Canadian Iron & Steel Energy Research Association

Summary of Activities and Path Forward

Jason Halko
Board Chair - CISERA

New Mandate, New Name

- CISERA has revised its mandate and expanded its R&D program to encompass all technological pathways to accelerate the path to net-zero emission steel

- As such, the CCRA has been renamed the:

'Canadian Iron and Steel Energy Research Association'

CISERA Mandate

The CISERA has a mandate to:

1. Improve the energy efficiency of metallurgical processes

2. Provide technical support for the continuous and sustainable development of both the Canadian metallurgical coal and steel industries

3. To achieve significant reduction in the carbon footprint of Canadian primary metal production

What is the CISERA?

- **CISERA – Canadian Iron & Steel Energy Research Association - Not-for profit organization, initiated in 1964.**
- **CISERA is a unique co-operative Research and Development effort between Industry and Government, which has become a model for many other industry/government R&D joint efforts.**
- **CISERA members and CANMET have a consensus-based program that has and continues to meet its members needs over many fruitful years.**
- **The role of the CISERA is to strive to meet its members' needs. Its technical research program continues to evolve as the demands of the coal mining, cokemaking and ironmaking industries change.**
- **The organization has a Board of Directors and a Technical Committee. There are by-Laws and a legal agreement with CanmetENERGY (NRCan).**
- **Long term agreement with CanmetENERGY (NRCan) in place to enable rapid transfer of IP to technology receivers.**

Current Members 2025/26

CISERA

EVR A GLENCORE COMPANY

ArcelorMittal DOFASCO | HAMILTON

STELCO The Steel Company of Canada

CHARTECH Decarbonizing for a Circular Economy

CanmetENERGY Leadership in ecoInnovation

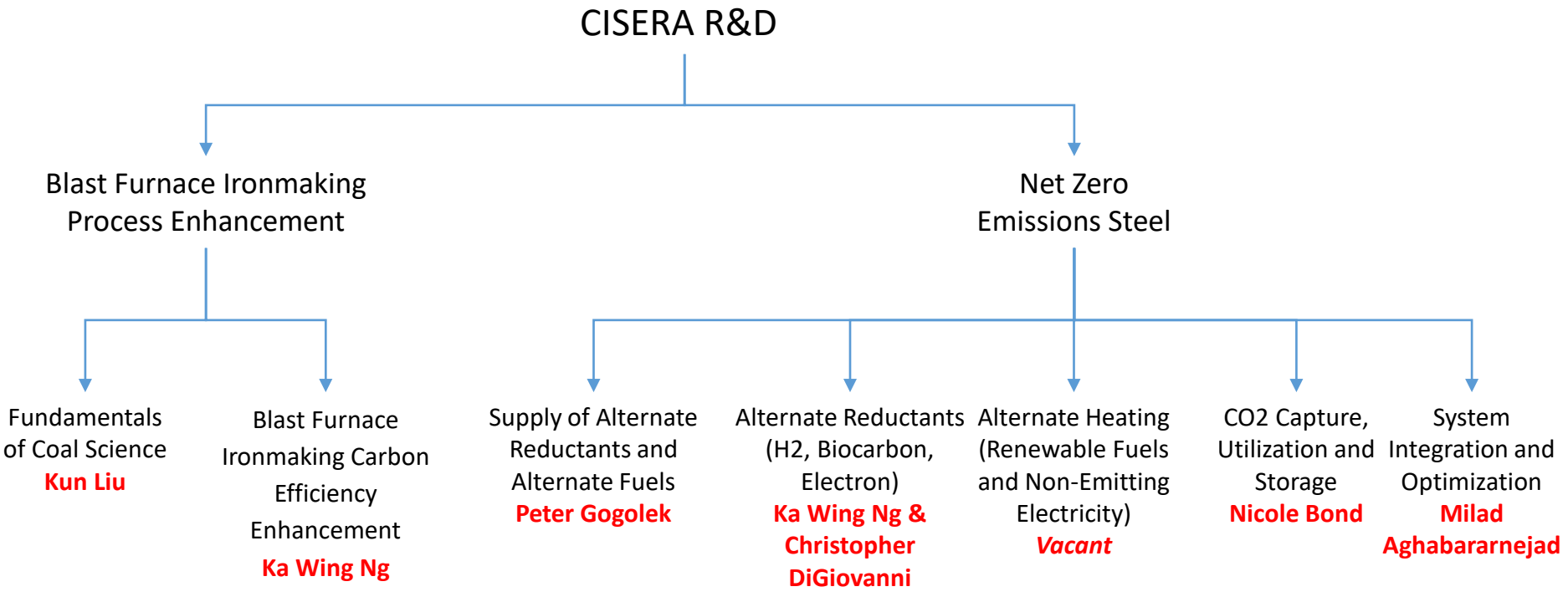
Two strategic board advisors:

