

# Reed resources in Poltava Oblast, Ukraine: biodiversity conservation and bioenergy production

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# Content presentation

- Introduction “Pellets for Power” Project
- Potentials for bioenergy from reed land
- Sustainable reed harvest
  - Selection of sites
  - Harvesting
  - Monitoring
- GHG emissions
- Conclusions





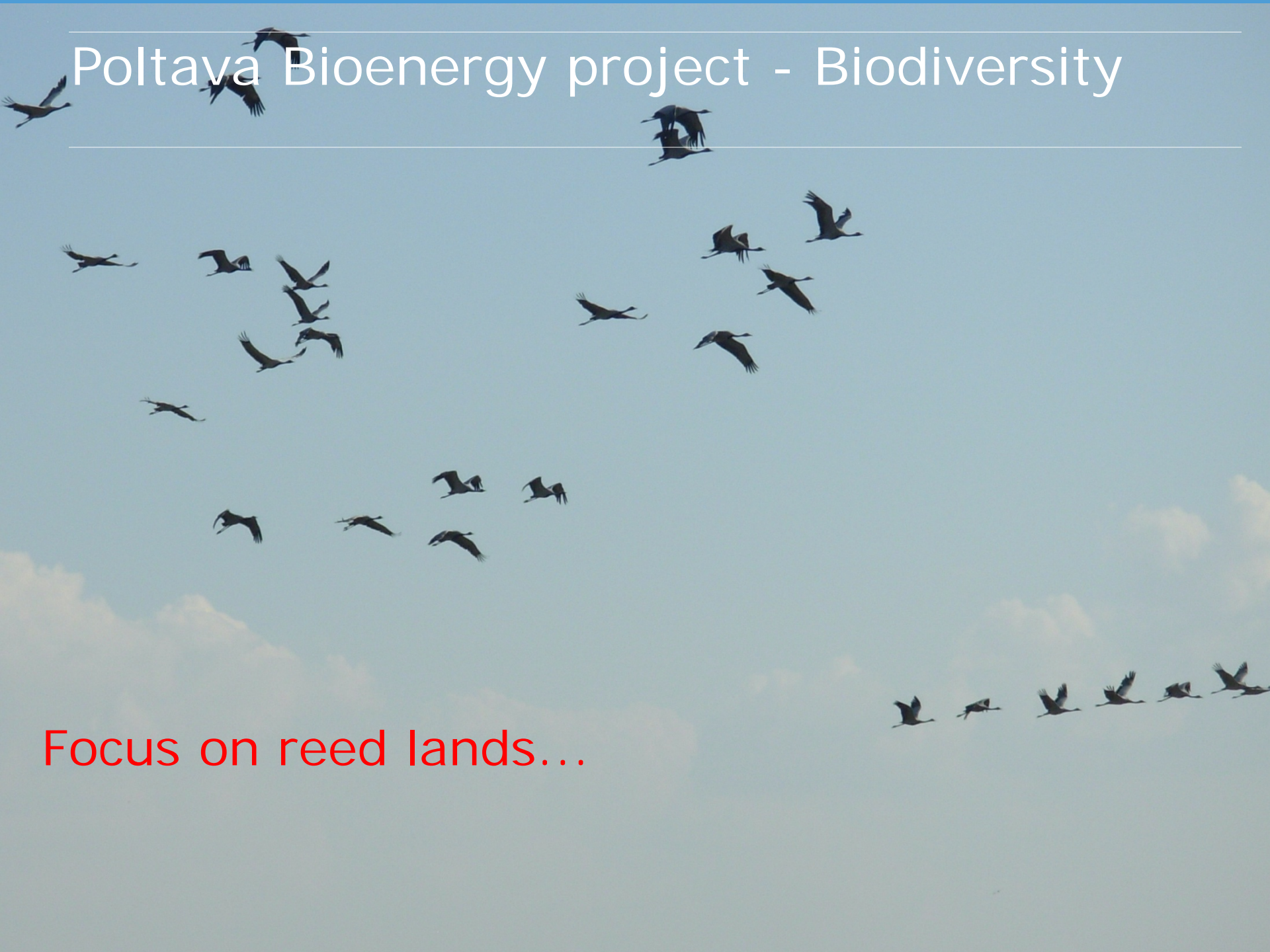
# P4P Pellets-for-Power project

- Objective: develop a business model for producing certified sustainable biomass pellets in the Ukraine for export markets and local fuel
- Biomass from switchgrass for its low input / high yield energy properties and from straw and reed as underutilized by-products
- A pilot project, in which farmers, communities, companies, certification body, and scientists in soil, bioenergy and biodiversity are involved
- NTA 8080 proof
- Funded by Agency NL (Sustainable Biomassa Import Program)



