

The Pellets for Power project DBI01010

Sustainable Biomass Import from Ukraine



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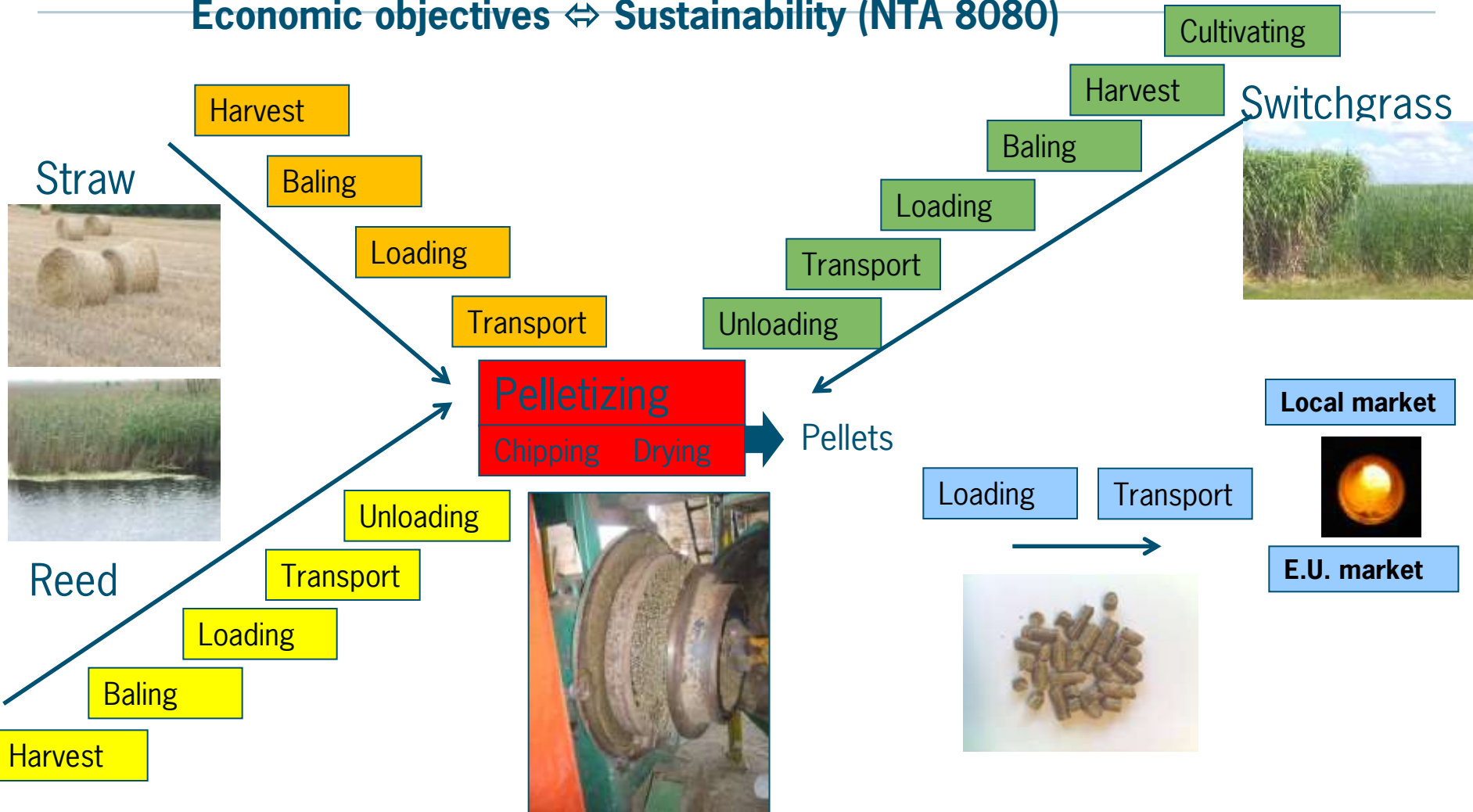
Objectives:

