



ENSYN

2015 BioEnergy
US Department of Energy

Advanced Cellulosic Biofuels

*Leveraging Ensyn's
commercially-proven RTP technology*

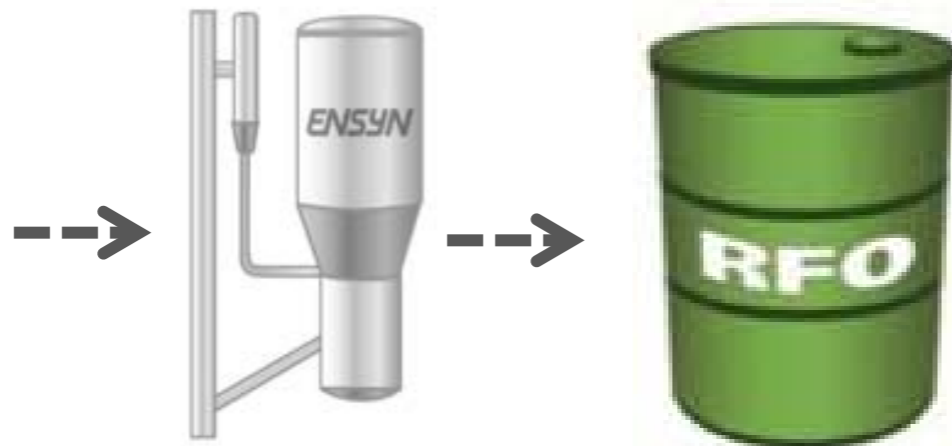


Our Business

Biomass Feedstock



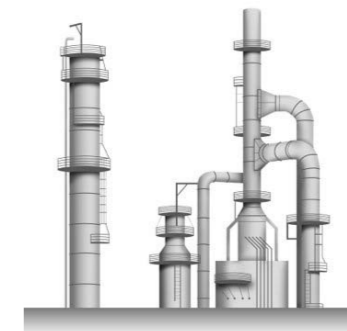
RTP Conversion



Renewable
Chemicals



Heating Oil



Refinery
Coproprocessing

30 Years of Successful Commercialization

