AGRI-FOOD WASTE ENHANCEMENT IN NAIT APPLIED RESEARCH

JUSTICE ASOMANING

FEBRUARY 13, 2024

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CREDIT PROGRAMS

NON-CREDIT PROGRAMS

APPLIED RESEARCH

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WE ARE ON A MISSION

At NAIT Applied Research, we work with our industry partners to address their complex problems and find solutions that improve processes, create technologies, and make an impact for Albertans.

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THIS IS CAPABILITY

OUR APPLIED RESEARCH CENTRES

- Centre for Boreal Research
- Centre for Culinary Innovation
- Centre for Energy and Environmental Sustainability
- Clean Technologies Team
- Centre for Grid Innovation
- Centre for Data Management & Visualization
- Centre for Sensors and System Integration

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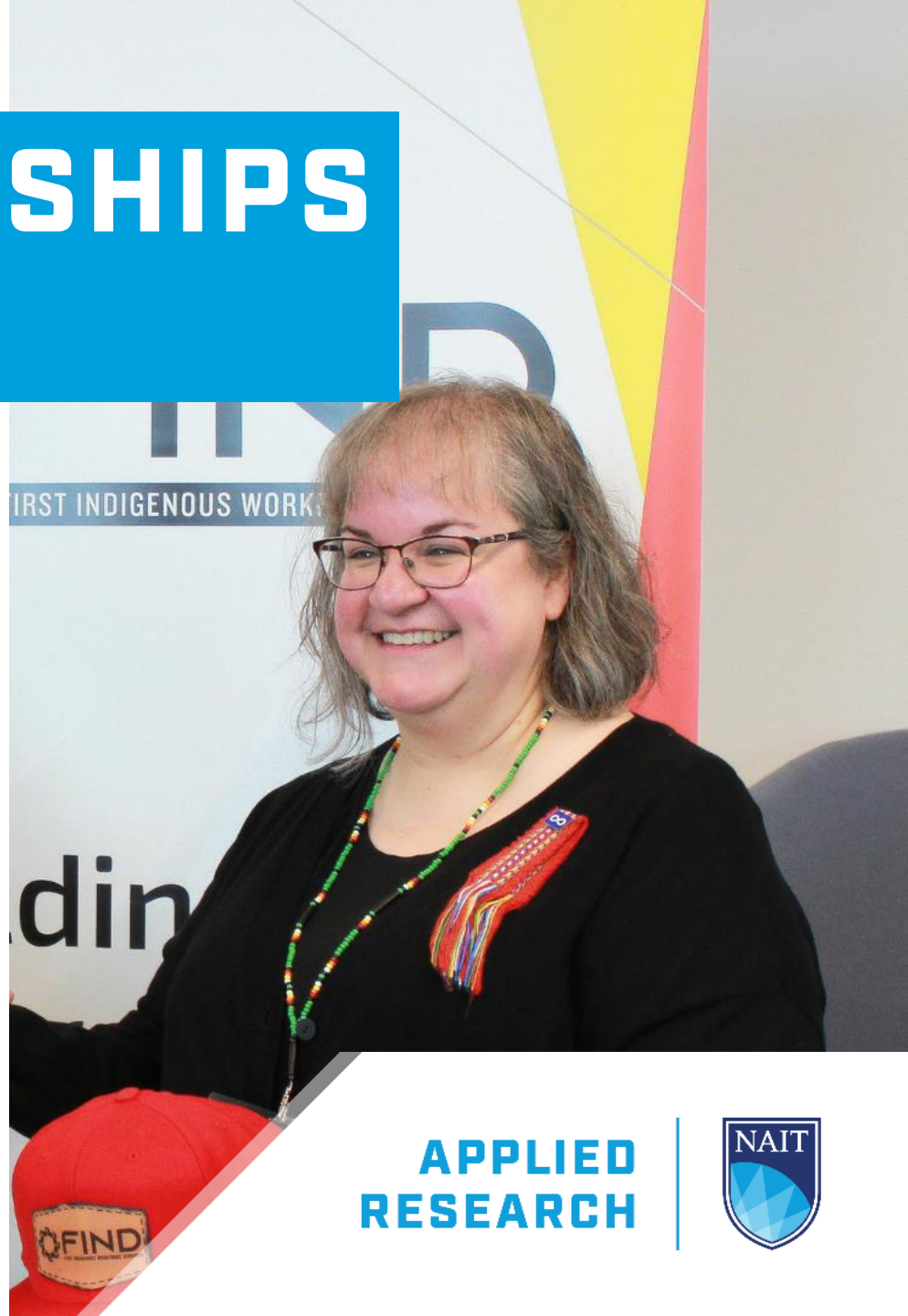
INDIGENOUS PARTNERSHIPS AND ENGAGEMENTS