CSPA ACPA CANADIAN STEEL PRODUCERS ASSOCIATION

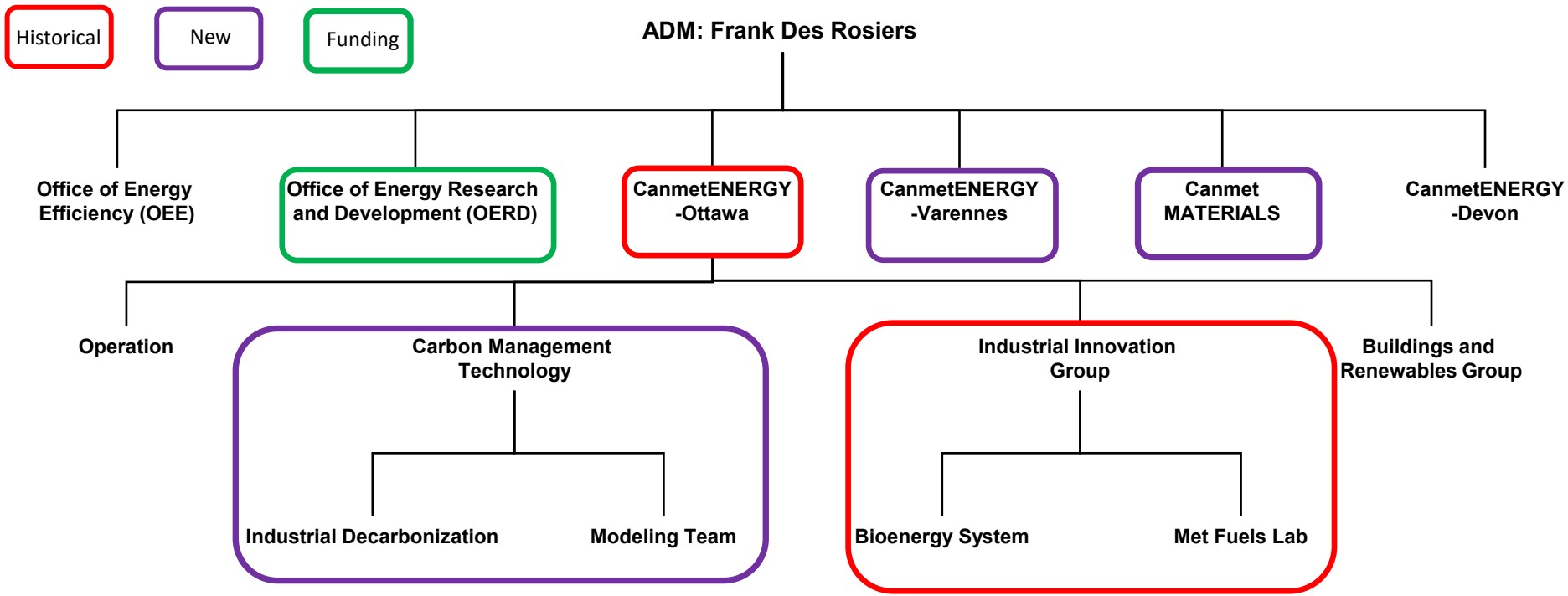
CRIBE Centre for Research and Innovation in the Bio-Economy

