

THIRTEENTH EDITION OF ANALYSIS OF BIOFUELS' CURRENT OUTLOOK

The Analysis of Biofuels' Current Outlook, one of the main publications of the Energy Research Office (EPE), presents the relevant facts that occurred in the year prior to its publication. Its thirteenth edition presents the impacts generated in sugarcane production, due to water deficit and frost, which resulted in the lowest indicators of the last ten years, in contrast with ethanol from corn, which maintained its growth. There was a recovery in Otto cycle fuel consumption, with market share loss of hydrous ethanol. In biodiesel sector, the mandatory addition on diesel ranged from 10% by volume (B10) to 13% (B13) throughout the year, due to several factors. The National Biofuels Policy (RenovaBio) concluded the first complete cycle of CBIO traded in stock exchange market.

The main topics covered annually in this document are ethanol supply and demand and its production and transport infrastructure, biomass in electricity generation, biodiesel market, international market for renewable fuels, new biofuels and the RenovaBio monitoring. This year, the final article has as its central theme an analysis of the fertilizer market, focused on biofuels sector.

In 2021, as countries recover from the pandemic crisis, fuel consumption has grown again. Ethanol production decreased by 8.4% compared to 2020, reaching 29.9 billion liters. There was an increase of 2.8% in the mix allocation towards ethanol, with a gain in anhydrous share. Sugar production was 35.1 million tons (15.4% lower than 2020 historic record) and its export was 27.7 million tons. The ethanol production from corn reached 3.3 billion liters, 35% higher than the previous year. The country maintained a positive balance in international ethanol trade (net exports of 1.5 billion liters), although both export and import levels were lower than last year.

The hydrous ethanol average price increased 28.6% compared to the previous year, while C type gasoline increased 24.6%, resulting in a relative price (EP/GP) of 70.5%, practically indifferent to consumers' preference for biofuel.

In 2021, 2 million new light vehicles were licensed in Brazil, 1.1% more than 2020. The hydrous ethanol demand dropped 11.5%, recording 17.6 billion liters, while gasoline type C consumption increased 10.6%, reaching 39.7 billion liters, resulting in an Otto cycle demand of 52 billion liters of gasoline equivalent, an increase of 4.4% over the previous year.

In 2021, Brazilian fleet of Otto cycle light vehicles remained at the same level, totaling 37.5 million units, with flex fuel technology representing 81.5% of the total.

Sugar-energy plants injected Bioelectricity into National Interconnected System in an amount of 2.3 GWm, 12% lower than 2020.

Regarding biodiesel, the percentage in diesel mixture, which was 12% in January 2021, increased to 13% in March, as provided for in CNPE Resolution No. 16/2018. It remained that way until the end of April, since from May to August its value was fixed at 10%. In the months of September and October, the percentage returned to 12%, when it was then fixed at 10% until December, a value established to also apply in 2022. Its production was 6.8 billion liters, an increase of 5.1% in relation to 2020. In 2021, the last biodiesel auctions took place, since CNPE Resolution no.14/2020 determined the change

in biodiesel commercialization system from January 2022, when producers and distributors will negotiate directly. In 2021, ANP Resolution nº 842/2021 established the green diesel specification, as well as the obligations regarding quality control, opening the possibility of new biofuels composing the mixture with diesel A.

The emissions avoided by ethanol, biodiesel and sugarcane bioelectricity in 2021 were 47.9 MtCO₂eq, 19.0 MtCO₂eq and 4.3 MtCO₂eq, respectively, totaling 71.2 MtCO₂eq.

As for biogas, its installed capacity in distributed generation reached 43 MW, using agro-industrial, animal and urban waste as its input. In addition, its share in the domestic energy supply (0.12%) grew by 22% p.y. in the last five years.

Among new biofuels, HVO (Hydrotreated Vegetable Oil) and biojet fuel (BioQAV) are worth mentioning. In the case of HVO, the characteristics that can influence penetration in Brazilian fuel market are presented. As for BioQAV, the industrial and economic challenges are pointed out so that it can be competitive against fossil-based jet fuel, in Brazil and in the world. Hydrogen is a future bet, with several projects being launched around the world, in a consortium of energy companies.

In 2021, RenovaBio concluded its first full cycle of operation in stock exchange market, still with some adjustments and internalization of continuous learning. By December 2021, 272 production units had been certified, most of which were ethanol. Through CNPE Resolution No. 17, the mandatory annual targets for GHG emissions reduction for fuel commercialization were defined, adjusting the year 2021 and including the year 2031. 30.9 million CBIO were emitted in 2021, which added to the remaining stock in 2020 totaled 34.8 million credits available for sale, 40% higher than the target (24.9 million CBIO). Fuel distributors retired 24.4 million CBIO, 98.2% of global target. The CBIO market went through different phases, with the weighted average price being R\$ 39.3/CBIO.

The Analysis of Biofuels' Current Outlook also provides an analysis of fertilizer market and the development of initiatives for this sector, showing the strategic importance of this feedstock, considering the agribusiness relevance in national economy, 27.4% of GDP in 2021, and the relationship of this sector as basis of biofuel production.

The thirteenth edition of the Energy Research Company's (EPE) Analysis of Biofuels' Current Outlook is available on the EPE website at www.epe.gov.br.