

An integrated network on thermal biomass  
conversion for power, heat and transport fuels

# ThermalNet Final Report

Work Package: 3B

WP Title: Economics

WP Leader: Max Lauer

# WP 3B

# Objectives

To enhance the understanding of economic issues of the ThermalNet members by covering issues as:

- Economic process evaluation
- Influence of environment health and safety measures on economic performance
- Cost of Greenhouse gas emission mitigation by substitution of fossil energy conversion by various bioenergy conversion processes
- Bioenergy potentials and the effect of their use on social economic parameters

# WP 3B

# Work Programme

## Topic list for workshops

- Case studies and technology assessment studies and recommendation of standard TEA methods
- Cost of GHG emission reduction
- Bioenergy potentials
- Assessment of upcoming technologies
- Conditions of industries for investment
- EHS and Economy

# WP 3B

# State of the Art

- As a state of the art for the economic assessment of possibilities for technology implementation information out of a variety of assessments is needed:
  - Techno-economic assessment (cost benefit relation or balance) and technology risk analysis
  - Market assessment (competitiveness, market volume, accepted prices/cost, fuel supply possibilities, economic risk)
  - Assessment of impacts on Environment, Health and Safety and the related risk analysis
  - Assessment of the structural ability of technology implementation (comparison of the needs of the user to the qualities of the technology)
- Assessments are done by investors, often not understood by researchers and technology developers

# WP 3B

# Results 1

Lille, May 2006

- “Economics and LCA of Renewable Transport Fuels”, (H. Boerrigter, E. Henrich, G. Jungmeier)
  - reasonable cost (15 €/GJ) for renewable FT fuel only in huge plants with high risk in development (multiple scale up). Small scale technology: more expensive but higher probability of realization. GHG emissions are highly dependant from the source and the efficiency of the conversion process.
- “Conditions of the industry for making investments and/or adopting new technologies” (F. Eder, C. Greil, P. Thornley)
  - The availability of a technology is an essential part of risk assessment and risk assessment is very important for technology decisions in the industry.
  - Risk matrix as a tool for comprehensive risk assessment explained.

Vicenza, October 2007

- Influence of EHS measures on economic performance of bioenergy conversion processes. (M. Lauer, H. Knoef, B. Livingstone, C. Greil)
  - EHS measures cost effort and money, but are often basis of operation permission or CE certification procedure.
  - From the economical point of view complete and documented EHS measures have positive aspects (market standing, customer relation)
- Bioenergy potentials (M. Lauer)
  - Potential analysis can only be used for technology development or project development issues,
    - if boundary conditions are clear and appropriate
    - if boundary conditions reflect also possible economic, social and social economic conflict areas

## “Virtual Workshop” on a TEA Methodology guideline

- Objective: Easy to understand guideline giving clear definitions and comments on cost and benefit assessment and on the various methods used for TEA
- Guideline (suggested by AVB) was discussed per E-Mail in several steps. Good comments received from ThermalNet members (Patricia Thornley!) and colleagues outside.
- Contents: specifications, explanations how to do and comments for
  - Cost assessment
  - Benefit assessment
  - TEA methods
- Final discussion in a dedicated workshop on Wednesday April 23rd

# WP 3B Achievements / Deliverables

## Achievements:

- All subjects addressed in the objectives and in the work plan were discussed in workshops giving interesting results
- The discussions integrating specialists coming from leading companies in biomass use and technology supply.

## Deliverables

- Workshop reports included in interim/final reports, presentation material on ThermalNet website
- Report on activities in ThermalNet newsletter (contribution on a small scale gasifiers provider presentation)
- Progress reports: done
- Contribution to final report: draft version submitted
- Methodology guideline on techno economic assessment (TEA)

# WP 3B

# Conclusions

## Outcome of WP3B (compared to contract):

- Enhancement of understanding of economic issues:
  - achieved
- Agreement on standards and methods in economic assessment:
  - TEA methodology guideline agreed, to be finalised.
- Overview on promising options and the sensitivity of economic boundary conditions (case studies, competitiveness, practical experience of industrial engineers):
  - new technologies case studies discussed including the competing situations
  - boundary conditions discussed (also in energy potentials)
  - conditions of industry for adopting new technologies discussed with experts e.g. from Mondi and Lurgi, risk analysis
  - EHS-economy workshop

## WP 3B

# Recommendations

- With the present rapid change of conditions on markets and public perception of environmental issues, non technical information becomes essential for the community of researchers and technology developers to focus the future work.
- Topics of this non technical issues to be discussed could be:
  - Global developments in biomass supply and use (food, industrial feedstock, energy) and in public perception of environmental issues (climate change, food supply, energy production and use)
  - Discussion on efficiency of supply chains (efficiency as a decisive quality of future technologies)