# Jamestown Oxy-Coal

Clean Power. Future Energy.


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JAMESTOWN bpu BOARD OF PUBLIC UTILITIES

Jamestown Oxy-Coal

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PRAXAIR

EPRI ELECTRIC POWER RESEARCH INSTITUTE

NYSERDA

**50 MWe Oxy-Coal CFB Power Plant with $CO_2$ Capture and Storage**

ecology and environment, inc.
International Specialists in the Environment

FOSTER WHEELER

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Battelle
*The Business of Innovation*

AES
*the power of being global*

Schlumberger

University at Buffalo *The State University of New York*

CONSOL ENERGY

# DOE Clean Coal Power Initiative

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- On August 11, 2008 the US Department of Energy issued a solicitation for the Clean Coal Power Initiative round 3
- Targeting advanced coal based power technologies
  - capture and store > 300,000 tons/yr of $CO_2$
  - > 90% $CO_2$ capture rate
- $1.5 billion available for multiple awards
- Jamestown Oxy-Coal Alliance submitted Jan 14, 2009
- Project awards to be announced in 3rd Qtr 2009

# Jamestown, New York
# Oxy-Coal Project Site

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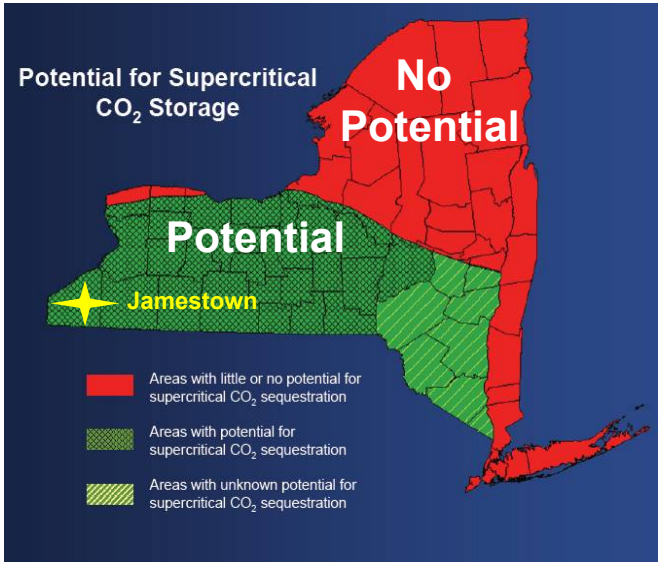
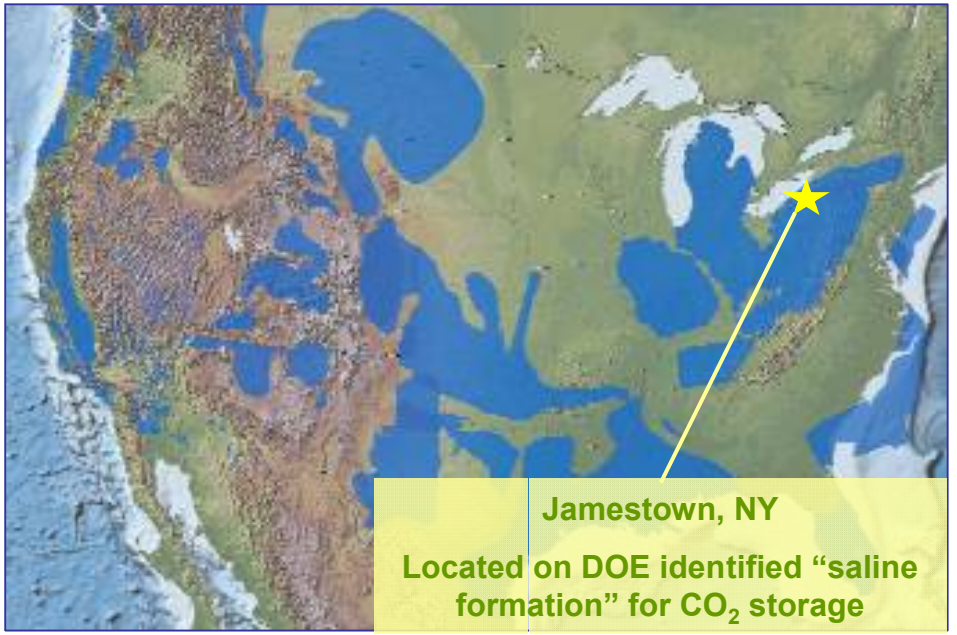



