.00	-13.2	20.82	20.89	-0.3
MOTOR PRICE SE (US\$/MMBtu) (e)	26.61	20.40	30.5	27.48	20.77	32.3
RESIDENTIAL PRICE SE (US\$/MMBtu) (e)	52.36	51.08	2.5	52.93	48.53	9.1
<b>ELECTRICITY</b>						
NATIONAL INTERCONNECTED SYSTEM	79,897	68,836	16.1	74,460	69,540	7.1
SOUTHEAST/MIDWEST POWER LOAD (MWavg)	45,543	38,814	17.3	42,367	40,012	5.9
SOUTH POWER LOAD (MWavg)	13,732	12,536	9.5	12,722	12,093	5.2
NORTHEAST POWER LOAD (MWavg)	13,373	11,232	19.1	12,245	11,236	9.0
NORTH POWER LOAD (MWavg)	7,249	6,254	15.9	7,126	6,199	15.0
TOTAL CONSUMPTION (TWh) (a)	47.2	43.3	8.8	44.2	42.3	4.5
RESIDENTIAL	15.3	13.7	11.7	13.7	12.7	7.5
INDUSTRIAL	15.7	14.9	4.9	15.7	15.2	2.8
COMMERCIAL	9.0	8.1	11.1	8.1	7.7	5.7
OTHER SECTORS	7.2	6.6	8.8	6.7	6.7	1.1
PLANTS ENTRY INTO OPERATING (MW)	1912	1184	61.5	10,464	8,262	26.7
RESIDENTIAL PRICE (R\$/MWh)	881	783	12.6	838	853	-1.8
COMMERCIAL PRICE (R\$/MWh)	843	747	13.0	806	811	-0.7
INDUSTRIAL PRICE (R\$/MWh)	813	712	14.2	773	775	-0.2
<b>ETHANOL AND BIODIESEL</b>						
BIODIESEL PRODUCTION (10 <sup>3</sup> b/d)	136	101	35.2	129	108	19.7
MOTOR ETHANOL CONSUMPTION (10 <sup>3</sup> b/d)	602	512	17.4	491	468	4.9
ETHANOL EXPORTS (10 <sup>3</sup> b/d)	61	67	-8.0	43	42	2.3
HYDRATED ETHANOL PRICE (R\$/l)	3.48	3.84	-9.4	3.75	4.40	-14.8
<b>COAL</b>						
ELECTRICITY GENERATION (MWavg)	874	291	200.3	879	798	10.1
IMPORT PRICE (US\$ FOB/t)	228.23	248.30	-8.1	220.18	290.63	-24.2
<b>NUCLEAR ENERGY</b>						
ELECTRICITY GENERATION - (GWh)	1674	1977	-15.3	1,657	1,662	-0.3
<b>INDUSTRIAL SECTORS</b>						
STEEL PRODUCTION (10 <sup>3</sup> t/day)	81	81	0.7	87	93	-6.2
ALUMINIUM PRODUCTION (10 <sup>3</sup> t/day) (c)	2.8	2.5	14.0	2.7	2.1	30.4
IRON ORE EXPORTS (10 <sup>3</sup> t/day)	1,175	950	23.8	969	891	8.8
PELLETS EXPORTS (10 <sup>3</sup> t/day)	93	60	55.6	69	51	33.8
BIG IRON EXPORTS (10 <sup>3</sup> t/day)	12.0	9.8	22.4	10.6	10.2	3.5
PAPER PRODUCTION (10 <sup>3</sup> t/day)	30.2	30.1	0.2	28.9	30.2	-4.2
PULP PRODUCTION (10 <sup>3</sup> t/day)	58.1	64.7	-10.2	65.3	68.1	-4.1
SUGAR PRODUCTION (10 <sup>3</sup> t/day)	52.0	29.3	77.8	125.3	99.5	25.9
SUGAR EXPORTS (10 <sup>3</sup> t/day)	131	71	84.3	96	75	27.2

