ITC

WYOMING
INTEGRATED
TEST CENTER

Overview of United States CCUS R&D Funding

September 5, 2023
JCOAL Clean Coal Day International Symposium

Jason Begger, Wyoming Integrated Test Center

State of Wyoming

ITC
WYOMING
INTEGRATED
TEST CENTER

Wyoming Energy Production

- Largest Producer of Coal
- Largest Producer of Uranium
- 8th Largest Oil Production
- 9th Natural Gas Production
- Proven rare earth element reserves
- Excellent geology for CO2 storage
- Large Enhanced Oil Recovery (EOR) potential

ITC
WYOMING
INTEGRATED
TEST CENTER

President Joe Biden

- Started 4-year term on January 20, 2021.
- Eligible to run for second 4-year term in 2024, which would run through January 2029.
- Has set a U.S. goal of achieving a carbon free power sector by 2035 and a net-zero emissions economy by 2050.
- Pursuing multiple approaches to achieve goals:
  - Most significant to the ITC are significant R&D funding administered by the Department of Energy (DOE)

ITC
WYOMING
INTEGRATED
TEST CENTER

Research and Development

Three major sources of funding for clean energy and low carbon technologies

1. Infrastructure Investment and Jobs Act
    - Signed into law November 15, 2021
    - One time funding
2. Inflation Reduction Act
    - Signed into law August 16, 2022
    - One time funding
3. Annual Federal Department of Energy funding
    - Annual amounts vary for each fiscal year: October 1 – September 30

ITC
WYOMING
INTEGRATED
TEST CENTER

Infrastructure Investment and Jobs Act

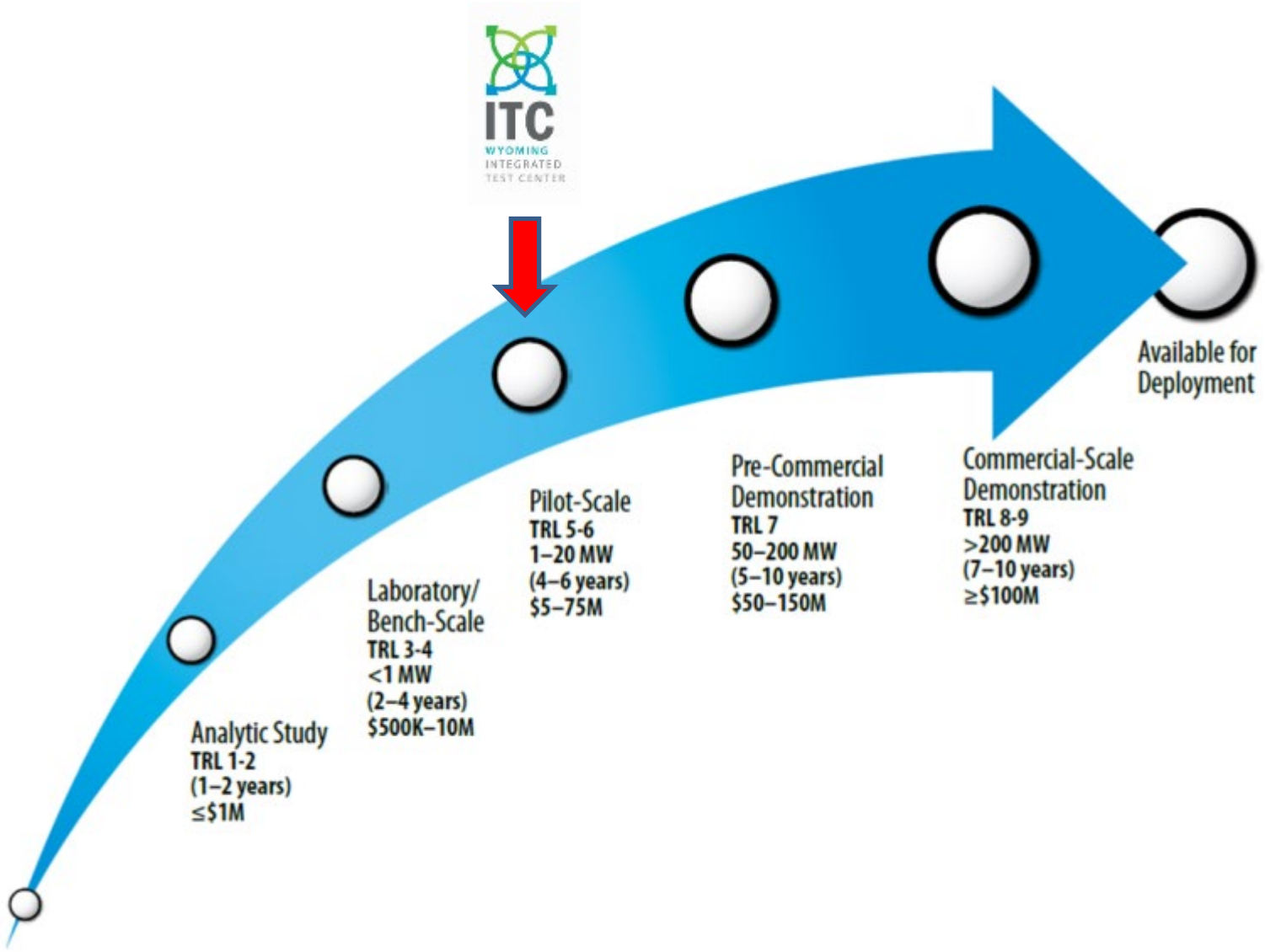
$21.1 billion USD of CCUS funding directed to the Department of Energy