- Develop a sustainable business model for pelletizing biomass residues, reed and switchgrass in Ukraine for domestic and NL energy markets
- Test sustainability of underutilized biomass and energy crop production on marginal land while avoiding Indirect Land Use Changes (iLUC)



Developing three biomass chains

Economic objectives ↔ Sustainability (NTA 8080)



Straw

Positive:

- 10 million tons of straw available each year
- Limited alternative uses (currently mostly burned)
- Positive GHG balance likely
- Clearly iLUC free

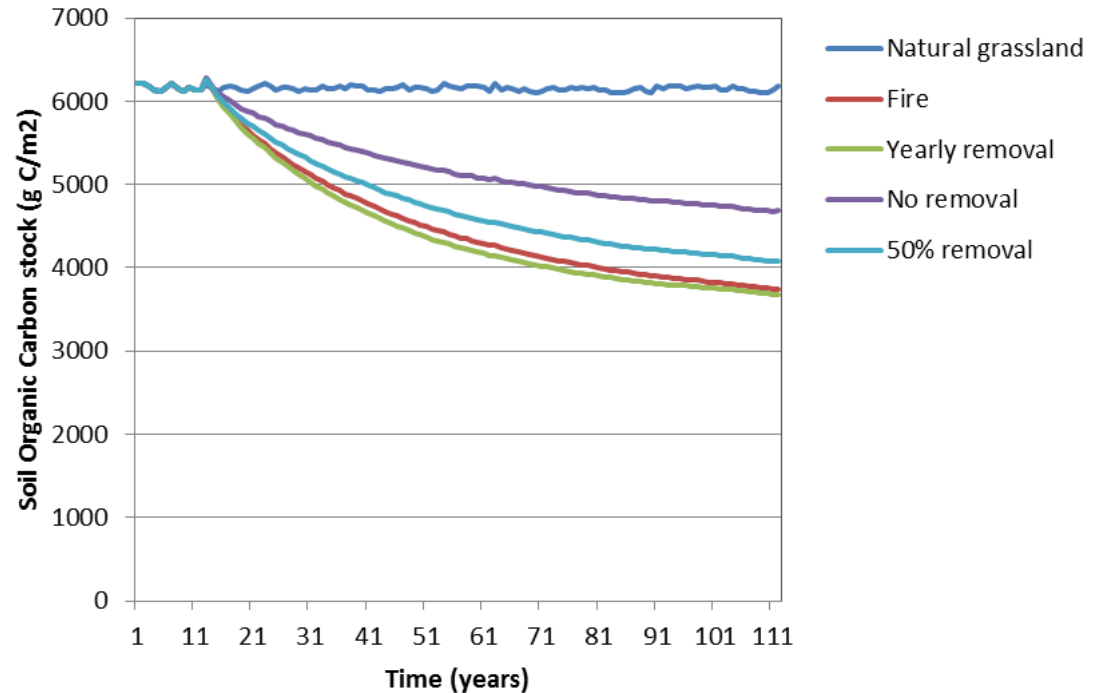


Burning straw in Ukraine



Straw challenges:

- Low yields → Soil carbon decrease
- Logistics costly (low yield per ha)
- Contracting is a challenge
- Low quality



Business partners decided not to pursue further for now



Switchgrass

- Model perennial biomass grass from North America. Tested in Europe and introduced to Ukraine by project partners.
- Switchgrass is seeded and can cover large areas at a low cost
- Low inputs
- Harvest in winter → lower nutrient removal and better quality
- 4 sites:



Switchgrass plot in Yaltushka



Switchgrass results

- Best varieties known
- Establishment methods known
- Management known
- Expertise is now available
- Yields positive → longer period needed for results
- iLUC assessed

Further needed:

- Large scale field results → Stand maintenance + yields
- Establishment optimisation: Time of seeding, row width, etc
- Environmental: soil C effects
- Performance on marginal lands
- Land availability
- Market!!!!!!
- Training experts → maintain expertise!



