

Contract No. R003-009
“Fischer-Tropsch Fuels Development”

Submitted by Energy & Environmental Research Center
Principal Investigator: Bruce C. Folkedahl

PARTICIPANTS

| Sponsor | Cost Share |
|--|-------------------|
| Energy & Environmental Research Center Utilizing U.S. Department of Energy National Energy Technology Laboratory funding | \$710,786 |
| North Dakota Industrial Commission | <u>\$189,034</u> |
| Total Project Cost | \$899,820 |

Project Schedule – 12 months

Contract Date – October 22, 2008

Start Date – October 1, 2008

Completion Date – December 31, 2009

Project Deliverables:

Status Report: December 31, 2008 ✓

Status Report: March 31, 2009 ✓

Status Report – June 30, 2009 ✓

Status Report – September 30, 2009

Final Report– December 31, 2009

OBJECTIVE/STATEMENT OF WORK:

To prepare pilot-scale testing equipment and perform testing in the areas of Fischer-Tropsch (FT) liquid production, catalyst development, catalyst testing, product upgrade, and process simulation. Biomass-derived syngases will be used for the testing. The FT pilot system will be combined with existing Energy & Environmental Research Center gasifiers to provide the capabilities to allow testing of current and newly developed catalysts with syngas from various fuels and at conditions of varied temperature, pressure, and gas composition. The catalyst development and production work will supply catalyst options for varied end use applications, including use in smaller-scale, distributed fuel production systems. The development of FT technologies to produce liquid transportation fuels from biomass, waste and coal will provide a new industry for North Dakota as well as helping to provide energy security not only for the state but for the entire country.

STATUS

Contract executed

First status report received April 7, 2009. During first quarter learned that the catalyst produced by project partners at Brigham Young University will be delayed until summer of

2009. An alternative FT catalyst developed and tested at EERD will be used for initial system shakedown. Equipment construction is complete and instrumentation is nearly completed. Preparation for the shakedown testing is nearly complete.

Second status report received April 7, 2009. During the January 1 – March 31, 2009 quarter the Fischer-Tropsch reactor system and gasifier construction was completed. A process simulation model was also completed. The process simulation model is now being used to predict the effect of various processing scenarios, such as recycle streams and intermediate separation steps. The model results will assist in formulating test plans for catalyst testing in the coming months. System shakedown has been delayed into the next quarter.

A request has been made and approved for a no-cost extension for the final report from September 30 to December 31, 2009.

Third status report received the first week of August, 2009. During the April 1 – June 30, 2009 quarter the EERC completed shakedown of all the reactor components in the Fischer-Tropsch (FT) reactor and fluid-bed gasifier. A large batch of iron-based catalyst was loaded into the FT reactor in preparation for initial testing. EERC has analyzed and prepared a large batch of torrefied biomass for cogasification with coal and FY synthesis. The torrefaction process converts the biomass into a hard friable product similar to pulverized coal, increasing the heating value and carbon content while decreasing the moisture. Catalyst manufacturing equipment has been procured and will be used to produce a large batch of FT catalyst using a formulation provided by Calvin Bartholomew at Brigham Young University.

Updated 8/17/09