Our Business

Biomass Feedstock

Conversion to Biofuel

20-100 million litre/year RFO production facilities

Fuel Oil

Heating Oil

Refinery Feedstock

Refinery Coprocessing
Ensyn’s RTP® Technology

- Maximizes conversion of solid biomass carbon to the liquid phase
- Non-catalytic, thermal process
- Similar to Fluid Catalytic Cracking (FCC)
- No need for catalysts, high pressure or hydrogen
- Gas and char used to run the facility and dry the biomass

Approximate Product Yields (weight %)

- Liquids
- Gas
- Char
UOP Alliance

- Broad technology alliance with Honeywell UOP
- Envergent Technologies Inc
  - (55% UOP, 45% Ensyn)
  - Provides engineering services and RTP equipment to RFO production projects worldwide
  - Provides performance guarantees
- Ensyn and UOP are allied in the commercialization of refinery coprocessing
Strategic Relationships

Conversion to RFO

RFO Coprocessing

RFO Heating

Institutional Shareholders

Fibria
UOP (A Honeywell Company)
Envergent (A Honeywell Company)
Chevron Technology Ventures
Sprague
CleaverBrooks
Petrobras
TRANE
NREL
GLOBAL
RFO Heating Applications

- Over 25 years of combustion of RFO on an industrial scale
- Approximately 20 million gallons combusted in industrial boilers
- Now demonstrated across a range of applications
  - Large commercial/institutional
  - District Heating
  - Mining (indurating furnace)
RFO Heating Sales & Contracts

- Memorial Hospital, New Hampshire
  - 100% conversion to RFO over last 14 months
  - Generating D-7 RINs

- Valley Regional Hospital, New Hampshire

- Youngstown, Ohio District Heating

- ArcelorMittal, Quebec

- Strategic Alliances with infrastructure/heating oil suppliers
Refinery Coprocessing

RFO Coprocessing leverages on existing refinery infrastructure
- Lowers total CAPEX & OPEX
- Facilitates implementation

ASTM spec fuels NOT blends

Crude Oil → Ensyn’s RFO → RF Gasoline, RF Diesel
Refinery Coprocessing vs traditional approaches

Crude Oil → RFO → Diesel / Gasoline → Traditional biofuels (Ethanol, biodiesel (Blends))

ENSYN | A Honeywell Company
Coprocessing Yields

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

Petco 1 - Demo  Petco 2 - Pilot  Petco 3 - Pilot  Average

Gasoline + Diesel  Diesel  Gasoline  Decant Oil
NREL, Petrobras & Ensyn in a Collaborative R&D Agreement

Refinery Coprocessing

Petrobras processed Ensyn’s RFO & produced 800 gallons of diesel & gasoline

Product used for Part 79 testing

Confirmed Ensyn’s RFO yields

Results presented March 25, 2015 at DOE Bioenergy Technology Office (BETO)
### Enablers of TEA: Yields/Catalyst

<table>
<thead>
<tr>
<th>Weight %</th>
<th>100% VGO</th>
<th>95% VGO + 5% Bio-oil</th>
<th>90% VGO + 10% Bio-oil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry Gas</td>
<td>3.5</td>
<td>2.8</td>
<td>2.8</td>
</tr>
<tr>
<td>LPG (C3-C4)</td>
<td>13.8</td>
<td>13.8</td>
<td>12.5</td>
</tr>
<tr>
<td>Gasoline (C5-220°C)</td>
<td>39.9</td>
<td>40.6</td>
<td>38.8</td>
</tr>
<tr>
<td>Diesel (220-344°C)</td>
<td>20.3</td>
<td>19.6</td>
<td>19.2</td>
</tr>
<tr>
<td>Bottoms (+ 344°C)</td>
<td>16.1</td>
<td>14.4</td>
<td>14.4</td>
</tr>
<tr>
<td>Coke</td>
<td>6.4</td>
<td>6.0</td>
<td>6.5</td>
</tr>
<tr>
<td>CO</td>
<td>0.0</td>
<td>1.0</td>
<td>1.7</td>
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<tr>
<td>CO₂</td>
<td>0.0</td>
<td>0.4</td>
<td>0.6</td>
</tr>
<tr>
<td>Water</td>
<td>0.0</td>
<td>1.4</td>
<td>3.5</td>
</tr>
</tbody>
</table>

- Negligible catalyst deactivation caused by alkaline metals was found with 5 wt.% bio-oil.
- Longer test runs are necessary to address this issue.
Part 79

- Part 79 process taking place over the past 12-18 months
  - RFO produced in Ontario facility, shipped to Petrobras in Brazil
  - 800 gallons of renewable diesel & gasoline produced at Petrobras SIX facility, shipped to a major oil company in the US for initial testing
  - Final testing carried out at Southwest Research (SwRI) in San Antonio

- Part 79 approval for Ensyn’s renewable diesel granted in August 2015

- Results for renewable gasoline anticipated by year-end
RFO Production Facilities & Projects
Ontario Production Facility

- 3 million gallons/year facility
- Commissioned in 2006 as chemicals/fuels merchant facility
- Enhanced in 2014 as Ensyn’s anchor fuels facility
- Facility is qualified by the EPA under RFS program
- Sales to qualified users in the US are generating D-7 RINs
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 early 2016
2015+ Production Build-out
How we got here - A 30+ Year Development Story
Early Days – 1980s and Early 1990s

- Concept to Commercial
- Initial scale-up
- First licensing transaction (Food Products)
Mid 1990s

- Scale up to 30-40 TPD
- RTP image at right
  - Commissioned 1996
  - Still in production
- Petroleum upgrading
  Opportunity identified
Late 1990s & Early 2000s

- Heavy oil upgrading
- Early funding by Gulf
- Sequential development
  - Concept
  - Pilot
  - 1,000 bpd demonstration
- Petroleum rights sold in 2005 at a $100 M enterprise value
  - Proceeds delivered to Ensyn shareholders
2005 – 2014 – Return to Biofuels

- Construction of Ontario plant - 70 TPD
- Alliance with UOP
- Alliance with Fibria
- Expansion of heating applications & sales
- Enhancement of Ontario facility
- Development of Refinery Coprocessing
- Multiple additional alliances
- Project development – Canada, Brazil, US
2015+ Production Build-out
Keys To Survival

**Competitive Technology**
*Science Matters!*

**Perseverance**
*Setbacks happen!*

**Funding**
*Sources, timing, strategy*
*Traversing the Valley of Death*

**Alliances**
*Find strong friends*
*Timing is key: be a dining partner, not the meal!*
Thank You!