



# The potential of syngas in Brazilian Industries

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MINISTÉRIO DE  
MINAS E ENERGIA



# Agenda

- Reasons for Research
- Alternative Aviation Fuel - Initiatives
- ProQR
- Production Forecasts
- Final Remarks

# Reasons for Research

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# Reasons for Research



- ❑ Reducing GHG emissions
  - ❑ The diversification of the Fuel and Energy Matrix
  - ❑ Reducing dependence on imported Jet-A1 aviation kerosene
  - ❑ Direct, indirect and income-effect generation of jobs and income in the production of raw materials
  - ❑ Creation of opportunities for economic and social development in industry and in the interior of the country, with the consequent reduction of regional disparities
- 
- ❑ The production cost of the raw material, as well as the production of biokerosene, must match the production price of aviation kerosene
  - ❑ The costs of certification of raw material production has impacts on production costs, but can increase the competitiveness of national biokerosene and its insertion in the world market.
  - ❑ The adoption or development of biokerosene production processes, with waste and alternative raw materials, that can simultaneously generate other products in the biorefinery concept may be interesting to enable the production of aviation biokerosene at more competitive prices.

# Prices - SAF and Jet Fuel

## Sustainable Aviation fuel (SAF) X Jet Fuel Prices

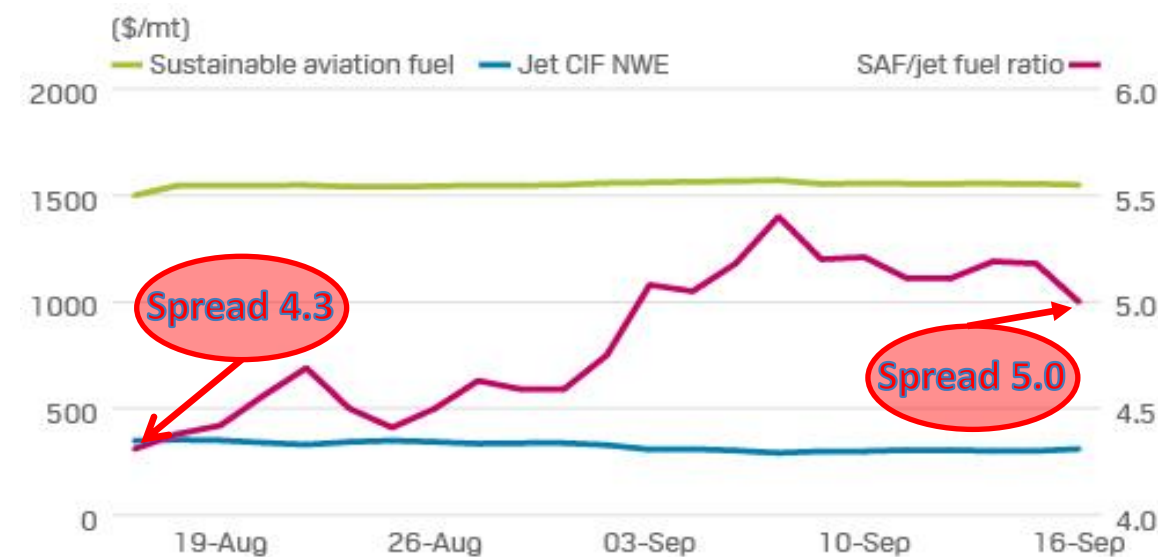
Apr, 2020 – Jul, 2021



Source: S&P Global Platts

Available in: <https://www.michaelkorsoutlet--2013.com/air-travel-and-decarbonisation-will-passengers-accept-a-potential-doubling-of-the-price-of-tickets-in-the-eu/>

