



BIOETHANOL PRODUCTION FROM SUGAR BEET IN POLAND

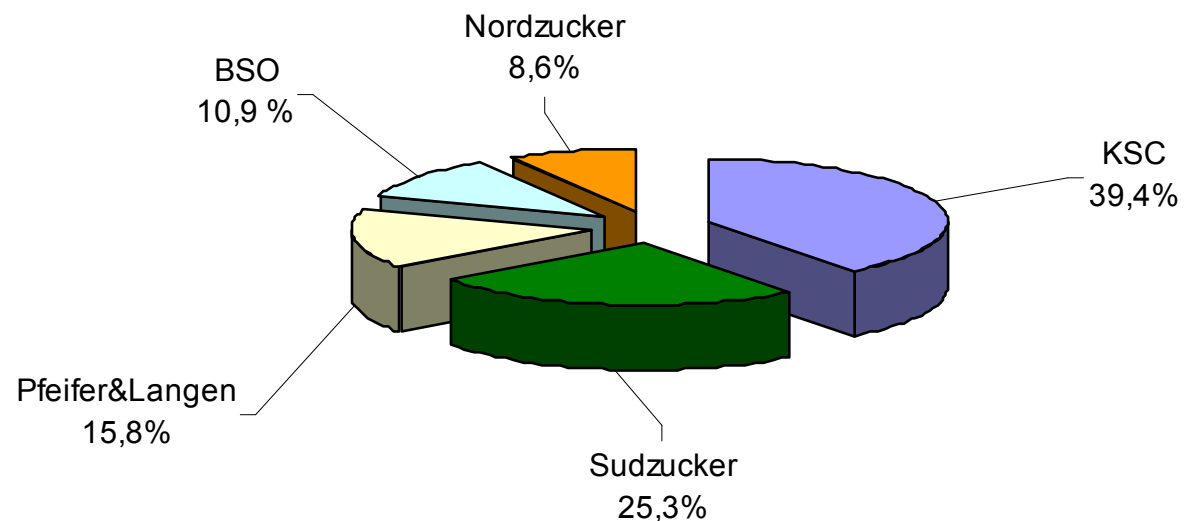
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RESIPE final meeting, 26 February 2009, Brussels



General data on KSC S.A.

- Established in 2002, including 27 sugar factories, > 80% shares belonging to State Treasury.
- Share in the sugar market in PL: 39,4 %
- Share in the EU sugar market: 4,0 %