## Jamestown Board of Public Utilities

- Public power utility in western NYS
- 115 years in existence
- Existing generation: four coal boilers and a gas turbine
- District heating cogeneration system (Ideal for efficiency gain from Oxy-Coal)



# Key Project Enhancements

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- Integrated Oxy-Coal Process Technology
  - Flexi-Burn Circulating Fluidized Bed
    - Dual oxidant
    - Fuel flexibility
    - Minimal air ingress
  - Advanced Cryogenic Air Separation Unit
  - Advanced $CO_2$ Capture Unit
- Environmental Leadership on Global Climate Change
  - $CO_2$ Capture and Storage (target 98%) for Life of Project
  - Biomass Fuel Option
  - Near Zero Emissions of Criteria Pollutants

# Focus on Asia

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- Algal biofixation and production of biodiesel in partnership with major Japanese firms
  - Feasibility Study planned for Q3/Q4 2009
  - Pilot Testing 2010/2011
  - Large Scale Ponds – during demonstration period
- Asia as large potential market for technologies developed in Jamestown

# Oxy-Coal CFB Power Plant with CCS

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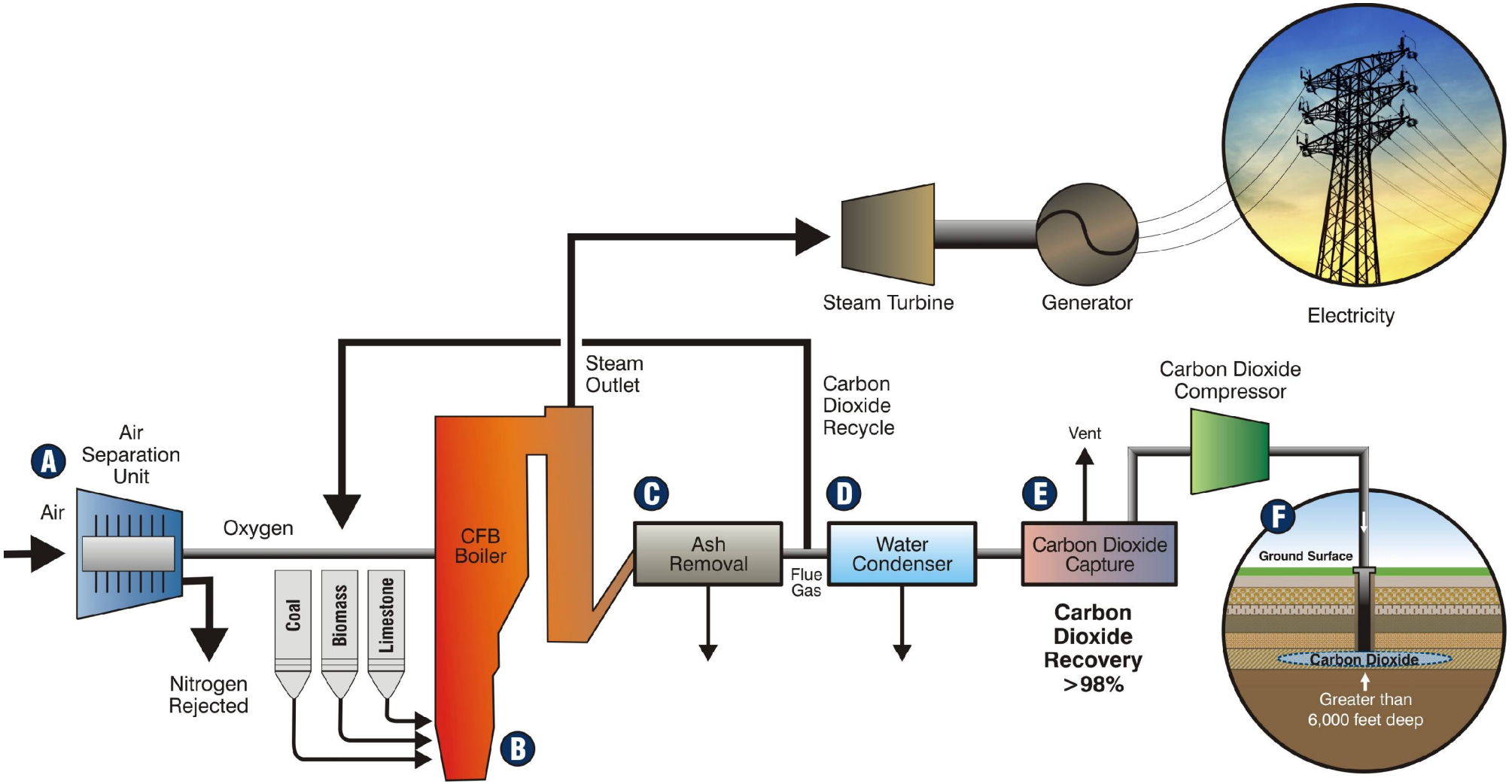

