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ICAO STOCKTAKING SEMINAR
TOWARD THE 2050 VISION FOR
SUSTAINABLE AVIATION FUELS



Vision 2030 MG – Minas Gerais

Mike Lu

CEO

Curcas Diesel Brasil Ltda





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Vision 2030 MG: Flying Green, Riding Green uniting efforts for a low carbon economy

Curcas Diesel Brasil

Montreal, May 1st, 2019



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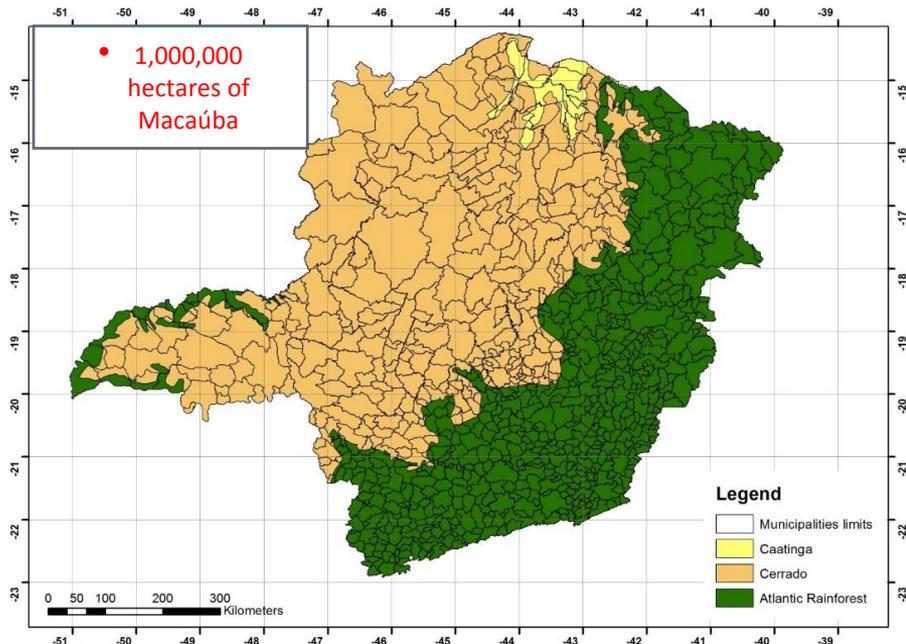
Brazilian NDC as an opportunity

Expand use of renewable fuels
12 million ha of reforestation
15 million ha of degraded land
5 million ha of ILPF

Vision 2030 MG: Reforest to decarbonise



Plataforma Mineira de Bioquerosene e Renováveis



INFORMATION SOURCE

Instituto Brasileiro de Geografia e Estatística (IBGE), 2011

- **State of Minas Gerais**

- 586.522,122 km²

- 853 municipalities

- Capital

- » Belo horizonte

- Three Biomes

- Atlantic Rainforest

- 241.704,766 km²

- Cerrado (Neotropical Savanna)

- 333.728,055 km²

- Caatinga (Semiarid)

- 11.093,429 km²



Vision 2030 MG: Regional Integrated Biofuel Value Chains

- Regional Agenda 2030 for sustainable development based on strategic “from research to fly” regional value chains in Minas Gerais
- Target: restoration of 1,000,000 hectares of degraded land using Macauba
- Six regional distributed biorefining capability, integrated to the local feedstock value chains, logistically optimized with regional off-take agreements.
- Proof of Concept in the Zona da Mata region bringing together 46+ municipalities to promote reforestation to produce water and sustainable feedstock for the biofuels value chain.
- Juiz de Fora, MG to host the integrated biorefinery Proof-of-Concept for **green diesel (HVO)** for the Transportation Segment (Aviation, Mobility, Mining, Railway and Agricultural fleets)



