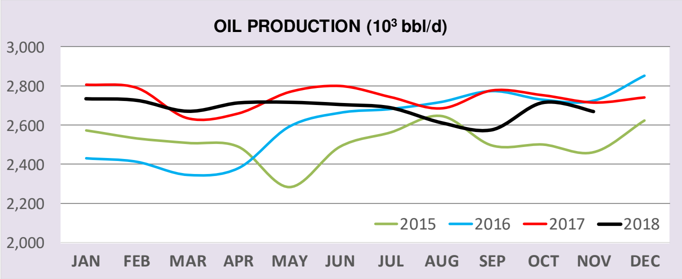

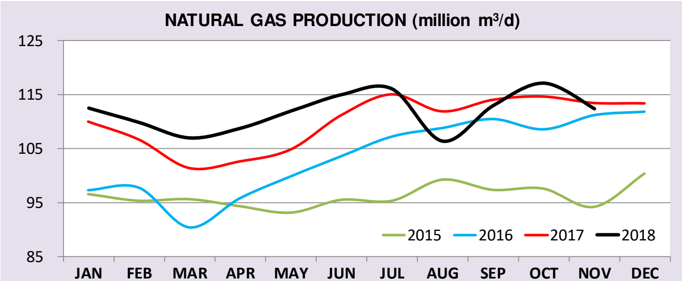

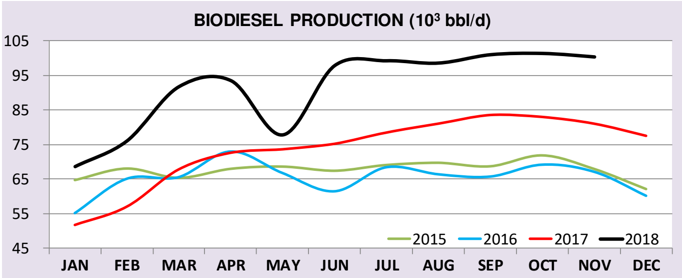

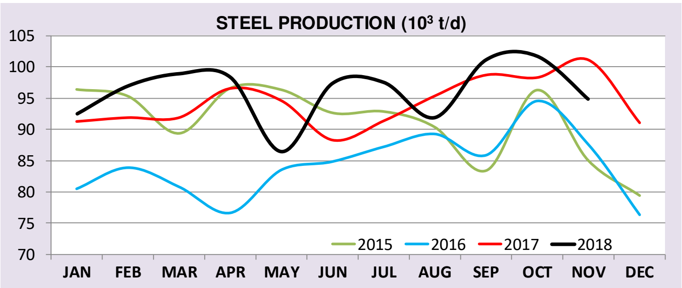

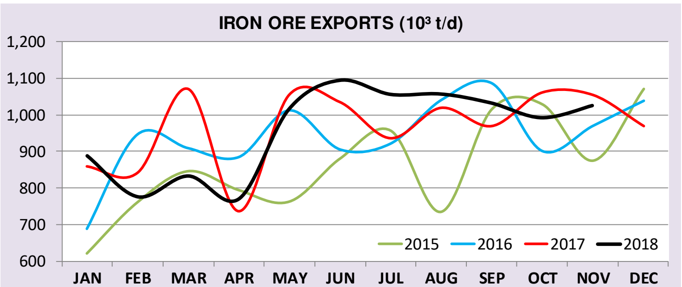

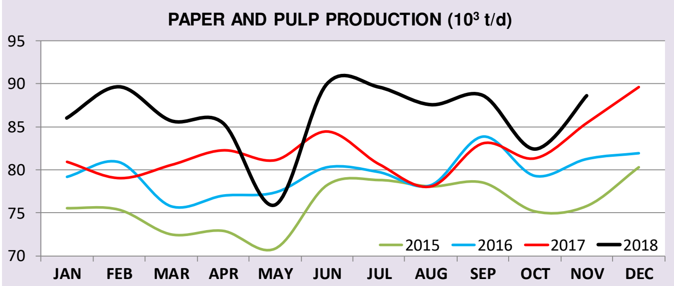

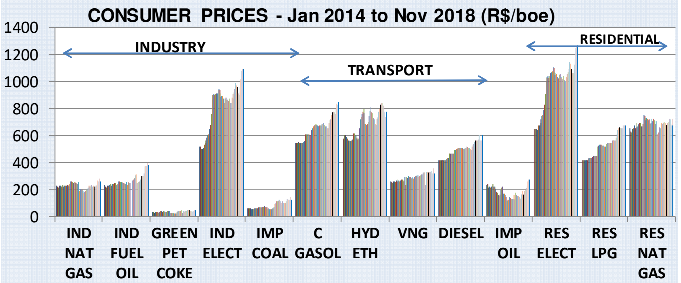

Note: For a better visualization, the minimum scale of the graphs was raised to the level close to the lowest value of the curves.