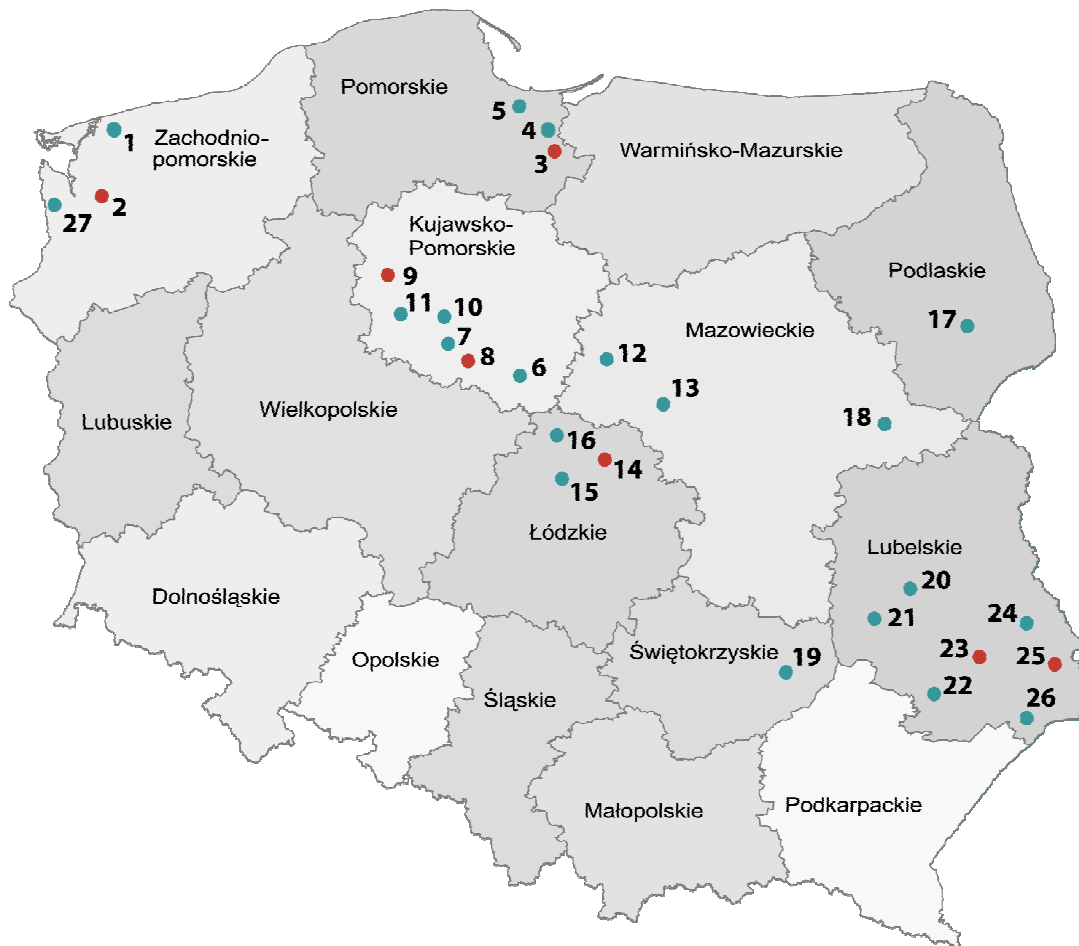




Sugar factories in KSC S.A.



In the sugar campaign 208/09 only 7 sugar factories under operation, 19 factories withdrawn.



Working sugar factories:

- 2. Kluczewo
- 3. Malbork
- 8. Kruszwica
- 9. Nakło
- 14. Dobrzelin
- 23. Krasnystaw
- 25. Werbkowice