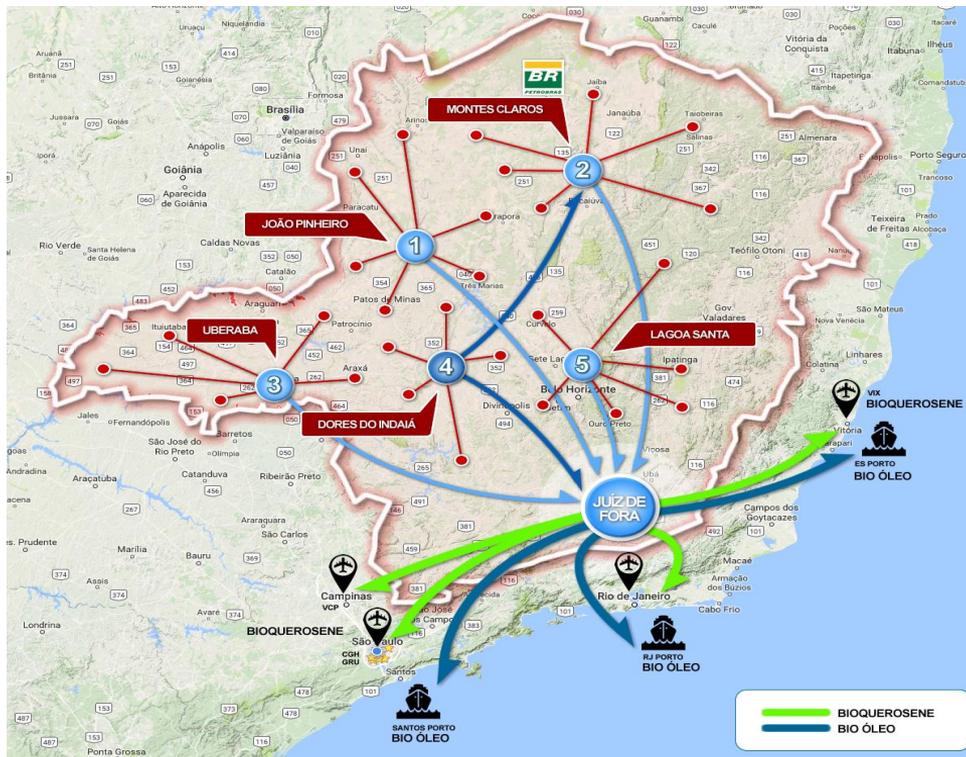
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Plataforma Mineira de Bioquerosene e Renováveis



Plataforma Brasileira de Bioquerosene e Renováveis



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(SAM) Office
Lima

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(WACAF) Office
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Southern African
(ESAF) Office
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THANK YOU



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ZONA DA MATA BIOJETFUEL AND RENEWABLES PLATFORM

The Juiz de Fora proof-of- concept

Rômulo Veiga

Secretary of Economic Development,
Tourism and Agriculture – Juiz de Fora





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JUIZ DE FORA

City located in Minas Gerais

Population: 568.000

HDI: 0,778 – high

GDP : US\$ 3.7 Billions



JUIZ DE FORA RURAL ZONE

70% - TERRITORY

0,5% - GDP

0,8% - FOOD SUPPLY*

*Juiz de Fora consumes 30.000 tons of farm products per year



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Difficulties for Mechanised Agriculture = Unproductive land



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Launch of the Platform

June 5th, 2018

“On this International Environment Day, we are taking a major step towards Global Sustainability by launching this regional initiative together with UK for the prosperity of Zona da Mata”

Mayor Antônio Almas, representing Zona da Mata

“The UK and Brazil are leaders in combating climate change and we are confident that working together in this project, we can contribute to achieve a sustainable future.”

