Biomass Program

Thermochemical R&D

Evaluation of Membrane Systems for Biomass Gasifiers

Membranes composed of metals or ceramics are currently used in high temperature and harsh environment applications, such as gas separations, reactive separations, and industrial wastewater treatment. They offer the potential to be used in biomass gasifiers to perform catalytic hot gas clean-up, catalytic shift reactions, and more. This project is evaluating the overall feasibility of integrating membranes into biomass gasifiers for a variety of uses.

R&D Pathway

Researchers have reviewed the gasification literature and decided to limit the evaluation to the use of high-temperature membranes located inside or very near to the gasifier where they are an integrated part of a gasification system that is producing liquid fuels. Existing membranes and those in the R&D stage for oxygen separation, hydrogen separation, and carbon monoxide separation were included in the assessment. As part of the technical feasibility evaluation, the stability of ceramic membranes in systems with alkali was reviewed.

Economic analyses will be performed on the membrane systems with the best technical merit.

Benefits

- **Improved performance in the targeted applications**
- **Reduced capital costs and footprint of biomass gasification systems**

Applications

Integration of membrane systems into biomass gasifiers could enable the commercialization of gasification technologies for use in integrated biorefineries.

Project Participants

National Renewable Energy Laboratory
Pacific Northwest National Laboratory

Project Period

FY 2005 – FY 2006

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