A REVOLUTION IN BIOBASED PRODUCTS AND PACKAGING

GUSTAVO SERGI
BRASKEM PRODUCTION IN KTA

- **PE:** 4,105
- **PP:** 3,965
- **PVC:** 710
- **CHEMICALS:** 3,752

**INDUSTRIAL FOOTPRINT**
- **Brazil**
- **USA**
- **Europe**
- **Mexico**

**BRASKEM IN NUMBERS**

- **People Worldwide:** 8,000
- **EBITDA:** R$11.5 BN in 2016
- **Industrial Units:** 41
- **Research Centers:** 3

- **PE:** 4,105
- **PP:** 3,965
- **PVC:** 710
- **Chemicals:** 3,752
WHY RENEWABLE CHEMISTRY?

1. MORE AND MORE CLIENTS ARE DEMANDING
   - Environmental consciousness continues to grow
   - Brand-owners are moving in that direction
   - Societal consciousness driving brand owners to pull for these products

2. LEGISLATIVE ACTION MOVING SLOWLY, BUT SURELY
   - Legislators continue to discuss and propose new alternatives to reduce carbon emissions

3. TECHNOLOGY CONTINUEES TO EVOLVE
   - Technologies start to show competitiveness even with low oil prices
   - Artificial intelligence, automation and advanced analytics will be used to dramatically reduce development timelines & costs
BRASKEM IS THE WORLD LEADER IN BIOPOLYMERS

**STARTUP:** Sept. 2010  
**CAPACITY:** 200 KTA  
**INVESTMENT:** US$290 MM  
**PRODUCTION:** Triunfo Complex, RS  
Portfolio formed by products in the HDPE, LLDPE and LDPE families

200 KTA ETBE (BA)  
175 KTA ETBE (RS)  
**COMBINED CAPACITY:** 375 KTA ETBE
Green Polyethylene helps reduce greenhouse gases and is 100% recyclable

Sugarcane captures CO2

Green PE Carbon footprint from Cradle to Braskem’s gate: 1 mt captures 3.09 mt of I’m green™ Polyethylene

Production of ethanol and renewable energy

Packaging made from Green Polyethylene

Production of Green Ethylene And Green Polyethylene

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Green PE Cycle
**BRASKEM’S PLASTIC REACHES OUTER SPACE**

State-of-the-art Brazilian innovation and technology towards the outer space

Braskem, in partnership with Made In Space, a North American company, takes Green Plastic and UHMWPE, known as I’m green™ and UTEC®, respectively, to be utilized in the manufacture of objects through 3D printing, in the International Space Station (ISS), a habitable artificial satellite in low Earth orbit.

The Additive Manufacturing Facility (AMF) printer, developed by Made In Space to work in microgravity environments, will provide astronauts with the ability to produce Green Polyethylene tools and spare parts on demand, increasing the autonomy of space missions. Braskem’s UTEC® was used in the creation of the printer.
VALUE CHAIN DISRUPTION

Raw Material

Ethanol (1G/2G)
- Ethanol
- Methane
- Ethane
- Propane
- Butane

Sugar (1G)
- GLP
- Naphtha
- Kerosene
- Diesel
- Parafin

Biomass (2G)
- Sugar
- Biomass

Chemicals & Polymers

Cracking
- Butene
- Isobutylene
- Butadiene
- Isoprene
- Hexene
- Cyclohexene

Ethylene
- Propylene
- Butene
- Isobutylene
- Butadiene
- Isoprene
- Hexene
- Cyclohexene

Ethylene Oxide
- Propylene Oxide
- Acid acrylic
- Gluoxal
- Polyester
- Polyethylene
- Polypropylene
- SAP
- Polisobuthylene
- Polibutadieno
- Poliisopreno
- Nylon 66
- Nylon 6
- Polyurethane

Polyester glycol
- Polyethylene glycol
- Propylene glycol
- Polyethylene
- Polypropylene
- SAP
- Polisobuthylene
- Polibutadieno
- Poliisopreno
- Nylon 66
- Nylon 6
- Polyurethane

Toluene
- Toluene Diisocianate
- Toluene Diamine
- Benzene
- Terephalic acid

Raw Material
- Biomass (2G)
- Sugar (1G)
- Ethanol (1G/2G)

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WORLDWIDE LEADERSHIP IN RENEWABLE CHEMISTRY

DEMO PLANT STARTS UP IN 2019, IN DENMARK
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