Methodological Remarks

The **purpose of this bulletin** is to follow up a set of energy and non-energy variables that provide a reasonable estimate of the behavior both monthly as cumulative of the total energy demand in Brazil.

Total demand of natural gas = domestic production (+) import (-) unused (-) reinjection.

Apparent consumption of oil derivatives = distributors' sales (+) Petrobras' own consumption (including refinery gas) (+) Petrobras' direct sales (+) consumer imports. The monthly data published in the press and on the ANP[3] website considers only the sales of distributors (+ or – 80% of total).

[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 of time, includes final energy consumption in the residential sector and in the other economic sectors, includes losses in transmission and distribution, losses on power transformation and the own consumption of the energy sector.

[2] The DES and DELS data from 2017 reflect the final position of the 2018 cycle of the Brazilian Energy Balance (BEN), prepared by Energy Research Office (EPE) in cooperation with MME and entities of the energy sector.

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Monthly Energy Bulletin - Brazil

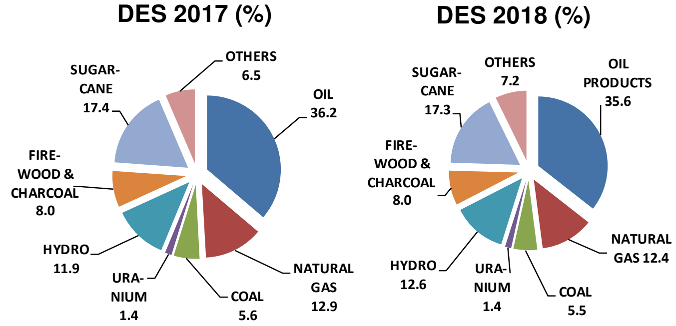
Reference Month: November 2018

Domestic Energy Supply

By 2018, the Internal Domestic Energy Supply (DES)[1] should retreat slightly above 1%. The negative performances of some variables contribute to this rate: a) 3-4% reduction in petroleum products consumption, in natural gas consumption and in grains production; b) 13-25% recoil in coal-fired generation, aluminum production, sugar production and pig iron export.

The positive performance of renewable energy sources (hydropower, wind, solar, ethanol and biodiesel) and some industrial products (steel, pellets and pulp) contribute to attenuate the decline in OIE.

Oil production is down in the year

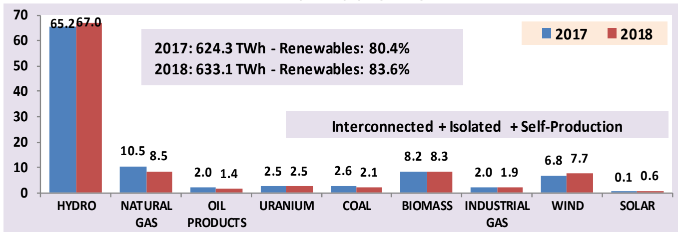


293.5 million toe
43.2% renewables

290.1 million toe
44.5% renewables

The Domestic Electricity Supply (DELS)[2] of 2018 was estimated at 633.1 TWh, showing an increase of 1.4% over 2017 (2.8% up to February and 2% to October). The share of renewables should remain somewhat above 84%. Wind energy continues to increase its share and solar PV energy starts a process of strong increase in the DELS matrix.

Domestic Electricity Supply, by Source (%)



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SECRETARIAT OF ENERGY PLANNING AND DEVELOPMENT
Department of Information and Studies on Energy

Highlights until November 2018

Oil production is down in the year

Oil production fell 1.7% in November, compared to the same month of 2017, accumulating a 2.0% drop in the year. Natural gas production grew by 2.1% in November, and accumulated a rise of 2.0% in the year.

