

Energy from crops

Dr Calliope Panoutsou

Biomass Department

CRES

Contents

- Energy from crops: the opportunities
- Status of biomass energy in EU
- RTD needs
- Outline of proposed work

Opportunities

- To select species and supply chains and closely match conversion requirements.
- To have uniform, large-scale, replicated crops and achieve learning curve effects.
- To achieve high yields.
- To minimize chemical and energy inputs.
- To either grow close to conversion sites or to trade standardised biomass fuels.
- To have multiple energy vehicles – electricity, heat/cooling, liquid, gas – and fit many markets.

Biomass energy status

- It is becoming clear that the large potential for biomass energy is not being delivered - EC communication COM(2004)366
- 22% RES-E by 2010 will be missed (18-19% maybe)
- 12% RE by 2010 will be missed (9-10% maybe)
- High growth rate in wind energy but slow expansion of biomass singled out as key reason for failure to reach targets.
- Poor progress in southern countries.

Work underway

- RTD fragmented, reflecting great diversity of crops, supply routes and end uses.
- In particular, division between researchers on energy crops and those working on end uses.
- Need to evaluate the whole chain; an integrated approach to deliver quality, availability and cost targets and achieve competitiveness.

Key RTD needs

- Establish competitive energy crop chains that meet the requirements of markets.
- Optimise bioenergy systems, matching production options through to conversion requirements.
- Improve know-how for stages between production and conversion.

Energy crops production

Yield & Characteristics

- Sustained high yields over long term under commercial (not research) conditions
- Multi-cropping of selected perennial crops for energy
- Optimise system parameters
- Agronomy to influence biomass quality
- Determine production systems that best integrate with chain including conversion requirements.

Harvesting & Collection

Effectiveness & Speed

- Test existing machinery
- Develop and test new machines and components
- Low contamination harvesting methods
- Harvesting and collection must be effective and high speed, deliver crop in optimal state, and minimize site impacts

Storage & Transport

Reliability & Quality

- Minimization of risks: fire, health.
- Ensure quality: feedstock physical specifications
- Optimise technology for chips / bales / pellets
- Assess different logistic structures, such as centralized fuel depots.

System integration

- System sustainability – energy and emissions balance over life cycle of chain
- System costs – vertical integration or each step as profit centre?
- Stakeholders consultation – agro-industry, hauliers, energy industry, local communities.
- Emergence of international trade of standardised biomass fuels – impacts?
- Minimization of risk throughout the chain and demonstrating schemes can be financed.

The proposed work

- STREP, 4 years
- Focus on perennial crops to energy in southern Europe.
- Trials targeted at key RTD challenges.
- Whole chain approach, integration of systems.
- Stakeholder participation and consultation.
- Transfer of experience, both north-south and south-south.