Key Partners – CISERA & CSPA

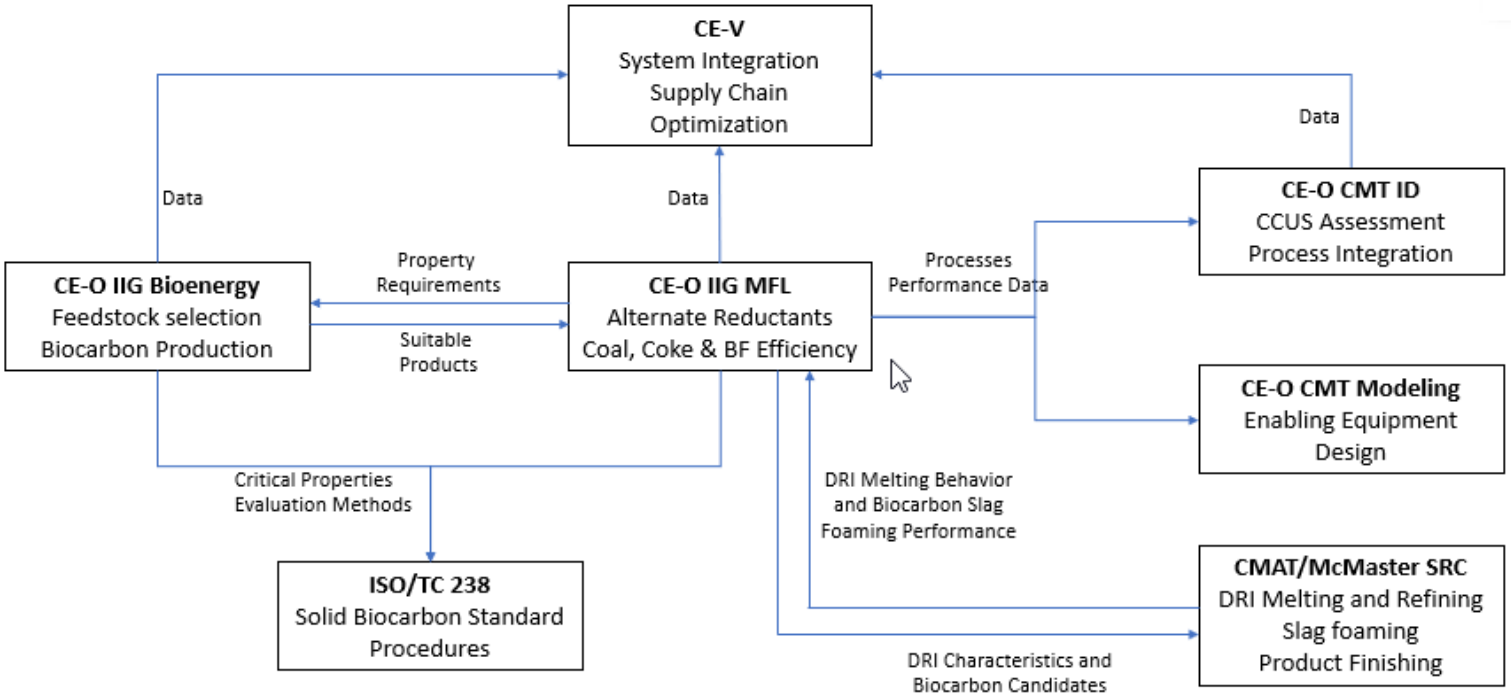
Current CISERA R&D Program



Energy Efficiency and Technology Sector



Inter-lab Collaboration (Example)



Recent Accomplishments

Publications

- Grindability of Biocarbon and Coal Blends in Blast Furnace - 2020
- Preparation of Clean Coal Samples Using the Roben Jig – 2021
- Interaction Behaviour of Biogenic Material With Electric Arc Furnace Slag – 2021
- Ranking of Injection Biochar For Slag Foaming Applications in Steelmaking – 2023
- Coal Rheology – The Effect of Coal Origin, Rank and Particle Size – 2023
- Biocarbon Utilization in Cokemaking by Partial Briquetting – 2024
- Evaluation of Biochar and Coke Blends for Slag foaming applications in EAF Steelmaking-2024
- Coating of Biocarbon to Reduce Reactivity For Slag Foaming Applications in Electric arc Furnace Steelmaking-2025

CISERA R&D Going Into The Future

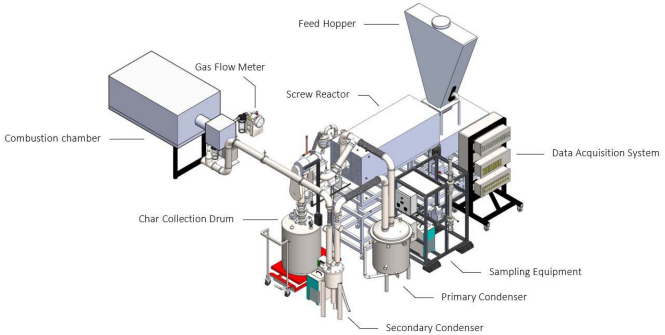
Theme 1 – Continued support for existing coal, coke, and blast furnace ironmaking

