

ENSYN

RTP™ BIO-REFINERY

ENSYN
Sustainable Solutions



Energy From Biomass

Extending the Value Chain



Presentation By:

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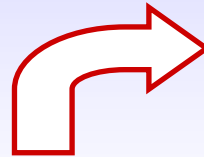
United Nations Climate Change Conference –
Montreal 2005

November 30, 2005

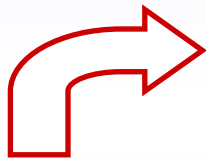
Extending the Value Chain

Biomass Refining Steps

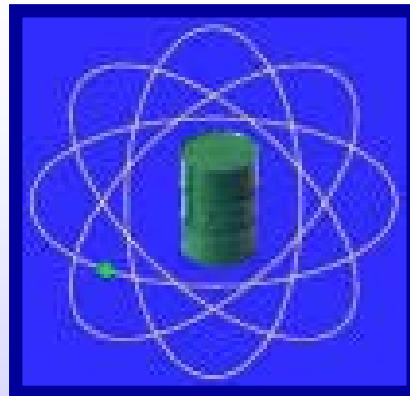
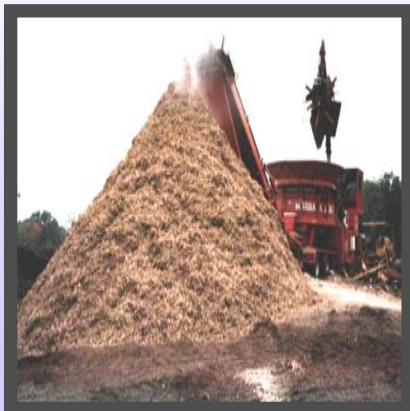
Refined Products