Through NAIT Applied Research, we partner with Indigenous communities and businesses to develop technologies, environmental testing strategies, and training that will enable growth and economic development which aligns with the goals and dreams of our partners.



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CANADIAN PLANT PROTEIN

Canada is the world's largest producer and exporter of dry peas and lentils:

- Over the next decade, plant-based protein will contribute >$4.5 billion to our GDP

Source: National Research Council Canada

The Road to $25 Billion:

- Roadmap for Canada's ingredient manufacturing, food processing, and bio-products sector
- Need to focus on value-add processing

Source: Protein Industries Canada

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BY-PRODUCT VALORIZATION

Pulse Starches:

- 40-50% of pulse seed (dry weight basis)
- High amylose content (31-49%)
- <1% protein and lipid content
- Higher resistance to high-temperature processing
- Greater resistance to enzymatic digestions

Source: Pulse Canada

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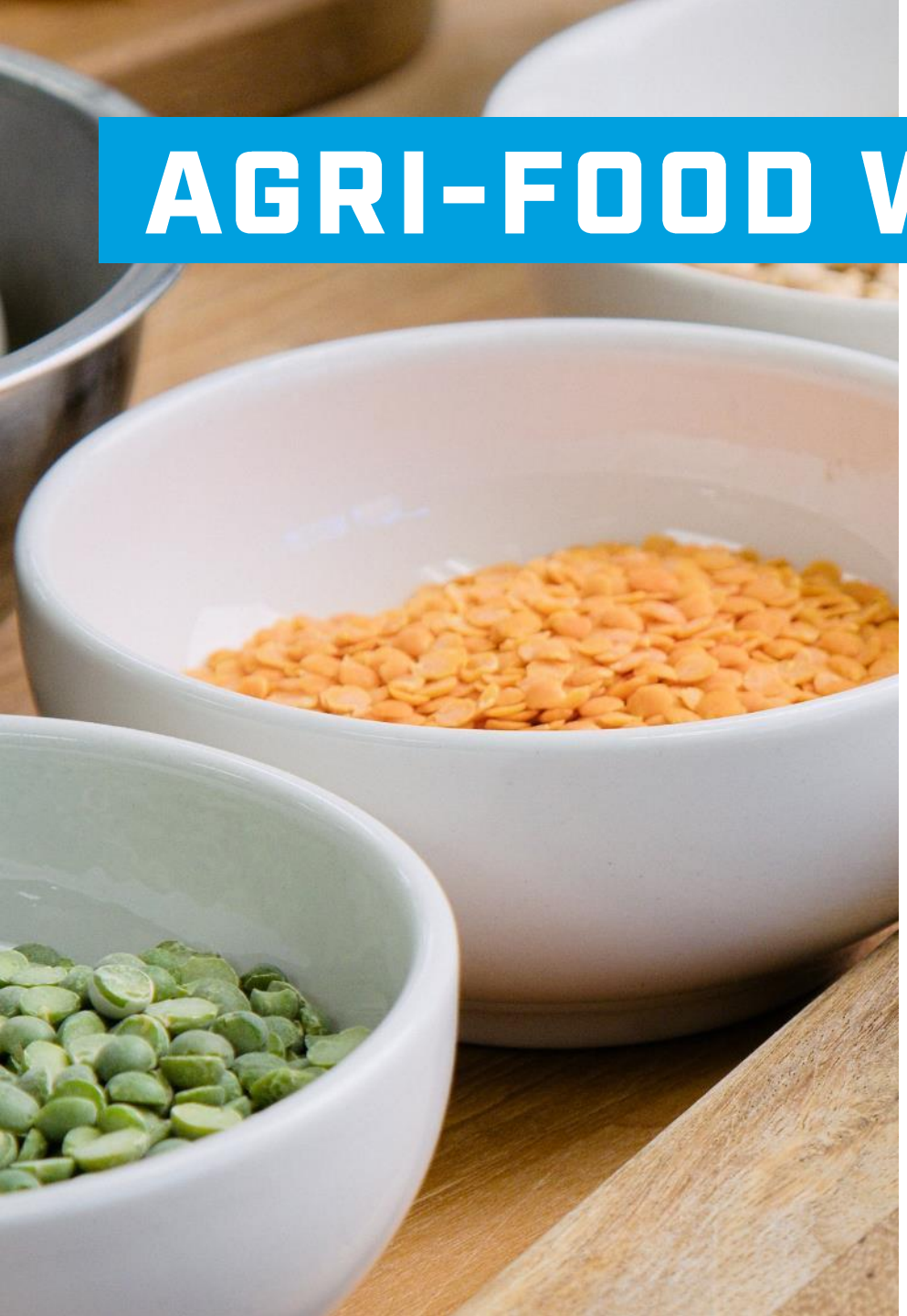