Aug/Sep, 2021

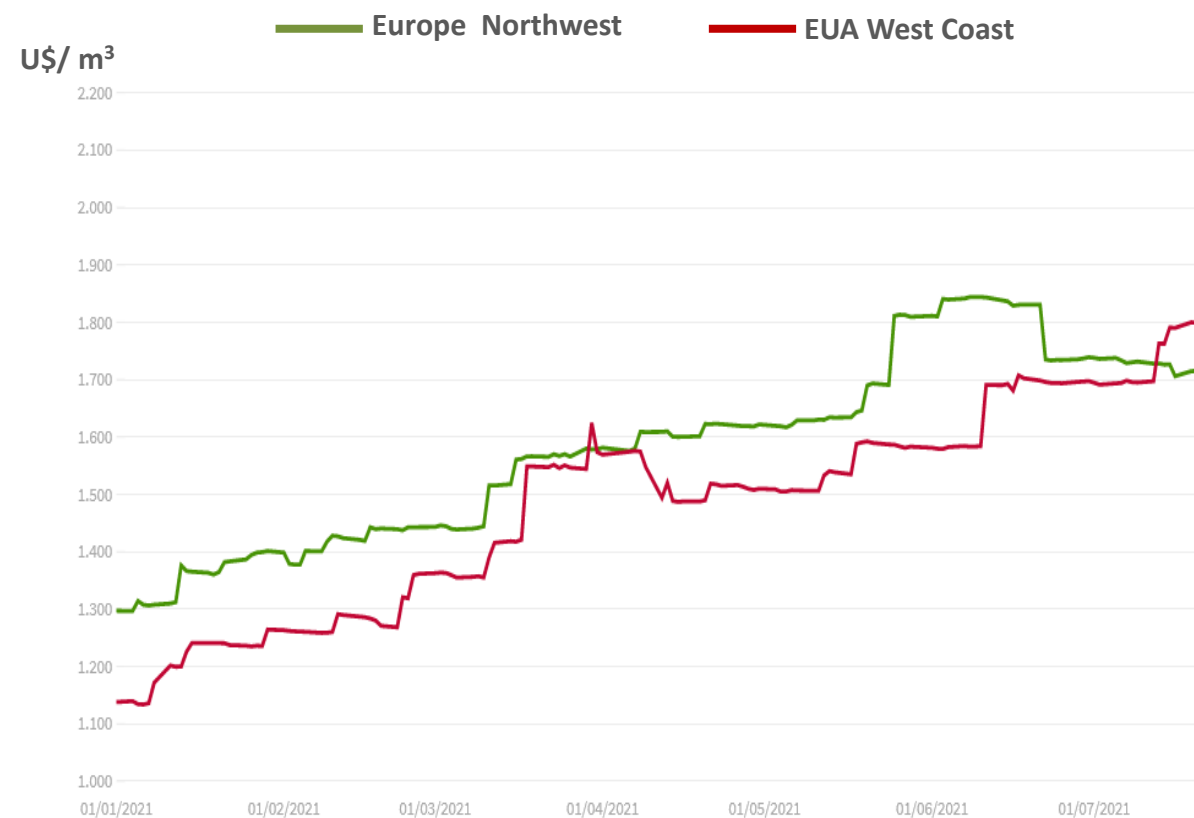


Source: S&P Global Platts

Available in: <https://www.spglobal.com/platts/en/market-insights/blogs/agriculture/092320-as-jet-fuel-market-craters-sustainable-aviation-fuel-prepares-for-takeoff>

\* Biofuel costs for a large commercial buyer in a biorefinery

## HVO Prices



Available in:

[https://public.flourish.studio/visualisation/6834847/?utm\\_source=showcase&utm\\_campaign=visualisation/6834847](https://public.flourish.studio/visualisation/6834847/?utm_source=showcase&utm_campaign=visualisation/6834847)

\* Biofuel costs for a large commercial buyer in a biorefinery

# **Alternative Aviation Fuel - Initiatives**

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# Alternative Aviation Fuel - Initiatives



2016

To produce Carbon neutral growth from 2020. It uses some market-based environmental policy instruments to offset CO<sub>2</sub> emissions. For example, aircraft operators have to purchase carbon credits from the carbon market.



2017

To reduce the carbon intensity of the Brazilian transportation matrix by expanding the use of biofuels and creating a carbon credit market to offset emissions of greenhouse gases by fossil fuels



2017

To create in Brazil an internationally usable reference case for the production and application of power-to-liquid sustainable fuels for aviation and other transport sectors without potential for electromobility.



