

The background image shows two men in business suits and hard hats standing on a metal walkway of an industrial plant. The sun is low on the horizon, creating a warm, golden glow and casting long shadows. The industrial structures, including tall distillation columns and piping, are silhouetted against the bright sky.

SUSTAINABLE TECHNOLOGY SOLUTIONS

TNChE 2023

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Honeywell
Uop



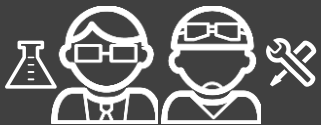
THE FUTURE IS WHAT WE MAKE IT

Forward Looking Statements

This presentation contains certain statements that may be deemed “forward-looking statements” within the meaning of Section 21E of the Securities Exchange Act of 1934. All statements, other than statements of historical fact, that address activities, events or developments that we or our management intends, expects, projects, believes or anticipates will or may occur in the future are forward-looking statements. Such statements are based upon certain assumptions and assessments made by our management in light of their experience and their perception of historical trends, current economic and industry conditions, expected future developments and other factors they believe to be appropriate. The forward-looking statements included in this presentation are also subject to a number of material risks and uncertainties, including but not limited to economic, competitive, governmental, technological, and COVID-19 public health factors affecting our operations, markets, products, services and prices. Such forward-looking statements are not guarantees of future performance, and actual results, and other developments, including the potential impact of the COVID-19 pandemic, and business decisions may differ from those envisaged by such forward-looking statements. Any forward-looking plans described herein are not final and may be modified or abandoned at any time. We identify the principal risks and uncertainties that affect our performance in our Form 10-K and other filings with the Securities and Exchange Commission.

HONEYWELL UOP PROFILE

- 100+ years of global expertise
- R&D powerhouse
- Broadest range of downstream refining and petrochemicals technologies
- Leading process technology licensor
- Invented most of the refining technologies in use today
- 40% of revenue from products introduced in the last 5 years



2,000

Engineers
and scientists



4,900

Active patents
and applications



Largest
process licensing
organization
in the world

31 out of **36**
refining technologies in use
today were developed by
UOP



NEW TECHNOLOGIES

Honeywell UOP creates new technologies that convert oil and natural gas into transportation fuels, energy and petrochemicals



UOP TECHNOLOGY MAKES MORE

than 60% of the world's gasoline, 70% of its polyester, and 90% of biodegradable detergents, and processes more than 40% of its LNG



BETTER ECONOMICS

UOP technologies offer a high return on investment



CONTINUOUS INNOVATION

Continuous technology improvement allows customer operations to remain cutting edge



RELIABILITY

UOP technologies are among the most widely proven in the world



EXPERTISE

UOP has a century-long record leading technology development for the oil and gas industry

SUSTAINABLE TECHNOLOGY SOLUTIONS

A New Business Unit for Honeywell



RENEWABLE
FUELS



PLASTICS
CIRCULARITY
TECHNOLOGIES



ENERGY
STORAGE



CLEAN
HYDROGEN



CARBON
CAPTURE

**Reducing Diesel and
Jet GHG Emissions
>80%***

UOP Ecofining™ can
deliver **outsized
profits** plus **significant
reduction in GHG
emissions**

**Removing Oil & Gas
Extraction from Plastic
Production**

Honeywell Advanced
Recycling aspires to
increase **waste plastic
circularity**

**Renewable Power
on Demand**

Honeywell Renewable
Energy Solutions helps
optimize energy with
energy storage and
remote operations

**Lower Emissions
Fuel for Hard to
Abate Applications**

Honeywell UOP provides
**efficient, tailored CO₂
capture** for clean hydrogen
production

**Reducing
CO₂
Emission**

Ready-now technology
to significantly **reduce
CO₂ emissions** from
energy and industrial
point sources