# CFB Process Advantages

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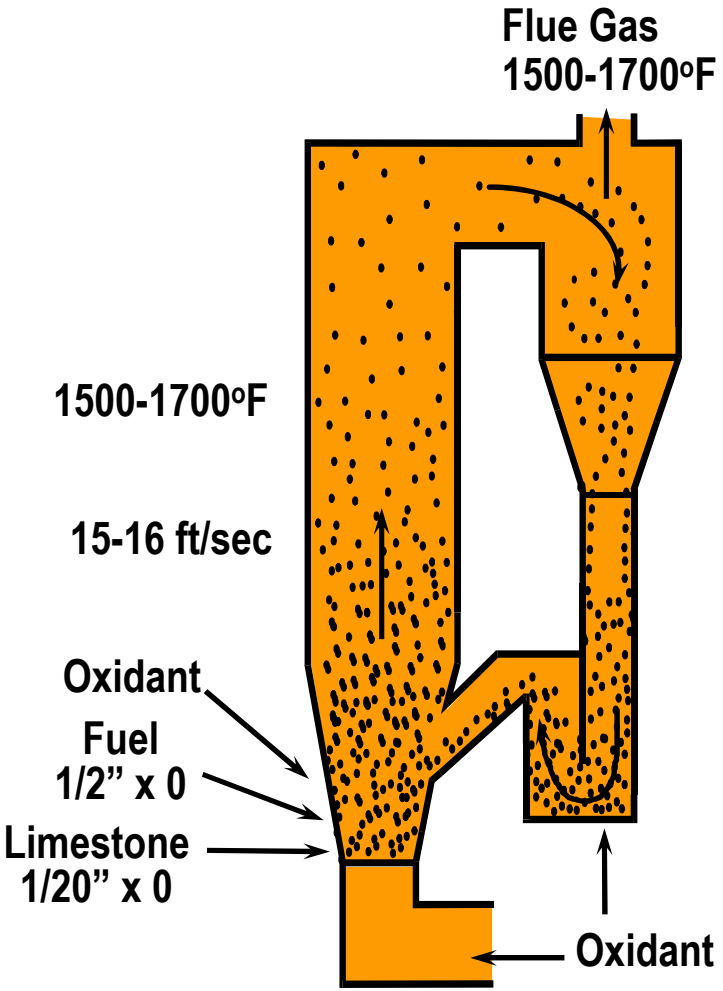
| Feature | Benefit |
|---|---|
| Low Furnace Temperatures | - Low $NO_x$<br>- In-bed $SO_2$ capture<br>-Fuel flexibility (Biomass)<br>- Ideal for Oxy-coal CCS |
| Hot Circulating Solids | - Tolerant to fuel variations<br>- Efficient heat transfer<br>- Simple feed systems<br>- Uniform heat flux |
| Long Solid Residence Time | - Good fuel burnout<br>- Good sorbent utilization |



