Western Governors' Association

Transportation Fuels for the Future

Coal to Liquids

WGA Coal To Liquids Team
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Final Report

design, engineering and construction and subsequent increased cost for an already premium-cost plant.

Limited Federal Investment in Basic Research and Development

Historically, federal research and development (R&D) in the CTL industry has not been sustained nor of sufficient magnitude to accelerate the development of a U.S.-based industry. And, given the lack of mature, broad-based and full scale U.S. experience in gasification and F-T technology, there is considerable basic research and development (R&D) that needs to be undertaken to improve efficiency of individual unit operations, as well as in entire plant configuration. Of particular importance is an accelerated R&D effort to advance the promising CBTL technology. The European experience can become the foundation for U.S.-based R&D, including constructing demonstration and pilot-scale facilities to test gasifiers, feedstock ratios and co-firing configurations.

In addition, specific R&D is needed to develop and test new and improved gasification technology (including the coal feed process); capture in a more cost-effective way gas stream contaminants; reduce the parasitic energy consumption of current processes; and improve catalysts for the F-T process, making them more efficient, cost-effective, and longer lasting.

APPENDIX A

CTL TECHNOLOGY PROVIDERS AND U.S.-BASED CTL PROJECTS

APPENDIX B

CBTL TECHNOLOGY DESCRIPTION

Appendix C

STATES OFFERING INCENTIVES FOR CLEAN/ALTERNATIVE ENERGY FACILITIES

APPENDIX D

STATEMENTS OF ALTERNATIVE VIEWPOINTS

might generate stranded assets. It would seek to enhance prospects for a robust synfuels future.

environment due to the inherent design features of CTL plants and the properties of the fuels produced by these plants. While mining activities are outside the scope of this report, it should be noted that proper management of coal mine sites and rehabilitation of the sites after use are already mandated and the industry has had a good track record of working to be very good stewards of the environment and meeting or exceeding the mandates for mine reclamation. Studies of rehabilitated mine sites show that biodiversity has actually increase after rehabilitation indicating that the sites are properly managed.

The CTL process will reduce regulated and unregulated emissions from all aspects of the project as compared to existing power generation and fuels production plants. A CTL plant design incorporates the cleanest method for coal utilization: coal gasification. In this process, coal and oxygen are mixed in such a manner that synthesis gas, CO and Hydrogen (H2) is produced along with CO_2 and contaminant gases such as hydrogen sulfide and nitrogen compounds. Prior to introduction to the Fischer-Tropsch reaction, the synthesis gas (syngas) is scrubbed to remove CO_2 and other contaminant gases. The CO_2 produced in this stage of the process can be compressed and made available for sequestration via several options: Enhanced Oil Recovery (EOR), Enhanced Natural Gas Recovery (ENGR), Coal bed methane recovery, or geologic sequestration in several types of underground structures that are stable and secure for the foreseeable future. CO_2 can also be captured from other units of the plant including the F-T reactor. The CO_2 that is used for EOR, ENGR and Coal bed methane production actually offers a multiplier affect to the benefits of the CTL facility. For Example the Rentech facility in Natchez Mississippi will provide its CO_2 to EOR and that will result in rehabilitation of oil wells that have been shut in and abandoned. This opportunity will produce an additional 30,000 to 50,000 barrels of oil per day from Domestic resources that had previously been written off, further enhancing the United States Energy picture and the Economic benefits.

By the very nature of their design requirements, CTL facilities are the first commercial fuels production facilities to capture CO_2 and reduce the greenhouse gas emissions from transportation fuels. For example, Rentech Inc. is developing plant designs such as their proposed CTL facility in Natchez, MS that show a lifecycle GHG emissions profile lower than for conventional fuels. The research on the emissions profile from this plant are still under internal and external review, the results to date show that CTL fuels reduce GHG emissions compared to conventional fuels and that incorporation of biomass co-feed in the process can reduce GHG emissions further.

Co-feeding of biomass to a CTL facility (CBTL) is a desirable feature of CTL plants, and will be part of the future as the technology and resources are developed.

F-T fuels from coal, natural gas, and biomass have been tested by the Environmental Protection Agency (EPA), DOD, DOE, California Energy Commission (CEC), plus many international government and industrial testing facilities and laboratories. All demonstrate the same results: the use of ultra clean fuels such as CTL derived fuels will result in significant reductions of all regulated emissions, being the emissions EPA has regulated for the past 20+ years that have been shown to create health hazards. In addition, recent testing of F-T fuels has demonstrated that because FT diesel contains less carbon than conventional diesel the unregulated CO_2 emissions are reduced when burned in conventional diesel engines.