Committed to Commercialization of Sustainable Technologies

RENEWABLE FUELS | WW SAF DEMAND

DRIVERS

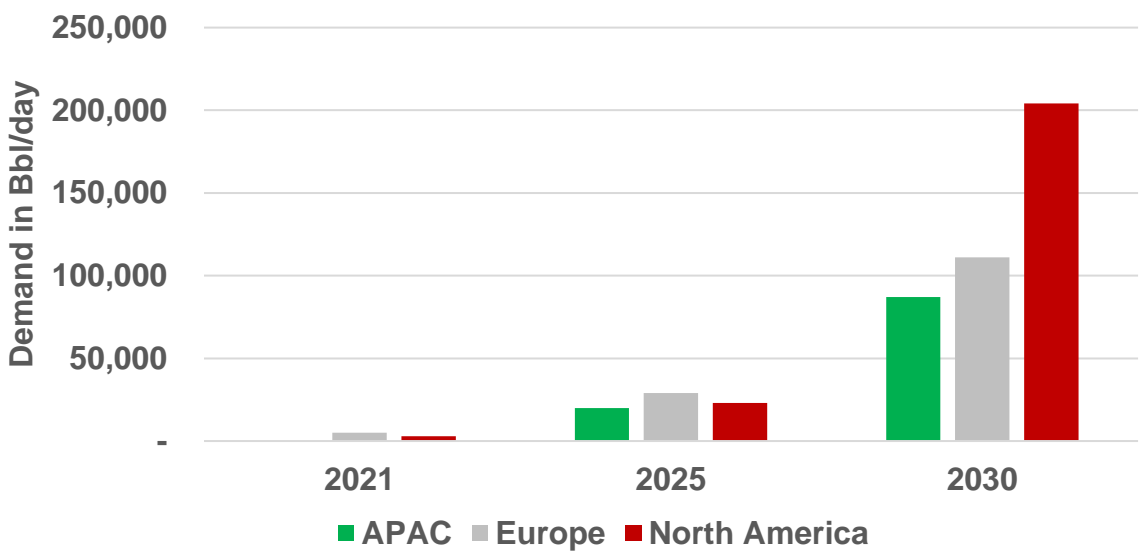
Short-term (2022-2030)

- SAF demand in US, Europe & Asia growing from 8 to 400 KBPD by 2030, driven by government incentives and mandates

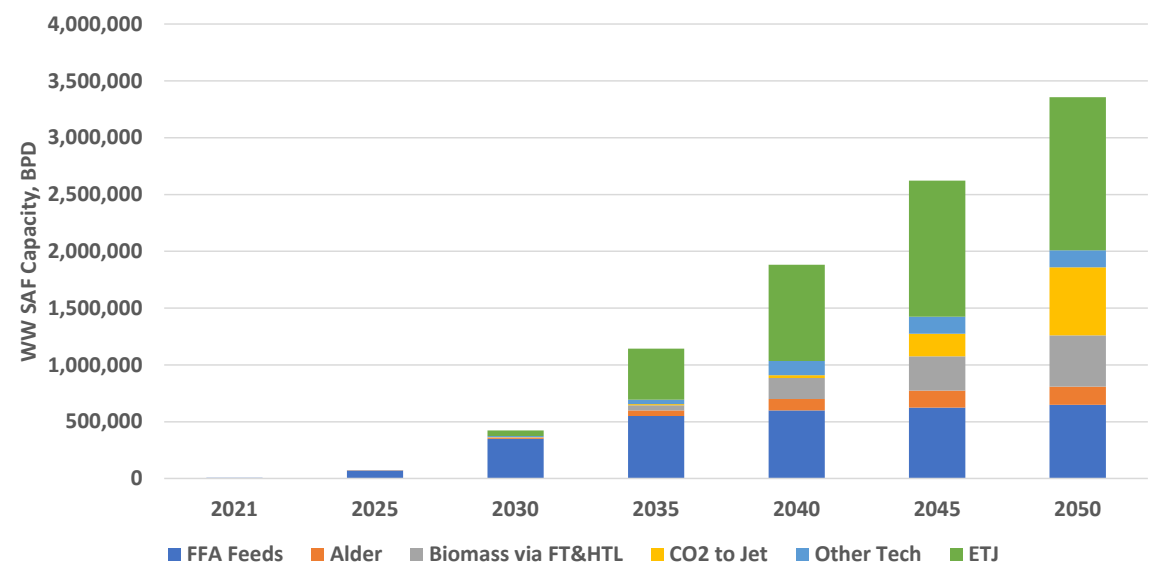
Long-term (2030-2050)

- Demand expected to grow further to nearly 3.5 M BPD
- New feedstock sources needed as FOGs nearly expended by 2030**

