

PUBLIC ABSTRACT

Applicant (primary) name: EnviRes, LLC

Applicant-s address: 1509 Bull Lea Boulevard, Suite 500
Lexington, KY 40511

Street City State Zipcode

Team Members (if any): None
(listing represents only participants
at time of application, not necessarily
final team membership)

Name City State Zipcode

Name City State Zipcode

Name City State Zipcode

(Use continuation sheet if needed.)

Proposal Title: Clean Coal Power Initiative

Commercial Application: New Facilities Existing Facilities

9 Other, Specify: _____

Technology Type: Gasification

Estimated total cost of project:
(May not represent final negotiated costs.)

Total Estimated Cost: \$ 72,826,451

Estimated DOE Share: \$ 31,584,973

Estimated Private Share: \$ 41,241,478

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PUBLIC ABSTRACT (cont=d)

Brief description of project:

Most major energy studies have concluded that integrated gasification combined cycle (IGCC) technology uniquely offers the prospect of meeting increasingly stringent environmental regulations and increasing energy efficiency requirements for the production of electrical power from domestic coal reserves. HyMelt technology, described in this proposal, is a radically new approach to coal gasification that offers even greater benefits than conventional IGCC at lower cost. We propose building a gasification plant that uses 454 t/d of Illinois #6 coal as feed in East St. Louis, IL. The plant size is the minimum size that allows a positive cash flow for the project while minimizing the capital at risk. The total cost for this project is approximately \$68,241,000. Approximately \$29,345,000 of the total funding comes from DOE. We present a schedule that obligates us to repay all of the money provided by DOE from operating revenues of the project.

HyMelt technology, in contrast to conventional gasification technology, produces separate hydrogen rich and carbon rich streams from coal or virtually any other carbonaceous fuel. Sulfur in the feed converts exclusively to H₂S making its removal less costly. The HyMelt technology can generate valuable gaseous products at pressures of 75 to 450 psig, reducing or eliminating the cost of compression for downstream use. The carbon monoxide rich stream can be used as fuel for a combustion turbine in a combined cycle generating system with a thermal efficiency slightly higher than that for natural gas and with an emission profile similar to that of natural gas.

The fuel gas produced by this project will be used in fired heaters of nearby customers. This saves millions of dollars in project costs by not having a combustion turbine, a generator, a steam turbine, a generator and a transformer in the project. Computer simulation of combustion turbine performance and validation with pilot combustion testing, which will be done outside this project, will completely address issues relating to combustion turbine performance. Combustion turbine, combined cycle power generation could be added later as a separate project. Sulfur oxide and nitrogen oxide emissions from HyMelt produced flue gas are lower than for any other coal gasification technology. The capture of mercury and other volatile metals often found in coal is orders of magnitude cheaper than for mercury removal in conventional pulverized coal power generation and several times cheaper than for other gasification processes. HyMelt technology offers a lower cost route to CO₂ sequestration than other gasification processes.

In addition to the above described benefits to electrical power generation, HyMelt technology offers a high volume, low cost route to chemical grade hydrogen. We believe that the quantity and cost of the hydrogen produced by HyMelt will accelerate the use of fuel cells for both stationary power generation and for powering personal transportation vehicles. Similarly, the low cost availability of hydrogen will allow refiners to more economically reduce sulfur and other pollution forming precursors in petroleum products. HyMelt technology offers the potential to produce ammonia, methanol and acetic acid more cheaply than from natural gas. This could mean the difference between domestic vs. offshore production of these chemicals. HyMelt technology offers the prospect of substantially reducing the demand for increasingly expensive natural gas in every area of its use except for residential heating. We believe that HyMelt technology can make the vast reserves of high sulfur coal in states such as Illinois a tremendous economic asset.