Simon Wood, Consul General of UK in Rio de Janeiro



*Mayor
Antônio Almas*



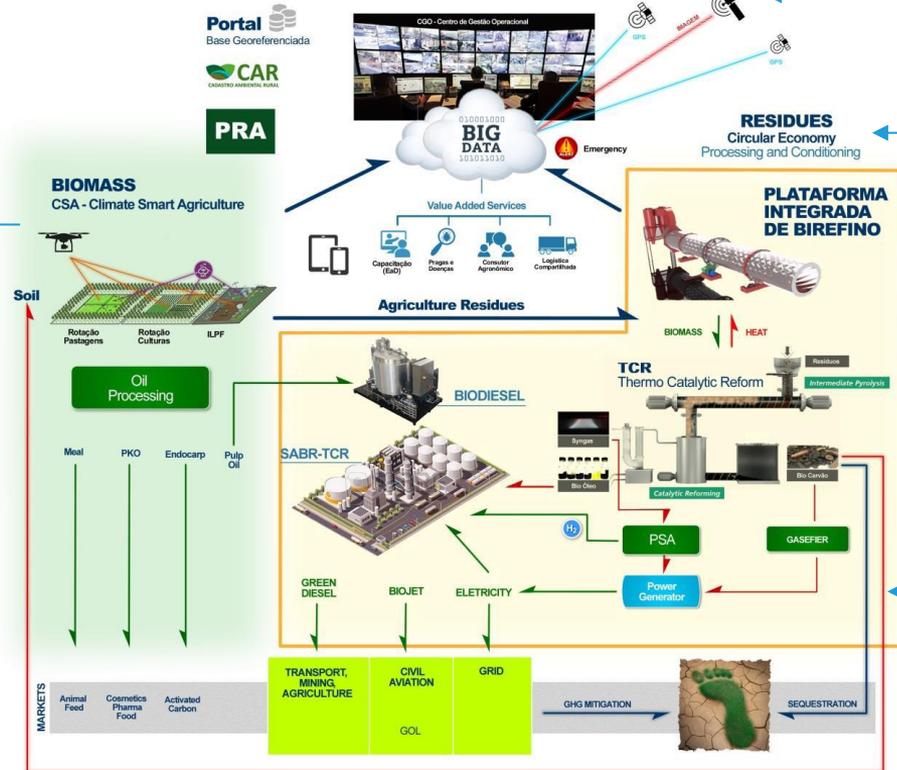
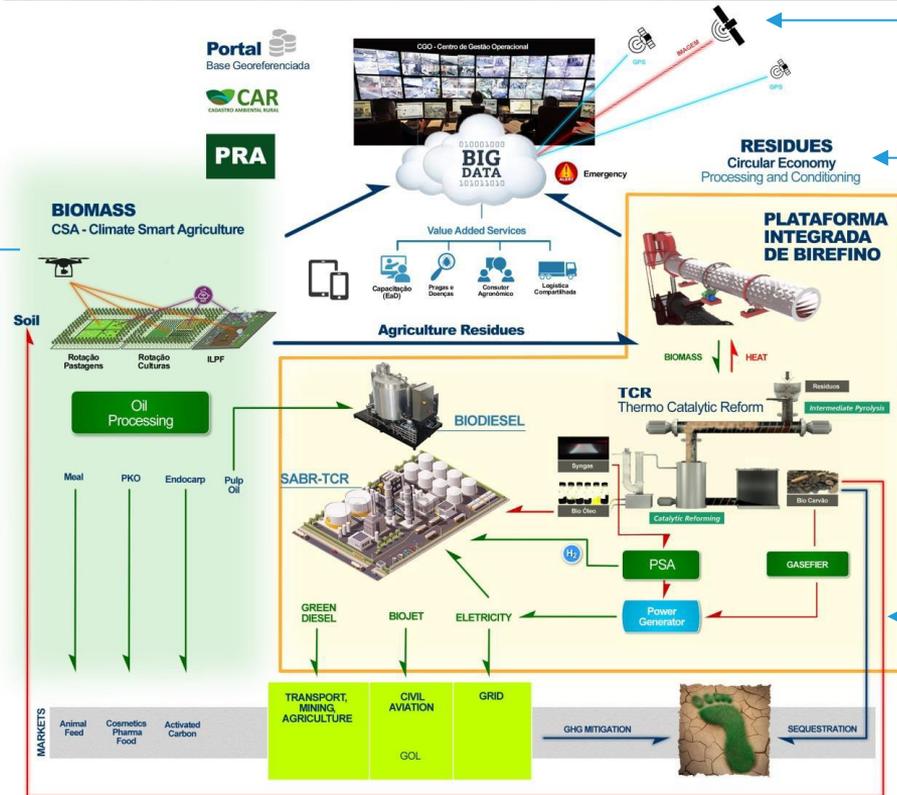
GREEN DIESEL AND BIOJETFUEL INTEGRATED VALUE CHAIN