Regional SAF Demand

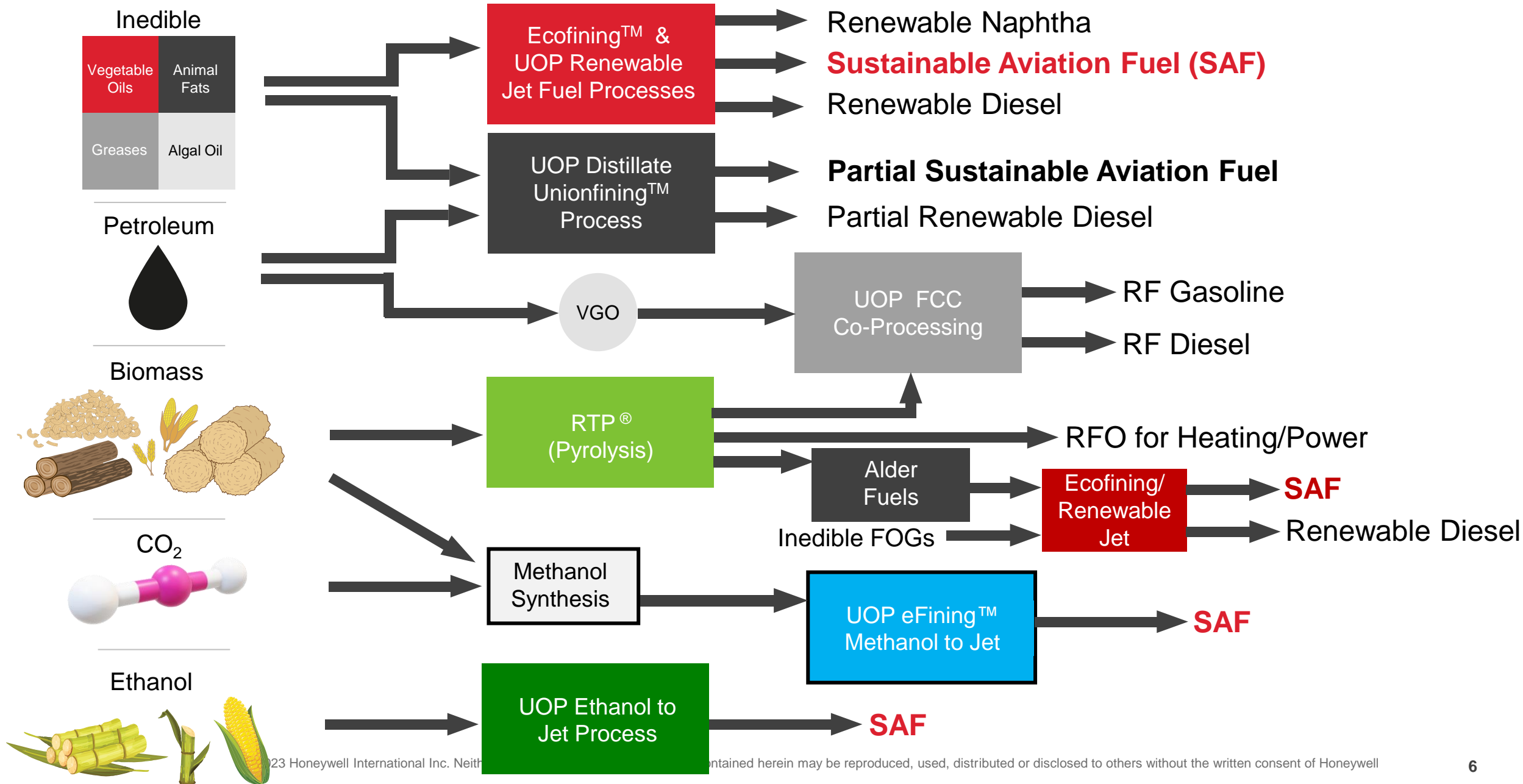


WW SAF Capacity by Technology Type - Adoption to Approach Gov't Targets

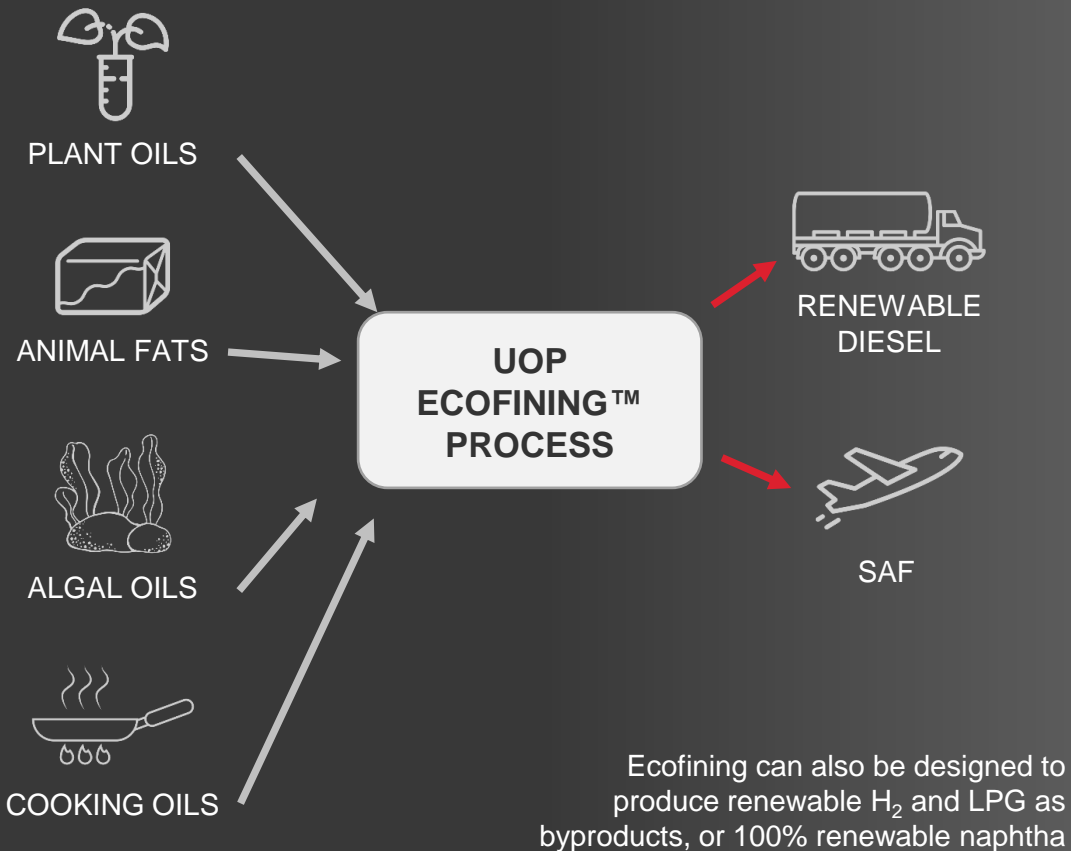


SAF demand expected to grow from <1% of global jet pool in 2022 to 35-40% by 2050

UOP RENEWABLE TECHNOLOGY SOLUTIONS



DROP-IN **RENEWABLE FUELS FROM HONEYWELL UOP**



Honeywell UOP is the Proven Licensor in Renewable Fuels

- Leading renewable fuels experience; 35 licenses and >25 years combined operating experience
- Proven start-up and performance tests with all units on stream, at capacity, and on spec within days of start-up
- 7 operating plants, including 3 customers expanding their facility with UOP



Commercial drop-in fuel replacements that are ready today

UOP UNITS PRODUCING SUSTAINABLE AVIATION FUEL

World Energy Paramount: Operating since 2016



- 150,000 MTA Feed (3,000 BPD)
- The first refinery retrofit to UOP Sustainable Aviation Fuel at Paramount, California
- Produces Sustainable Aviation Fuel and Renewable Diesel
- Expansion to 1,000,000 MTA (20,000 BPD)

Other Ecofining units under Design/Construction

Site	Capacity
North America	78,000 BPD
Europe	17,000 BPD
South America	24,000 BPD
Middle East	10,000 BPD
Asia	80,000 BPD

Most experienced licensor producing Sustainable Aviation Fuel!