AGRI-FOOD WASTE ENHANCEMENT

The Program is a collaboration between NAIT Applied Research Centres to create a sustainable economic ecosystem through the valorization of agri-food by-products and by partnering directly with industry to develop tailor-made solutions.

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CLEAN TECHNOLOGIES TEAM

CENTRE FOR CULINARY INNOVATION

CENTRE FOR DATA MANAGEMENT & VISUALIZATION

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CLEAN TECHNOLOGIES TEAM

Conversion of agriculture and forestry waste into value-added intermediates and products

Detailed compositional and functional characterization of waste streams

Sustainable conversion approaches

- Enzymatic
- Microbial
- Chemical
- Mechanical
- Thermo-chemical

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CENTRE FOR CULINARY INNOVATION

Utilization of an advanced research and innovation kitchen

Repurposing food waste and by-product streams for functional ingredient formulation to create great-tasting food

Specializing in plant-based foods, functional ingredient formulation, and fermentation

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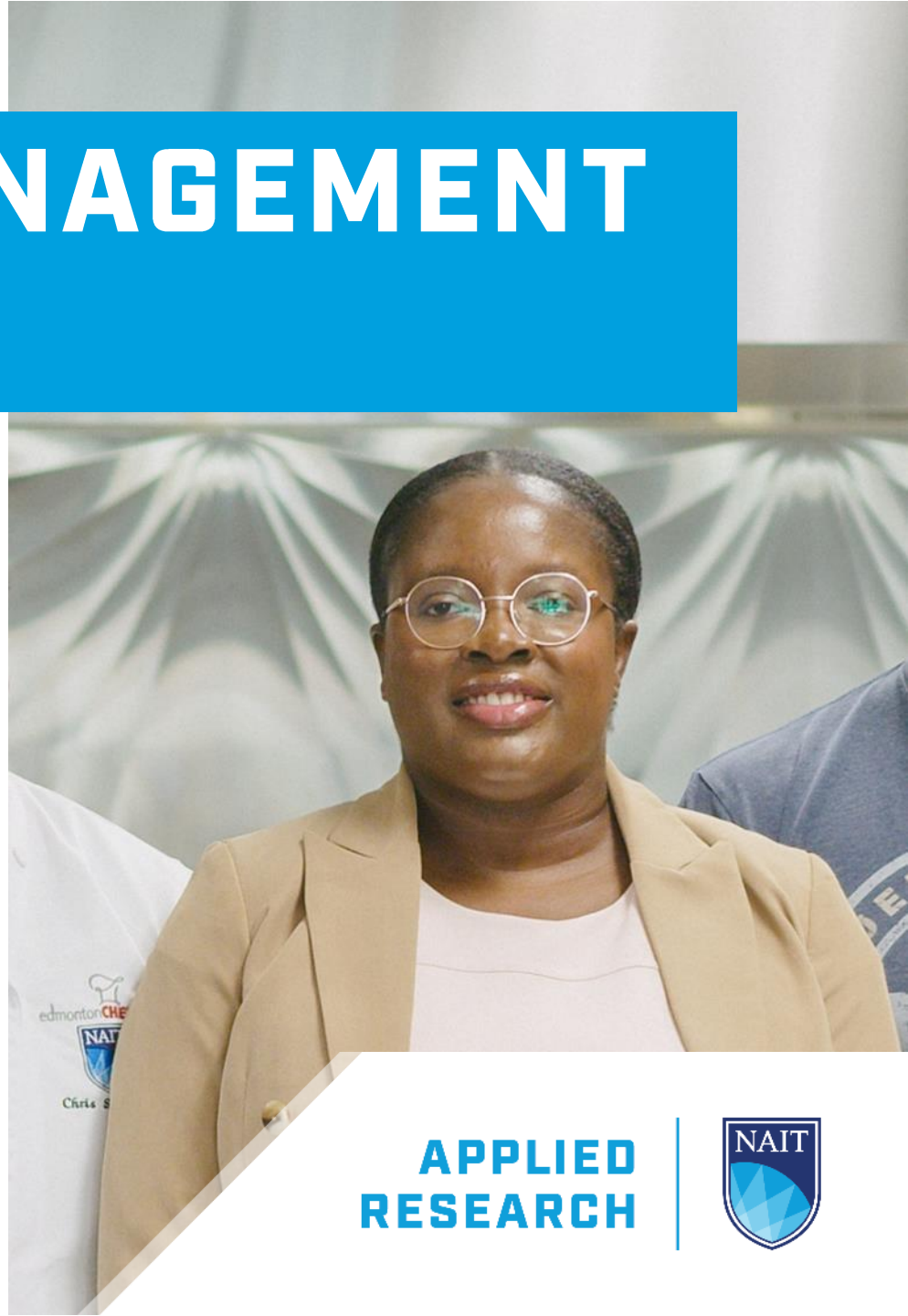
CENTRE FOR DATA MANAGEMENT & VISUALIZATION

Data analytics and visualization

Life cycle assessment and greenhouse gas emissions calculations

Creation of an ecosystem development database



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VALUE-ADD PRODUCTS

We will partner with end-users to develop new value-added products and applications for emerging markets:

- Biofuels
- Specialty chemicals
- Formulating food ingredients
- Prototyping food products
- Developing bioplastics
- Drilling mud additives

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VALUE-ADD PRODUCTS

We partner with end-users to develop new value-added products and applications for emerging markets:

- Bioethanol
- Biogas (renewable natural gas)
- Hydrogen

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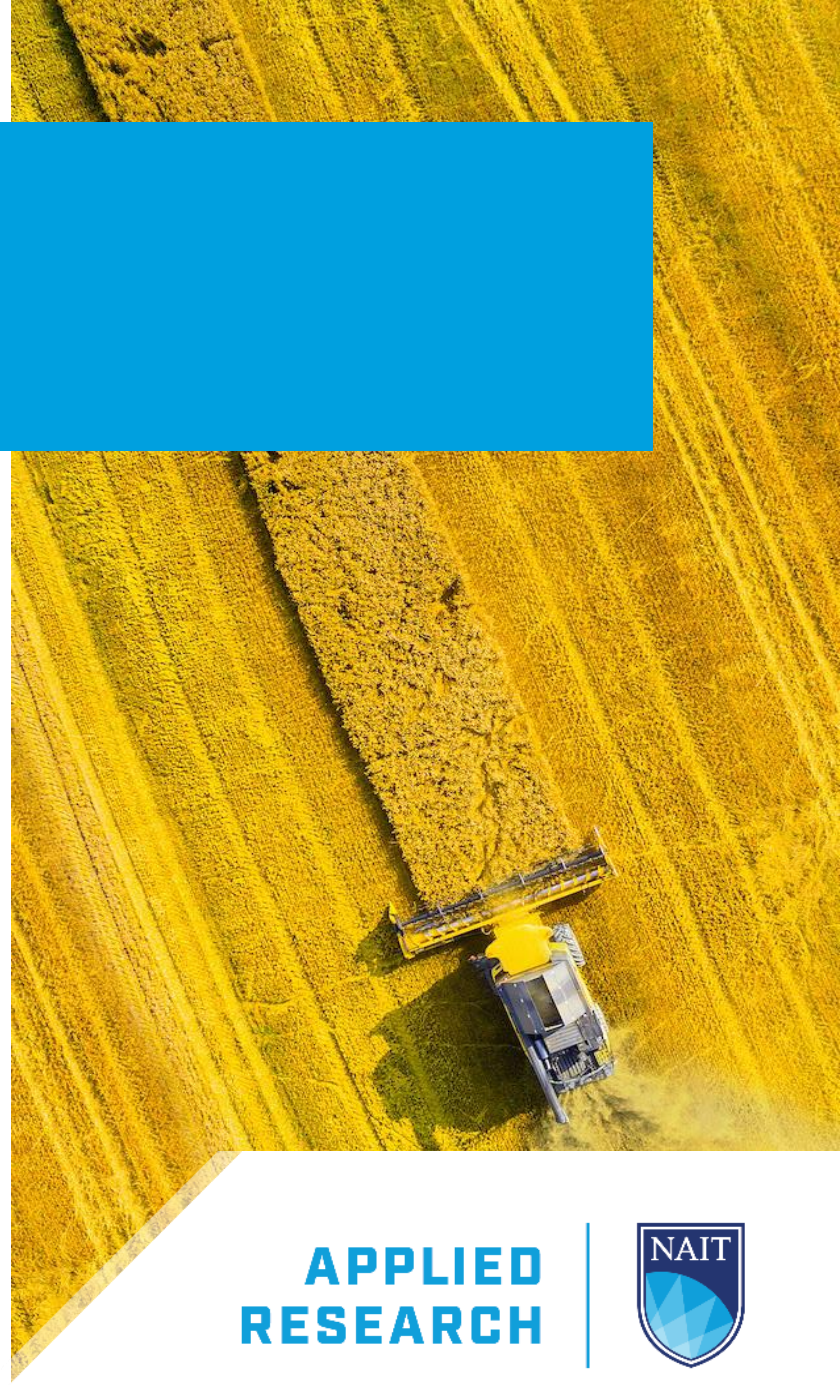
Challenges to full-scale deployment