Liquid Wood



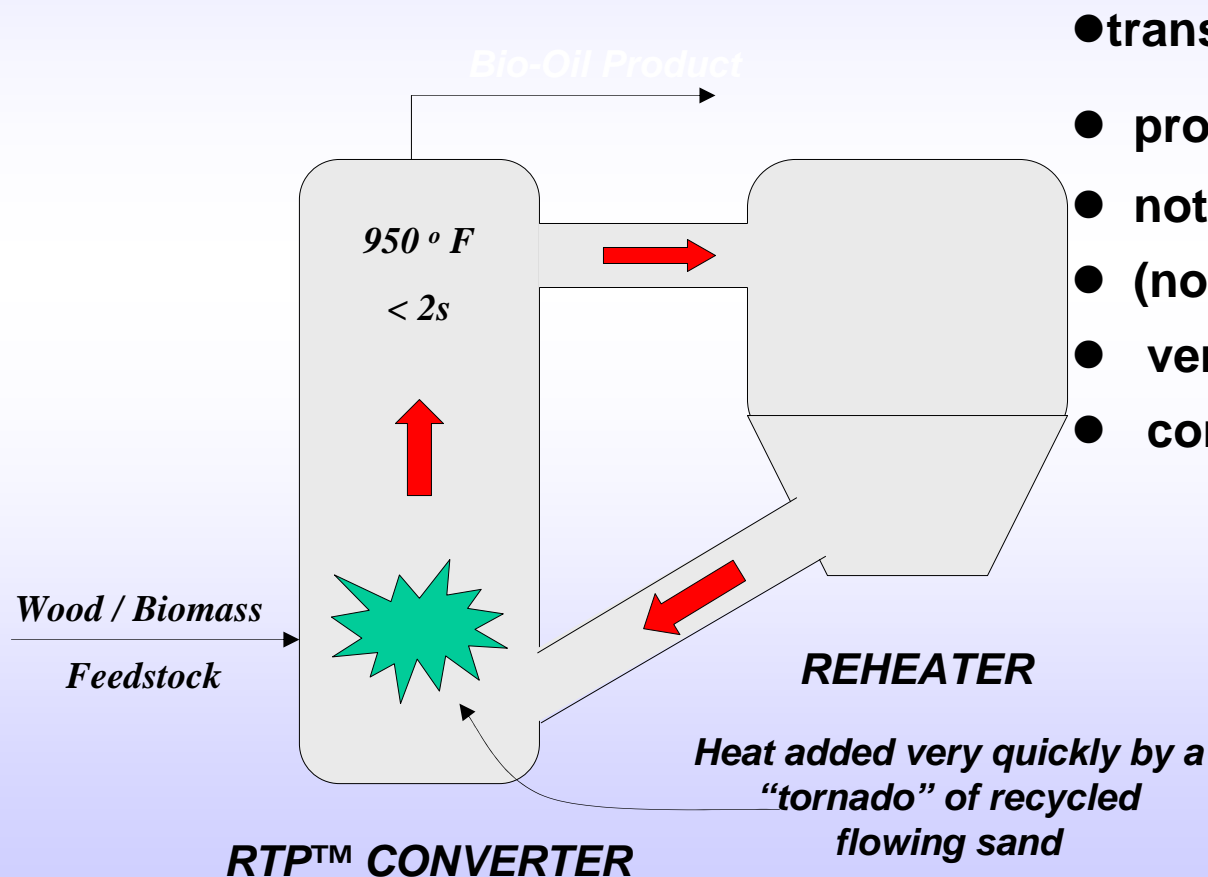
Wood Residues



November 30, 2005

Extending the Value Chain

Ensyn “RTP™” Bio-Refining Core Technology



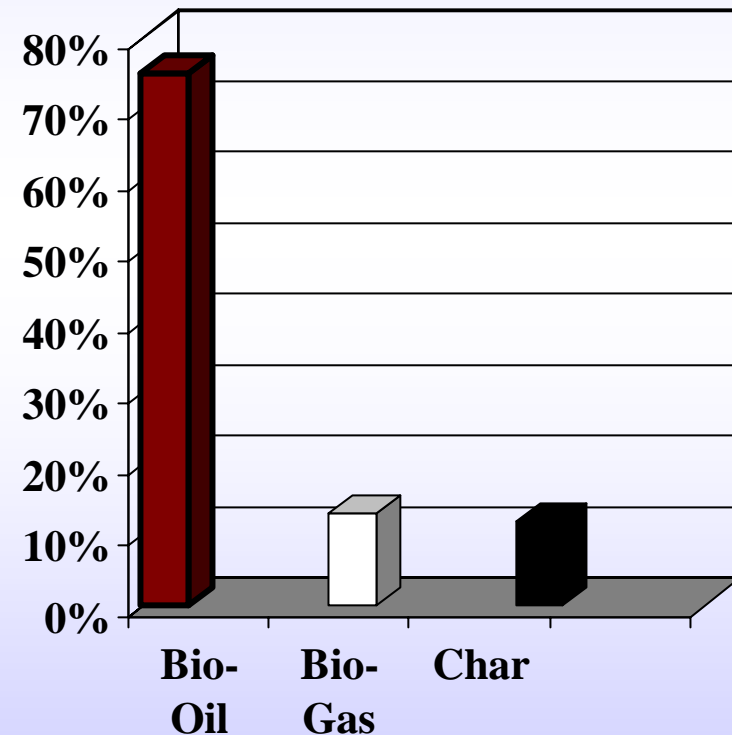
- transported fluidized bed
- proven technology
- not a “severe” process
- (no catalyst, low pressure)
- very fast heat addition
- compact & modular