BP To Use Honeywell's Ecofining™ Technology To Increase Global SAF Production

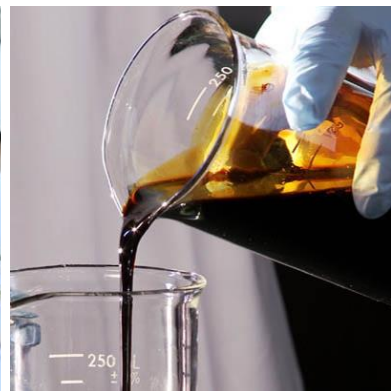


- Ecofining™ technology will be installed at 5 bp sites:
 - Cherry Point refinery, Washington, USA
 - Rotterdam II refinery, The Netherlands
 - Lingen refinery, Germany
 - Castellón de la Plana refinery, Castellón, Spain and
 - Kwinana Oil refinery, Kwinana, Australia



EXPANDING FEEDSTOCKS FOR SAF

- Finding alternative feedstocks is vital to producing Advanced Biofuels and SAF to meet global targets
- UOP understands the need for new technologies and is focusing on three pathways



UOP Ethanol to Jet (ETJ) Process

- Using ethanol or other alcohols as the basis for multi-step conversion to Jet/Diesel Fuel
- Expands on prior work and is based on largely commercial technologies

Biomass to Jet Technology

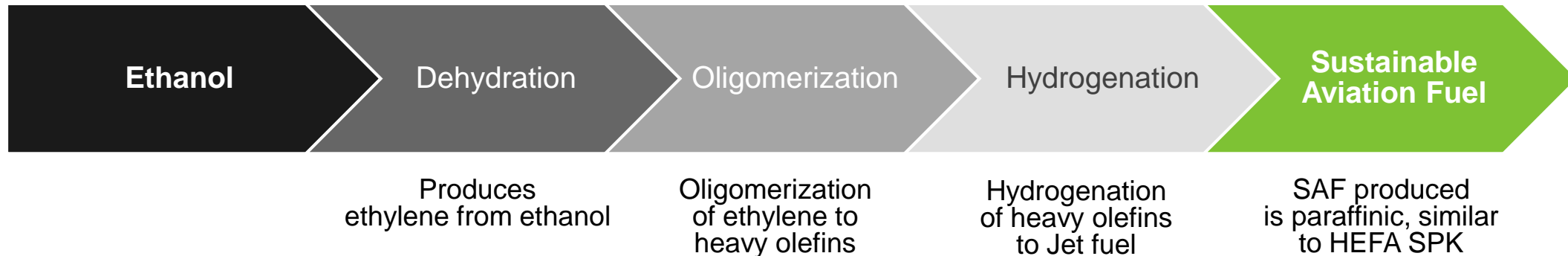
- Announcement from Honeywell, United Airlines, and Alder Fuels
- New pathway in development for processing of 100% SAF originating with solid biomass materials

CO₂ to Jet (via Methanol)

- CO₂ is the most challenging feedstock, but can achieve low carbon intensity
- Driven by mandates in Europe and incentives in the US
- Enabled by UOP's e-Fining technology

Expanding Feedstock Sources is Vital to Long-term Decarbonization

UOP'S APPROACH ETHANOL CONVERSION TO JET



Key Features

- High yields to jet and diesel from UOP's ETJ process
- Reduce greenhouse gas (GHG) emissions by 80% on a total lifecycle basis¹
- Compatible with hydrous or ASTM D4806 anhydrous ethanol
- Advanced heat integration for lower carbon intensity route
- Based on commercially demonstrated technologies – enables fast scale-up and quicker time to commercialization
- Option to purchase full-scope catalyst and process design to provide a single point of guaranteed accountability

HONEYWELL AND SUMMIT AGRICULTURAL TO BUILD WORLD'S BIGGEST ETHANOL JET PLANT

Summit NextGen Project:

- US Gulf Coast region, with access to easy logistics and utility infrastructure
- 250+ million Gallons/ year
- Operational by 2025
- Honeywell-UOP will provide related engineering and technical services, equipment, catalysts and adsorbents, and technical support services for start-up and throughout the life of the plant.
- Honeywell's ETJ technology can be modularized



"The creation of Summit Next Gen and our partnership with a technology leader like Honeywell UOP sets a new standard for the agriculture, ethanol, and aviation industries," **said Bruce Rastetter, CEO of Summit Agricultural Group.** "The agriculture and ethanol industries have a long history of continuous improvement producing more with less, and this has enabled forward-thinking ethanol producers to be favorably positioned for the present challenge of helping aviation reduce its carbon footprint."

