Advanced Biofuels and Bio-Refinery Platforms
Creating the Bio-Refinery Platform

- In Canada, and more specifically Ontario, the effort has been a true collaboration of Government, Communities, Industry, and Investors.
  - *Eco Energy for Biofuels Program*
    - Natural Resources Canada
  - *Eco Agriculture Biofuels Capital Incentive*
    - Agriculture Canada
  - *Ontario Ethanol Growth Fund*
    - Ontario Ministry of Agriculture and Rural Affairs
  - *5% Mandated Blend Rate Nationally and Provinceially*
IGPC Ethanol Inc.-One Example

- **Project Conceptualized in 2002**
- **Investors**
  - Approx 900 Shareholders totalling $58MM
- **Lenders**
  - Syndicated Term Debt totalling approx $65MM
- **Community**
  - Aylmer, Ontario
  - Municipal Government Support
- **Provincial & Federal Support**
  - Approx $30MM total Capital Incentive
  - Ongoing Operating Grants
  - Governed by Contribution Agreements
- **Technology Provider**
  - ICM Inc.
- **Constructor**
  - North America Construction (NAC)
IGPC Ethanol Inc.

• Construction commenced July 2007
• Workforce Hired July 2008
• Project Commissioned Sept 2008

2013.....
• Healthy Balance Sheet
• Skilled workforce
• Proven Track Record
  – To Communities and Government
  – To Investors and Lenders
  – To Future Partners
• Knowledge Base
  – Renewable fuels
  – Starch Chemistry
  – Fermentation
Beyond Ethanol

• **Considerations:**
  – **Synergies with current platform products**
    • Starch, protein, ethanol, carbon dioxide
  – **Synergies with current markets**
    • Fuels, animal nutrition, grains and oil seeds
  – **Market requirements**
  – **Emerging Technology Trends**
  – **Government Policy and Direction**
    • Growing Forward II
  – **Financial**
**Beyond Ethanol**

- **Opportunities:**
  - Advanced renewable fuels
    - Further GHG reductions
    - Differentiated feedstock - Beyond ‘Food vs Fuel’
      - Wood waste
      - Municipal waste
      - Food processing waste
      - Feedstock agnostic
    - Includes ethanol and “drop in” fuels
  - Renewable Chemicals
    - Glycol
  - Nutraceuticals
    - Omega 3
# Evolving Platform

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<td><strong>Oil Extraction</strong></td>
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<td>– Pathway to advanced fuels</td>
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<td><strong>Wet Fractionation</strong></td>
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<td>– Simulates wet mill</td>
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<td>– Isolates fibre</td>
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<td>– Improves fermentation efficiency</td>
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<td>– Increases co-product protein levels</td>
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<td>– Establishes pathway to advanced fuels from fibre</td>
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Corn Bio-Refining
A Material Conversion Process

“Complex” Corn Bio-refinery
- Complex, integrated process flow
- Multiple upgrading process units and bolt ons
- Feedstock Agnostic
- Multiple valuable products
- Limited low value product (distillers’ grains)
- More energy & other inputs
- Less expensive feedstock