



ENSYN

Scale-up & Optimization BETO Workshop

October 5-6, 2016 Rosemont, IL



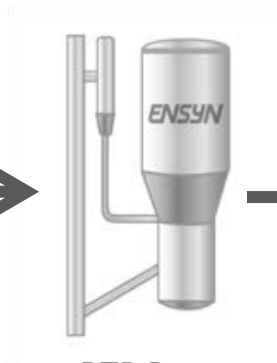
Ensyn's Business – Forest Biomass to High Value Products

*Maximum Conversion of
Solid Carbon to Liquid*

**Biomass
Feedstock**



**Conversion
to Liquid
Biocrude**



RTP Process



**Chemical
Feedstock**

**Food Ingredients &
Renewable Chemicals**



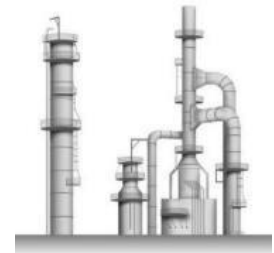
**Renewable Fuel
Oil (RFO)**

Heating & Cooling



**Refinery
Feedstock**

**Refinery
Co-processing**



- Not “severe” – a non-catalytic, thermal process
- Mechanically similar to Fluid Catalytic Cracking (FCC)
- No high pressure or hydrogen
- Gas and char used for process & drying

A 30+ Year Growth Story Backed by Commercial Operations



1984



1989
Commercial
Deployment



1998-2005
Heavy Oil



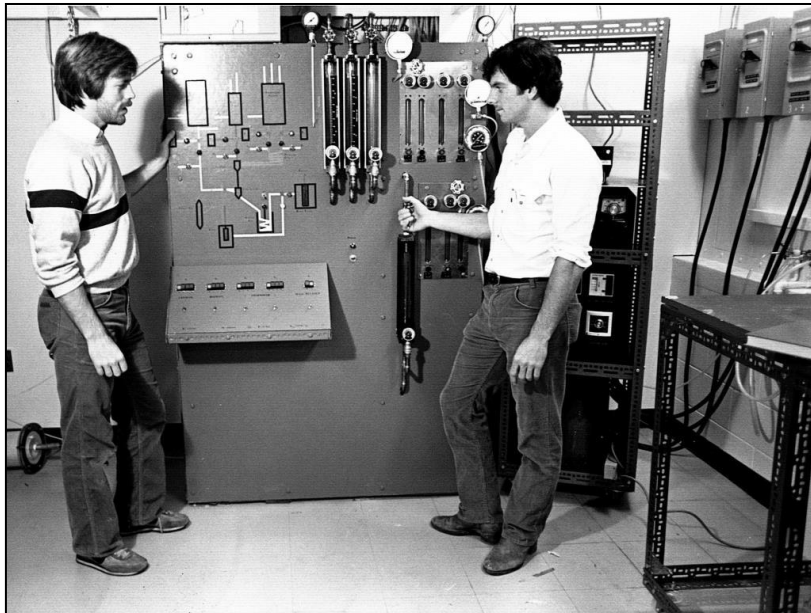
2006
Ontario Facility &
return
to Bio-energy



Ongoing
Bioenergy
Expansion

Crossing the “valley of death”

1984 – Early 1990s Initial Commercialization – Food Ingredients & Industrial Heating Fuels



- From proof of concept to 2 Ton per day
- Demo evolved to commercial unit

Early 1990's Scale-up

Food Ingredients & Heating Fuels



- From 2 Tons/day to 30 Tons/day
- Both units in operation today

1998 – 2005: Scale-up Heavy Oil Upgrading



- From Pilot to 300 barrels per day of residual oil
- Approximately equivalent to 70 dry tons of biomass/day

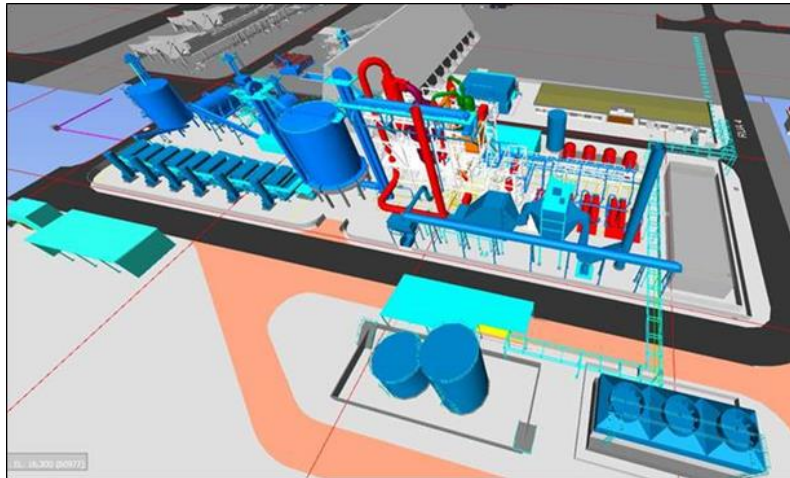
2006 – Renfrew Merchant Plant



- 70 tons/day nameplate
- 3 million gallons/year
- Operated since 2006
- Ensyn's first dedicated fuels facility