Agriculture 4.0
Climate Smart
Agriculture

Industry 4.0
Innovative Processes

Circular Economy
"waste-to-energy"

NDC reduction
Opportunities
of Paris Agreement

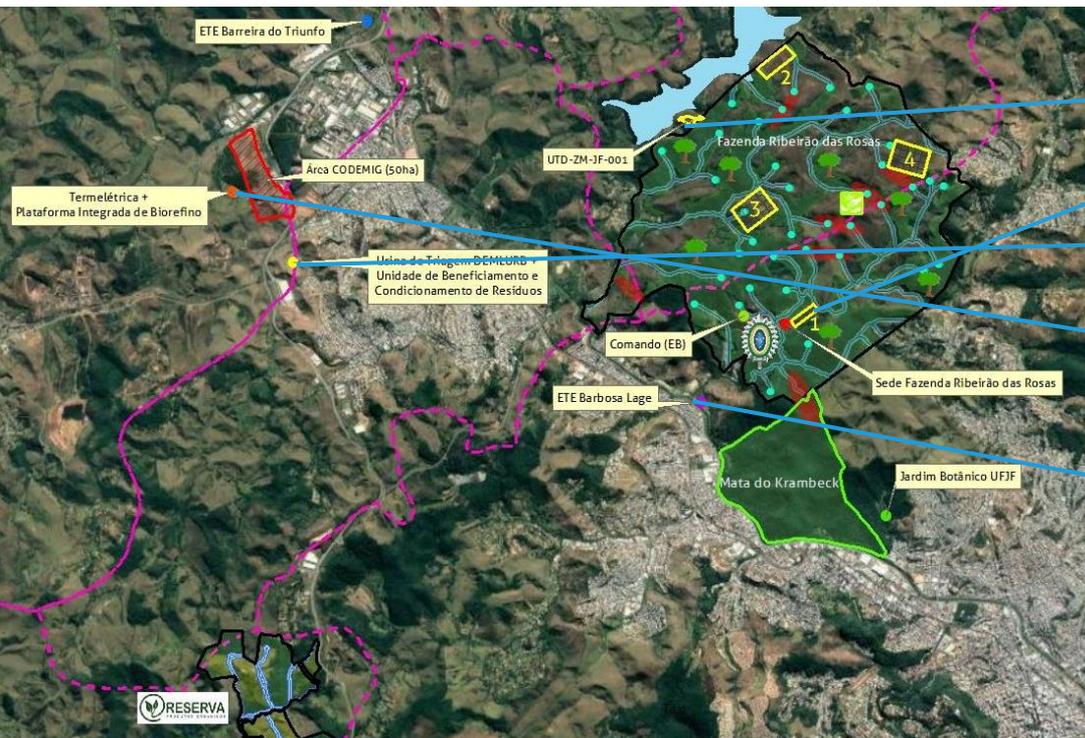




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UTD - Technical
Demonstration Unit

Waste Sorting Plant

Area for
Bio Jet fuel Plant

Water treatment
station



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 **OBJETIVOS**  **DE DESENVOLVIMENTO SUSTENTÁVEL**





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João Penido
Reservoir
2013



João Penido
Reservoir
2014





UTD 3 – Modelo Cartesiano de Consorciamento

f/mc Feijão + Macaúba

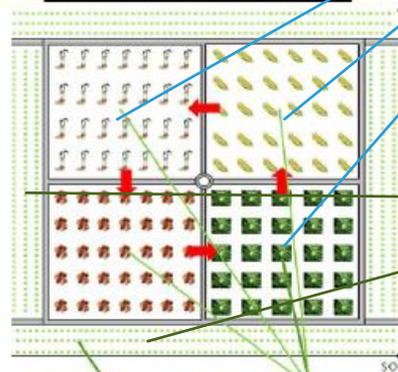
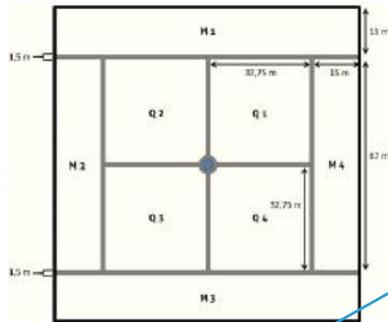
f/ma Feijão + Mandioca

