BioConversion Databank Foundation

Making Alberta the global hub for credible knowledge associated with the building blocks of bio-conversion for GHG reduction and the application of AI and Machine Learning for developing organisms and scaling up technology, tools, platforms, processes and bio-industrial systems.
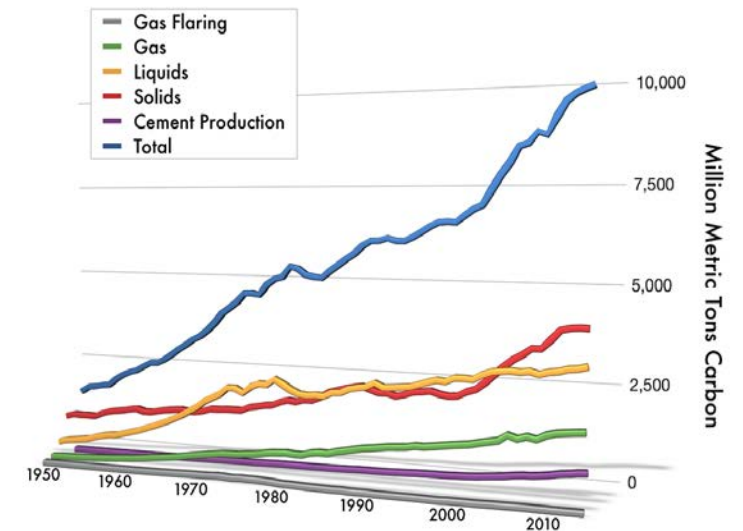
SUPPORTING

HIGH-IMPACT

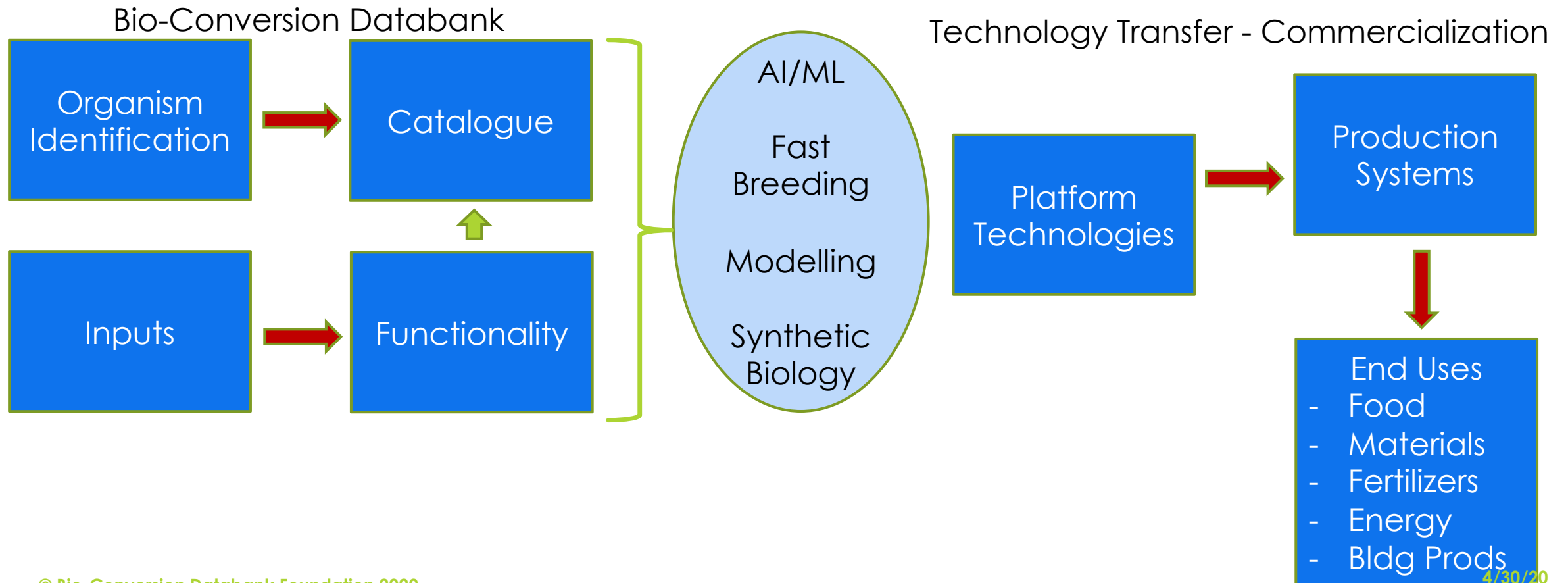BIO-INDUSTRIAL SOLUTIONS FOR GLOBAL GHG REDUCTION

The Problem

▶ GHG reduction must be very large scale to make a significant difference – 1 billion tonnes/annum.