Major authorizations:

- $2.5 billion for Commercial Carbon Capture Demonstration Projects
  - Dry Fork Station is a potential site
- $937 million for Large-Scale Carbon Capture Large Scale Pilots
  - ITC is well positioned to host these types of projects
- Carbon Storage Validation and Testing - $2.5 billion
  - Wyoming CarbonSAFE near Dry Fork Station and the ITC
- CO2 Transport FEED studies - $100 million
- CIFIA (loans and expansion grants) – $2.2 billion
- Direct Air Capture Hubs - $3.5 billion
- Hydrogen Hubs - $8 billion (at least one fossil energy blue hydrogen hub)
- Direct Air Capture incentive prizes

ITC
WYOMING
INTEGRATED
TEST CENTER

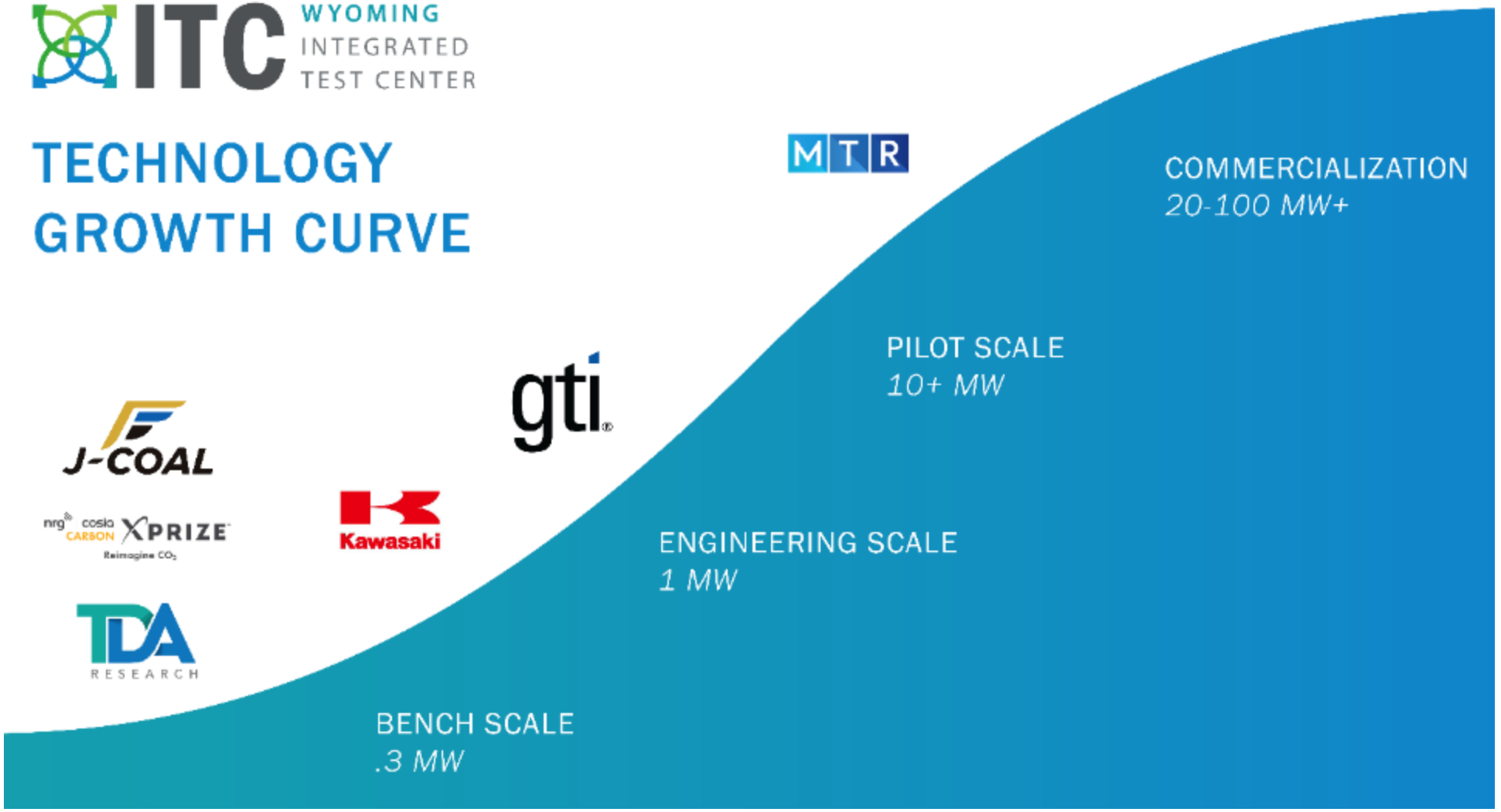
R&D Timeline



ITC
WYOMING
INTEGRATED
TEST CENTER

Source: National Energy Technology Laboratory, "Carbon Storage Technology Program Plan," December 2014

Scale of Projects



ITC
WYOMING
INTEGRATED
TEST CENTER

Inflation Reduction Act

$500 billion USD of funding and tax incentives

- $394 billion for private investment incentives, including tax credits
- 45Q Tax Credit enhancements
  - 45Q refers to the specific section of the United States' tax code
  - CO2 captured and sequestered permanently, such as geologic sequestration or conversion into products
    - $85/ton for CO2 from industrial sources
    - $180/ton for DAC
  - CO2 captured and utilized in enhanced oil recovery applications
    - $60/ton for CO2 from industrial sources
