

# **INNOVATIVE PATHS TO CLEANER SKIES**

## **2025 HONEYWELL APAC SAF CONFERENCE**

**BIOMASS TO RENEWABLE FUELS**

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May 29, 2025

**Honeywell**





# FORWARD LOOKING STATEMENTS

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# **AGENDA**

## **TITLE**

### **I. Renewable Fuels Market Overview**

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### **II. Biomass to Fuels Through Pyrolysis**

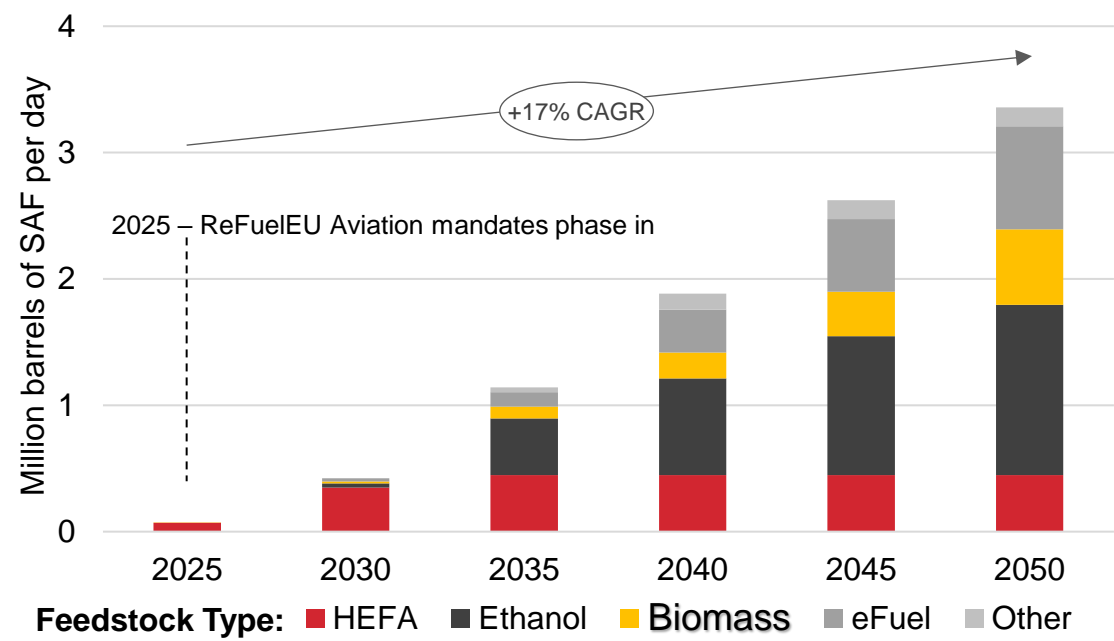
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### **III. UOP Biocrude Upgrading Technology**