HONEYWELL CO₂ SOLUTIONS

Chemical Solvents

- **Amine Guard™ & Amine Guard FS Process**
UOP is largest licensor of high concentration MEA-based systems; formulated solvents have lower Opex vs. MEA (> 600 units)
- **Benfield™**
Totally inorganic solvent for pressurized flue gas & industrial processes (> 650 units)
- **Advanced Solvent for Carbon Capture**
Direct CO₂ capture from flue gas for refining, power, steel, cement, and natural gas industries (seeking first commercial scale application)

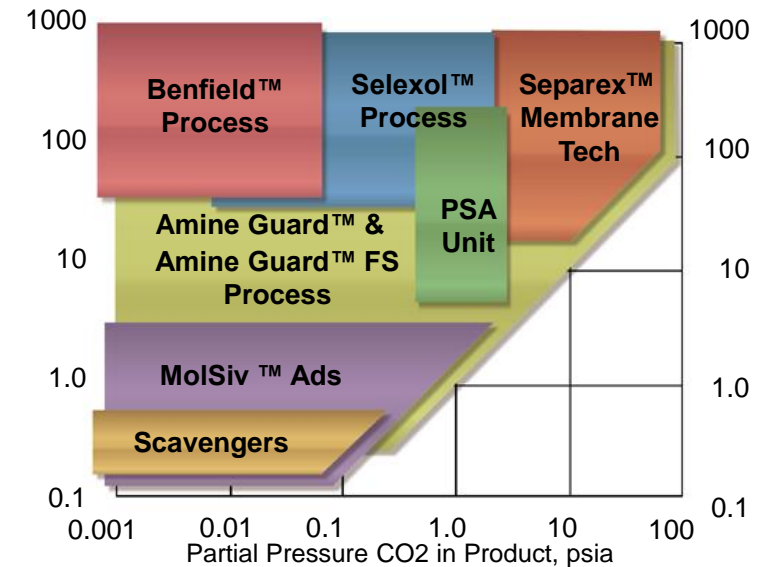
Physical Solvents

- **SeparALL™ Process**
H₂S/CO₂ selectivity using Selexol solvent for sources containing sulfur or in oxidative conditions (>50 units)

Note: Solvent processes can be used in hybrid cycles with other technologies like PSA, membranes, and cryogenics to optimize CO₂ capture

Adsorbents

- **Polybed™ Pressure Swing Adsorption (PSA) System**
Optimized adsorbents and cycles for CO₂ rejection (>1000 units, 3 operating in CO₂ application)