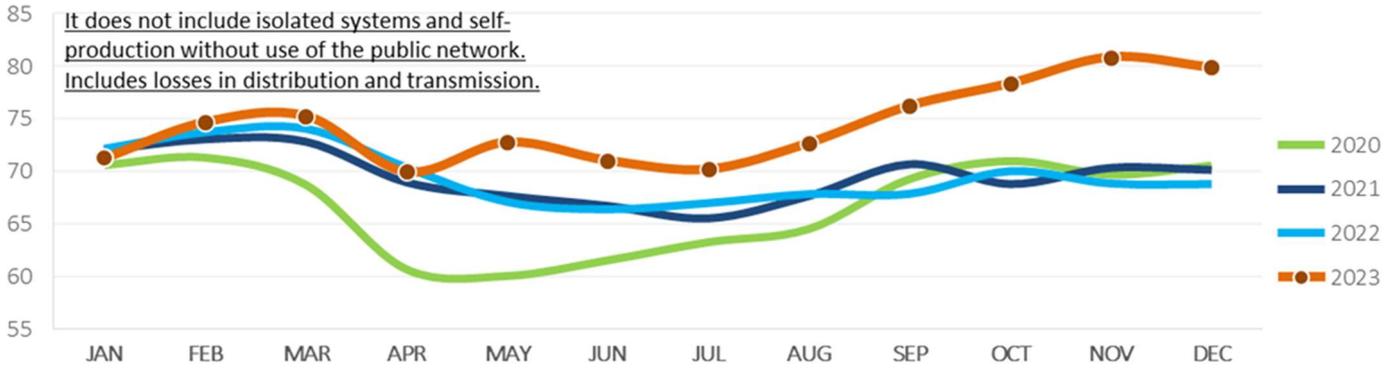
(a) The traditional autoproducers (consumers that do not use public grid) is not included. (b) SE is the acronym of Southeast