b Banana

	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p
1	f/mc															
2	f/mc															
3	f/mc															
4	f/mc															
5	f/mc															
6	f/mc															
7	f/mc															
8	f/mc															
9	f/mc															
10	f/mc															
11	f/mc															
12	f/mc															
13	f/mc															
14	f/mc															
15	f/mc															
16	f/mc															

Produção Ano 1

- Plantio de 200 macaubeiras
- Duas safras de feijão
- Uma safra de mandioca
- Uma safra de banana
- Incorporação da matéria orgânica ao solo provenientes dos resíduos das culturas (feijão-mandioca-banana)



Colheita Energia

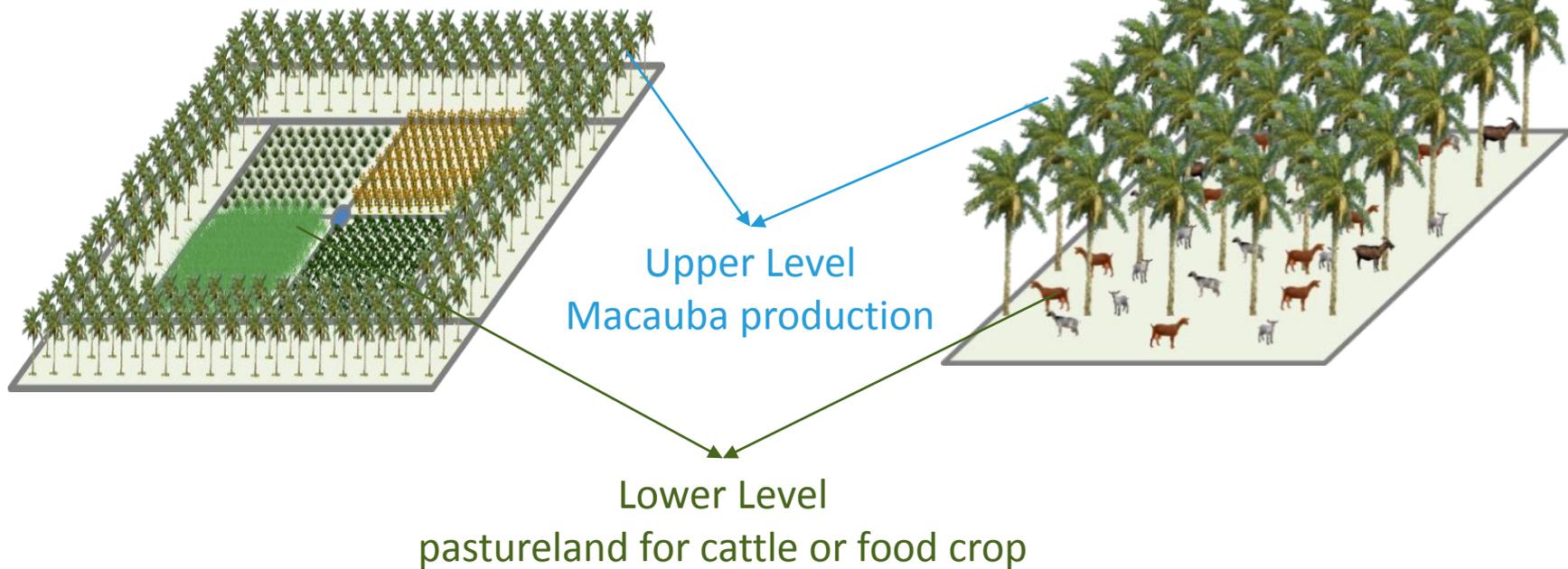
Colheita Alimentos

UTD - Technical Demonstration Unit
(1 hectare Cartesian model)
FOOD CROP– Increasing the food production of the Family Farms of the region