RTP™ - Bio-Oil “Crude” Product Yield

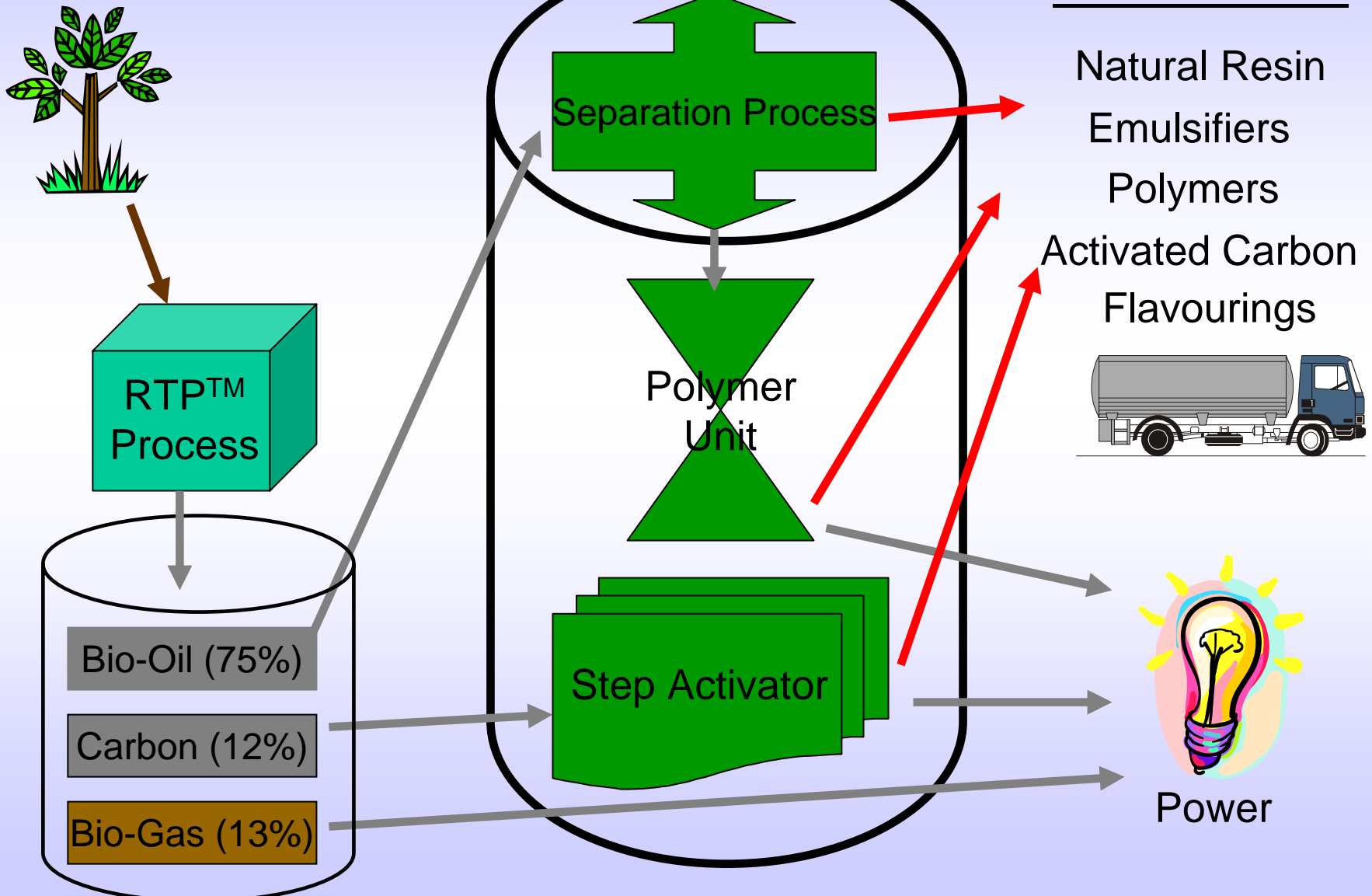
Biomass (Wood) Applications: -

current commercial optimums

- high yields of light liquid “bio-oil”, typically 75 wt %
- bio-refinery approach extracts & isolates natural chemicals
- by-product bio-oil applied to heat and power applications
- by-product char value added products or energy
- bio-gas used for process energy or power

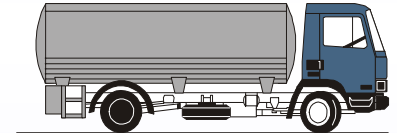


The RTP Bio-Refinery Process



The Products

Natural Resin
Emulsifiers
Polymers
Activated Carbon
Flavourings



Power

Commercial Summary

- commercial production and sale of bio-oil since 1989
- current annual bio-oil production capacity is in excess of 5 million gallons.
- products sales include food ingredients, food enhancers, and construction material polymers.
- gas, liquid and solid energy products providing process energy.
- product development approach parallels petroleum refinery model - bio-oil is treated as a “crude” oil.
- chemicals are isolated, extracted and processed to meet customer specifications.

Commercial RTP™ Equipment



40 dry TPD

Operating since 1995



45 dry TPD

Operating since 2002

Benefits of a Biomass-Refinery

- Onsite thermal energy – modular integration
- Transportable gas, liquid and solid energy
- Processing flexibility for multiple feedstocks
- Product diversification – multiple natural chemicals