(c) September Data

(d) Estimated

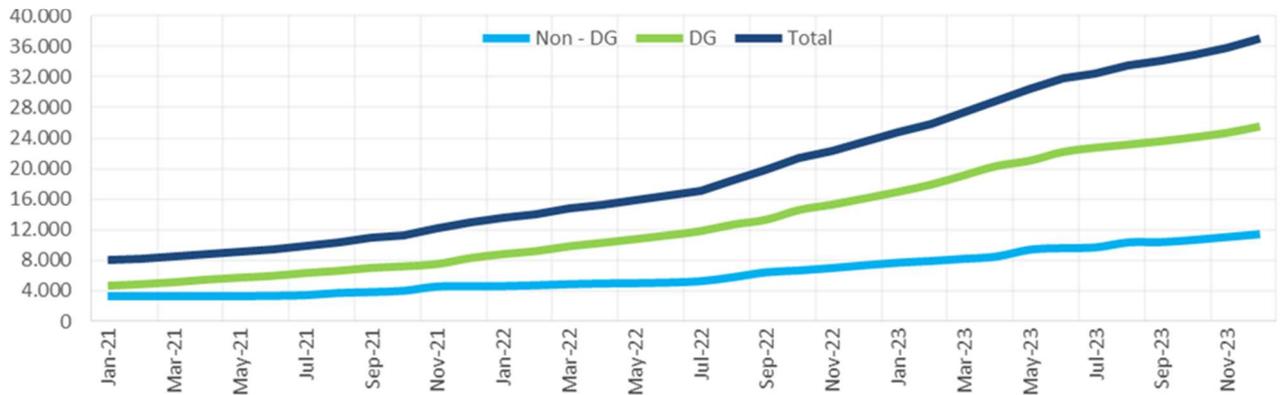
(e) October Data

### NATIONAL INTERCONNECTED SYSTEM POWER LOAD (GWAVG)



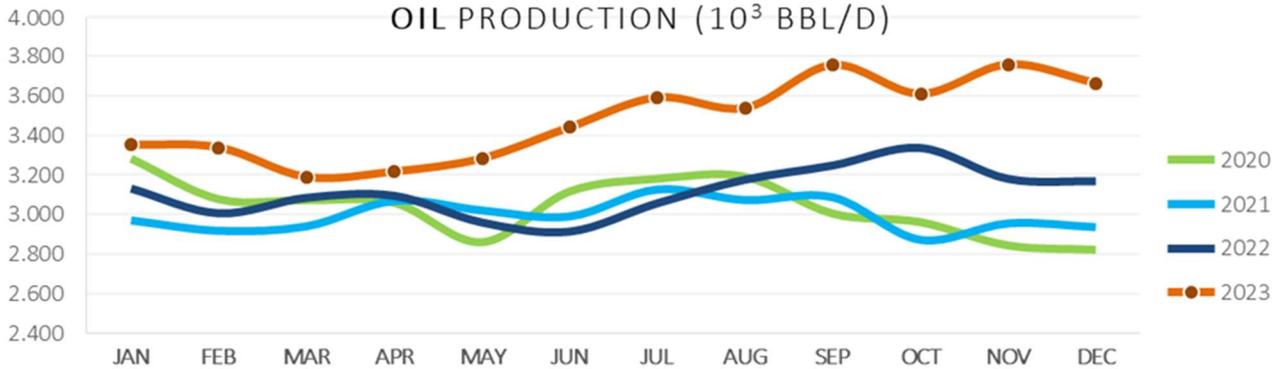
Source: National Electric System Operator (ONS)

### PHOTOVOLTAIC SOLAR INSTALLED CAPACITY (MW)



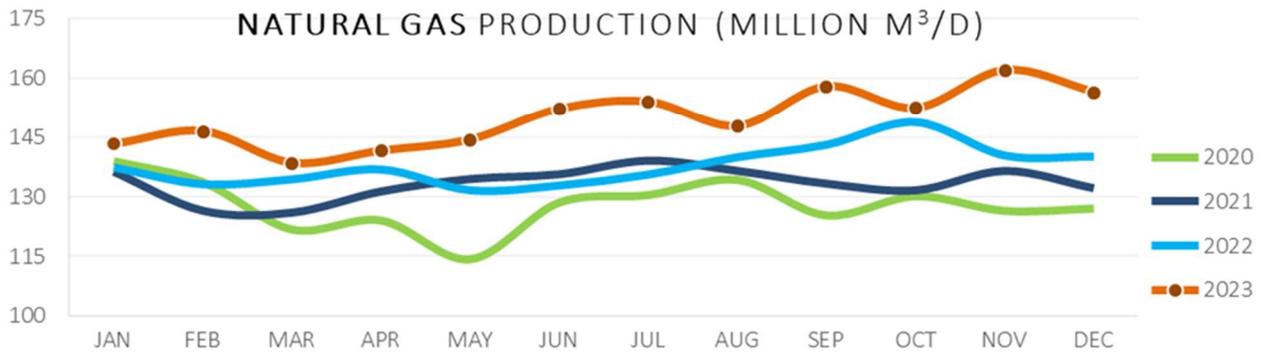
Source: Electric Energy Secretary of Ministry of Mines and Energy