1984



1989-Present
Renewable
Chemicals &
Heating Fuel



1998-2005
Heavy Oil Upgrading



2006-Present
Heating & Transportation Fuels



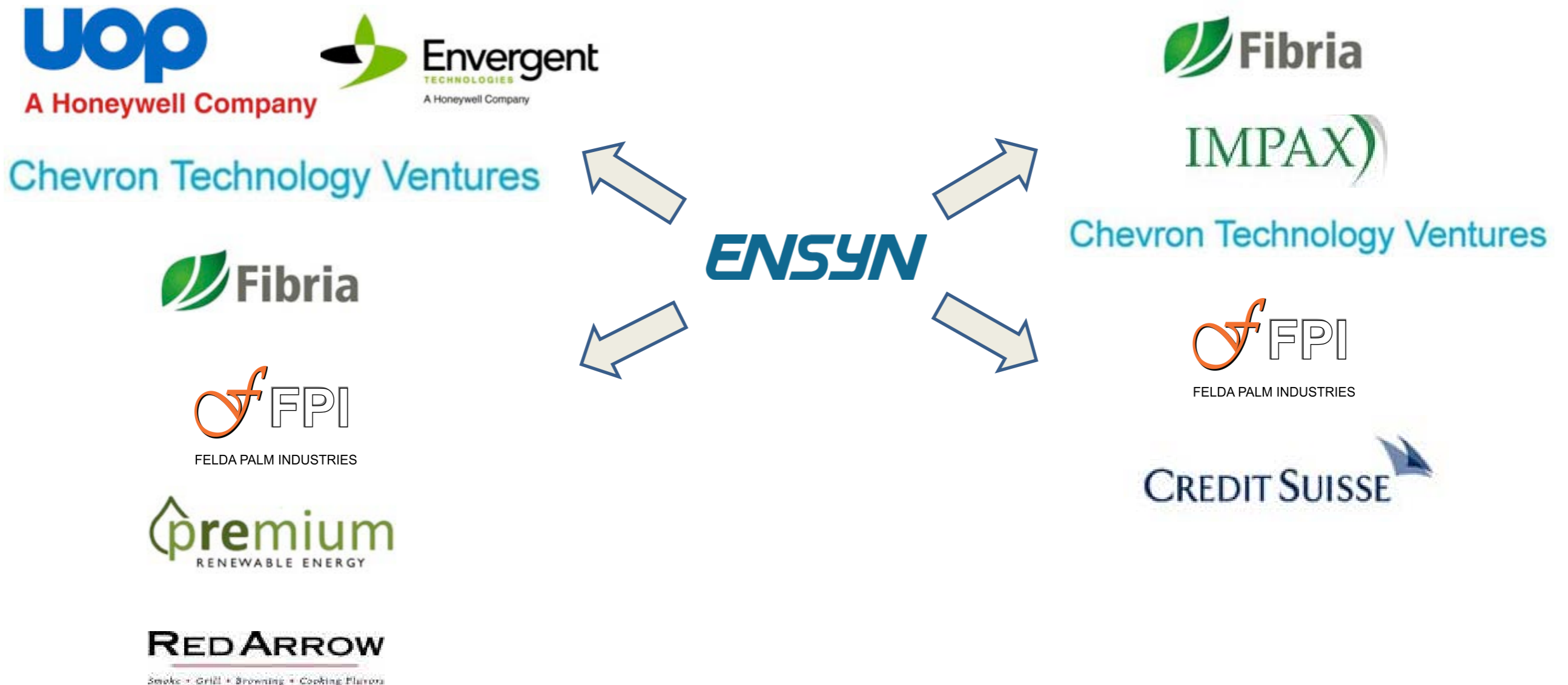
Technology focus over past 10+ years – Renewable Fuel

- ▶ Offtake applications: heating & refinery coprocessing
- ▶ Alliance with UOP for commercial roll-out

