

Biomass cogeneration

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Dr Calliope Panoutsou
Center for Renewable Energy Sources
Biomass Department



BIO-ENERGY
ENLARGED PERSPECTIVES

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BIOCOGEN

- DG Research.
- 24 months (Dec01 to Nov03).
- Six work packages (incl. project management) with different lead partners.
- Desk-based reviews & surveys, networking & events, reporting & dissemination.
- Wide interpretation of biomass (incl. MSW, sewage).

Partners

EU & eastern European

Austria: Joanneum Research

Bulgaria: Ecolinks

UK: TV Energy Ltd.

Denmark: EnergiGruppen Jylland a/s

Finland: Technical Research Centre

France: Institut Technique Europeen du Bois-Energie

Slovenia: Forestry Institute

Sweden: Sveriges Lantbruksuniversitet

Turkey: TUBITAK- Marmara Research Centre

Biomass cogeneration contributes to many EU policies

- White Paper for Renewable Energy
- Directive: promotion of electricity from renewable energy sources.
- CHP Directive
- Strategy for Sustainable Development
- Emissions Trading Scheme Directive
- Reformed Common Agriculture Policy
- Directive on biofuels for transportation.

Review of biomass cogeneration

- Large number of commercial plants
- Most solid biomass CHP plants are located in countries of considerable forest industry
- Smaller capacities <1 MWel in central Europe, larger capacities >20 MWel in Northern Europe

Review of biomass cogeneration

- Largest plant in Jakobstad- Finland: 240 MWe, 100 MW process steam and 60 MW district heating. Uses wood- based biofuel and peat along with coal as a reserve fuel
- Steam turbine and engine are most common technologies
- Examples for innovative CHP systems already exist: ORC, gasification and Stirling

Strengths (1)

- **Industry and other investors**
energy solutions for various biomass streams
- **Energy sector**
decentralization
avoid electricity transmission & distribution losses
greater use of renewable energy
improve local energy security
reduce fuel import needs

Strengths (2)

- **Environment**
reduce greenhouse gas emissions and other pollutants
reduce impacts from waste disposal
- **Agriculture and forestry**
enable diversification
create rural revenue streams
create / maintain jobs
- **Competitiveness**
stimulate development of technologies and services with worldwide applications

(internal) Weaknesses

- Multiple benefits not economically rewarded
- Advanced technologies unproven
- Potential fuel supply logistical problems
- Poor data on economic available biomass potential
- High capital costs, no economies of scale
- Many potential applications have low heat demand

(external) Threats

- Static market for cogen generally
- RE incentives exclude heat (RE heat is 6-7 times greater than electricity in terms of primary energy)
- Changes in legislation & support, thus uncertainty
- Lack of awareness among political & business decision makers
- Negative public perceptions, not favoured by environmental lobby
- Competing uses of biomass
- Decline in new build district heating
- Changes in CAP so focus on core food business

Opportunities (1)

Wood processing industry

Primary wood processing (including sawmills and board mills)

Pulp and paper mills

Secondary processing (e.g. furniture)

Heat use is widespread; CHP in pulp and paper industry. Opportunities for more CHP if incentives are attractive

Opportunities (2)

Agriculture

poultry and animal raising (individual or centralized generation sites)

cotton ginning factories, wineries, olive mills, rice mills, etc.

Industries could realise the energy value of their wastes; incentives are required to overcome risks; heat demand is important

Opportunities (3)

Waste management industry

landfill gas, sewage gas & waste incineration

With incentives for GHG emissions can be
commercially attractive

Opportunities for considerable additional
capacity in south, central and eastern Europe

Opportunities (4)

Commercial sector

public buildings, such as museums, leisure centres, and hotels etc in rural or peri-urban locations, where a high value is placed on the environmental and other benefits and lesser focus on short-term financial return

Emissions trading

While cogeneration technologies in general offer CO₂ savings, biomass cogeneration offers nearly full CO₂ neutrality on a life cycle basis

Opportunities (5)

Innovative concepts

Centralised biomass conversion units, for example producing pyrolysis liquid for onward transfer to cogeneration units in commercial and public sector.

Multiple fuelling, such as cogeneration plant on waste management sites using gas from anaerobic digestion of organic waste, gas from landfilled waste, supplemented by synthesis gas from gasification of local biomass material

Liquid biofuels and cogeneration