### OIL PRODUCTION (10<sup>3</sup> BBL/D)



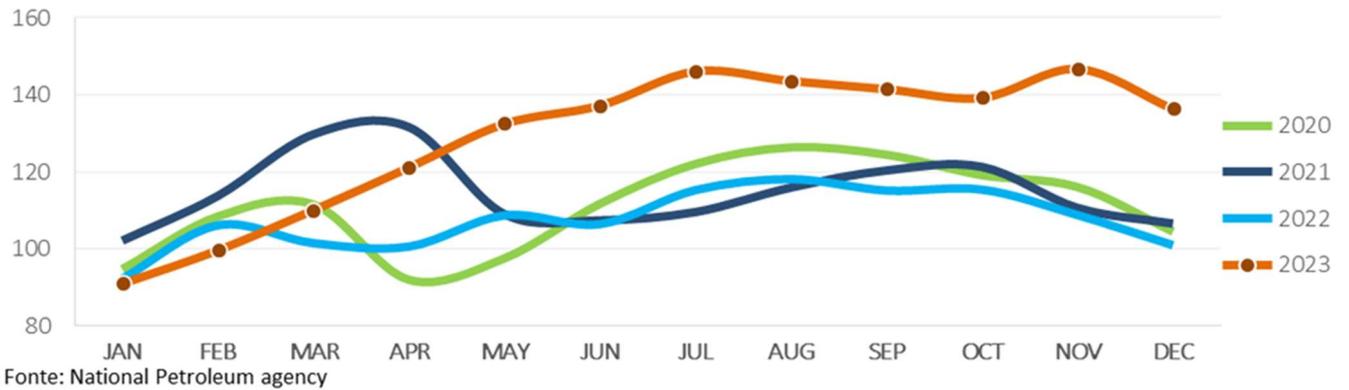
Source: National Petroleum Agency

### NATURAL GAS PRODUCTION (MILLION M<sup>3</sup>/D)

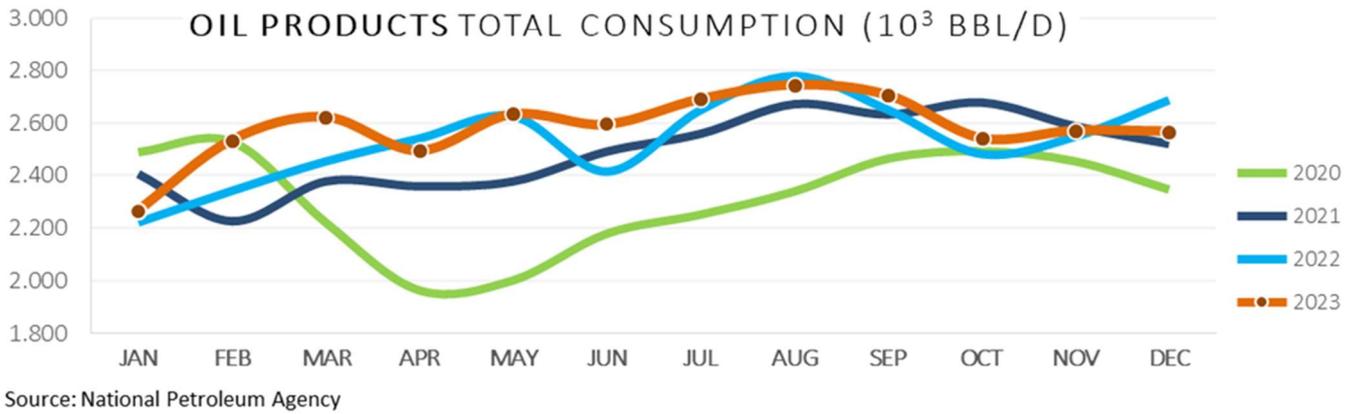


Source: National Petroleum Agency

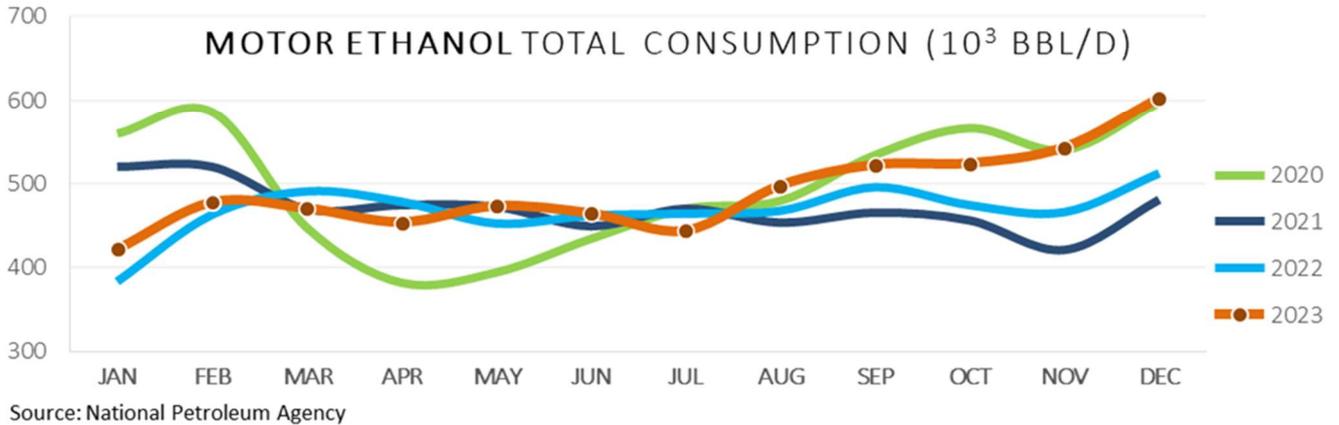
### BIODIESEL PRODUCTION (10<sup>3</sup> BBL/D)