Steel production with a slight rise this year

Steel production declined 6.1% in November, compared to the same month in 2017, and accumulated a rise of 1.7% in the year (4.8% up to March). Exports of iron ore show a drop of 0.8% in 2018 (-9.9% to March), and those of pellets are up 14.8% (0.9% to March).

Hydraulic supply upward

Hydraulic generation grew 20.3% in November, and accumulated a rise of 3.1% in the year. Until December, the rate was 4.1%, according to the ONS data.

Oil derivatives turn to fall

The apparent consumption of petroleum products fell by 3.6% in November, and accumulated a fall of 3.6% in the year (-4.6% until May). The consumption of diesel (biodiesel included) accumulated a high of 3.3% in the year, and that of gasoline, down 13.4%. The decline in gasoline is partially offset by the increase in ethanol consumption of 15.5% in the year. The total demand for natural gas reversed the highs trajectory, with a decline of 3.7% in the accumulated of the year (+ 6.7% until March).

Energy consumption in light vehicles of the Otto cycle (gasoline, ethanol and natural gas) decreased by 1.5% in the year (+ 1.7% in 2017, -1.1% in 2016, +0.8 % in 2015 and + 6.2% in 2014). It is an indicator that directly reflects the effects of the economy on the purchasing power of the population.

Electricity consumption with slow down

Electricity consumption - excluding self-producers that do not use the public grid - accumulates a high of 1.1% in the year (0.9% in all of 2017 and a negative of 0.9% in 2016). In the year, industrial consumption is expanding by 1.5%, residential with a 1.3% increase and commercial consumption by 0.6%.

Biodiesel production in a strong rise

Biodiesel production continued with a 23.8% increase in November, accumulating a rate of 24.8% in the year (12.9% in all 2017, -3.6% in 2016 and 15% in 2015).

Pulp production increased by 8.5% in the year (3.8% in 2017, 7.8% in 2016, 8.5% in 2015 and 9.2% in 2014). Paper production accumulated a high of 0.9% (+ 1.7% throughout 2017). Cement production fell by 0.6% in the year (-7% in 2017).

Electricity rates in high

The average domestic tariff for residential electricity grew by 12.4% in the year over the same period of 2017 (stable in 2017, 5.8% in 2016 and 42.5% in 2015). The commercial tariff increased 12.5% (0.7% in 2017, 5.7% in 2016 and 43.8% in 2015) and the industrial increased 13.7% (1.2% in 2017, 3.6% % in 2016 and 51.7% in 2015).