    - $130/ton for DAC
  - Projects must begin construction by 2033
  - Minimum project sizes:
    - 1,000 tons per year for DAC
    - 18,750 tons per year for electrical generation facilities
    - 12,500 tons per year for any other facility

ITC
WYOMING
INTEGRATED
TEST CENTER

DOE Program Funding

- Energy Storage: $450 million
- Critical Minerals: $248.5 million
- Industrial Decarbonization: $685 million
- CO2 Removal: $140 million
- Office of Fossil Energy and Carbon Management: $890 million
- Carbon Management Technologies: $460 million

Drilling the University of Wyoming's test CO2 sequestration well under DOE's CarbonSAFE program in 2022.

ITC
WYOMING
INTEGRATED
TEST CENTER

Summary

- Biden administration has prioritized carbon reductions and is utilizing many different agencies and approaches to reach goals.
- Over the past two years, the US Government has provided unprecedented amounts of funding for low-carbon energy.
- Significant resources are available to directly fund R&D
- Many different tax incentives to promote private investment of commercial projects.
- Many of these benefits could be available to Japanese companies if they have an American partner.
- Wyoming would like to help and conduct joint projects with Japan.

KHI's solid sorbent test facility under construction in August 2023 at the Wyoming ITC

Stay in Touch!

Jason Begger Wyoming
Integrated Test Center
Jason@armatureadvocacy.com