Location	Fresh matter MT/ha	Moisture content, %	Dry matter MT/ha
Yaltushka	20,0	36,8	12,6
Veselyi Podil	27,5	22,2	21,4



Chain assessment:

	High productive Veselyi Podil	Lower productive Yaltushkiv
Climate	Cool dry	Cool dry
Topography	Flat	Rolling
Land degradation	Few saline soils	Acid soils
Soil type	Chernozems	Phaeozems
SOC _{REF} stock (ton C/ha)	117 ton C/ha	86 ton C/ha
Abandoned land	~2%	~25%
Switchgrass yield	12 ton/ha	7 ton/ha
Avg. distance pelletizer	7.1 km	13.2 km



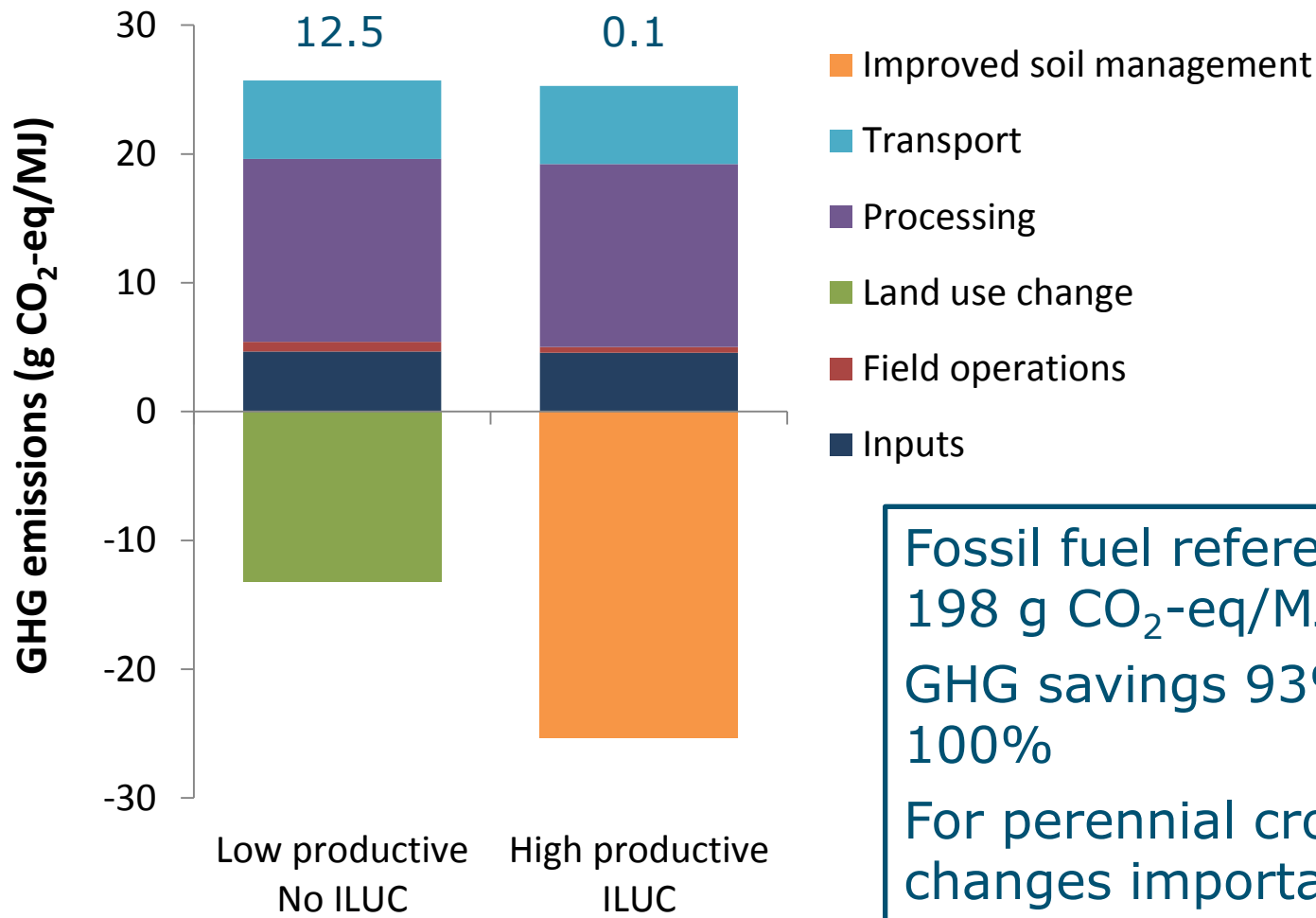
High productive soil Veselyi Podil



Lower productive soil Yaltushkiv



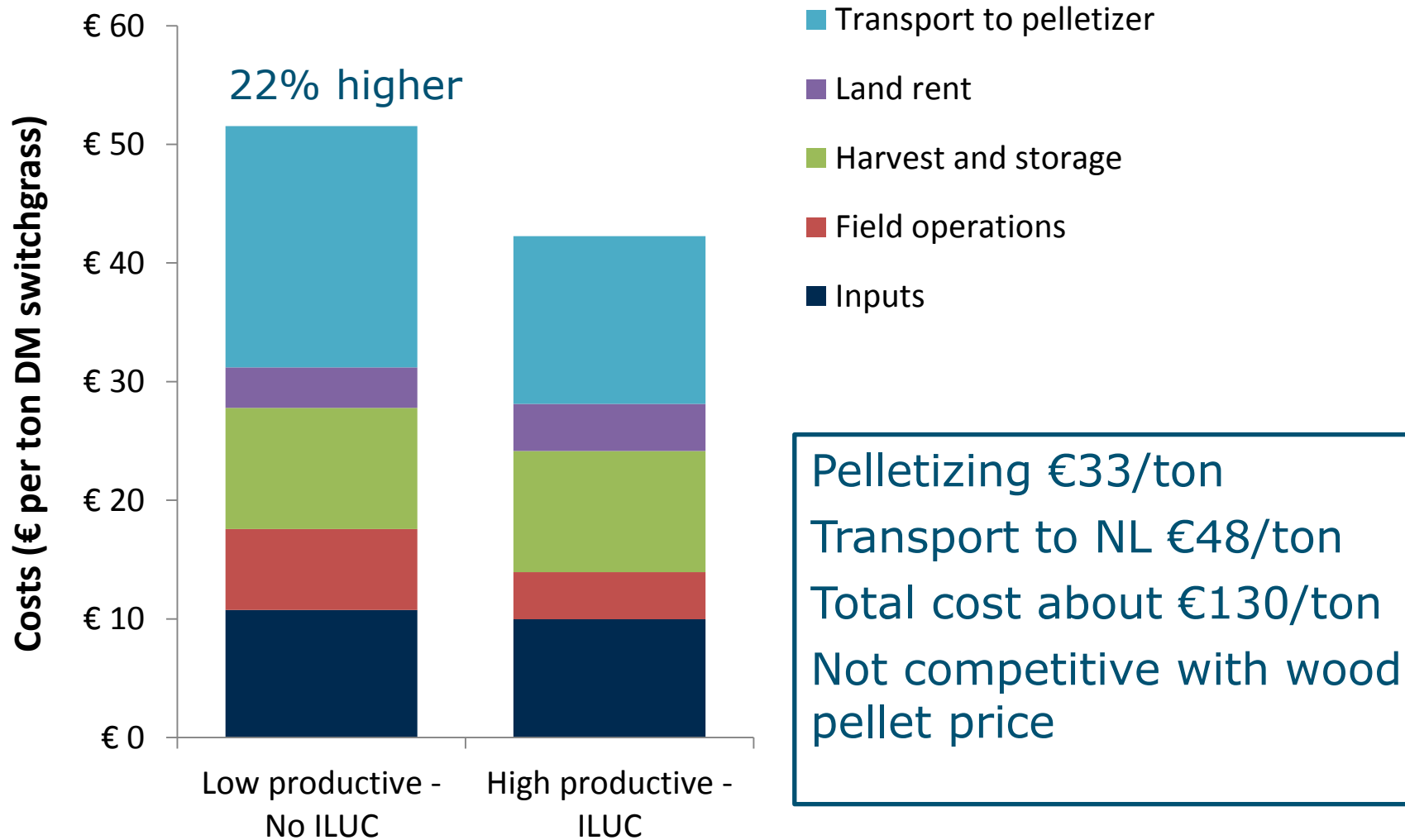
Results GHG calculation



Fossil fuel reference
198 g CO₂-eq/MJ
GHG savings 93% and
100%
For perennial crops SOC
changes important



Results cost calculation



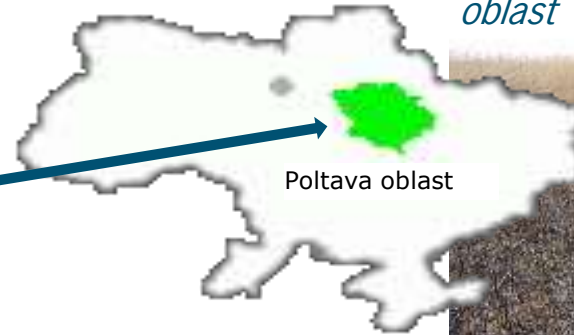
Reed:

Only natural reed stands:

- Wetlands = 10.081 km² = 1.68% Ukraine territory
→ 300.000 ha reed (1.5 to 4.5 million tons of biomass?)