Expansion Projects for Fuels – Honeywell UOP

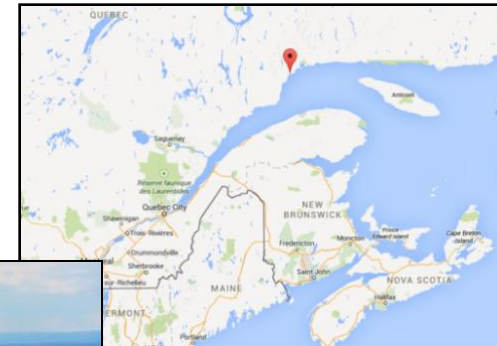
- Increasing Biocrude production capacity
- Engineering & Supply by Honeywell UOP with performance guarantee
- Two designs: 5 million gpy & 20 million gpy (100 & 200 tpd)



Cote Nord Project, Quebec



- 10 M gpy (200 tpd) facility – partners are Ensyn, Arbec Forest Products, Groupe Rémabec
- First of several projects under a joint development agreement
- Located at Arbec's sawmill in Port Cartier, Quebec - forest slash feed
- Product will be sold to heating and refining customers in the U.S. Northeast
- Fully financed, under construction
- Project capex approx CDN\$ 103 million



Cote Nord – Under Construction



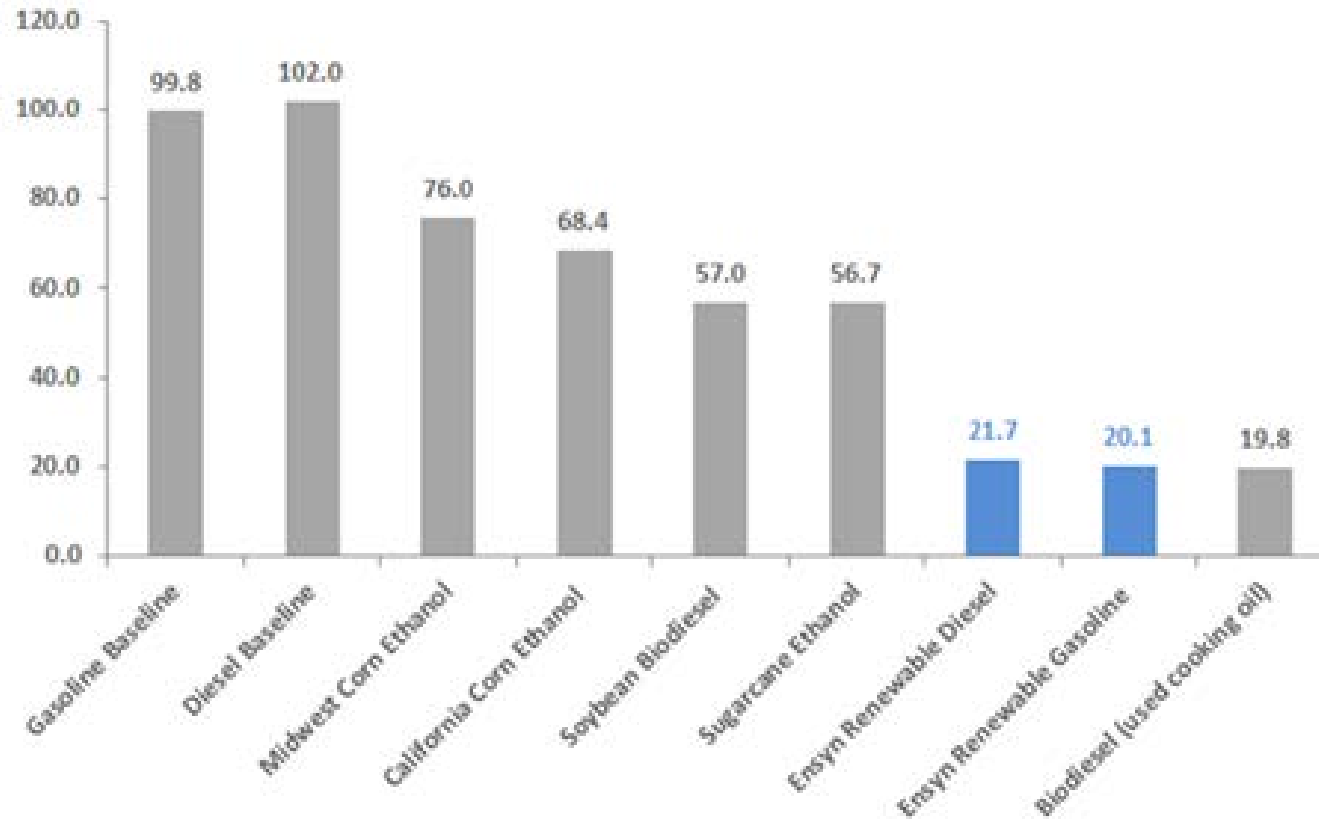
Cote Nord – Commissioning scheduled for end 2017

Regulatory Framework Supports Expansion

RFS	<ul style="list-style-type: none">▪ Three pathways for Ensyn – fuel oil (D-7), renewable gasoline (D-3) & cellulosic diesel (D-7)▪ Part 80 registration at Renfrew facility▪ Part 79 approval for Ensyn’s renewable gasoline and diesel
LCFS	<ul style="list-style-type: none">▪ Ensyn’s renewable gasoline & diesel approved by the California ARB (4 co-processing pathways)▪ Carbon Intensity of 21-27 gCO₂e/MJ – among the lowest
RECs	<ul style="list-style-type: none">▪ Generation of REC-eligible fuel oil since August 2015 in NH▪ Final stages of agreeing on measurement protocols with the regulatory authorities

California regulatory framework is very attractive

- Strong LCFS provisions, in addition to RFS and Cap & Trade





Thank You !!