# Foster Wheeler CFB Experience

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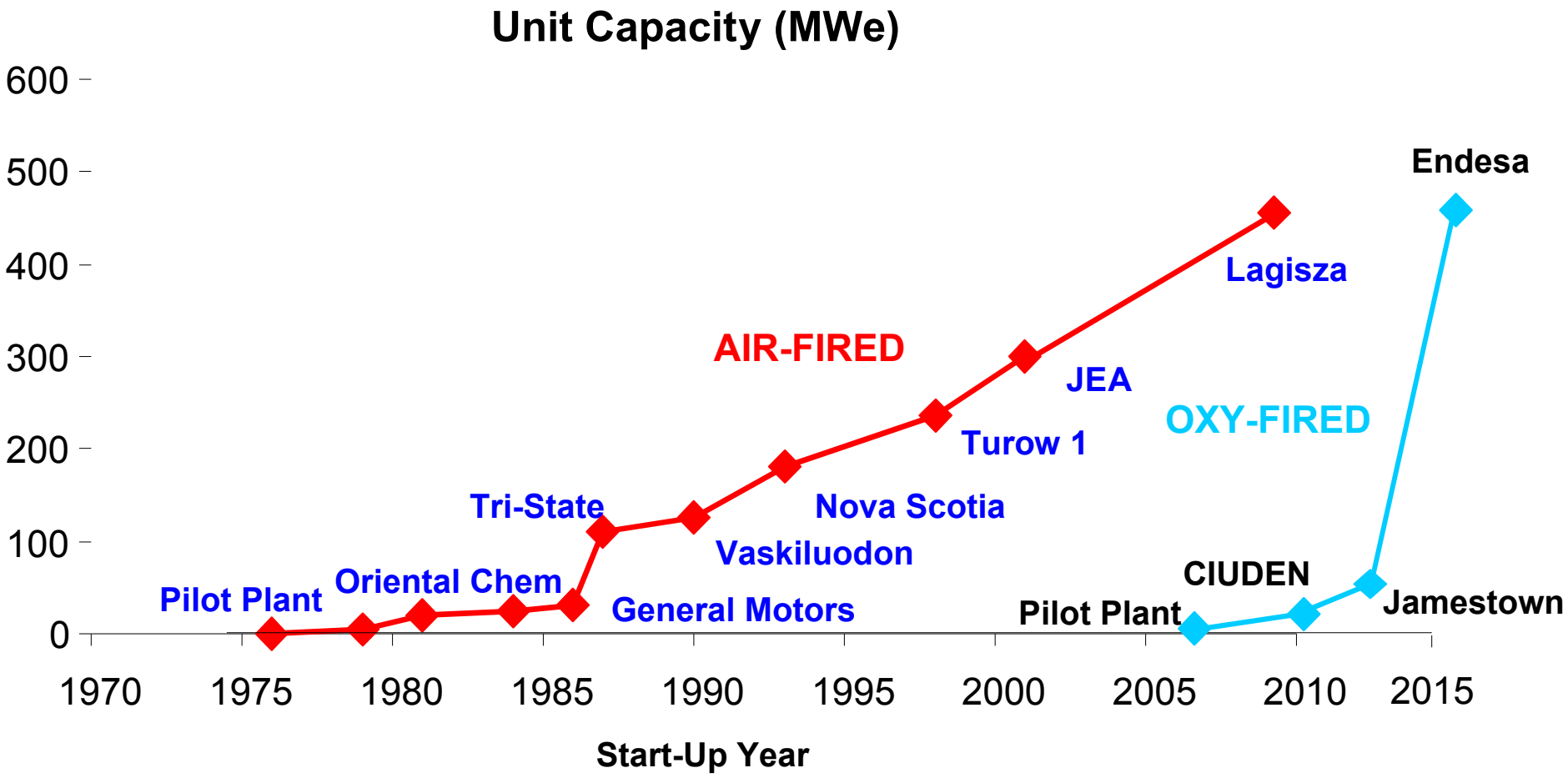