Basic Data

SPECIFICATION	NOVEMBER						
	IN THE MONTH			ACCUMULATED IN THE YEAR			
	2018	2017	%18/17	2018	2017	%18/17	%2018
OIL							
PRODUCTION - with Shale Oil and NGL(10^3 b/d)	2,671	2,716	-1.7	2,686	2,739	-2.0	-
IMPORTS AVERAGE PRICE (US$/bbl FOB)	88	58	51.7	74	54	37.6	-
OIL PRODUCTS							
TOTAL CONSUMPTION (10^3 b/day)	2,372	2,461	-3.6	2,432	2,524	-3.6	**100.0**
hereof: DIESEL with biodiesel - (10^3 b/day)	1,043	1,021	2.2	1,014	982	3.3	0.0
hereof: GASOLINE C (10^3 b/day)	647	720	-10.2	658	759	-13.4	0.0
CONSUMER PRICE - DIESEL (R$/l)	3.66	3.29	11.2	3.47	3.09	12.3	-
CONSUMER PRICE - GASOLINE C (R$/l)	4.59	4.00	14.6	4.37	3.73	17.1	-
CONSUMER PRICE - LPG (R$/13 kg)	69.0	65.2	5.8	67.9	58.2	16.7	-
NATURAL GAS							
PRODUCTION (10^6 m^3/day)	112.4	113.4	-0.9	111.8	109.6	2.0	-
IMPORTS (10^6 m^3/day)	18.1	35.2	-48.5	31.0	29.6	4.8	-
NON-UTILIZED AND REINJECTION (10^6 m^3/day)	39.4	27.3	44.3	38.2	30.6	24.9	-
AVAILABILITY FOR CONSUMPTION (10^6 m^3/day)	91.1	121.3	-24.9	104.6	108.6	-3.7	**100.0**
INDUSTRIAL CONSUMPTION (10^6 m^3/day)	39.2	40.8	-3.8	39.5	41.0	-3.7	37.8
POWER GENERATION CONS. (10^6 m^3/day)	16.5	42.5	-61.3	29.0	33.9	-14.4	27.8
INDUSTRIAL PRICE SP(*) (US$/MMBtu)(a)	12.6	12.3	2.3	12.2	11.9	2.5	-
MOTOR PRICE SP (US$/MMBtu)	16.6	18.0	-8.1	16.4	17.8	-7.9	-
RESIDENTIAL PRICE SP (US$/MMBtu)	32.5	37.7	-13.9	34.1	37.4	-8.7	-
ELECTRICITY							
NATIONAL INTERCONNECTED SYSTEM	66,850	64,786	3.2	65,566	64,677	1.4	**100.0**
SOUTHEAST/MIDWEST POWER LOAD (MWavg)	38,526	38,249	0.7	38,145	37,425	1.9	58.2
SOUTH POWER LOAD (MWavg)	11,613	11,681	-0.6	11,324	11,361	-0.3	17.3
NORTHEAST POWER LOAD (MWavg)	11,316	9,695	16.7	10,696	10,432	2.5	16.3
NORTH POWER LOAD (MWavg)	5,395	5,440	-0.8	5,400	5,534	-2.4	8.2
TOTAL CONSUMPTION (TWh) (b)	40.3	39.8	1.3	432.5	427.6	1.1	**100.0**
RESIDENTIAL	11.6	11.5	1.5	124.5	122.9	1.3	28.8
INDUSTRIAL	14.5	14.3	1.1	155.5	153.3	1.5	36.0
COMMERCIAL	7.6	7.5	1.5	81.1	80.7	0.6	18.8
OTHER SECTORS	6.6	6.5	1.1	71.3	70.7	0.8	16.5
PLANTS ENTRY INTO OPERATING (MW)	1,262	295	328.4	5,457	6,182	-11.7	-
RESIDENTIAL PRICE (R$/MWh)	770	694	11.0	713	635	12.4	-
COMMERCIAL PRICE (R$/MWh)	687	625	9.9	641	570	12.5	-
INDUSTRIAL PRICE (R$/MWh)	661	599	10.3	614	540	13.7	-
ETHANOL AND BIODIESEL							
BIODIESEL PRODUCTION (10^3 b/d)	100	81	23.8	92	73	24.8	-
MOTOR ETHANOL CONSUMPTION (10^3 b/d)	579	499	16.2	520	450	15.5	-
ETHANOL EXPORTS (10^3 b/d)	52	28	85.4	32	26	24.7	-
HYDRATED ETHANOL PRICE (R$/l)	2.92	2.79	4.7	2.89	2.66	8.7	-
COAL							
ELECTRICITY GENERATION (MWavg)	579	2,145	-73.0	1,461	1,683	-13.2	-
IMPORT PRICE (US$ FOB/t)	143.3	134.2	6.8	141.9	145.8	-2.7	-
NUCLEAR ENERGY							
ELECTRICITY GENERATION - (GWh)	984	1,443	-31.8	14,282	14,391	-0.8	-
INDUSTRIAL SECTORS							
STEEL PRODUCTION (10^3 t/day)	95	101	-6.1	96	94	1.7	-
ALUMINIUM PRODUCTION (10^3 t/day)	1.6	2.2	-26.8	1.8	2.2	-17.2	-
IRON ORE EXPORTS (10^3 t/day)	1,026	1,054	-2.7	960	968	-0.8	-
PELLETS EXPORTS (10^3 t/day)	107	85	25.9	95	82	14.8	-
PAPER PRODUCTION (10^3 t/day)	29.6	29.2	1.4	28.9	28.6	0.9	-
PULP PRODUCTION (10^3 t/day)	59.0	56.2	5.0	57.4	52.9	8.5	-
SUGAR PRODUCTION (10^3 t/daY)	62	83	-24.7	82	114	-27.4	-
SUGAR EXPORTS (10^3 t/day)	62	73	-15.7	61	80	-23.7	-

(*) SP is the acronym of the state of São Paulo.

(a) INDUSTRIAL PRICE SP(*) (US$/MMBtu) - consumption range of 20,000 m^3/day;

(b) Self-producers, do not use public grid, is not included.