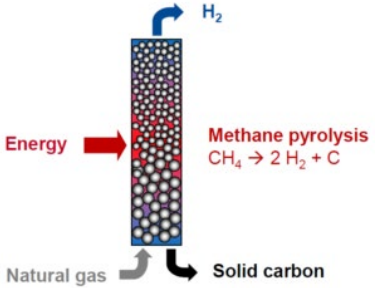
Theme 2 – GHG reduction technologies to be implemented in near future (5-10 years)

Theme 3 – Decarbonization technologies to be implemented in the long term (>10 years)

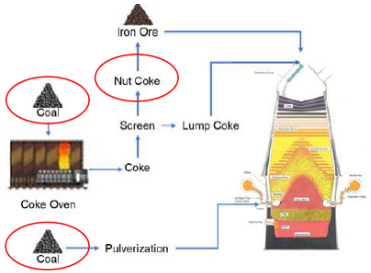
Decarb Projects Overview

- **Alternate Fuels/Reductant Supply**
  - Biogenic reductants properties optimization
  - H2 production by methane pyrolysis
- **Alternate Reductants Utilization**
  - Biogenic reductant application in the steel industry
  - Iron reduction using biogenic syngas
  - Combined pilot scale EAF/ladle metallurgy furnace facilities
  - Potential use of decarbonized EAF and BOF slag
- **Alternate Heating**
  - Low grade waste heat to power H2 production
  - Advance electrification technology development for heating

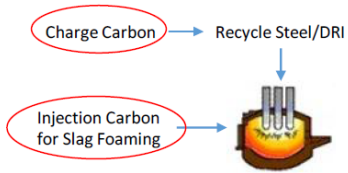




Pellet Induration



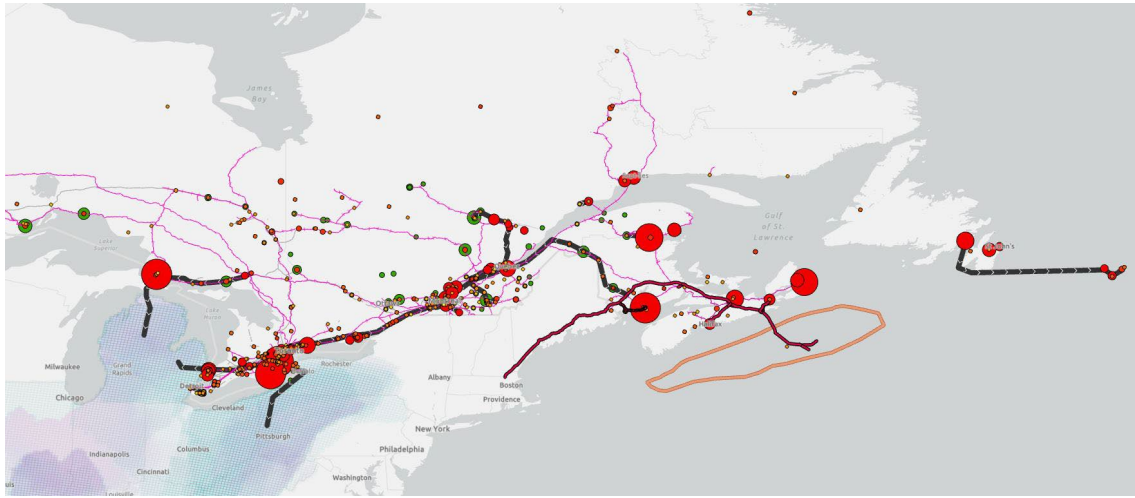
Cokemaking and Blast Furnace



EAF

Decarb Projects Overview Cont'

- **CCUS**
  - Dynamic Carbon capture for iron and steel production
    - EAF Modelling
    - Fixed bed chemical looping
    - Inertial CO2 separation technology development
  - Advanced CO2 utilization through conversion and mineralization
  - CO2 storage in SW Ontario and Eastern Canada
  - National CCUS assessment framework
- **System Integration and Optimization**
  - Integration of waste heat recovery with steel production
  - Integration of biogenic reductants and fuels production into steel production
  - Integration of CO2 capture into various sub-processes



CISERA Canadian Iron & Steel Energy Research Association

Thank You!

CISERA Canadian Iron & Steel Energy Research Association