# Cryogenic **A**ir **S**eparation **U**nit

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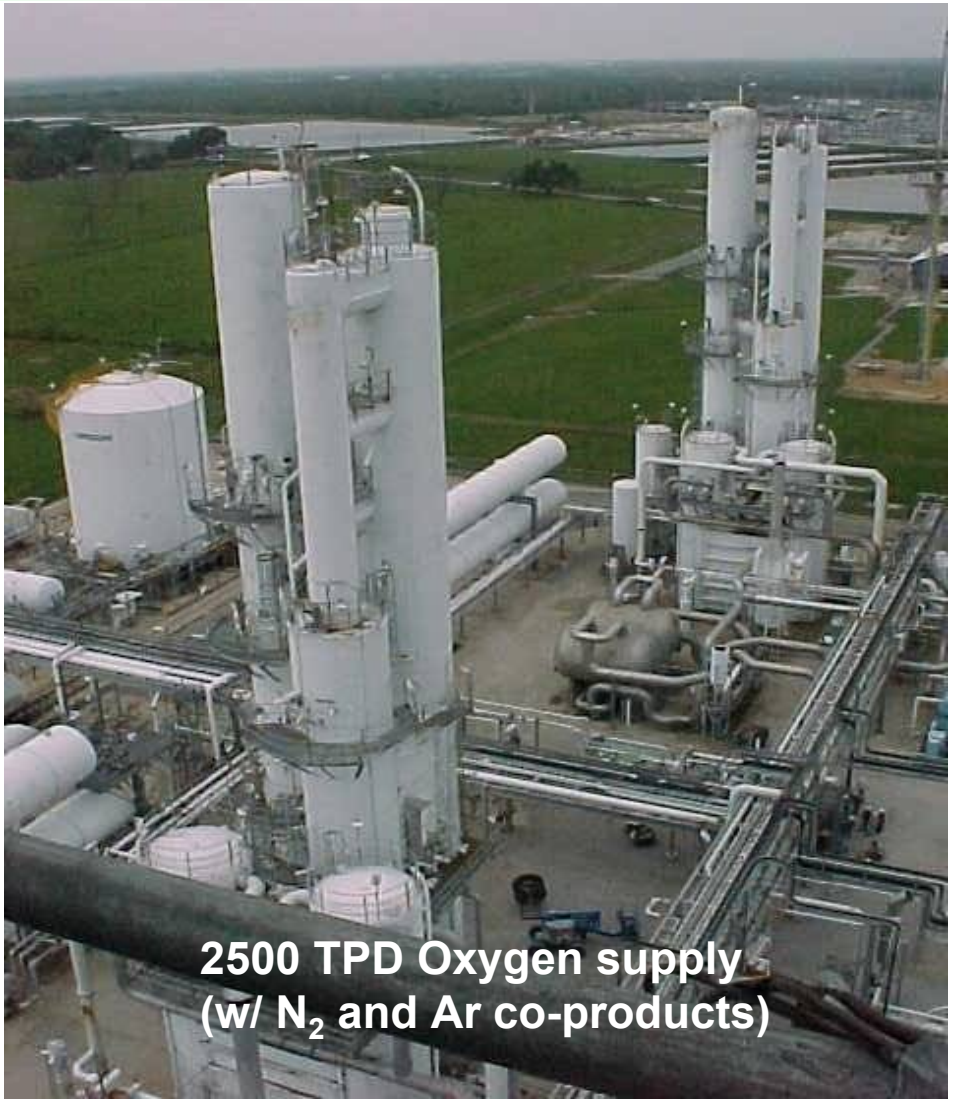
**Praxair experience:**

**Over 500 cryogenic ASUs operating worldwide**




**The 50MWe Oxy-Coal CFB will require ~1200 TPD Oxygen supply**

# Praxair $CO_2$ Plant Experience

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- **85 Operating Units Worldwide**
- **Plant Capacities: 30-600 TPD**
- **14,700 TPD $LCO_2$ Capacity (750 MW equiv)**

**The 50MWe Oxy-Coal CFB will require ~1200 TPD CPU**

# Features of the Oxy-Coal Option

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- Scalable from 50 MWe platform
- Operation simulates air-fired boiler
- Applicable to retrofits
- Advances in steam cycle directly beneficial
- Variety of feedstocks can be used
- $CO_2$ capture rate > 98%
- Near zero emissions of SOx/NOx/Hg
- Cleanest – no solvents needed

# Success Factors for an Oxy-Coal CFB Power Plant Demonstration

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- Proximity to a suitable geologic $CO_2$ storage site
- Advanced coal power plant with CCS
  - Scalable technologies
  - Applicable to retrofit (PC and CFB)
- Availability of financing for capital investment
  - Cost share support by municipal utility
  - Established rate base
  - Supported by government and industry
- Project timing on a fast track
  - Targeted 2014 start-up
- Highly motivated world class technology / project execution team
  - Team members have global reach and plan to commercialize
  - NYS State active participation

# Partnership with New York State

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$9 million in State funding for immediate progression of project

- Design work
- Stratigraphic test well and seismic monitoring for geological characterization
- Development of state regulatory structure, property rights for sequestration and indemnification
- Permitting and SEQR/NEPA review for project

**Regional Greenhouse Gas Initiative (RGGI) – Minimum $170 million available annually from New York for funding clean energy and energy efficiency technologies, including CCS.**

