Powering the Nation, Fueling Innovation
What is Wyoming’s strategy?

Commercialization of new technologies will ensure the long-term viability of Wyoming’s natural resources.
The Integrated Test Center

- 20+ MW of coal derived flue gas from the Dry Fork Power Station.
- 300 gpm of service water and a 22 kV electrical service loop to provide power to the facility.
- Simple design minimizes costs, provides flexibility & quick turnaround times.
- Designed for maximum flexibility and scalability for testing.
- Focused on larger scales to compliment NCCC and create a space for further scale up.
R&D Timeline

ITC Partners

- State of Wyoming - $15 million
- Basin Electric – Host at Dry Fork Station
- Tri-State G&T - $5 million
- National Rural Electric Cooperatives Association - $1 million
- Black Hills Corp. and Rocky Mountain Power providing technical expertise and in-kind contributions
The ITC Layout

ITC UTILITIES
* Service Water (TOTAL 350 gpm)
  * 10 gpm to each STC
  * 300 gpm to LTC
* Electric Power
  * 75 kW to each STC
  * 3,000 kW to LTC
* Flue Gas
  * 0.4 MW to each STC
  * 18.0 MW to LTC
* Potable Water
  * 500 gpd to Media Center & Restroom

STC 1    STC 2    STC 3    STC 4    STC 5

Credit: Basin Electric Cooperative
Tenant Summary

- **TDA Research**
  - Currently testing hybrid membrane/solid sorbent capture system.

- **Kawasaki Heavy Industries (KHI)**
  - Fixed bed adsorbent optimization testing.

- **GreenOre**
  - Carbon dioxide and fly ash utilization to calcium carbonate.

- **Membrane Technology Research (MTR)**
  - 200 ton per day CO\(_2\) capture project in the large test bay using membrane separation system combined with cryogenic distillation – subject to DOE Phase III funding.

- **University of Kentucky (UK)**
  - 10 MWe large pilot also awaiting phase 2 funding decision announcement – subject to DOE Phase III funding.

- **XPRIZE**
  - 5 teams competing for best commercial CO\(_2\) utilization offering will produce building materials, polymers, and methanol using various CO\(_2\) capture technologies.

- **GTI**
  - 1 MWe membrane system
TDA Research

- Extensive research program in cooperation with DOE/NETL.
- Hybrid skid system using membrane and adsorbent technology.
- Testing underway!
Breathe (Bangalore, India) – Led by Dr. Sebastian Peter, the team is producing methanol, a common fuel and petrochemical feedstock, using a novel catalyst.

Carbon Capture Machine (Aberdeen, Scotland) – Based out of the University of Aberdeen, the team is producing solid carbonates with applications to building materials.

C4X (Suzhou, China) – Led by Dr. Wayne Song and Dr. Yuehui Li, the team is producing chemicals and bio-composite foamed plastics.

Dimensional Energy (Ithica, New York, US) – CEO Jason Salfi is using photocatalysis to convert CO2 to fuel.

Carbon Upcycling UCLA (Los Angeles, CA, USA) – Led by Dr. Gaurav Sant, the team is producing building materials that absorb CO2 during the production process to replace concrete.

XPRIZE is a temporary tenant of the ITC and at the completion of the competition, the space will be available to new testers.
JCOAL – GreenOre

- June 2019 – Wyoming Infrastructure Authority, JCOAL (Japan Coal Energy Center), Columbia University MOU.
- November 2019 – ITC site visit
- Fall 2020 – Laboratory testing at Columbia University
- 2021 – Tentative site deployment

A slag carbonation pilot plant owned by the JV between GreenOre and Baotou Steel Group (China), commissioned Spring 2019.
JCOAL – Kawasaki Heavy Industries

- July 2016 – State of Wyoming - JCOAL (Japan Coal Energy Center) MOU.
- April 2018 – Announcement of JCOAL-KHI (Kawasaki Heavy Industries) test at ITC – 0.2 MWe dry adsorbent, fixed bed system.
- Completed initial engineering design.
- Currently conducting detailed engineering.
- Construction to commence in 2021.
August 2020 – Awarded DOE grant to test
Host site for 1 MWe post combustion capture system using advanced membrane technology developed by the Ohio State University with budget period 1 beginning 2021 which was previously tested at NCCC.
Completed initial engineering design.
Tentative on-site testing in late 2021/early 2022.
Membrane Technology and Research

- MTR has a successful CO$_2$ capture research portfolio.
- Has received initial phase 1 funding from U.S. DOE.
- Partnering with Wyoming ITC for phase 2 application for design and permitting and phase 3 operation.
- 200 ton per day of liquid CO$_2$ product system will be located in the large test bay.

Photo Credit: NETL
University of Kentucky

- UK has a successful CO₂ capture research portfolio.
- Has received initial phase 1 funding from U.S. DOE for a large pilot.
- Partnering with Wyoming ITC for phase 2 application for engineering design.
- 10 MWe scale.
- Currently have a 0.7 MWe pilot at LGE’s Brown Station (left)

Photo Credit: NETL
The value proposition
Stay in Touch!

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