Powerful Strategic Relationships

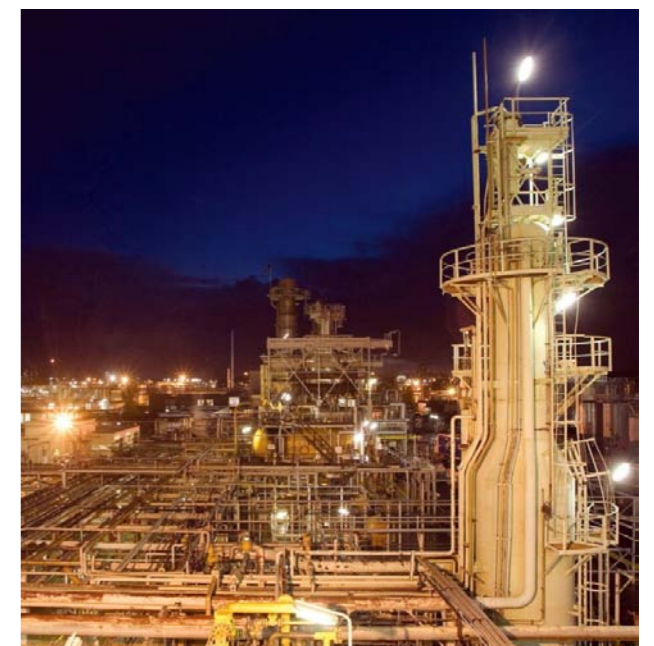
Strategic Relationships

Shareholders

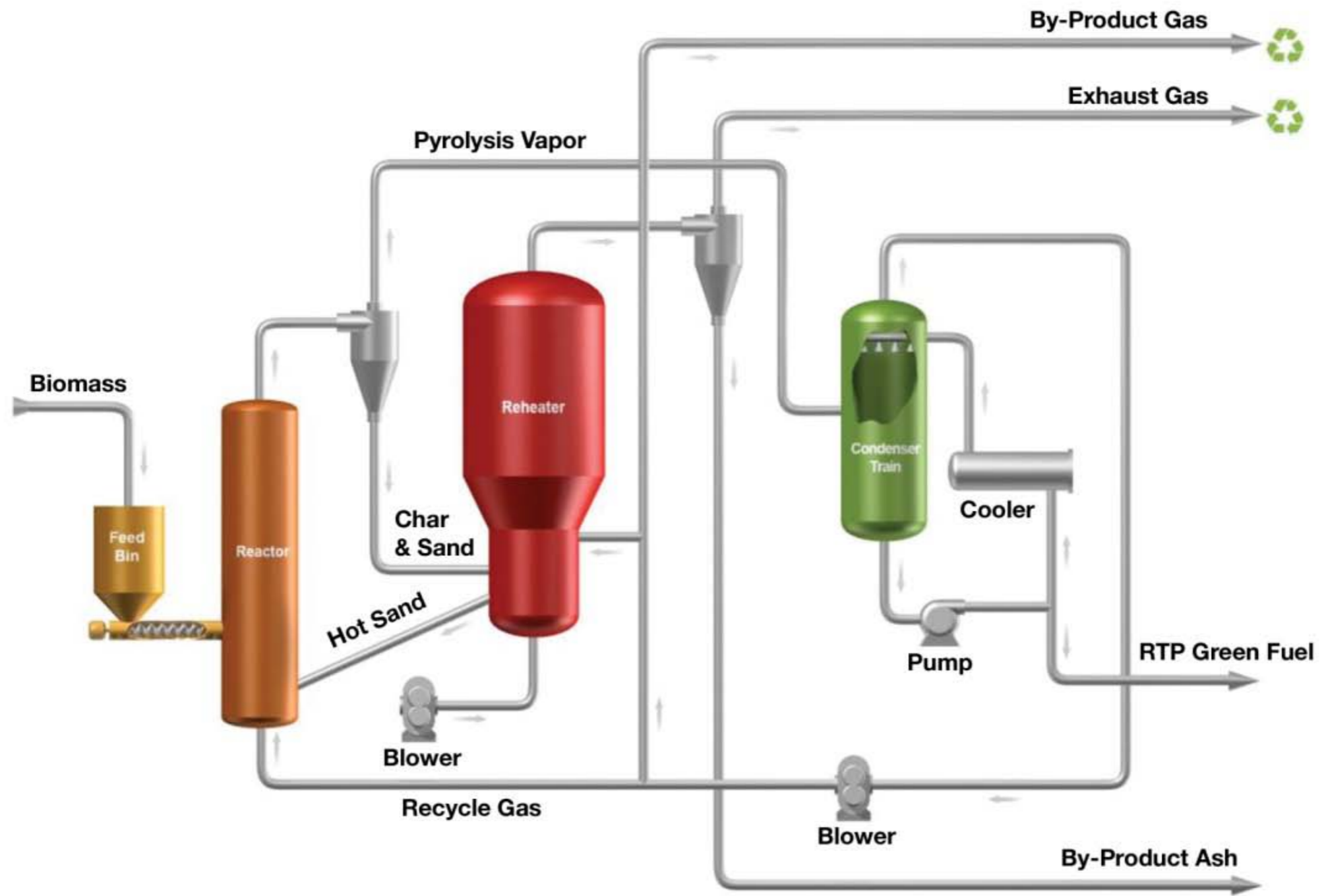


Technology Alliance with UOP

- Ensyn has a broad technology alliance with UOP
- Two major components to the alliance:
 - ▶ UOP provides RTP equipment to Ensyn's RFO production projects, with performance guarantees
 - ▶ UOP is assisting Ensyn in refinery coprocessing commercialization
 - Interfacing with refiners
 - Providing RFO delivery systems to refineries