▶ It must require minimal incremental conventional energy.

▶ Something of value must be produced cost-effectively.

Concept - Biological Systems


Global CO2 Emissions from Fossil-Fuel Burning

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Business Model Framework

Bio-Conversion Databank

Technology Transfer - Commercialization

| Organism Identification | → | Catalogue |

Inputs → Functionality

AI/ML

Fast Breeding

Modelling

Synthetic Biology

Platform Technologies → Production Systems

End Uses
- Food
- Materials
- Fertilizers
- Energy
- Bldg Prods

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The Pieces are in Place

- Tools to make designer molecules:
  - Genetics
  - Alpha-folding prediction
  - Synthetic biology
  - AI & machine learning
- Market Needs and Applications:
  - Carbon reduction
  - Fuel
  - Plastics
  - Food/Animal feed
  - Building products
- Money looking for good teams.

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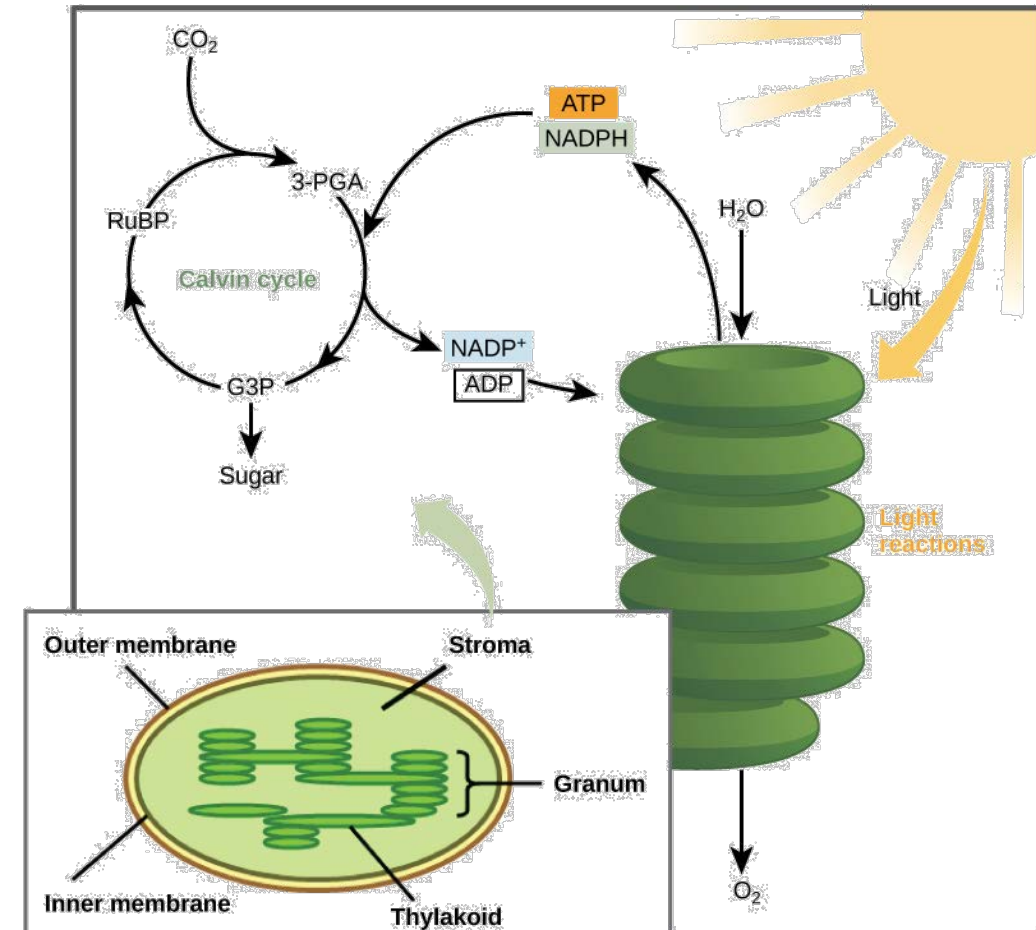www.shutterstock.com
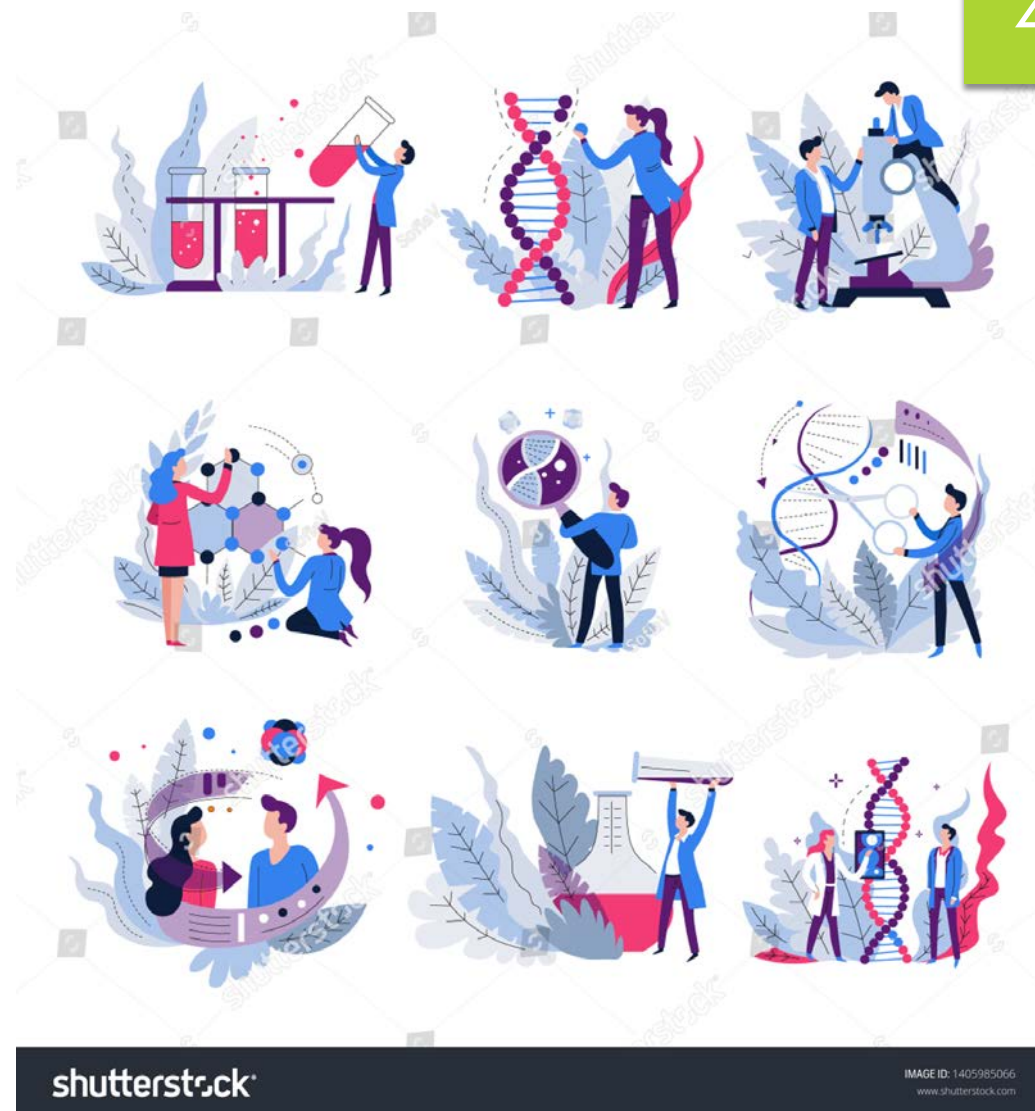
BDF is Positioning to Make it a Reality

▶ **Bio-Conversion Databank Foundation (BDF)** established as foundational infrastructure to in the public domain:

  ▶ taxonomy, cataloguing and "biobanking" organisms.

  ▶ documenting and modelling bio-organisms associated with capturing, processing, transforming and utilizing matter.

