BIOMASS IN CZECH REPUBLIC, ENERGY AND TRANSPORT SYSTEM

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INTRODUCTION

- Energy crisis and price signals coming from oil and nature gas markets and other alternatives of nature sources.
- Biomass for energy purposes.
- Use this energy resource in the energy and transport systems of Czech Republic.
- Biomass cannot replace the fossil fuels as a full substitute, the local and regional application.
- It is already known how to grow, burn and plant biomass in energy processes and how to receive ethyl alcohol and its derivates for transport use.
- In spite of good technology know-how there are exist economic and financial barriers. The biggest producers, suppliers and also refinery business would invest to the renewable resources.
- Production centralisation and decentralisation approaches have to go hand in hand.
ALTERNATIVE ENERGY RESOURCES

PRIMARY IDEA: ENERGY

- SUBSTITUTION OF FOSSIL FUELS
- SUPPLY RELIABILITY
- SELF-SUFFICIENCY

SECONDARY INTEREST: AGRICULTURE

ENERGY RESOURCES: ALTERNATIVES

- NATURE GAS
- BIOMASS
- SOLAR ENERGY
- WATER
- WIND
- GEOTHERMAL
- HYDROGEN
BIO FUELS PRODUCTION

- Historically no news
- Mastery of oil and nature gas: biofuels unprofitable
- Energy crisis and price changes: energy aimed at bio fuels
- Agriculture focus
- These approaches come near over time and also diametrically diverge: environment, reliability, security supply, autarky (Brasilia, USA)
- Biofuels: closed cycle CO2 possibility to blend with the fossil fuels (B5, B20, E10-E85) to use derivates MTBE,ETBE)
- Political and other interests
## The Alcohol Production Cost

<table>
<thead>
<tr>
<th></th>
<th>cEUR</th>
<th>EC</th>
<th>USA</th>
<th>BRASILIA</th>
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<tbody>
<tr>
<td><strong>Production Cost</strong></td>
<td>50</td>
<td>30</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td><strong>Input Raw Material</strong></td>
<td>30</td>
<td>15</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td><strong>Input Raw Material/Production Cost</strong></td>
<td>60%</td>
<td>50%</td>
<td>70%</td>
<td></td>
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</table>
CLASSICAL FUELS VS. RENEWABLE

• Cost in EU 150%, in USA 50% higher in compare with Brasilia

• Biofuels – local resource
  production of bio ethanol 50 mil ton/year as a 5% substitution

• American and Canadian studies: within 20 years
  * price of ethanol could reach the level of present classical fuel (price moving)
  * production volume of ethanol: 2/3 of current consumption of classical fuels
Biomass in Czech Republic

RESOURCES AND USE:

• Wood waste, fast growing species, non-wood plant mass, fast growing crops industrial and municipal waste of plant source.

• Animal sources, waste water sludge and sorted municipal waste for biogas production.

• To use biomass for the energy and transport

• The heat and electric power supply and fuel production suppose much more massive biomass demand. Therefore the use of waste is not enough.

• The agricultural sector can offer the land use for non food purpose.

• The exploitation of such land can be used in a larger extent for power and transportation purposes.
AGRICULTURE AND NON FOOD LAND

Such approach can bring some effects:

• reduction of fossil fuels consumption
• reduction of dependence on oil and natural gas import
• environmental protection improvement
• preferable geographic location of power sources and more equal emission load
• decrease of land erosion
• increase of employment
• regional development

1. List of annual, biennale, multi-annual and perennial plants for energy purposes
2. Transport purpose was aimed at rape use for biofuels and cereals or potatoes for bio alcohol production
PRICES

The price depends on many factors:

- Regional geography
- Biomass source
- Technology process
- Transportation cost
- Logistics

AVERAGE PRICES MOVE

- 20 EUR/ton to 150 EUR/ton or
- 3 EUR/GJ to 10 EUR/GJ
TECHNOLOGY APPROACH

Energy production

• Heat production. Burning biomass is primarily technology process with the wide spectrum of heat production within small and medium-seized units.

• To construct and design the boilers due to demanded heat power, kind of biomass (waste and by-product material or energy producing plants) and load curve.

• Biomass can be burned together with the fossil fuel (coal). The use of fluidized-bed combustion gives the good results.

• The more economic biomass use is the cogeneration approach.
TECHNOLOGY APPROACH: COGENERATION

The economy of combined process depends on:

- fuels used, capital investment required, efficiency in converting fuel to electricity, electricity-to-heat ratio and environmental effects
- combined production use need the high time operation, high load and steady load curve.

Every project has to be solved as an individual case with the special attention to the given conditions.

The economic cogeneration use, for this time, is valid:

- The time operation must be greater than 5000 hours/year.
- The only winter operation is not best alternative.
- The consumption of heat energy has to be demanded throughout the all year (technology consumption in industry or cooling).
- Spreading the customers through connection of the cogeneration unit or plant to the existing distribution heat nets.
TECHNOLOGY APPROACH: TRANSPORT

Biomass can be used for transport:
• 1st generation of biofuels. Production of methyl- and ethyl-alcohols and derivates.
• 2nd generation: diesel and metylester

Biofuels can be used in the two ways:
• Bio ethanol use together with gasoline (in Czech Republic up to 5%)
• Metylester and diesel (10 – 12%)

Biofuels production problems:
• Higher production cost.
• Chains from agriculture till end - costumers.
• The transport running around the world supposes the big volume of biofuels as a substitution of contemporary use of fossil fuel.
FOSSIL VS. RENEWABLE RESOURCES

- Renewable resources – economic competition with fossil fuels is limited.
- Depends on price signals of fossil fuels markets.
- Relative plenty for the next decades.
- In many cases the competition can be provided.
- Problem of environment damages through combustion and global warming.
- Fossil fuels are concentrated form of solar energy.
- Renewable forms, biomass is not exception, are dilute.
CONCLUSION

Biomass use in energy and transport sectors is determined:

1. Price signals coming from oil and nature gas markets.
2. Growth of prices can influence the moving of financial sources to research and development of alternative fuels.
3. Economic combined energy production use is due to the operation time greater than 5000 hours/year and high ratio electricity- to- heat.
5. Biggest producers and suppliers of energy, petrochemical industry, producers of transport means, producers of power engineering equipment and other investors not only in energy and transport, would invest in renewable resources.
6. Creation the mixed small (local or regional energy and transport systems) and big systems as centralized and decentralized forms of organizational structures.
Thank you for your attention!