

RD&D Projects

RDG-06-22: Flexible Biomass Gasification Technology for Distributed Power Generation

Project

Many biomass gasification technologies currently being developed or demonstrated are largely based on the experience of coal gasification. These gasifiers will often be operated at high temperature (and high pressure), incurring capital and operating costs higher than those for coal gasification. These large gasifiers would also require the biomass fuels to be collected and transported to centralized locations. However, aside from some special cases of relatively densely populated biomass resources, biomass fuels are often distributed in rural areas. The costs of collection and transportation of (wet) biomass are often another important factor limiting the economic competitiveness of this renewable energy source. Considering the special thermochemical features of biomass fuels, this project aims to develop a flexible biomass gasification technology to separate the whole gasification into 2 steps: pyrolysis (the initial step of gasification) and subsequent reforming/gasification. The mild pyrolysis of biomass acts as a fuel pre-processing step to convert biomass into bio-oil and char, which can be much easier and cheaper to transport than the original bulky biomass. The subsequent reforming of bio-oil and gasification of char will then produce gaseous fuel suitable for (solid oxide) fuel cells or gas engines for distributed power generation. Representing a paradigm change in biomass utilization philosophy, the technology will be applicable for both distributed and densely populated biomass resources. In particular, this technology will greatly reduce the transportation costs and will be particularly suitable for distributed power generation in rural areas where biomass fuels are grown.

Participation

Project manager

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Other participants

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Mr. In-Gu Lee, Bioenergy Research Centre, KIER, Korea

Dr. Hongwei Wu, Curtin University of Technology, Australia

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Participation of India's research sector is likely and the project will also involve the direct participation by industry partners.

Objectives

The ultimate aim of this project is to demonstrate the key technological aspects of the proposed biomass gasification technology for distributed power generation, to speed up the commercial uptake of biomass as a reliable and cheap renewable energy source across the Partner countries.

Milestones

The project includes both research/development and demonstration activities: The concept of the proposed technology will be proved within the first three years.

The key technological aspects of the technology will be demonstrated within five years, ready for further commercial activities. Early uptake of this technology by industry may also be possible.

Location

The project will be carried out in laboratories of the participants.

Resources***Cash***

US\$3,030,000 requested from REDGTF programs (in Korea, Australia, Japan and China).

In-kind

US\$ 4,168,000 would be contributed by the participating Partner countries' organizations.