Cryogenics & Membranes

For capture of CO₂ at higher partial pressure

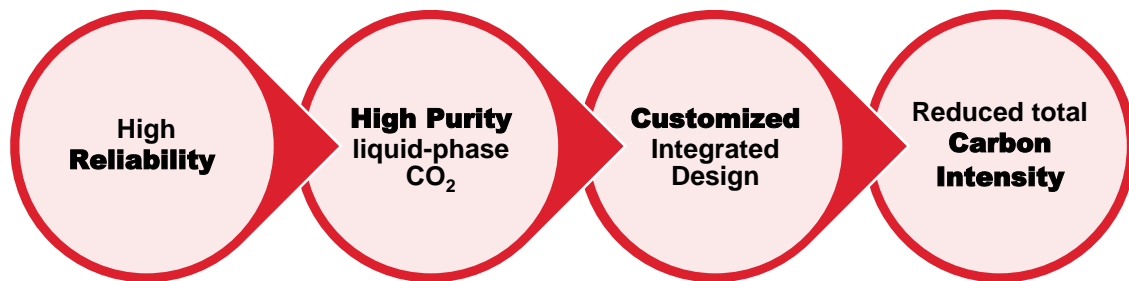
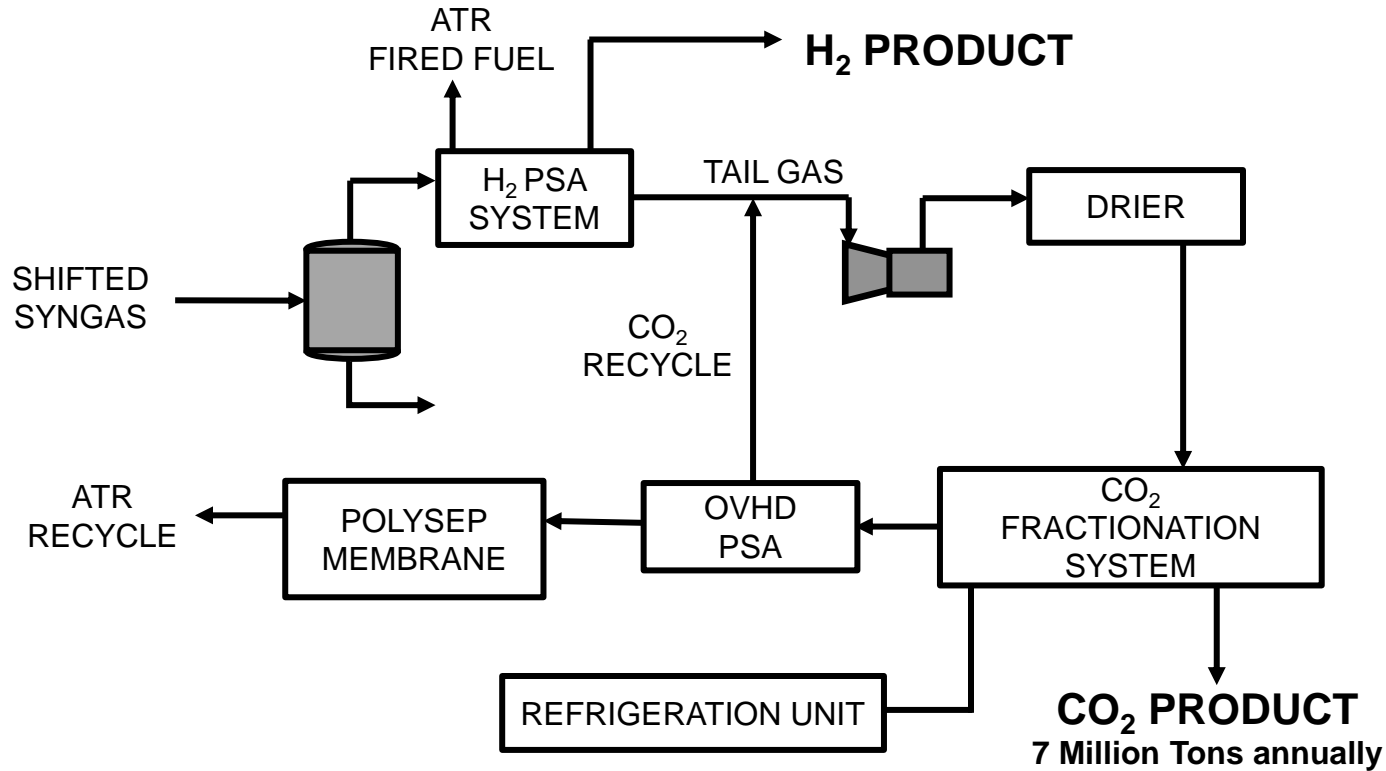
- **Separex™ Membrane Systems**
Significant experience in offshore capturing & sequestering CO₂ (>300 units)
- **Ortloff CO₂ Fractionation**
Not only captures but also provides CO₂ as a high purity liquid product (2 operating units)

UOP is leveraging existing technologies and expertise to deliver differentiation in new applications

Proven Technologies can be used for CO₂ Capture

EXXONMOBIL CASE STUDY

UOP H2 PURIFICATION AND CO2 FRACTIONATION



CO₂ Fractionation System

- Enables the capture of about **7 million tons of CO₂ annually**, equivalent to the emission of 1.5 millions of automobiles for one year¹

- **98% CO₂ emissions captured** across Low-Carbon Hydrogen production facility²

H₂ Purification

- **High Purity H₂ produced** from Pressure Swing Adsorption and Polysep™ Membrane technologies