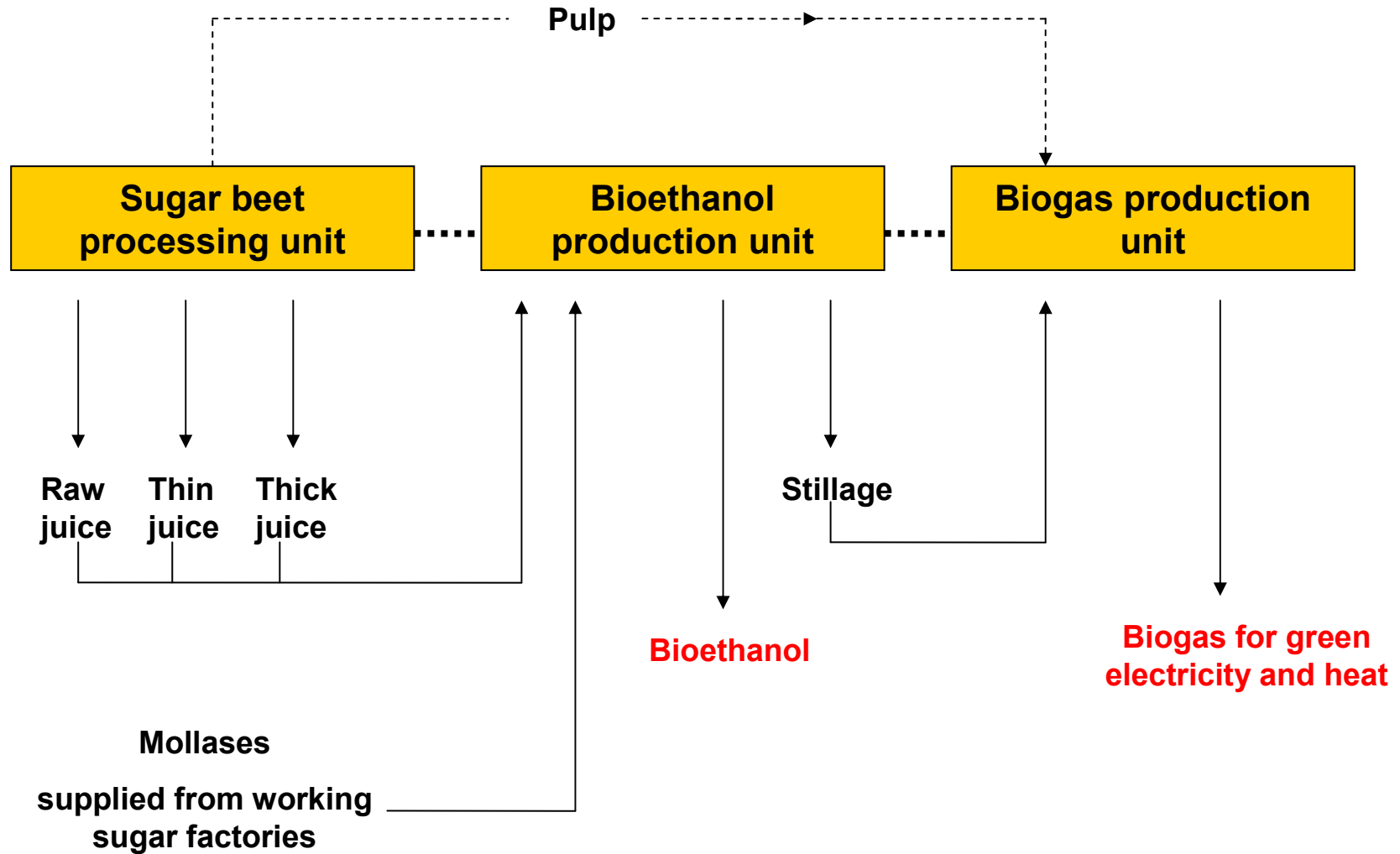
Strategy of KSC S.A.



- Aim:
 - keep the position of the leading sugar producer in Poland
 - find alternative business for the withdrawn factories
- Bioenergy-biofuel strategy:
 - establishment of a network of bioenergy-biofuel centres based on the withdrawn sugar factories infrastructure
- Project with cooperation with energy sector
- First plant commissioned in 2010/11