ENERGY CROP– Intercropping Macauba with cash crops will increase the economy value of property by produce Food, Oil and Carbon Credit



TWO-STOREY MODEL





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MACAÚBA

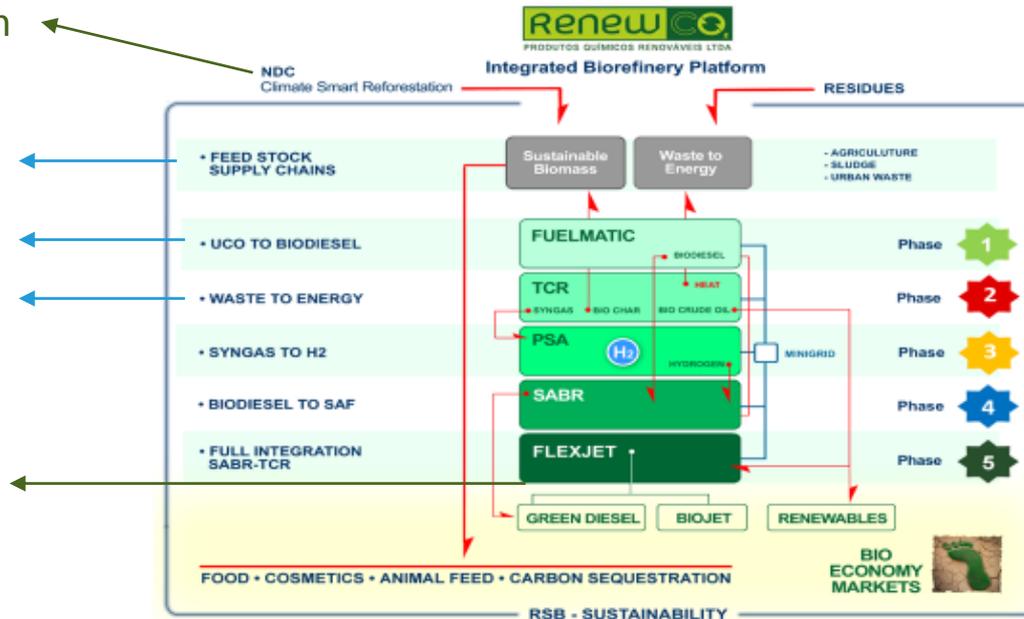
- Carbon Sequestration
- Reforestation

LOW COST FEEDSTOCK

- Agriculture Residues
- Urban Waste
- Used Cooking Oil
- Sludge from sewage

↓
FOSSILE FUEL PRICES

Integrated Biorefining Platform





TCR PROCESS (Susteen Technologies)

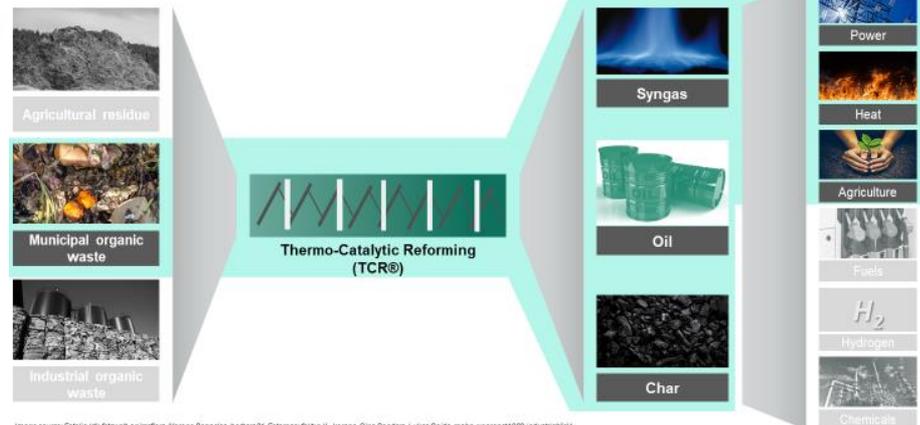
Our Technology Platform – Thermo-Catalytic Reforming (TCR®)
Developed by Fraunhofer UMSICHT