Simplified PFD

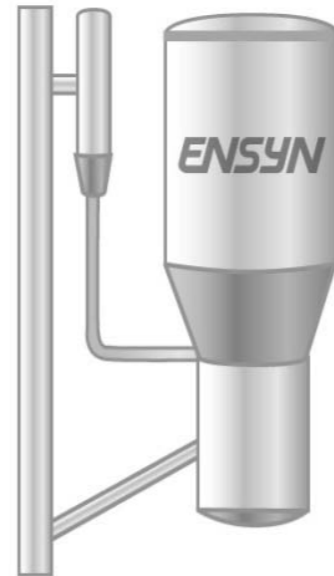


Maximum Conversion of Carbon

Biomass Feedstock



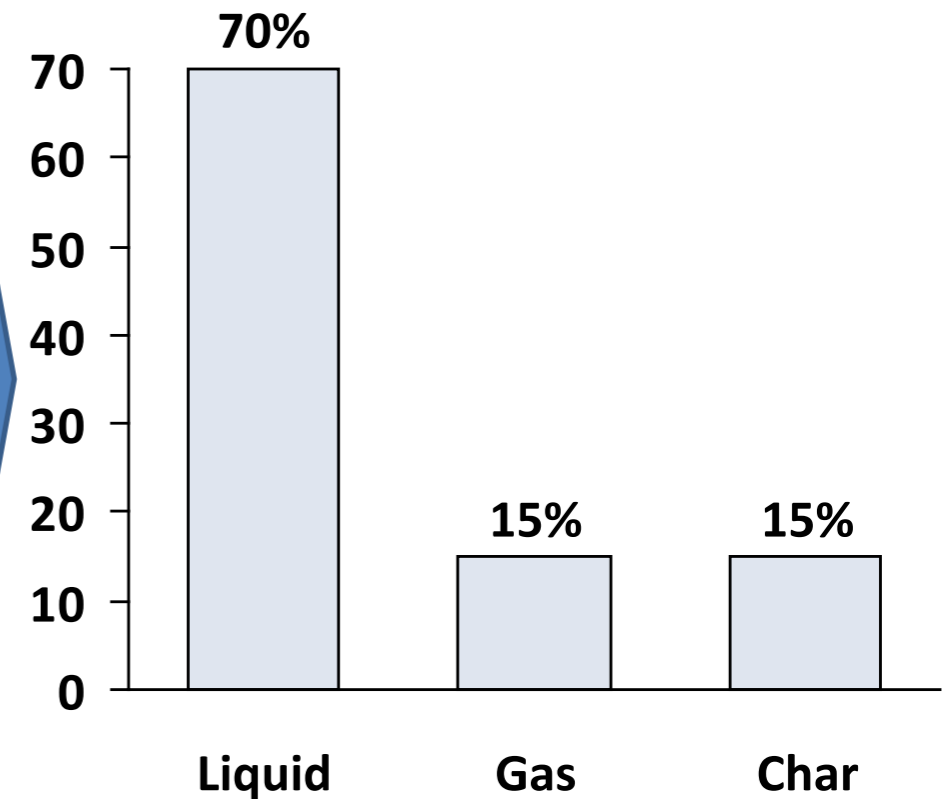
RTP Process



RTP Products



Approximate Product Yields (weight %)



- *Non-catalytic thermal process*
- *maximizes carbon conversion*
- *Low capex & opex*

RFO Production

- 7 fully-commercial biomass RTP units commissioned since 1989
- RFO - essentially the same product produced by Ensyn/Red Arrow over 25+ years – “liquid wood”
 - ▶ Over 40 million gallons produced to date – six commercial facilities in operation
- Ensyn has an existing 3 million gpy facility in Renfrew, Ontario
- Additional projects are under development to increase production capacity – Brazil, Canada, US