# Jamestown BPU Oxy-Coal Plant
# Preliminary Artistic Rendering

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# Project Timeline

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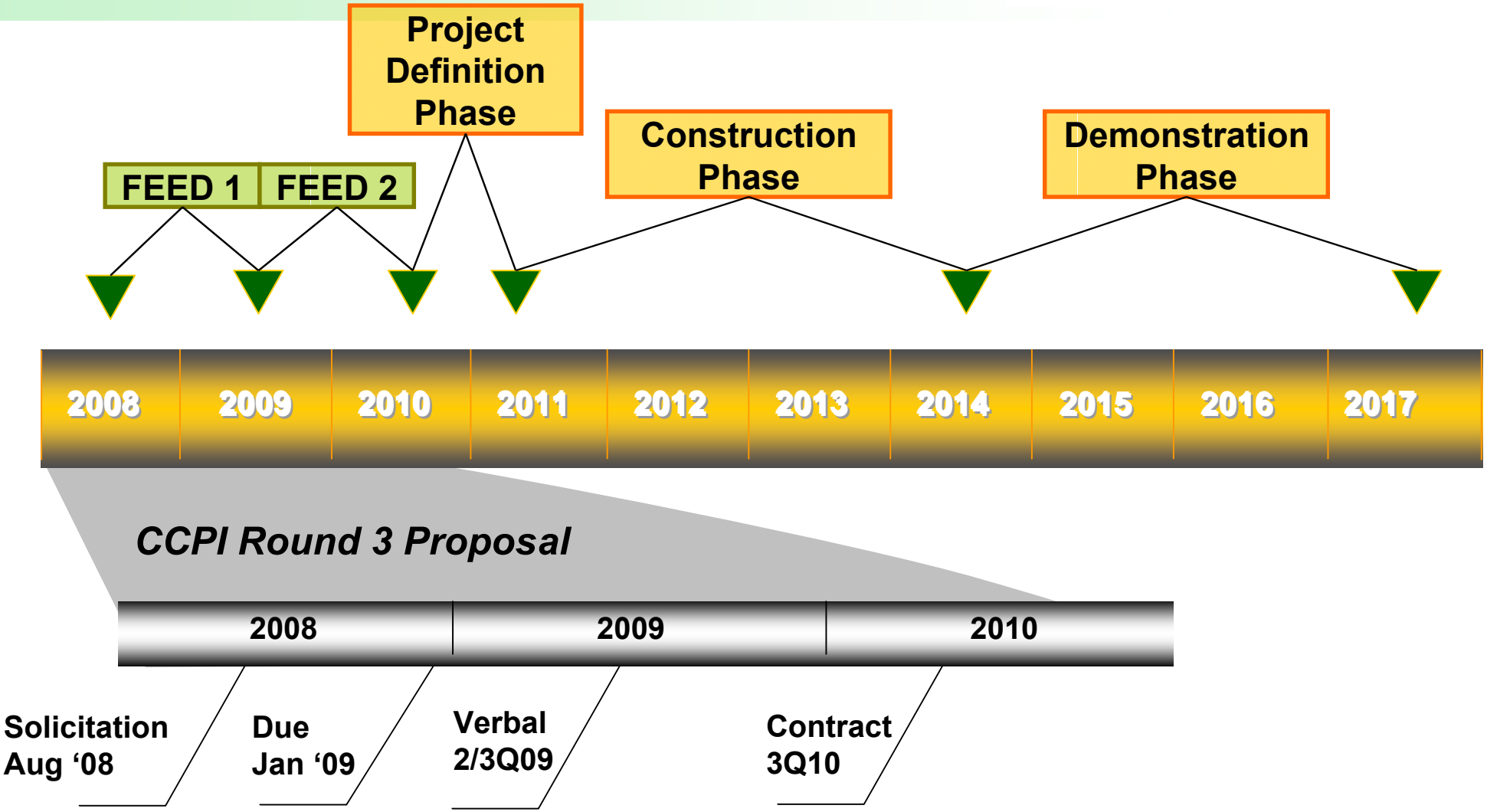

# Project Summary

Jamestown Oxy-Coal
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- 50 MWe Oxy-Coal CFB with CCS demonstration planned
  - enables direct scale-up to 600 MWe
  - designed for > 98% $CO_2$ capture rate
  - near zero SOx, NOx and mercury air emissions
- Oxy-Coal Alliance anticipates funding from DOE CCPI Round 3
- NYS Governor Paterson announced financial support to launch the project allowing other funding agencies to join the Alliance

**The time is now for a fully integrated Oxy-Coal Power Plant with CCS demonstration**

# Contact Information

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