Feedstock

- Availability
- Consistency
- Cost
- Competition with food



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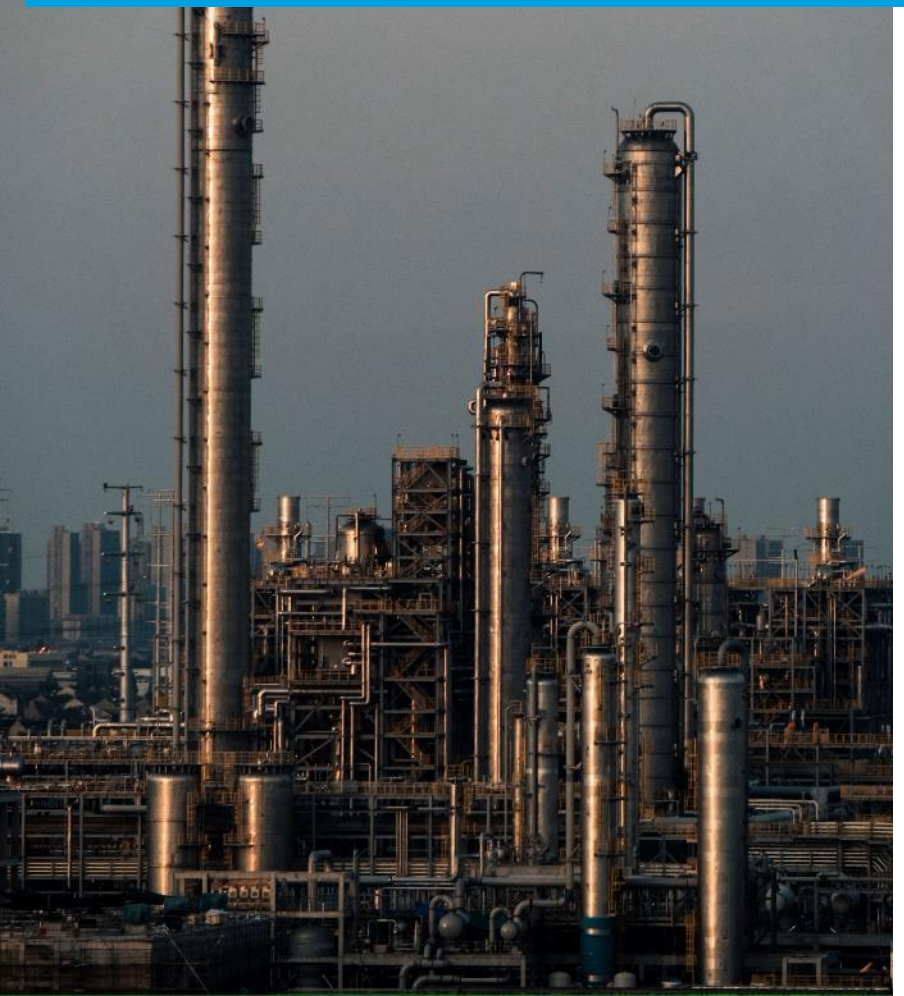
Challenges to full-scale deployment



Technology scale up cost and risks

- Securing capital
- Technical and operational challenges
- Cost competitiveness

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Challenges to full-scale deployment