Ontario Production Facility



Aracruz Project - Brazil

- Partnership with Fibria Celulose S.A., (NYSE: FBR), the world's largest market pulp producer
- First project in Brazil announced – sited at Fibria's pulp mill in Aracruz, Espirito Santo
- Permitting and engineering in progress
- Initiation of construction in late 2015



RF Fuel Oil - Heating Sales & Contracts

- Memorial Hospital, New Hampshire
- Valley Regional Hospital, New Hampshire
- Youngstown, Ohio District Heating
- Mining operation – N. Canada
- Strategic Alliances with infrastructure/heating oil suppliers
 - ▶ Trane
 - ▶ Cleaver Brooks
 - ▶ Global



Memorial Hospital –RFO Fuel Oil Delivery System



RFO Refinery Feedstock: FCC Coprocessing

Refinery FCC Unit



RFO Coprocessing leverages on existing refinery infrastructure

- ▶ Lowers total CAPEX & OPEX
- ▶ Facilitates implementation
- ▶ Powerful yield structures

UOP

A Honeywell Company

Summary Data: Comparison of Coprocessed RFO-VGO and VGO Yields

% Yields From Coprocessed RFO-VGO Compared to
% Yields from VGO
(ratio of yields)



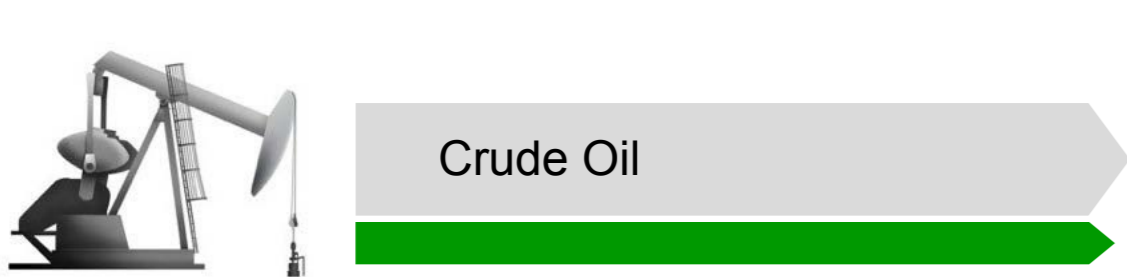
Over 200 Bench, Pilot, Demo and Commercial Trials completed



RFO performance volumetrically comparable to VGO

Refinery Coprocessing vs traditional approaches

Upstream



RFO

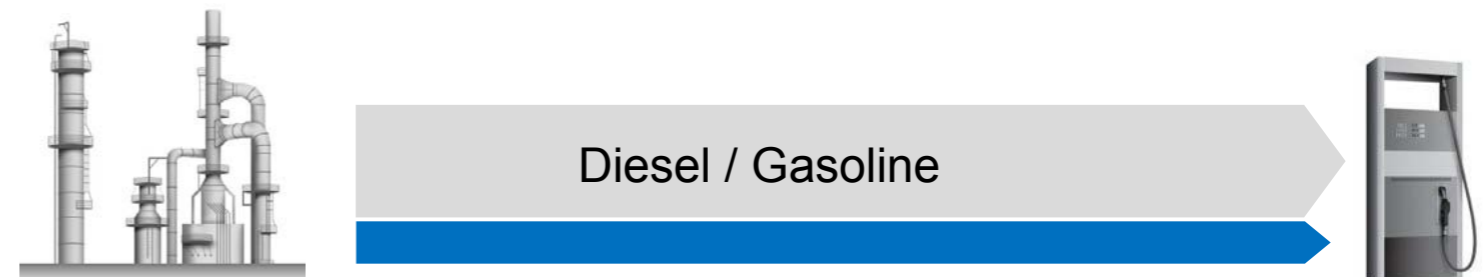


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Downstream



Traditional biofuels
Ethanol, biodiesel
(Blends)



Thank You

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