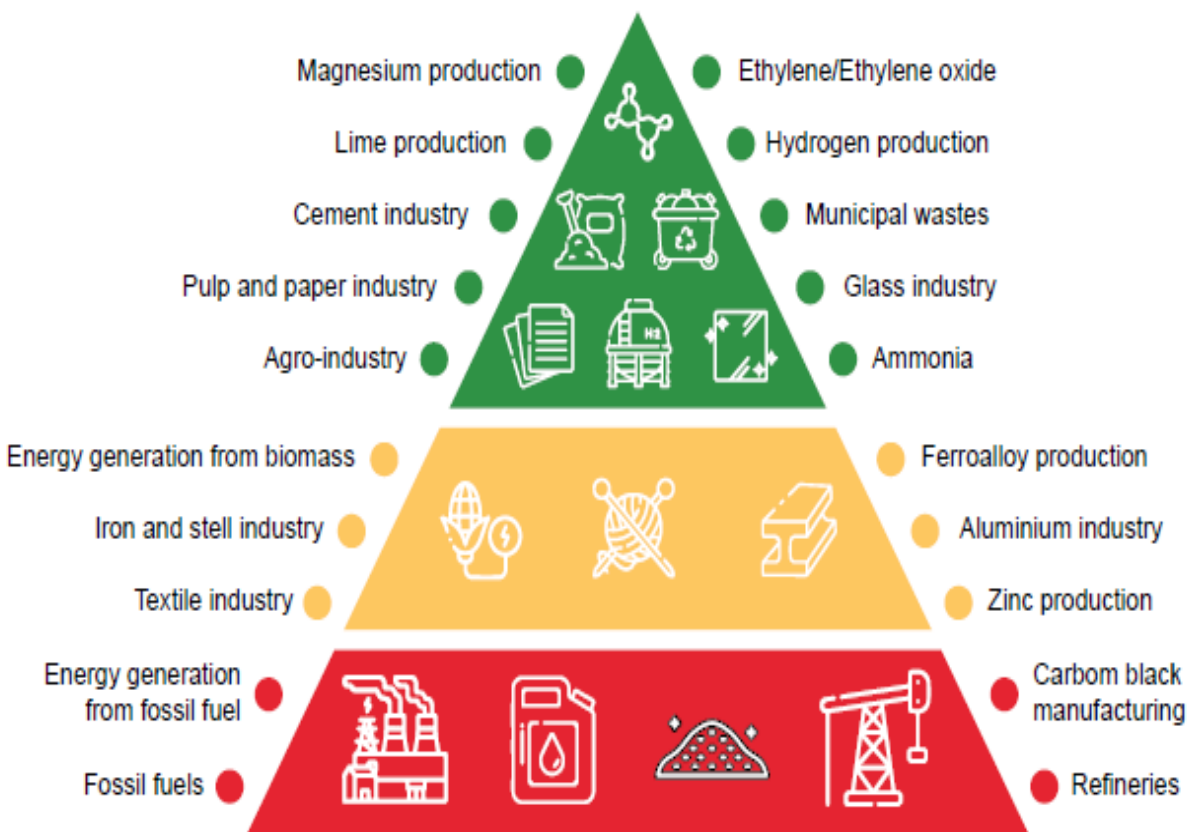
2021

To increase the use of sustainable fuels and low carbon intensity, as well as the application of national vehicle technology, with biofuels.

# ProQR Project

- Study2

# Waste Potential of industries

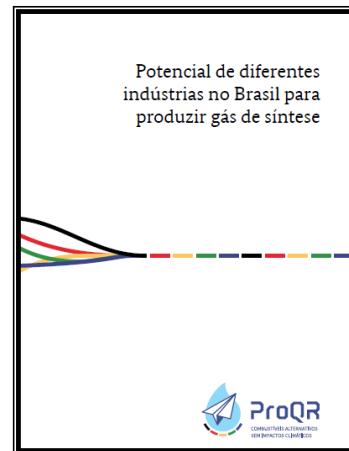


Probability of Future Existence

High

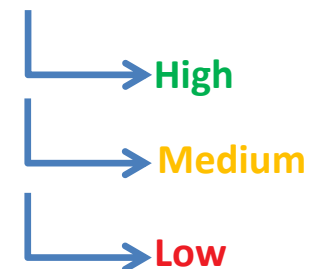
Medium

Low










To analyze the potential of Brazilian's industries to produce syngas from its low value waste and by-products

