Who is involved in the project?

This project will involve private industry, Federal government partners, and the technology rights holders. 8 Rivers Capital from North Carolina is the private development group and rights holders. They have received funding commitments from the United States Department of Energy for $7M and from a UK government grant for $8.5M.

ALLETE and Basin Electric, through the Lignite Research Council, funded a feasibility study during 2013-2014 that encouraged 8 Rivers to move on the next phase of development. (Stage 1) They have expressed an interest to continue to contribute time and funds to Stage 2. Other partners will be approached as Stage 2 progresses.

The Lignite Research Council would be the organization through which State dollars would flow to support the Stage 2 project. The Lignite Research Council is hoping to secure an additional $10M beyond its normal appropriation in order to support the Allam Cycle Stage 2 project.

What is the Allam Cycle?

The Allam cycle is a new method of generating electricity that is smaller, less capital intensive, more efficient and has fewer emissions than traditional steam generation. Instead of steam-driven turbines, the turbine in an Allam design would be driven by supercritical CO2. The cycle also captures a stream of pure CO2 that can be directed to Enhanced Oil Recovery.

What are the prospects for success?

No technological obstacles have been identified with the cycle, and a 50mw facility using natural gas as the fuel is being constructed in Texas. All initial studies have returned positive results.

Why is this project important for North Dakota?

A project like this allows North Dakota to preserve the option to burn coal into the future, securing current and future coal related jobs and providing a new option to meet electricity needs in the future.

If the natural gas cycle is already being built, why do we need to fund another demonstration?

The natural gas cycle will prove the Allam cycle's ability to produce electricity from its high pressure turbine outside the lab, but before coal can be used in the future the following questions need to be answered:

- What is the best gasification technology for application with ND lignite.
- What level of gas cleanup be determined, and what are the options to meet that level.
- What changes to materials due to impurities, high temperatures and pressures need to be made to switch the cycle from gas to coal.
- The heat exchanger required in the system must be demonstrated.

How does this fit into the coal industry's future?

We have focused our efforts on protecting our current assets and preserving the option to burn coal in the future. Our research efforts have been directed at identifying disruptive, high impact technologies such as the Allam cycle for the past few years that would allow North Dakota to continue to monetize its vast coal resources. A technology such as this moves the industry forward to a future where new construction can once again occur, allowing us to meet our twin goals of protecting our current assets and preserving the value of coal into the future.

How would this money be spent?

Through the Lignite Research Council, in cooperation with the Petroleum Research Council

What is the time frame?

A project could be submitted to the November grant round of the LRC, which could lead to the project beginning almost immediately after approval.

How soon could commercial operation begin?

If our initial demonstration were successful, work toward Stage 3—Pilot Plant Construction could begin as early as 2019. Pilot Plant costs could range from $200-400M, which would necessitate additional state support. Stage 4, full commercial operation could then begin in the 2020s.