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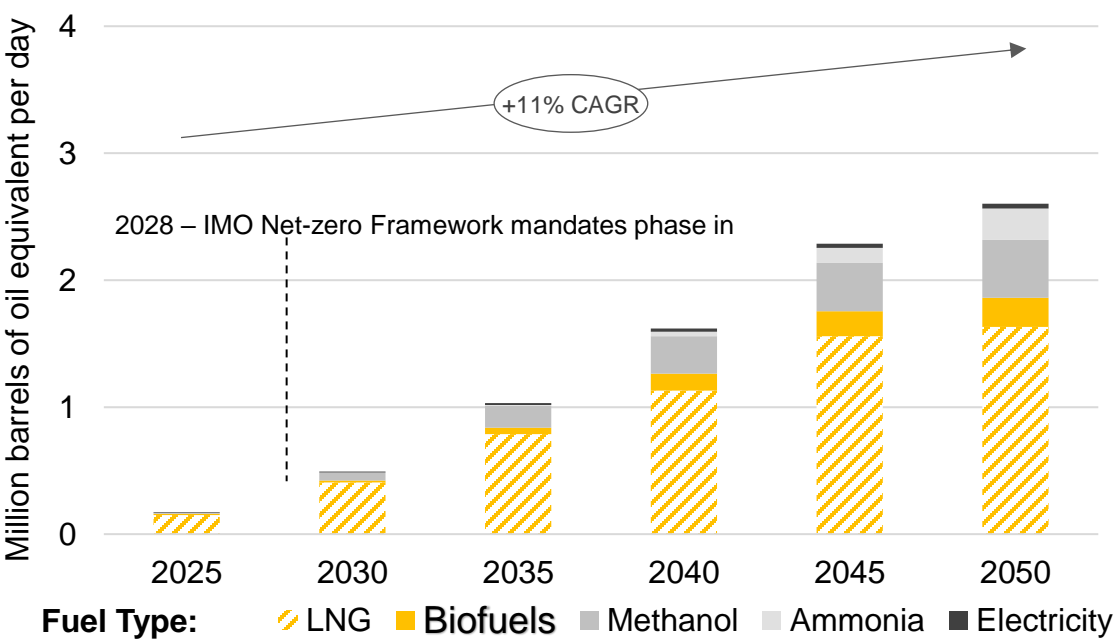
# RENEWABLE FUELS MARKET OUTLOOK

Global Sustainable Aviation Fuel Production Forecast <sup>1</sup>



Availability of Fats, Oils & Grease feedstocks limited after 2030

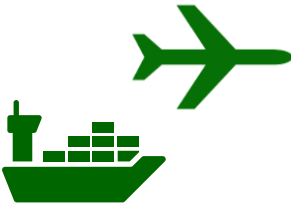
Global Low-Carbon Marine Fuel Demand Forecast <sup>2</sup>



Low-carbon alternative marine fuel market still nascent, opportunity for Biofuels to displace LNG adoption