## Time Analyses (Future Existence)



# Brazilian Industries Resource – Wastes and its potential for syngas production

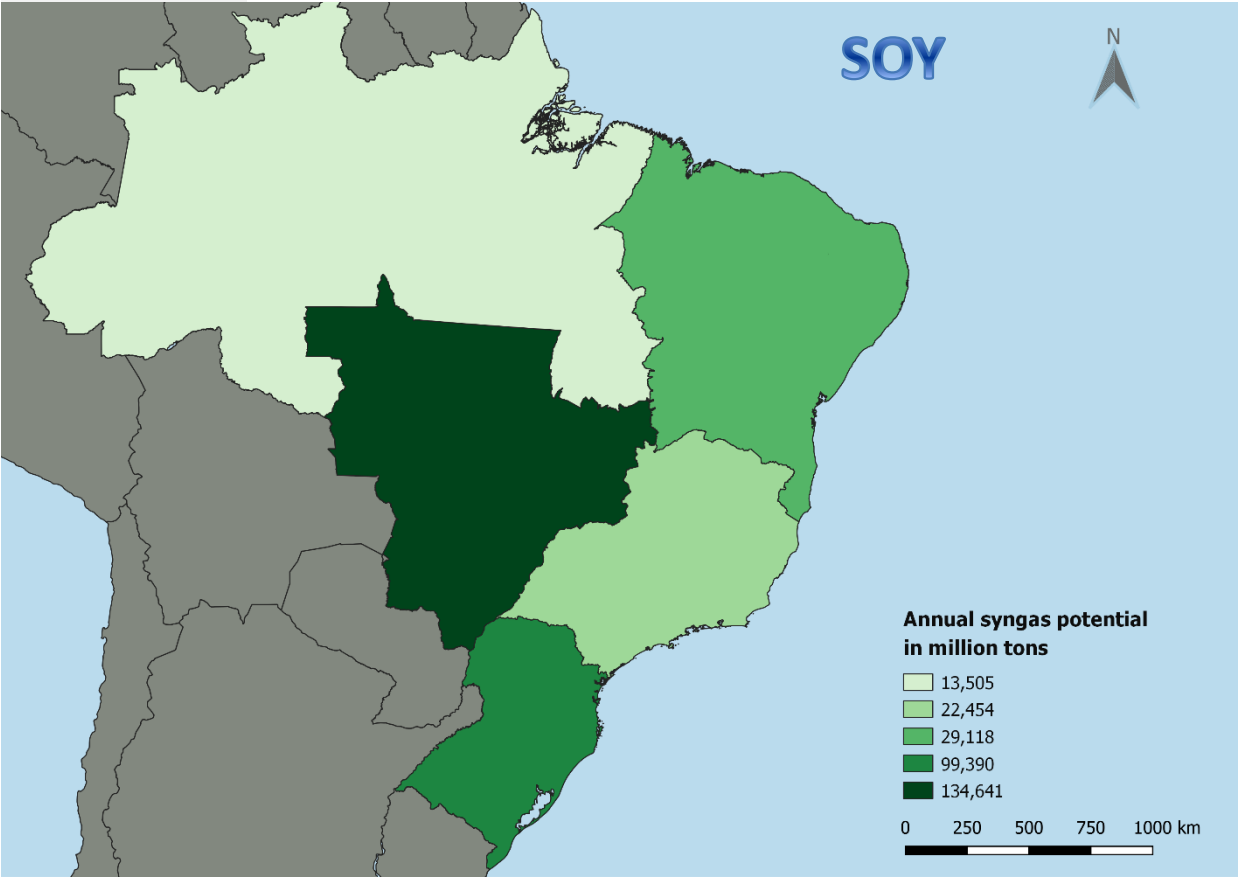


SOY	RICE	SUGAR CANE	CORN	STEEL	CELLULOSE INDUSTRIES	CEMENT
						
Straw, Glycerine	Straw, husk	Straw (leaves and tips) bagasse, CO <sub>2</sub>	Stem, straw, bark, cobs	CO <sub>2</sub> , sludge	CO <sub>2</sub> , sludge, black liquor	CO <sub>2</sub>
Country (t) 299,108,536 238,979	Country (t) 20,810,901	Country (t) 146,296,782	Country (t) 158,660,843	Country (t) 31,944,563	Country (t) 25,236,865	Country (t) 22,267,418
Regional (t) 80,235,174 (MT) 63,490 (RS)	Regional (t) 14,898,045 (RS)	Regional (t) 77,781,228 (SP)	Regional (t) 51,038,319 (MT)	Regional (t) 9,558,017 (MG)	Regional (t) 5,745,931 (BA)	Regional (t) 5,297,780 (MG)
Factor/ton harvested 1,52	Factor/ton harvested 1,24	Factor/ton harvested 0,14	Factor/ton harvested 1,25	1.56 t CO <sub>2</sub> per ton of crude steel		0.55t CO <sub>2</sub> / ton of prod. cement