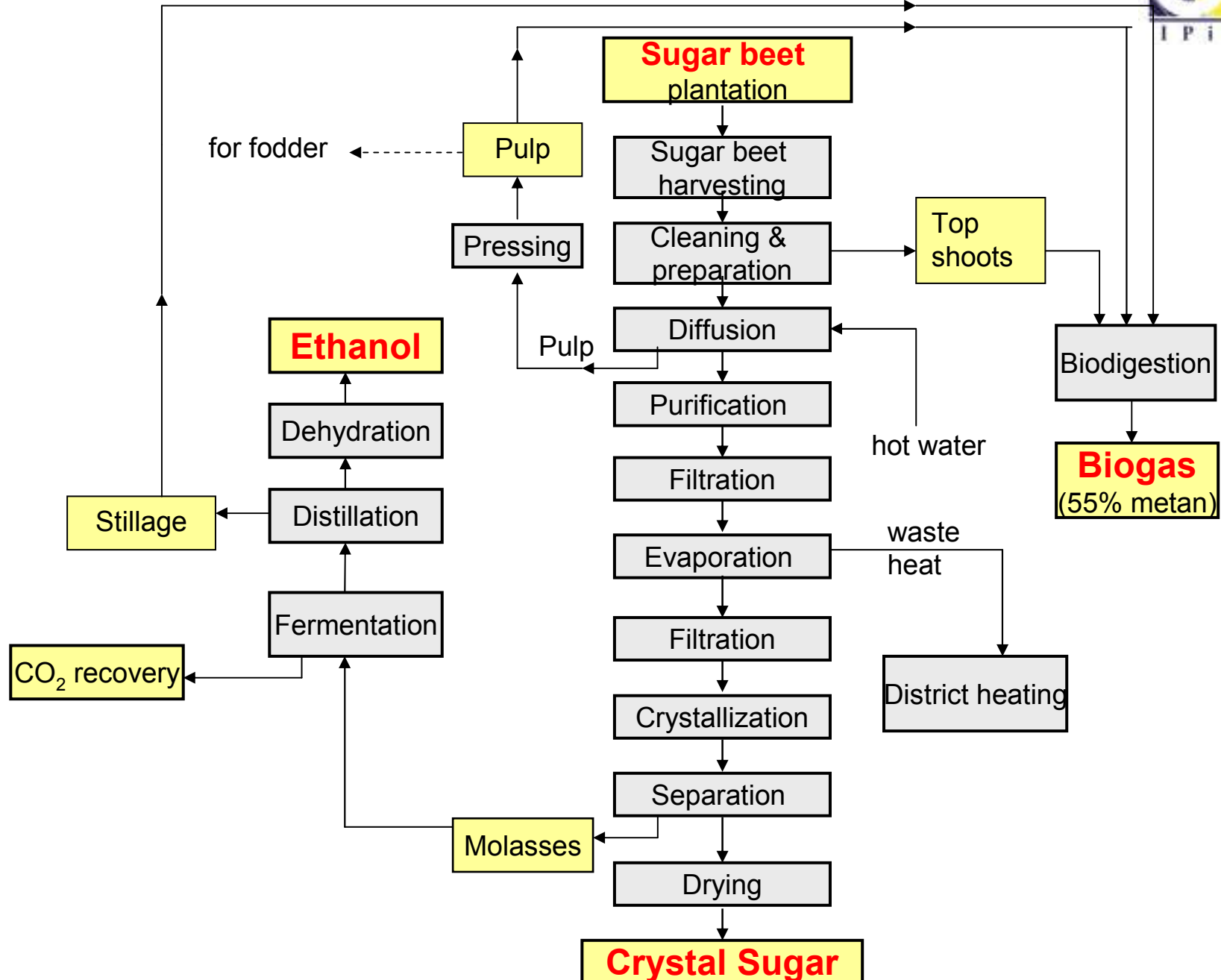


Bioenergy-biofuel centre



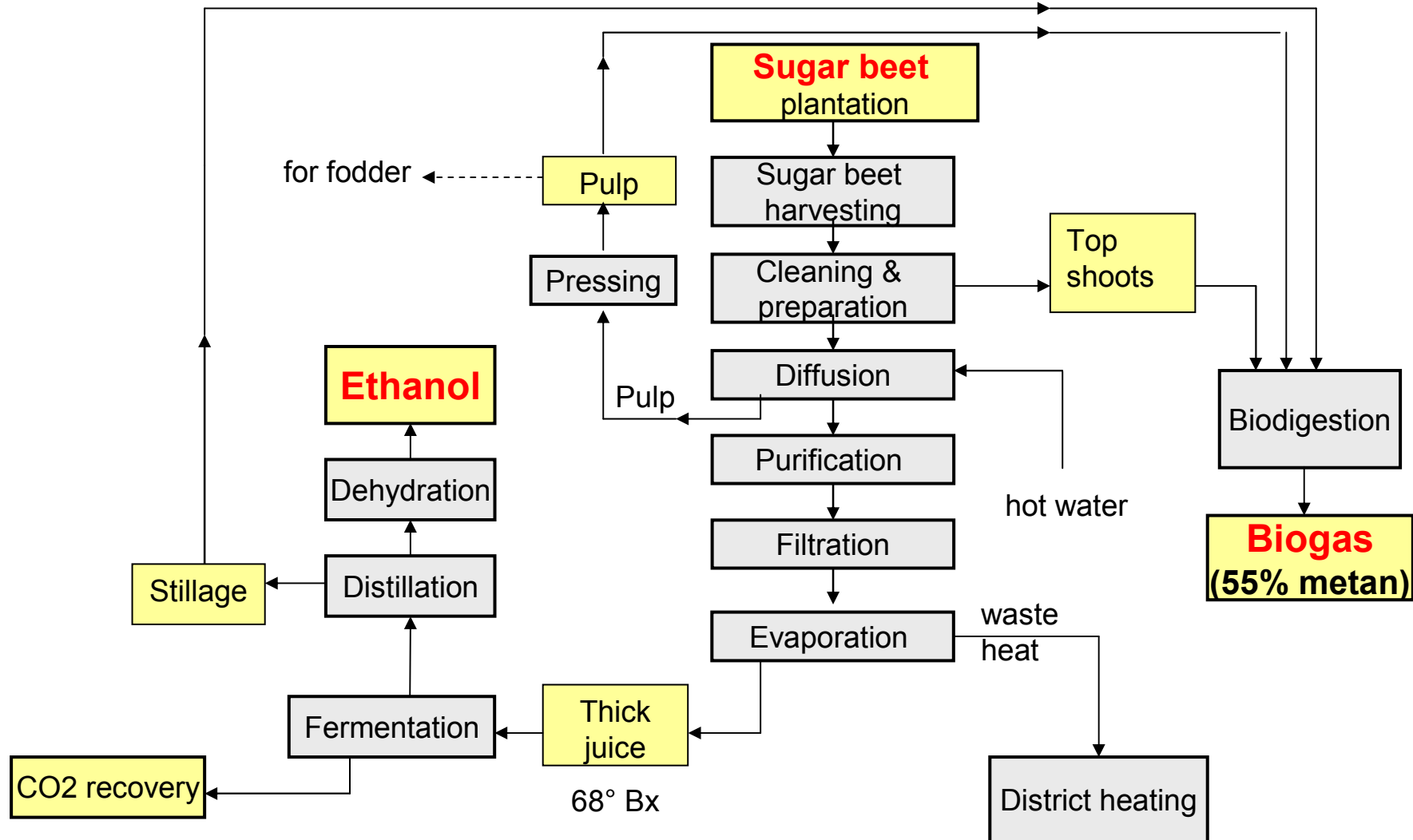


Concept with crystal sugar production





Concept with thick juice production





Bioenergy-biofuel centre technical factors



- Sugar beets: 170 000 t
- Thick juice prod. (68° Bx): 43 000 t
- possibly:
 - molasses supply: 56 000 t
- Bioethanol production: 17 250 000 dm³/year
50 000 dm³/day
- 'Green' electricity
installed capacity: 1,5 MW



Bioenergy-biofuel centre financial factors



- Investment costs: 17,70 mln €
- Operation costs:
 - raw material: 0,28 €/dm³
 - other operation costs: 0,21 €/dm³
- 'Green' electricity: 105,70 €/MWh
 - which constitutes: 0,09 €/dm³
- Bioethanol production costs: 0,40 €/dm³
- Bioethanol selling price: 0,54 €/dm³
- IRR: 13,70 %
- Simple return period: 7 years

Remarks: IRR and return period without the cost of capital



Summary



- Alternative business for withdrawn sugar factories: polygeneration, biorefinery
- Strategy of KSC: network of regional bioenergy-biofuel centres in sugar factories
- Investment profitability:
 - Raw material cost is a key factor
 - Electricity improves much the economics of the project (revenue from green certificate selling)
- Future: second generation bioethanol from beet pulp (alcohol fermentation)