Public Perception and Awareness

- Building public awareness
- Addressing misconceptions about biofuels

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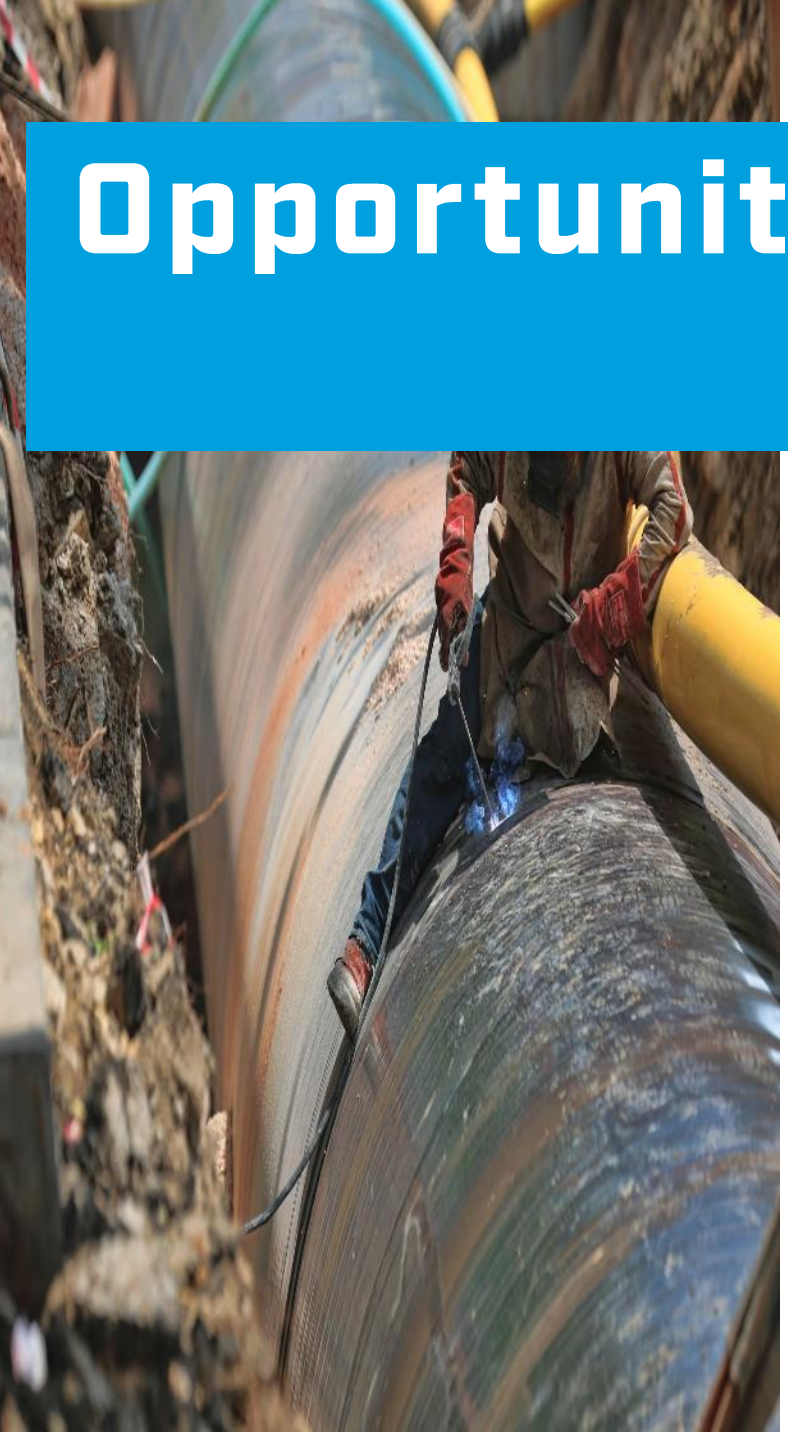

Opportunities

Established Infrastructure and Expertise

- Existing conventional oil & gas infrastructure
- Available expertise and workforce

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Opportunities

Demand

- Imports to meet current blend mandates
  - 1.74 billion litres of ethanol in 2022
  - 0.4 billion litres of biodiesel in 2022
  - 0.38 billion litres of renewable diesel in 2022

Source: Biofuels Annual 2023, USDA

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Opportunities

Demand

- Clean Fuel Regulation CI reduction
  - Additional 2.2 billion litres low-CI diesel by 2030
  - Additional 0.7 billion litres ethanol by 2030

Source: Environment and Climate change Canada

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Opportunities

Regulation/Carbon pricing

Carbon pricing - $80/tonne (2024) increasing to $170/tonne by 2023

Carbon credit generation and trading

Clean Technology Investment tax credit

30% refundable tax for clean technology properties

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Role of Stakeholders

Government

- Regulatory and policy certainty
- Incentives and funding programs to support scale up and production

Producers and distributors

- Increase investment/support local production
- Off-take agreements
- Higher blends than regulation requires

Consumers/the Public

- Support to increase demand
- Greater awareness

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THANKS TO OUR PARTNERS!

FABA CANADA LTD.

More Than Protein Ingredients Ltd.

ALBERTA INNOVATES

NSERC CRSNG

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