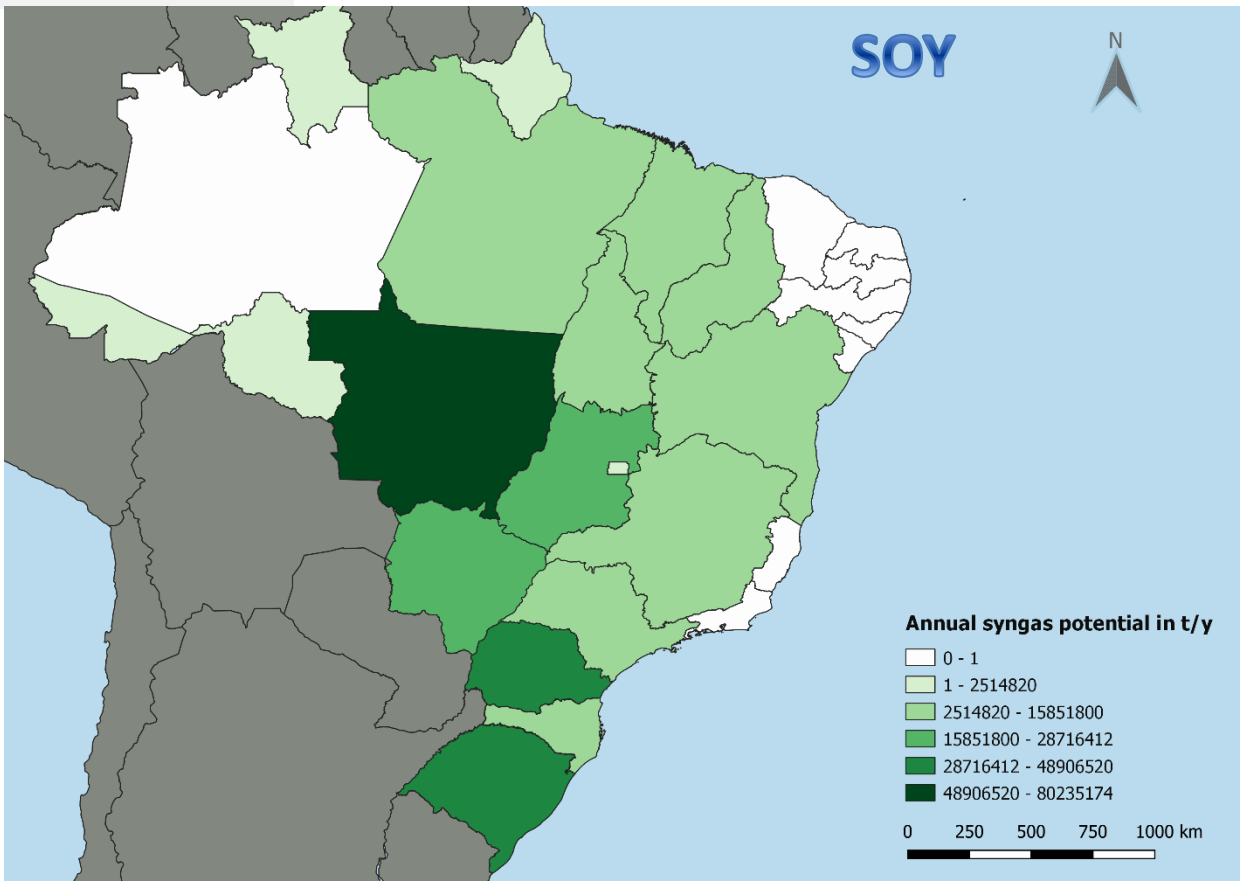
# Potential regional syngas production from soybean agricultural residues – Total and Regional