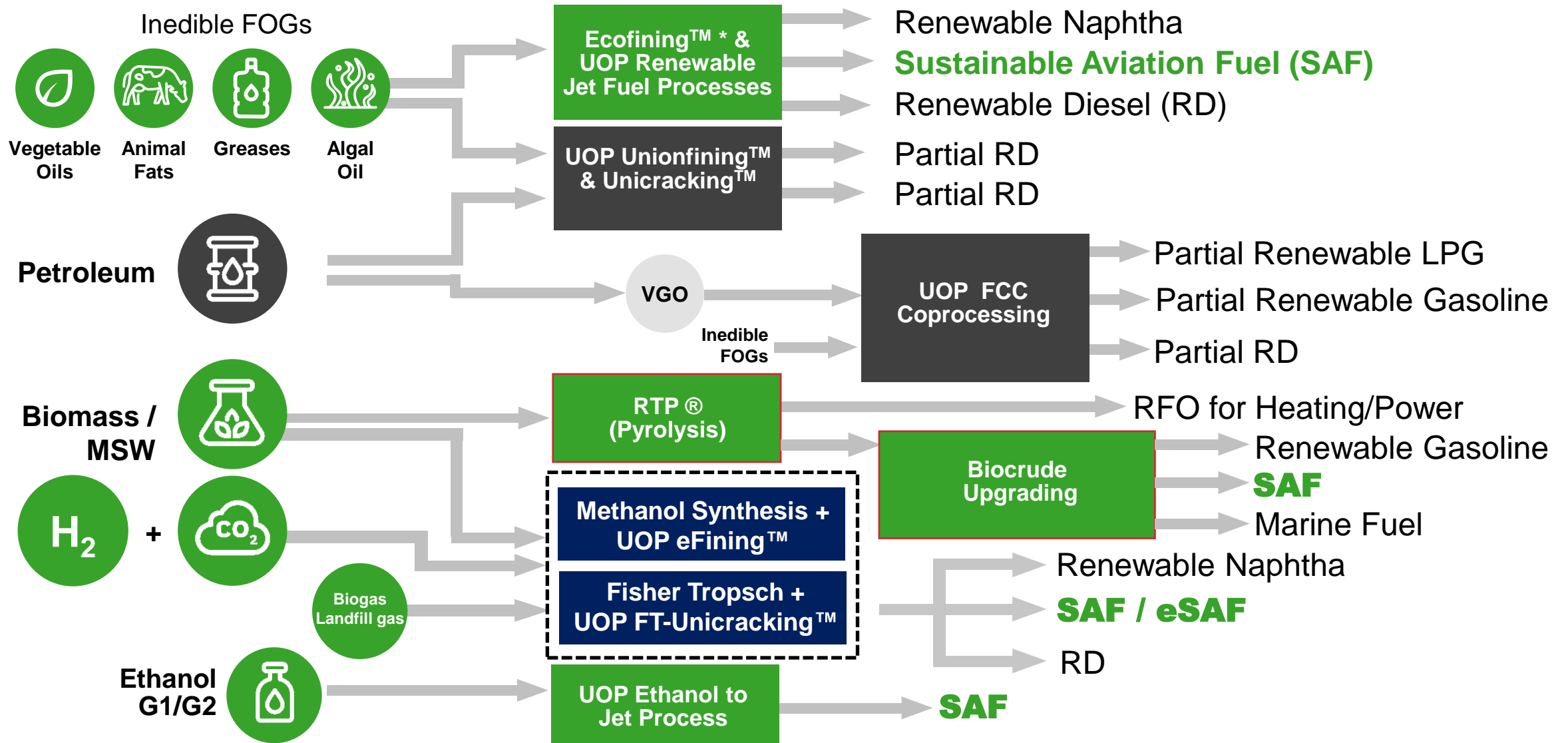


Large opportunity exists for a biomass-based solution to serve the emerging >1MM BPSD Renewable Aviation & Marine Fuel markets



(1) Internal Honeywell market analysis  
(2) BloombergNEF, 2025 Marine Fuel Outlook

# HONEYWELL UOP PATHWAYS TO RENEWABLE FUELS



\* Ecofining technology produces renewable diesel, SAF, and other renewable products from biogenic feed sources.

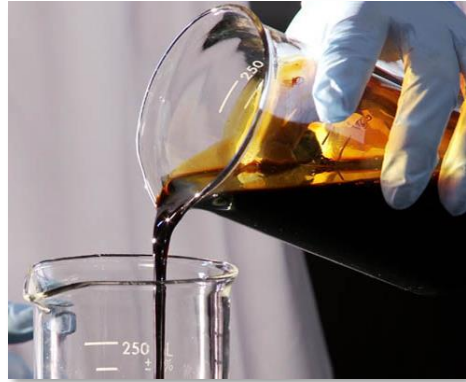


# RTP – RAPID THERMAL PROCESSING

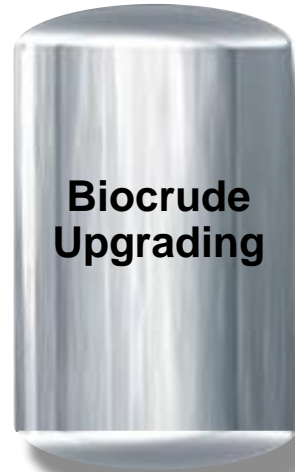


**Multiple High-Value Energy Applications**

# BIOCRUDE UPGRADING SOLUTION



**Biocrude**



**Biocrude Upgrading**



**Stabilized  
Biocrude  
Product**



**Renewable  
Gasoline**



**Sustainable  
Aviation  
Fuel**

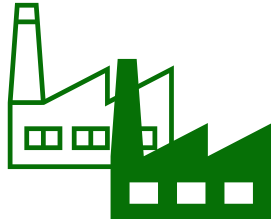


**Drop-in  
Renewable  
Marine  
Fuel**

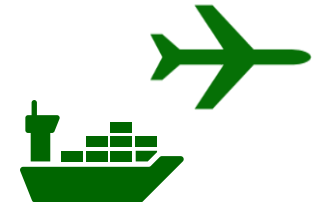
Biocrude has limited value due to chemical instability