- Reed lands are important for biodiversity and environmental services (fishing and hunting)
- Most reed lands are burnt in autumn
- Controlled harvesting can benefit key marshland birds.



Up to 6 m high reed in Poltava oblast



Poltava oblast



Burnt reed field in Ukraine

Reed issues:

Harvest

- Harvest chain - Cost of harvesting
- Harvest window (Ice thickness vs snow cover)

Greenhouse gas balance

- GHG balance: emissions in unmanaged reed lands → CH₄ (below ground) and CO₂ (burning)

Biodiversity

- Harvest in “wetlands” problematic - Set aside vulnerable areas (20%) and rotational harvest (1 in 2, 1 in 3?)

Biomass quality

- Winter harvest increases quality (K, Cl) and reduces moisture (>15% water)

“Governance”

- Legal framework developed
- Stakeholder process /
- Contracting > 6000 Ha



Cost estimations

Scenario 1: Domestic heating market

Operation	€/MT	€/GJ
Reed harvesting	12	0,75
Reed transport to pelletizer	7	0,44
Pelletizing	57	3,50
Pellet transport to Lubny	4,5	0,28
VAT (20%)	15	0,94
Total costs	94,5	5,91
Reference prices:		
Natural gas		13
Industrial wood pellets	130	7,8
Coal		2,5
Shale gas		1
Average price domestic market	100	

Scenario 3: Train + River barge to Rotterdam

Operation	€/MT	€/GJ
Reed harvesting	12	0,75
Reed transport to pelletizer	7	0,44
Pelletizing	56	3,50
Transport pellets to railway 20km	3	0,19
Loading and transport to Izmail	28,6	1,79
Unloading, sent to port, loading	12	0,75
Storage at Izmail	0.7	0.04
Loading and river transport to R'dam	28	1.75
Custom clearance	4.5	0.28
Canal cost	0,99	0,06
Total costs	165	10,31
Reference prices:		
Natural gas		10
Industrial wood pellets	130	7,8
Coal		2,5
Shale gas		1
Average price domestic market	100	



Reed total chain test

Reed harvested in Poltava
and pelletized

Transported to Marum and
tested in municipal wood
chip heating stove:

Ash problems encountered
→ adaptation to furnace
needed + chain optimisation



END

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