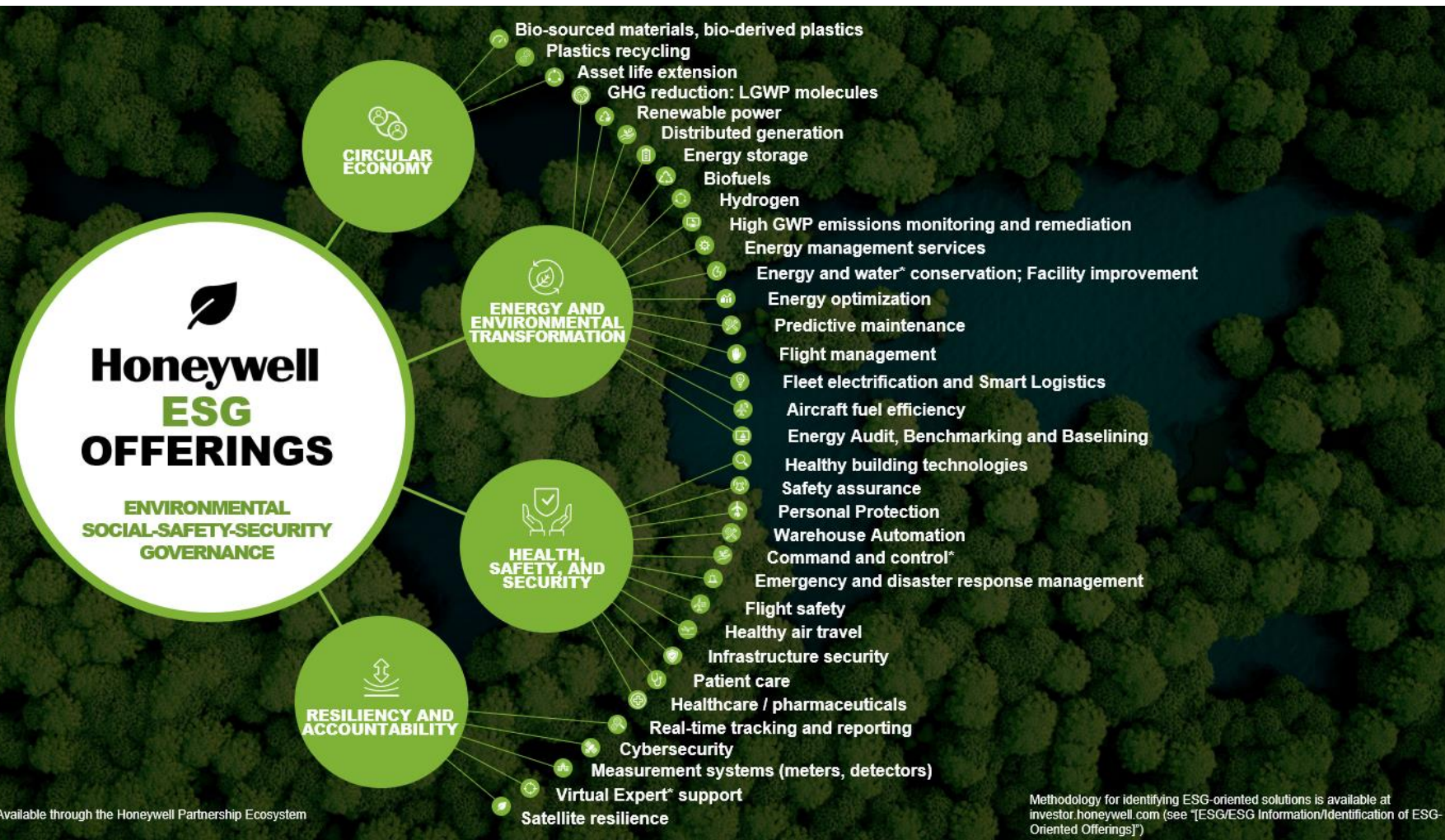
- ExxonMobil's H₂ production project will enable **up to 30% of scope 1 and scope 2 emissions** reduced at their Baytown facility³

¹ Based on the EPA's GHG equivalency calculator comparing nearly 7 million tons of CO₂ per year with gasoline-powered passenger vehicles on the road.

² CO₂ equivalent emissions is a calculated value based on the combined carbon compounds emitted from the Hydrogen production and Carbon Capture equipment plus the combined carbon compounds in the H₂ product.

³ Based on press release issued Feb 15, 2023, announcing HON H2 tech in Exxon Baytown facility. [Link](#)

CREATING SUSTAINABLE SOLUTIONS



HIGHLIGHTS

>60%

of sales were comprised of solutions that contribute to ESG-oriented outcomes

~60%

of our new product R&D activity is directed towards ESG-oriented outcomes

Innovating to Solve the World's Toughest Sustainability Challenges



**THANK
YOU**

**Honeywell
Uop**