Economic barriers for energy crop development: *Lessons learnt from Czechia*

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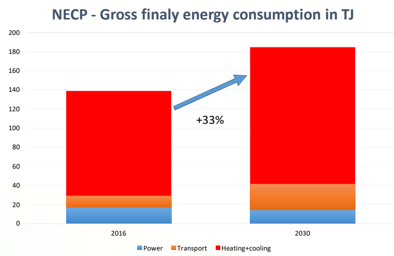
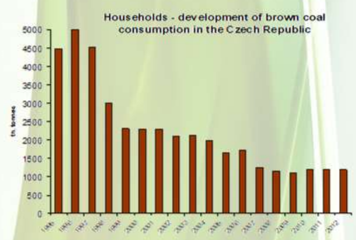
Ambitious plans for renewable energies increase in the Czech Republic



Biomass in Czech energy mix

- Increase of gross final RES consumption from 165 PJ (2016) to 232 PJ (2030)
- Decisive role of biomass – from 45.5 PJ (2016) to 67 PJ (2030)
- Important role of (solid) biomass for heating and cooling: +27 PJ (substitution of domestic coal widely used both for local (+17 PJ) and district heating (+10 PJ)



Sources of (solid) biomass

- Residual biomass (straw) of conventional crop
- Energy crop (e.g. SRC plantations, Miscanthus, Reed Canary Grass, etc.)
- Forest residuals (preference of material utilization of wood, bark beetle calamity significantly falls to the biomass availability in next decades)
- Residuals from wood processing industry (already utilized – no additional potential)

App. 330–450 th. hectares needed for additional 30 PJ! i.e. 13–19% of total arable land needed!

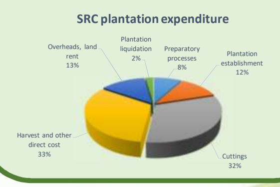
Barriers for energy crop

Economic

- Competition between (heavily subsidized) conventional crop and energy crop, competition of (solid) biofuels with conventional fuels – solid biofuels for local space heating are not competitive
- Supply side point of view = minimum price for biomass planting (to get required return from economic activity) + transportation/storage cost + cost of pelleting/briquetting 7.2–12.4 EUR/GJ (pellets/briquettes)
- Demand side point of view=limit of price defined by the price of conventional fuels (coal, natural gas)
- Price of coal for local space heating =6.5–7.3 EUR/GJ

Financial

- Energy crop – plantations with 10 to 25 years lifetime: high cost of establishment, e.g. SRC plantation 50% of total expenditures during plantation lifetime are associated with plantations establishment – high risk for farmers, maximum of biomass production only after 8th. years of plantation lifetime



Non-production function of energy crop

Cost of saved carbon

- Substitution of domestic brown coal for local space heating with solid biofuels (pellets, briquettes) from energy crop results in saving of 88–95 kgCO2/GJ – net balance

Effects not included in economic decision

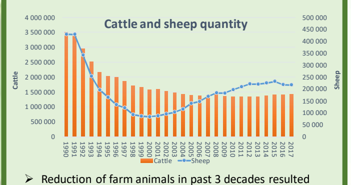
- Biodiversity increase
- Reduction of soil erosion, better absorption of water from precipitation, landscape cooling, etc.
- Diversification of economic activities

Other barriers for energy crop

- High share of rented land (short rent periods – e.g. 5 years only) x 10 to 25 years of energy crop plantation lifetime (the same as to finance long term project with „short money")

VERSUS

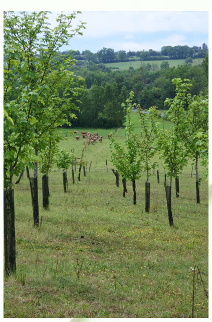
- One year decision/production cycle for conventional crop (wheat, barely, etc.)



- Reduction of farm animals in past 3 decades resulted in deficit of organic matter in soil – increasing requirement for amount of straw ploughed into soil and reduction of future potential in residual straw

BUT

- Significant part of currently assumed biomass potential is in residual straw (app. 50% for 20% arable land allocation for energy crop)



Conclusion

To increase solid biofuel competitiveness

- Doubling SAPS agriculture subsidies up to 390 EUR/ha
- Linking SAPS agriculture subsidies with non-production functions
- Increase of ecological tax on coal 10 times to 3.3 EUR/GJ
- Reduction of farmers' financial risk by subsidizing of energy crop plantation establishment
- Support of technology switch from coal to solid biomass

Without complex measures – all biomass utilization predictions are just fiction

Vávrová, K., Knápek, J. Weger, J, 2014: Modeling of biomass potential from agricultural land for energy utilization using high resolution spatial data with regard to food security scenarios. Renewable and Sustainable Energy Reviews. Pp. 35 436–444. ISSN 1364–0321.

Vávrová, K., Knápek, J., Weger, J., Králík, T.,Beranovský, J., 2018. Model for evaluation of locally available biomass competitiveness for decentralized space heating in villages and small towns. Renewable Energy. 2018(129), 853–865. ISSN 0960–1481.

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