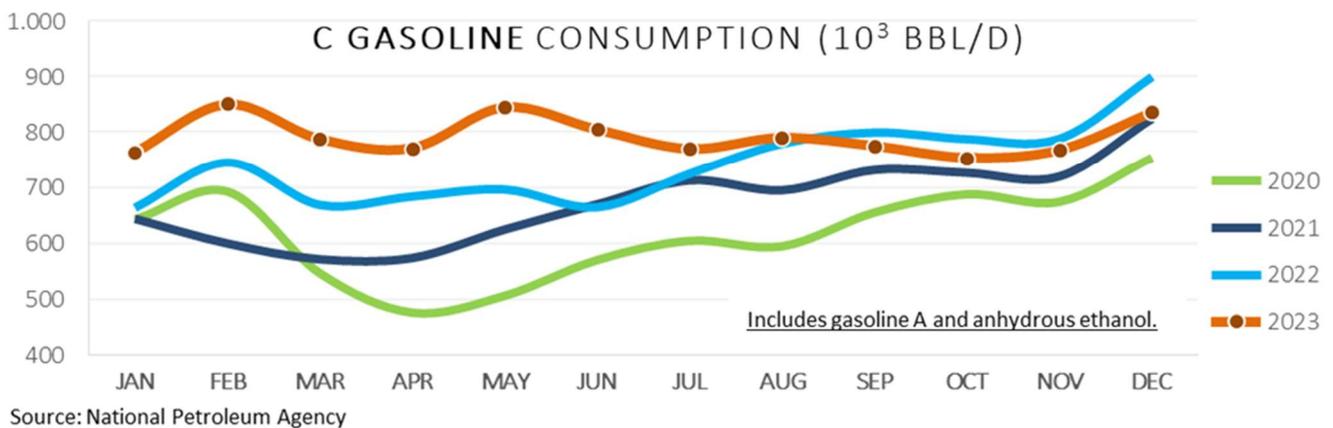
### OIL PRODUCTS TOTAL CONSUMPTION (10<sup>3</sup> BBL/D)