Key Innovations

- Self-replenishing catalyst
- Tar avoidance
- High product quality
- Robust for industrial use
- >80% energy efficiency
- Low emissions – no solid combustion

Near-term market priority: Decentralized Organic Waste-to-Energy



For a video illustrating the TCR® process please refer to the following link: <https://www.youtube.com/watch?v=H2Lx0XxQgsk>, © 2014 Fraunhofer UMSICHT

Slide 1

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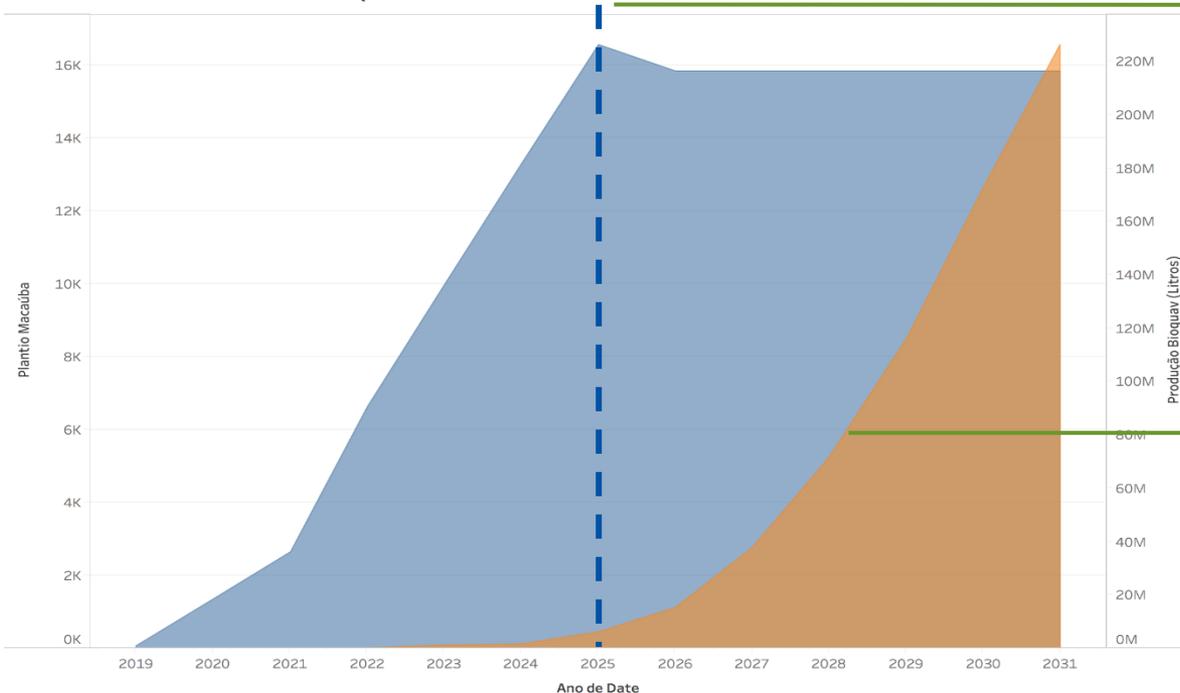
Slide 5

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REFORESTATION VERSUS BIOQAV PRODUCTION



Nomes de medida

■ Plantio Macaúba ■ Produção Bioqu..

2025 - Peak of Macaúba Plantation

Curve of Bioquerosene Production
2031 – 220 milion litres per year

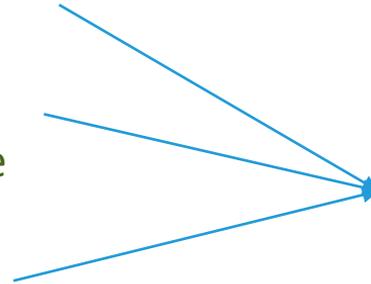


PLATAFORMA DE BIOQUEROSENE E RENOVÁVEIS DA ZONA DA MATA

“waste-to-energy” – Circular Economy

Protect Water Springs and increase Water Supply

Paradigm change for Family Farmers integration to low carbon economy



Supply the Aviation Market with Biojet Fuel and Carbon Credit, while improving Environment



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