- Biocrude Upgrading transforms biocrude into more valuable products

Further upgrading creates lighter transport fuels

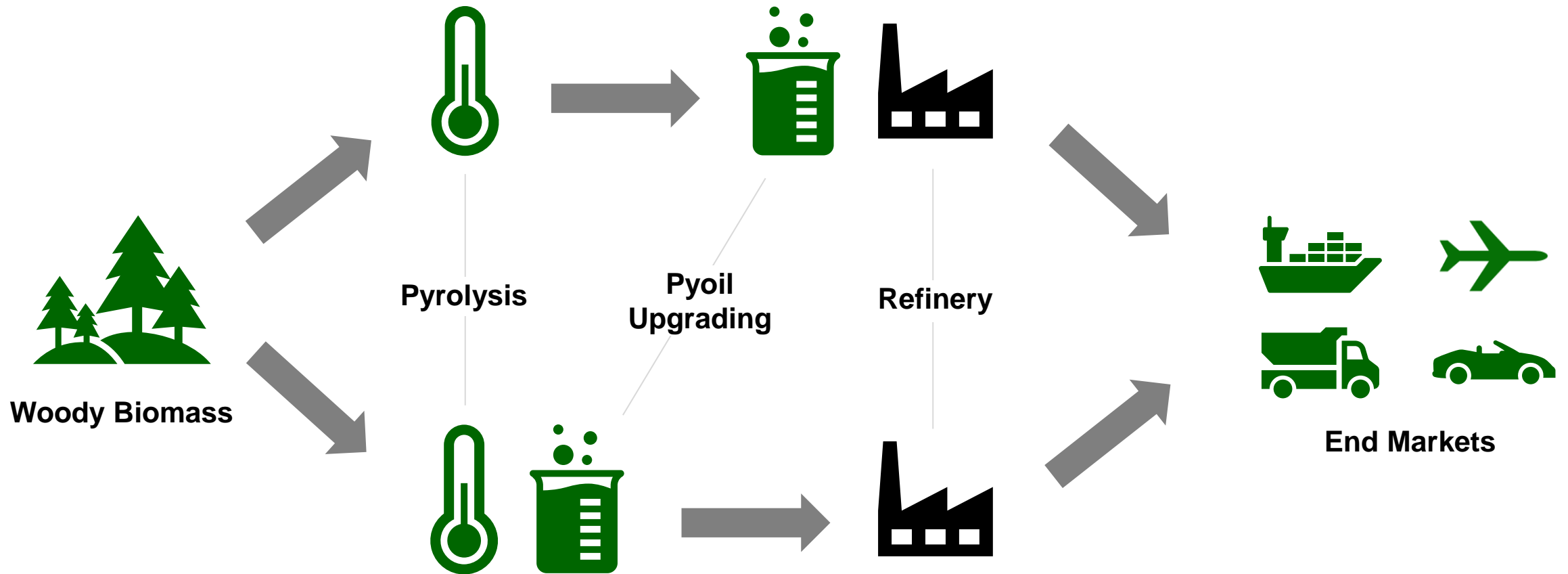


Stabilized biocrude allows customers to utilize existing refinery assets and produce high-value transportation fuels