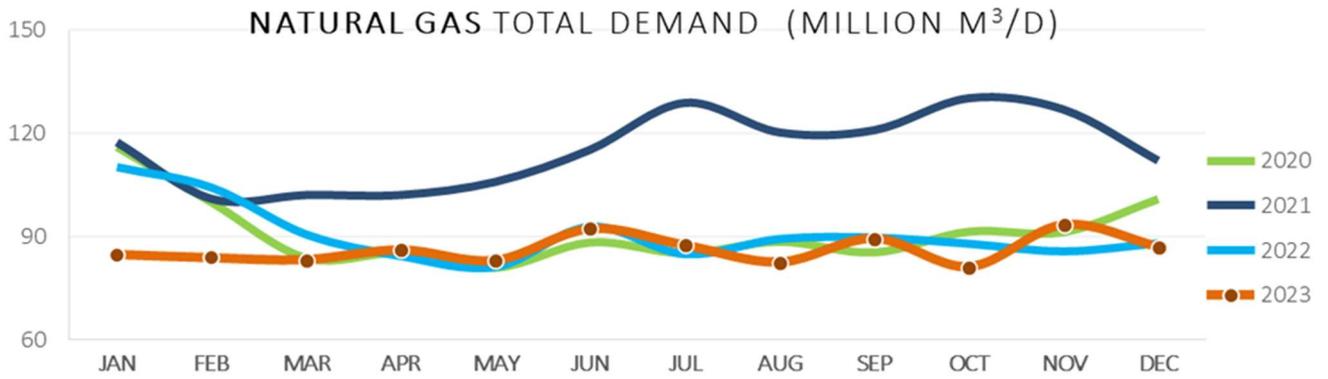


### MOTOR ETHANOL TOTAL CONSUMPTION (10<sup>3</sup> BBL/D)

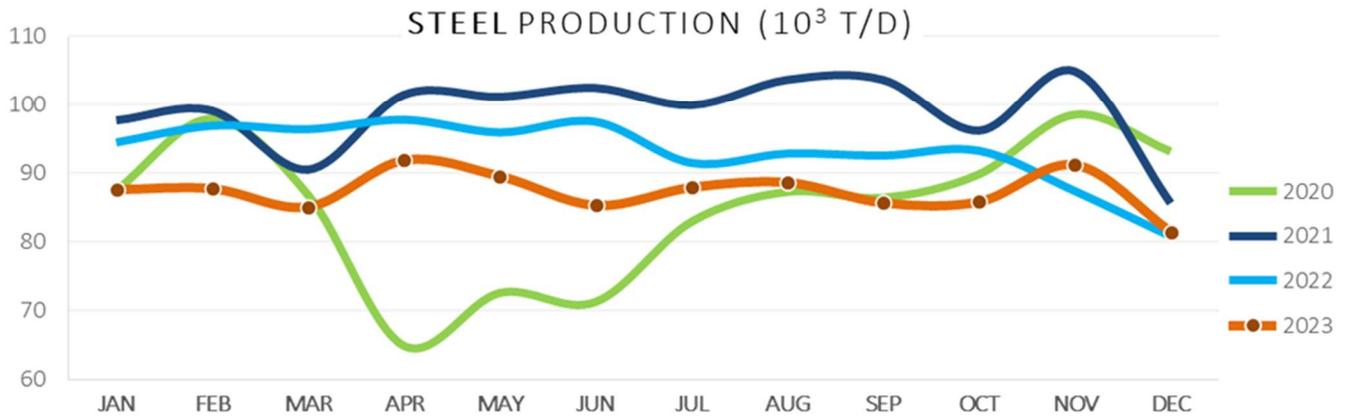


### C GASOLINE CONSUMPTION (10<sup>3</sup> BBL/D)

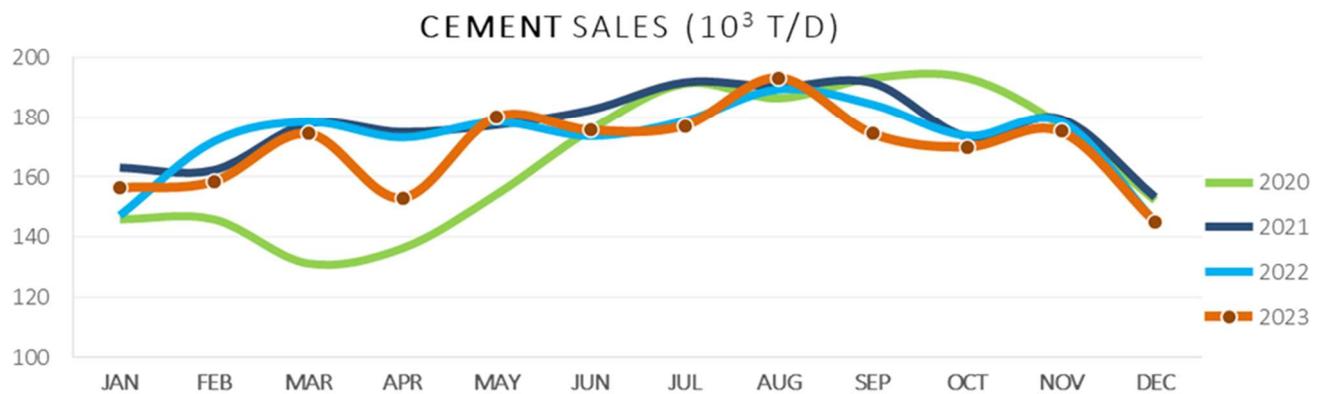




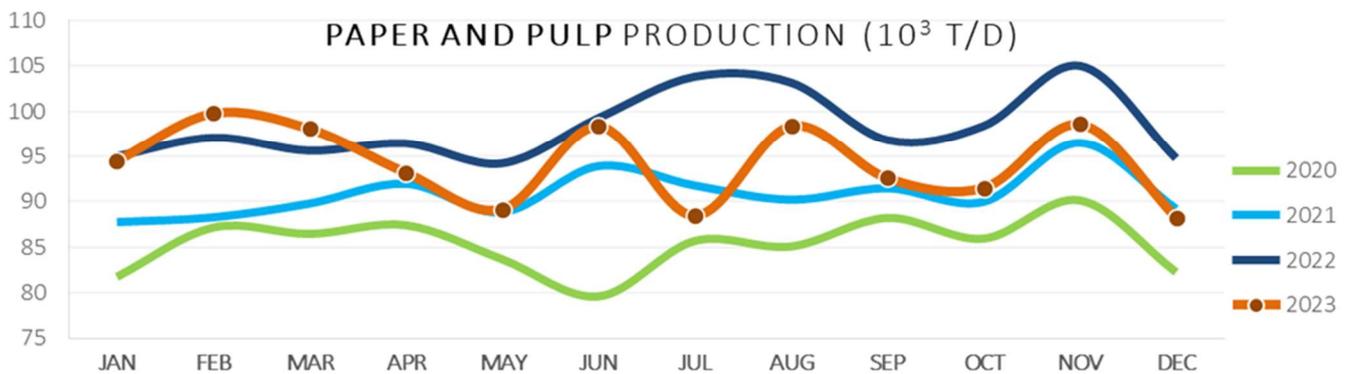
Sources: National Petroleum Agency (ANP) and National Electric System Operator (ONS)



Source: Brazil Steel Institute

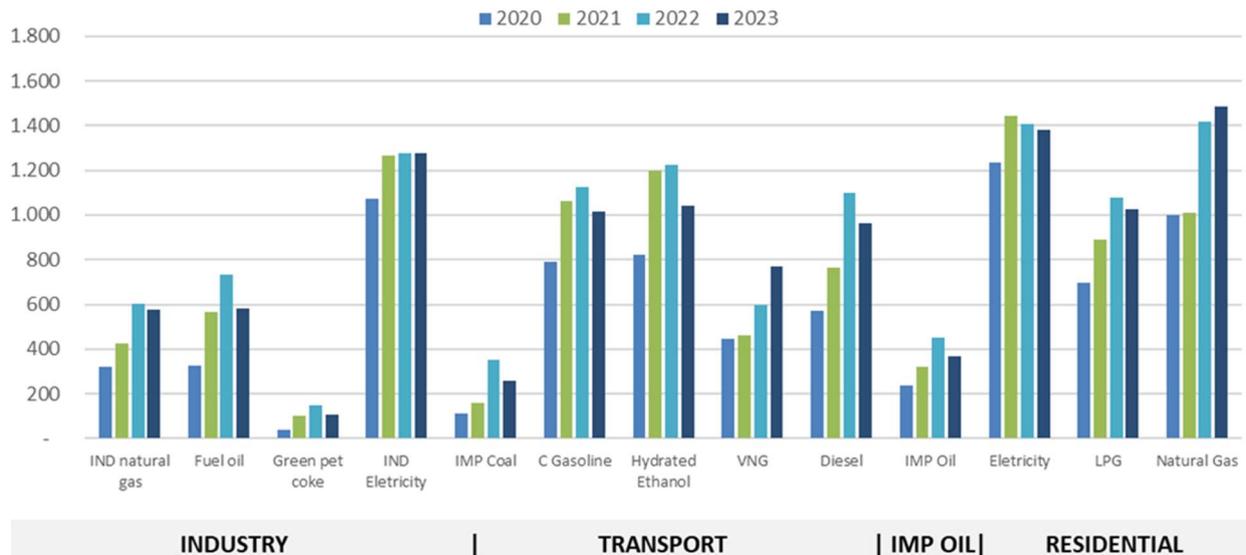


Source: National Cement Industry Union



Source: Brazilian Tree Industry (IBA)

## Consumer Prices - Average from 2020 to December 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.

<sup>1</sup> Domestic Energy Supply (DES), represents all the energy made available to meet the national demand for energy. For the year 2023 the value is an estimate. This value is consolidated with the publication of the National Energy Balance.

<sup>2</sup> The Domestic Electricity Supply (DELS) accounts for the portions of generation from Centralized Generation, Distributed Generation (DG), Autoproduction of Energy (APE), Isolated Systems and Electric Energy Exchange. For the year 2023 the value is an estimate. This value is consolidated with the publication of the National Energy Balance.

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.



[Access the interactive dashboard](#)

[www.gov.br/mme/pt-br/assuntos/secretarias/spe/publicacoes/boletins-mensais-de-energia](http://www.gov.br/mme/pt-br/assuntos/secretarias/spe/publicacoes/boletins-mensais-de-energia)

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