Brazil



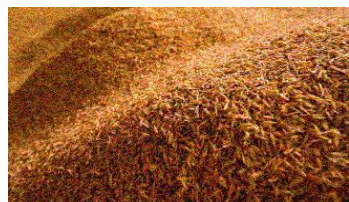
Regional



# Production Forecasts

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# Production Forecasts



## RICE

**Variação %  
2020/21 a 2030/31**

Produção (mil t)	3,5%
Consumo (mil t)	-2,2%
Importação (mil t)	-18,8%



## SOY

**Variação %  
2020/21 a 2030/31**

Produção (mil t)	29,5%
Consumo (mil t)	19,6%
Exportação (mil t)	33,6%



## CORN

**Variação %  
2020/21 a 2030/31**

Produção (mil t)	28,7%
Consumo (mil t)	23,1%
Exportação (mil t)	43,8%



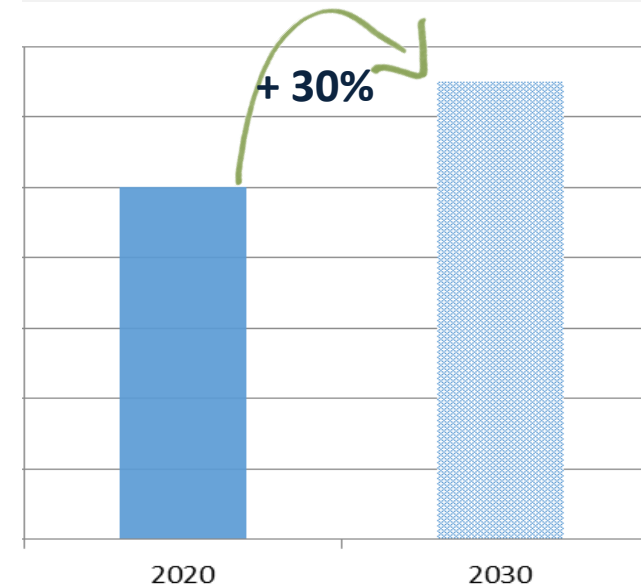
## CELLULOSE

**Variação %  
2020/21 a 2030/31**

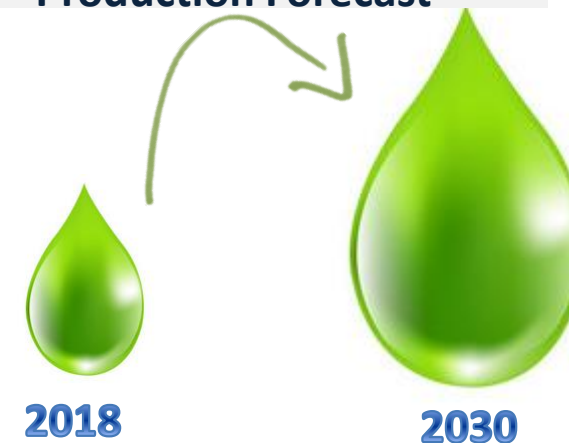
Produção (mil t)	27,6%
Consumo (mil t)	9,6%
Exportação (mil t)	34,7%

Available in: <https://www.gov.br/agricultura/pt-br/assuntos/politica-agricola/todas-publicacoes-de-politica-agricola/projecoes-do-agronegocio/projecoes-do-agronegocio-2020-2021-a-2030-2031.pdf/view>

## Average Production Growth



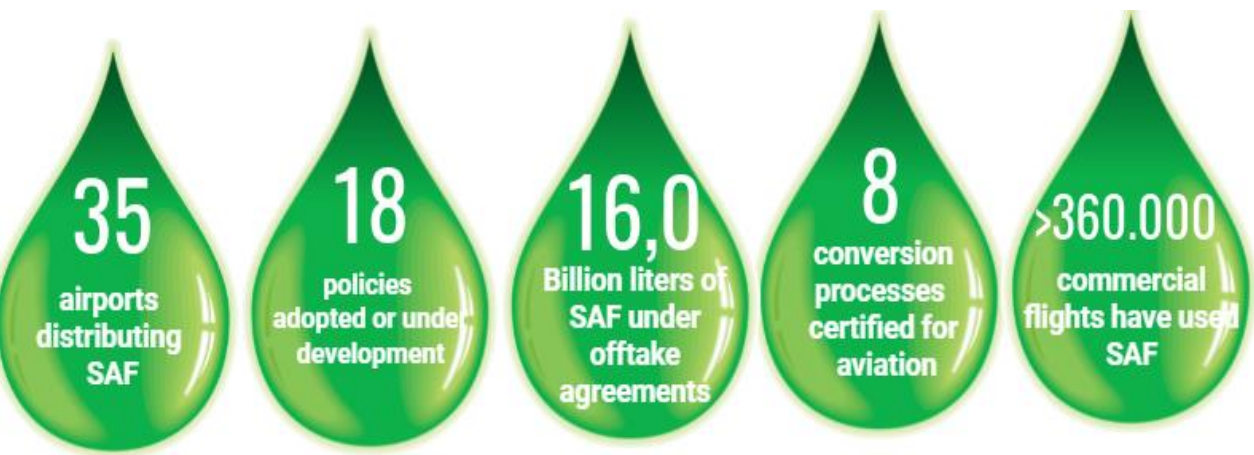
## Syngas Potential Production Forecast



# Final Remarks

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## Evolution of SAF



Available in: <https://www.icao.int/environmental-protection/Pages/SAF.aspx>

In a near future, we will be ready to take off by using SAF from ProQR project

SAF



ProQR  
CLIMATE NEUTRAL  
ALTERNATIVE FUELS





[www.epe.gov.br](http://www.epe.gov.br)

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