# FLEXIBLE DEPLOYMENT TO ADDRESS LOGISTIC HURDLES

## Case 1: Bio-crude Upgrading at Refinery



## Case 2: Bio-crude Upgrading with Pyrolysis Unit



# UOP FCC BIOGENIC COPROCESSING

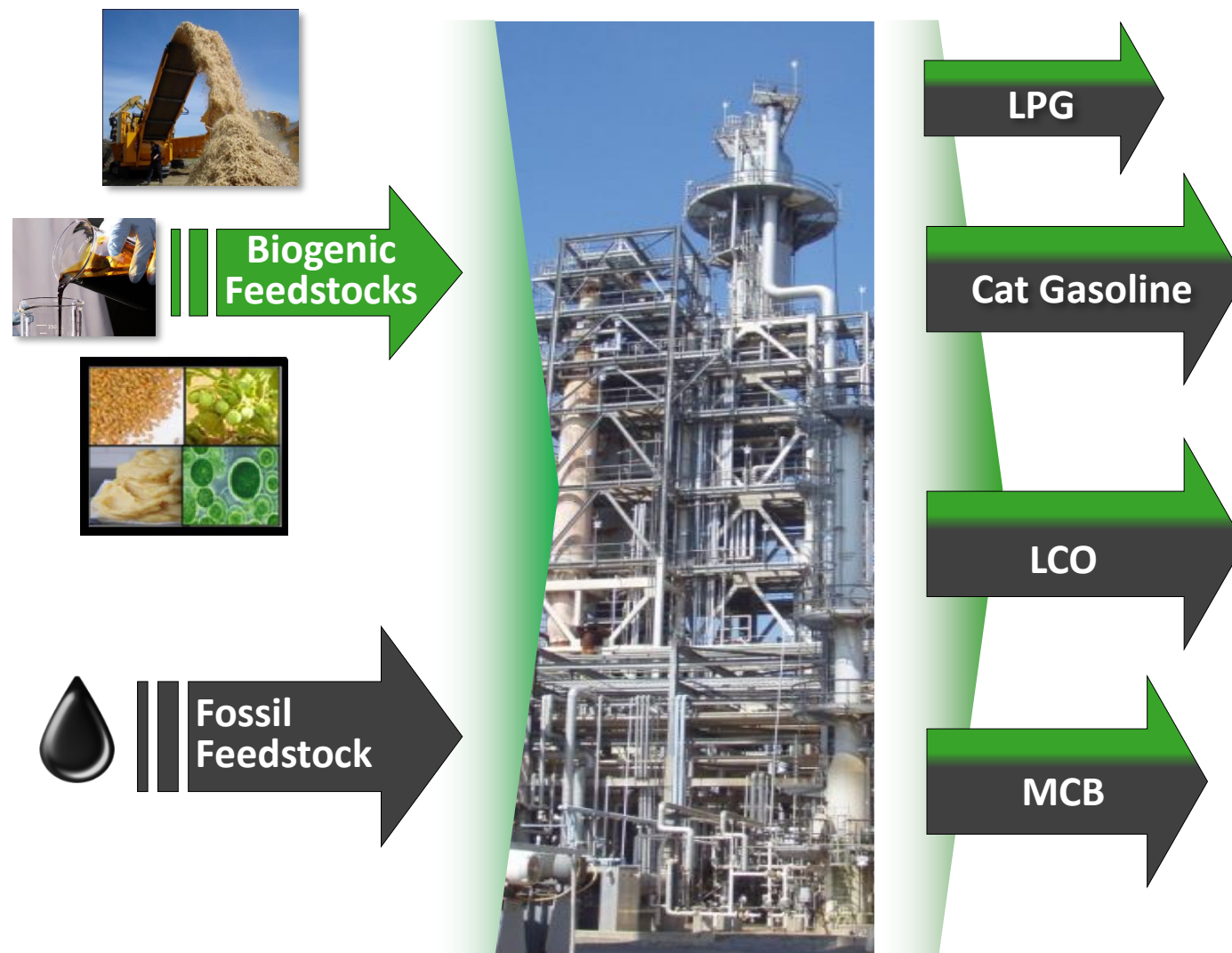
## Potential blends alongside the fossil FCC feedstock:

- Vegetable, animal fat waste oils
- Other biomass liquids

## Value to refiner:

- Produce sustainable **low carbon fuels**
  - Meet cellulosic RINs and LCFS credits (US)
  - Using RED Annex IX Part A feeds (EUR)
- **Low capital cost** solution
- **Low risk**

Partially-renewable products have **similar quality and yield** to petroleum-derived FCC products



**Commercially Proven Technology Available Today**

# THANK YOU

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