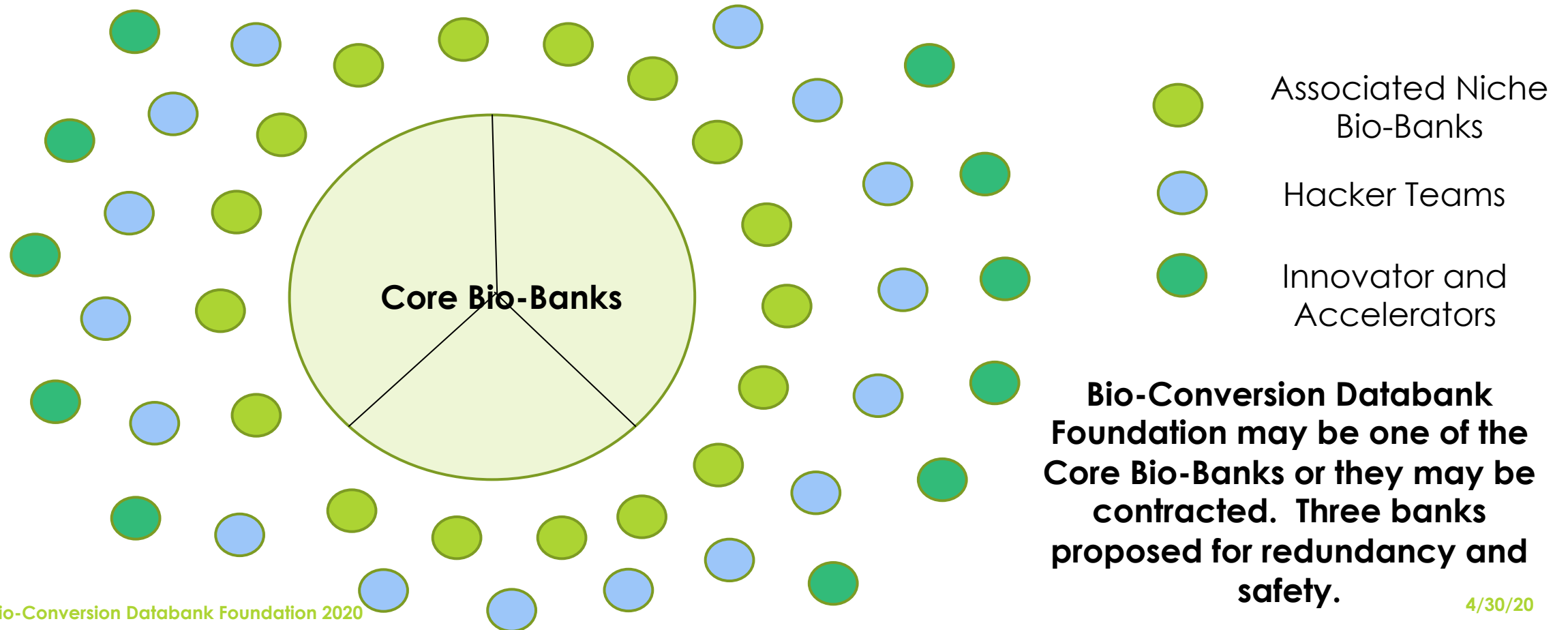▶ Knowledge will be open source and shared on a cost recovery basis.

Biological Systems

▶ Biological systems employ chemical and physical processes to convert GHG inputs to outputs of various kinds and are self-replicating.

▶ Organisms that do a useful job could be the starting point to create the ultimate CO2 converter, delivering carbon and monomers; and sugars, proteins or lipids for conversion into value-added products through another biological process.

This illustration shows that ATP and NADPH produced in the light reactions are used in the Calvin cycle to make sugar (Source: Khan Academy).

Bio-Conversion Community

Core Bio-Banks

Associated Niche Bio-Banks

Hacker Teams

Innovator and Accelerators

Bio-Conversion Databank Foundation may be one of the Core Bio-Banks or they may be contracted. Three banks proposed for redundancy and safety.

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Building Blocks

To be a centre of knowledge for identifying, evaluating and developing organisms and building blocks to support the development of bioconversion processes and industries.

Database

To facilitate, fund, conduct and manage databases, catalogues, knowledge sharing platforms, research and development projects and programs, and networking.

Facilities

To own, operate or manage facilities and for storing biological samples, DNA analysis, modelling, genetics, prototyping, product development and commercialization services.

Community

To develop communities of interest as needed to search for, evaluate, understand, modify, promote and inspire an interest in the industrial biotechnology applications.

Opportunity

To publicize and promote the potential and benefits associated with bioconversion and bio-mimicry as a future source of commercial opportunities and economic development.

BDF Core Activities