

Activities of Task 33 are to review and exchange information on biomass gasification research, development, demonstration, and commercialization, seek continuing involvement with bioenergy researches and to promote cooperation among the participating countries to eliminate technological impediments to advance the state-of-the-art of thermal gasification of biomass. The ultimate objective is to promote commercialization of efficient, economical, and environmentally preferable biomass gasification processes, for the production of electricity, heat, and steam, for the production of synthesis gas for subsequent conversion to chemicals, fertilizers, and transportation fuels, and also for co-production of these products.

There are 2 meetings each year and at every meeting a workshop is organized.

Topics at the Meetings:

1. Evaluation Analysis and Role of Biomass Gasification Technologies
2. Future Energy Needs
3. Procedures/Guidelines for BMG synthesis gas characterisation
4. The Way to safe and eco-friendly Biomass Gasification
5. Case for Thermal Gasification of Biomass
6. Synthesis Gas Conversion
7. Success Stories & R&D

By biomass gasification synthesis gas can be produced, which can be used to produce chemicals or fuels. In these synthesis gas applications, catalysts normally have useful lives of 2 – 5 years. The challenge is the development of synthesis gas conversion with any catalyst without the prevention of deactivation. Not only poisons like sulphur or carbon but also temperature distribution, hot spots, heating up rate, and treatment / reduction can reduce the lifetime of a catalyst.

In principle there are two different ways to analyse synthesis gas:

- Offline (Batch sampling) – Take the sample to the lab – i.e. sample of gas in a bomb or series of impingers and deliver the sample to an analytical lab for subsequent analysis.
- On-line (Continuous sampling) – Take the sample to the lab to the sample condition the synthesis gas stream so that it can be analysed by laboratory instrumentation in real time.

Methods to characterise the following impurities were discussed and the results can be downloaded from the homepage:

- Gas Composition (CO, CO₂, CH₄, O₂, hydrocarbons, tars)
- Sulphur Compounds (H₂S, COS, mercaptans, thiophenes)
- Halogens, Nitrogen compounds, and Metals

HIGHLIGHTS www.ieatask33.org

IEA Bioenergy

Task 33 / Thermal Gasification of Biomass

The Way to safe and eco-friendly Biomass Gasification

A workshop was organised by IEA Bioenergy Task33, by GasNet and the EC Project "Gasification Guide".

Biomass gasification is a promising technology, that is energy efficient, environmentally friendly and that can contribute significantly to sustainable energy generation. The technology is close to commercialisation but large-scale implementation is hampered by several reasons. Leading gasification experts from around the world identified Health, Safety and Environmental (HSE) issues as an important barrier to technology deployment. Due to poor awareness and lack of understanding of HSE issues authorities tend to impose excessive and costly requirements on gasification plants. A broadly accepted HSE guideline would effectively tackle this barrier.

A guideline was presented and discussed at the workshop. In the guideline the following points are covered:

1. Legal Framework for Biomass Gasification Technologies

2. Theoretical Aspects of Risk Assessment

3. Potential hazards and good design principles in practice

- Explosion / deflagration Fire
- Toxic liquid escape
- Toxic gas escape

Visions for Biomass Gasification

In sorting out the biomass energy conversion options, namely combustion, gasification, and pyrolysis, the classical thermodynamic 'exergy' analysis provides the insight into efficient energy conversion technologies. While exergy can identify quantitative advantages of gasification over combustion and pyrolysis, the qualitative comparison are clearly in favour of transforming biomass into a single product stream of clean burning fuel or synthesis gas that can be used for a broad range of applications; an option that gasification provides.

