Production of renewable low carbon fuels and chemicals

Anchored by Ensyn’s commercial RTP process

Existing chemicals, heating & cooling business offer steady growth

Refinery market represents a large-scale, global opportunity

World-class strategic relationships across the value chain

Existing commercial production in Ontario

Capacity expansion underway in Quebec*, Brazil and the U.S.
Ensyn’s Business – Forest Biomass to High Value Products

Biomass Feedstock → RTP Process → Biocrude → Chemical Feedstock → Renewable Fuel Oil (RFO) → Refinery Feedstock

- Food Ingredients & Renewable Chemicals
- Heating & Cooling
- Refinery Co-processing
Maximum Conversion of Solid Carbon to Liquid

- Not “severe” – a 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 (energy self-sufficient)
- 35 patents issued, 97 pending
A 30+ Year Growth Story Backed by Commercial Operations

1984
1989 Commercial Deployment

1989
Heavy Oil

1998-2005

2006
Ontario Facility & return to Bio-energy

Ongoing Bioenergy Expansion

ENSYN
Strategic Relationships Across the Value Chain

Feedstock

Conversion to RFO

Refinery Feedstocks

Heating & Cooling

Specialty Chemicals & Food Ingredients

Fibria

Honeywell

Honeywell

Sprague

Red Arrow

ARBEC

Envergent

Chevron Technology Ventures

CleaverBrooks

KERRY

Roseburg

A Forest Products Company

Envergent

A Honeywell Company

Tesoro

Br Petrobras
Specialty Chemicals – Initial Commercialization

- Initial commercial application – specialty chemicals & heating fuels
- 25+ years of commercial production
- Over 40 million gallons produced
- Five commercial RTP facilities in operation
- Strategic relationship: Kerry Group (Red Arrow Products, Wisconsin)
- Over 30 food products developed
- Red Arrow is now the market leader
Heating Fuels

- Over 25 years of combustion on an industrial scale
- Approximately 20 million gallons used in industrial boilers
- Now demonstrated across a range of applications
  - Heating & cooling markets
  - Large commercial and institutional users
  - District heating systems
  - Mining (indurating furnace)
Refinery Co-processing vs. Traditional Biofuels

Leveraging existing infrastructure:

- Lowers the refiners CAPEX & OPEX of compliance
- Facilitates implementation
- Up to 5% biocrude processed with conventional petroleum feedstocks
- Provides comparable yields on a volumetric basis
- Does not compete for market share with the refiner
- Allows refiner to control generation of their regulatory credits
Co-processing Commercialization

- 5+ years of development
- Strategic alliance with Honeywell UOP expanded in 2014 to include Refinery Co-processing
- In negotiations with a motivated group of “Early Adopter” refiners
- Announced refiner strategic relationships include Chevron & Tesoro
- Several additional refiner initiatives underway
- Biocrude supply for these contracts:
  - Initially from the Ontario facility
  - Additional deliveries from projects in development
Regulatory Framework Supports Deployment

- **RFS** – the following pathways are in place
  - RFO Heating (D7 RINs – Ensyn leading producer of D7 RINs)
  - Co-processing gasoline (D3 RINs)
  - Co-processing diesel (D7 RINs)

- **LCFS** – California pathway approved:
  - For Ensyn’s renewable gasoline and diesel
  - Carbon intensity determined to be approximately 20.25 g CO$_2$e/MJ

- **RECs**
  - Generation of REC- eligible heat since Aug 2015 in NH
  - Final stages of measurement protocols with the regulatory authorities
Production Facilities & Projects
Ontario Production Facility

- Operational facility with capacity of 3 million gallons per year
- Deliveries ongoing to commercial markets – focus on U.S. markets
- Commissioned in 2006 with a focus on chemicals/fuels production
- Enhanced in 2014 as Ensyn’s anchor fuels facility
- Facility is qualified by the U.S. EPA under the RFS program
- Sales to qualified users in the U.S. are generating D-7 RINs
Cote Nord Project, Quebec

- 10 million gpy facility being constructed by Ensyn and Arbec Forest Products
- First of several projects under a joint development agreement
- Located at Arbec’s sawmill in Port Cartier, Quebec - feedstock is forest slash
- Product will be sold to heating and refining customers in the U.S. Northeast
- Civil work has begun and major equipment modules ordered
- Project capex approx CAN$ 103 million, fully funded, financing parties include:
  - Sustainable Development Technology Canada
  - Investments in Forestry Industry Transformation
  - Investissement Quebec
Aracruz Project - Brazil

- 22 million gallon per year facility being developed in partnership with Fibria Celulose
- Located at Fibria’s pulp mill in Aracruz, Espirito Santo
- Feedstock is eucalyptus forest residues
- Offtake targeted for U.S. refineries and heating clients
- Preliminary engineering substantially complete
Vienna Project, Georgia

- 20 million gallon per year facility being developed by Ensyn, Renova Capital Partners, and Roseburg Forest Products
- Location is a mothballed mill in Dooly County, Georgia
- Feedstock is forest residues and thinnings from local sources
- Product targeted for refineries and district heating clients
- Conditional commitment from the USDA for a $70 million loan guarantee with Citibank as the Lender of Record
- Preliminary engineering substantially complete
Ensyn’s Success is Supported by its Strong Investor Base

Credit Suisse
Fibria
investeco
Roseburg
Impax

Chevron Technology Ventures
Advancing the Bioeconomy Initiative