PRODUCT DEVELOPMENT MODEL

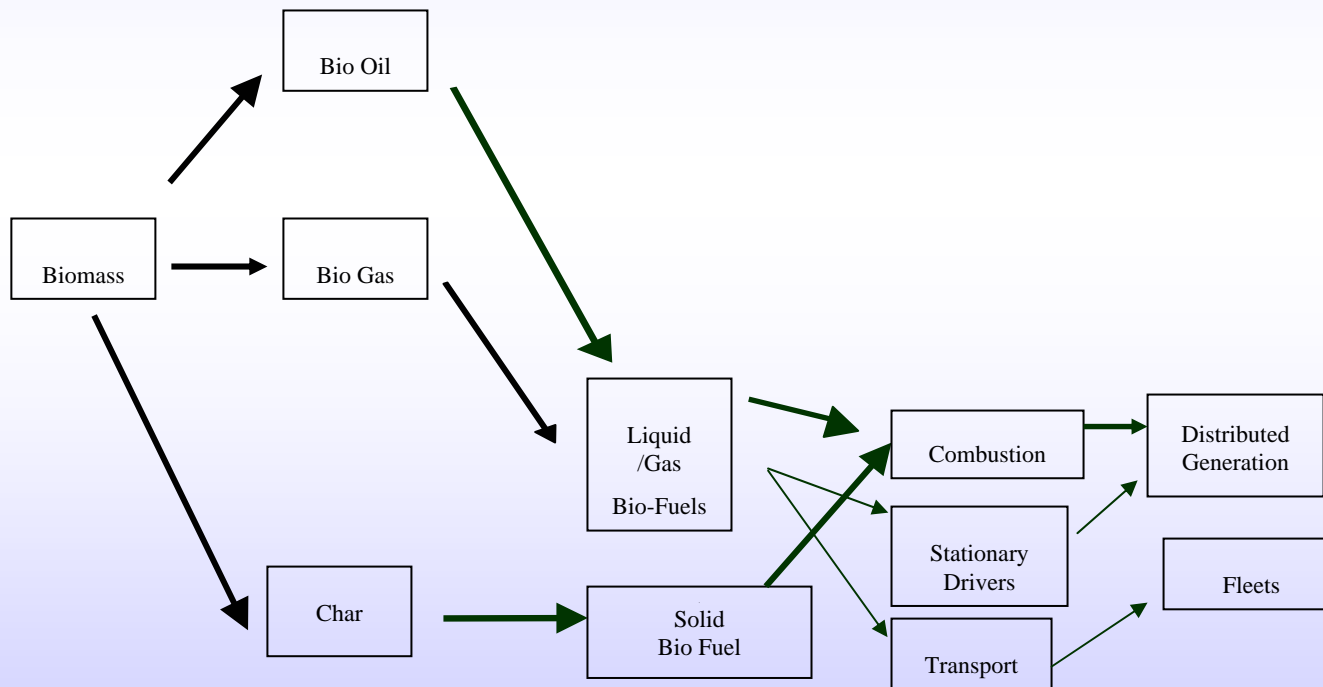
INPUTS

BASIC
BUILDING
BLOCKS

INTERMEDIATES

DERIVATIVES/
APPLICATIONS

CUSTOMERS



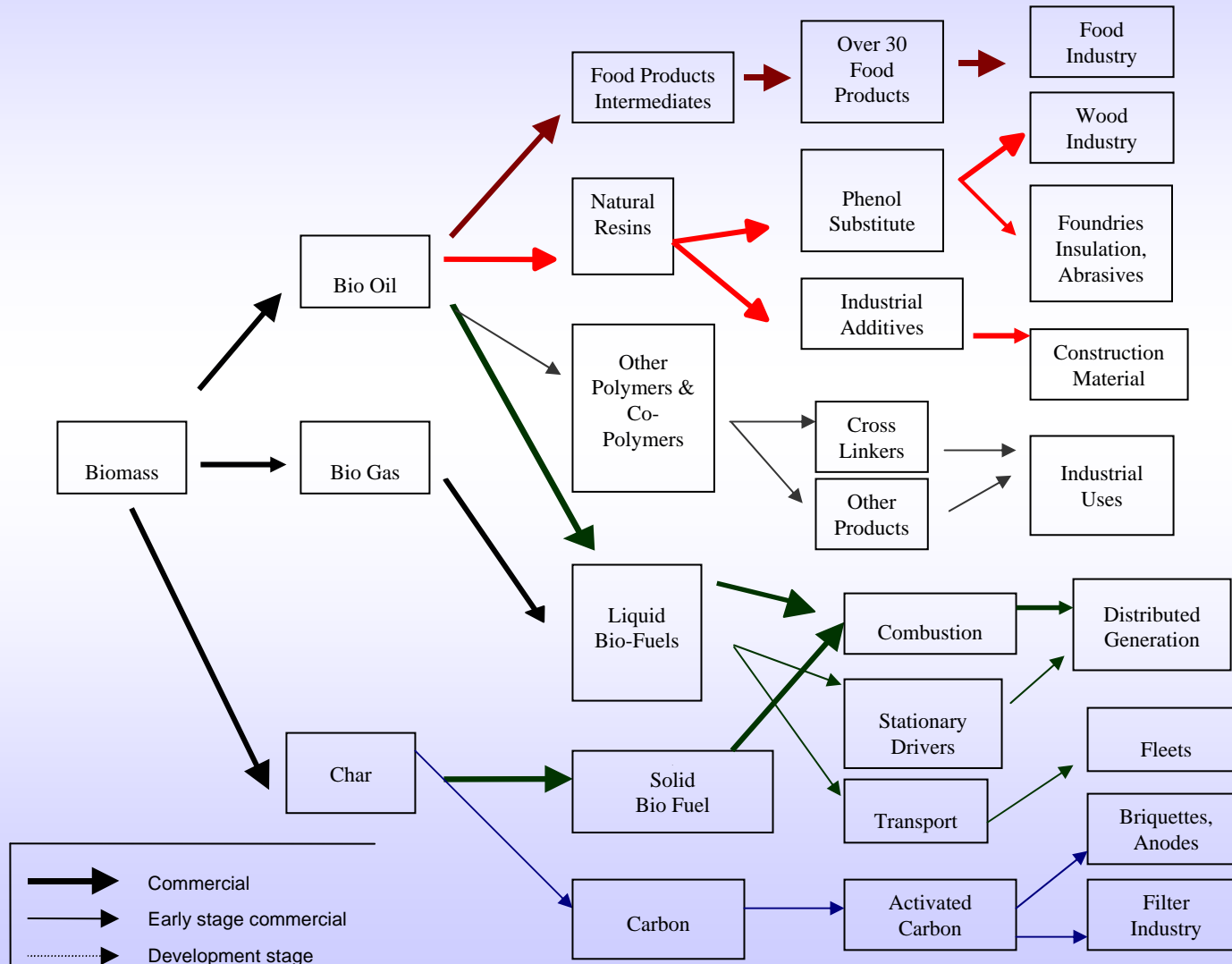
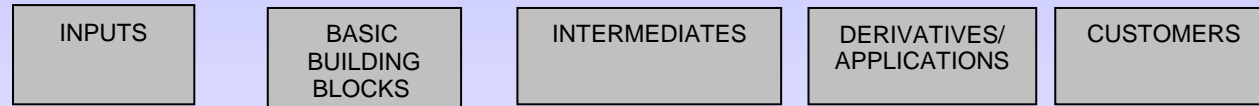
PRODUCT OVERVIEW

Energy Products

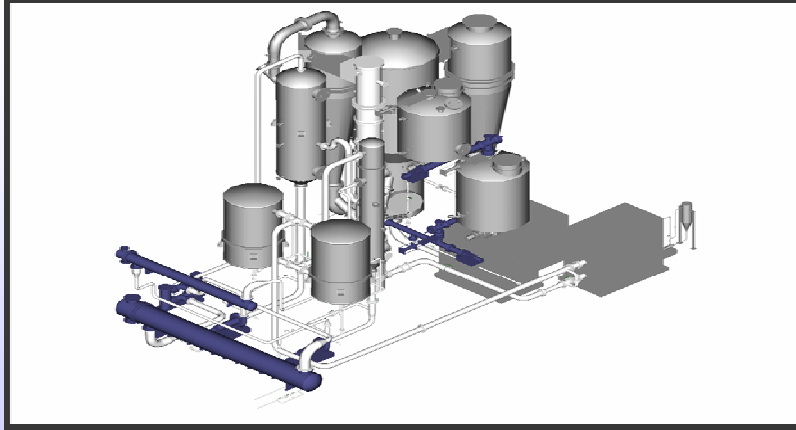


- in production since 1989
- clean burning, CO₂ neutral, no sulphur, minor NOx
- allows for emission reductions in existing fossil fuel facilities
- process heat & co-generation
- conventional storage allows for peak power production

PRODUCT DEVELOPMENT MODEL



Production Expansion Renfrew Bio-Refinery



- retrofit of existing vacant industrial facility
- produces a range of products from regional available feedstocks (forestry and agriculture)
- first of many to be driven by product markets and availability of feedstocks.
- commercial scale facility open to collaborations for new product concepts and development



Thank You