# Poltava Bioenergy project - Biodiversity

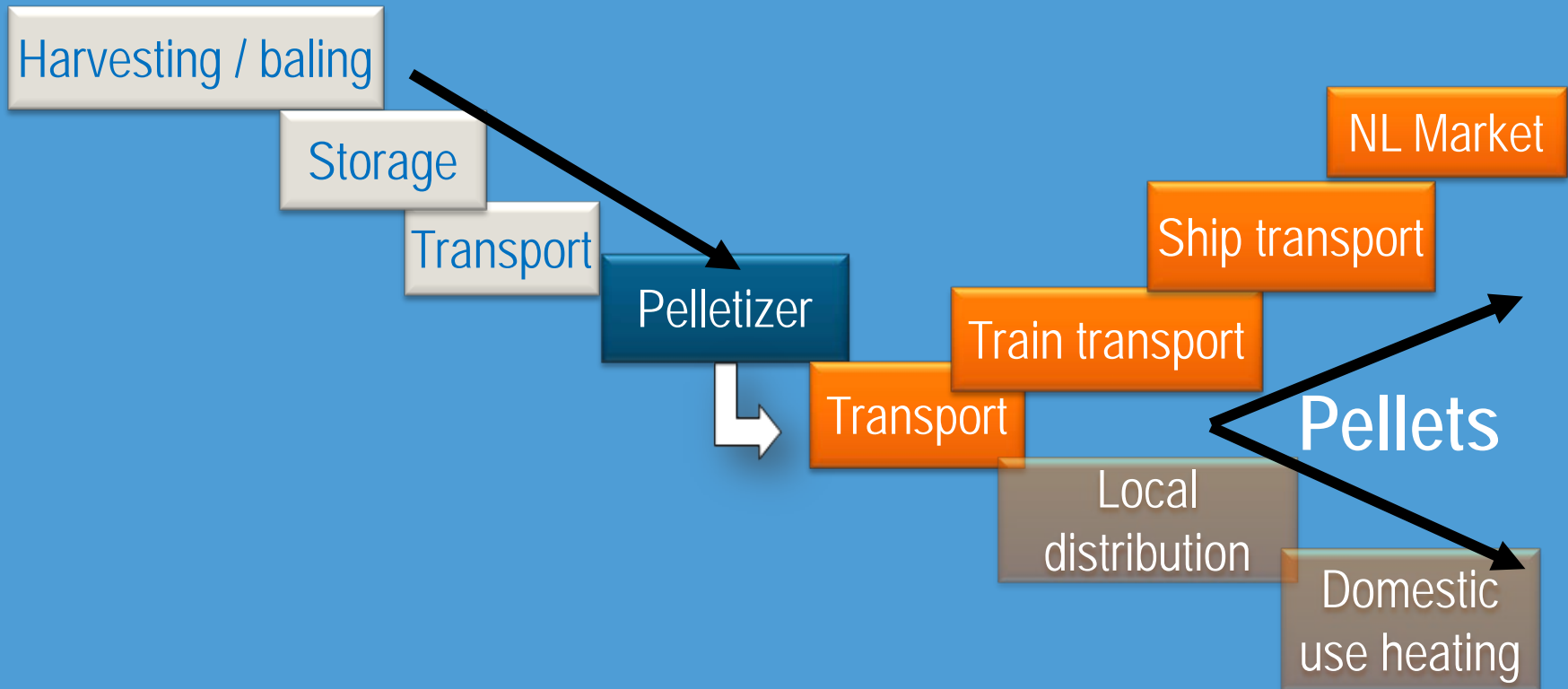
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Focus on reed lands...



# Assessed reed chain



- Pelletizer size of 40,000 ton/year
- Export pellets to NL for electricity generation



# Biomass – risk-mitigation strategy

1. Conservation of areas with significant biodiversity value,
2. Avoid indirect land use change (ILUC)
3. Promotion of practices with low negative impacts on biodiversity

Hennenberg 2009)

P4P project: certification!

Netherlands NTA8080

- Minimize environmental impact
- Stakeholder involvement / prosperity
- Reduce Greenhouse Gas emissions
- No ILUC



# Poltava Bioenergy project - Biodiversity

## Economic opportunities ⇔ Sustainability (NTA 8080)



- 1.2 Million ha wetlands in Ukraine, 53.000 hectares in Poltava
- No competition with food crops
- 10 tons dry matter per hectare per year (13-58 tons wet biomass)
- Low ash and moisture in winter harvest
- Large areas currently burned
- 16.000 MJ/ton = 4,5 MWh / ton



- Ensure that procedures are in line with legislation (formal protected areas)
- Consult experts on best practices
- Before: inventory of baseline situation (protected areas, species)
- Install monitoring system to ensure that no deterioration occurs



# Poltava Bioenergy project

- Agreements for over 8000 ha harvesting
- Current land use: hunting, fishing
- Most reed land is burnt due to lack of management (30-100%)
- Agreements with land owners (30+ municipalities)
- Biodiversity inventories (2010-2012)





# Sustainable reed harvest – consult experts

Dutch 'Society for protection of birds' advice:

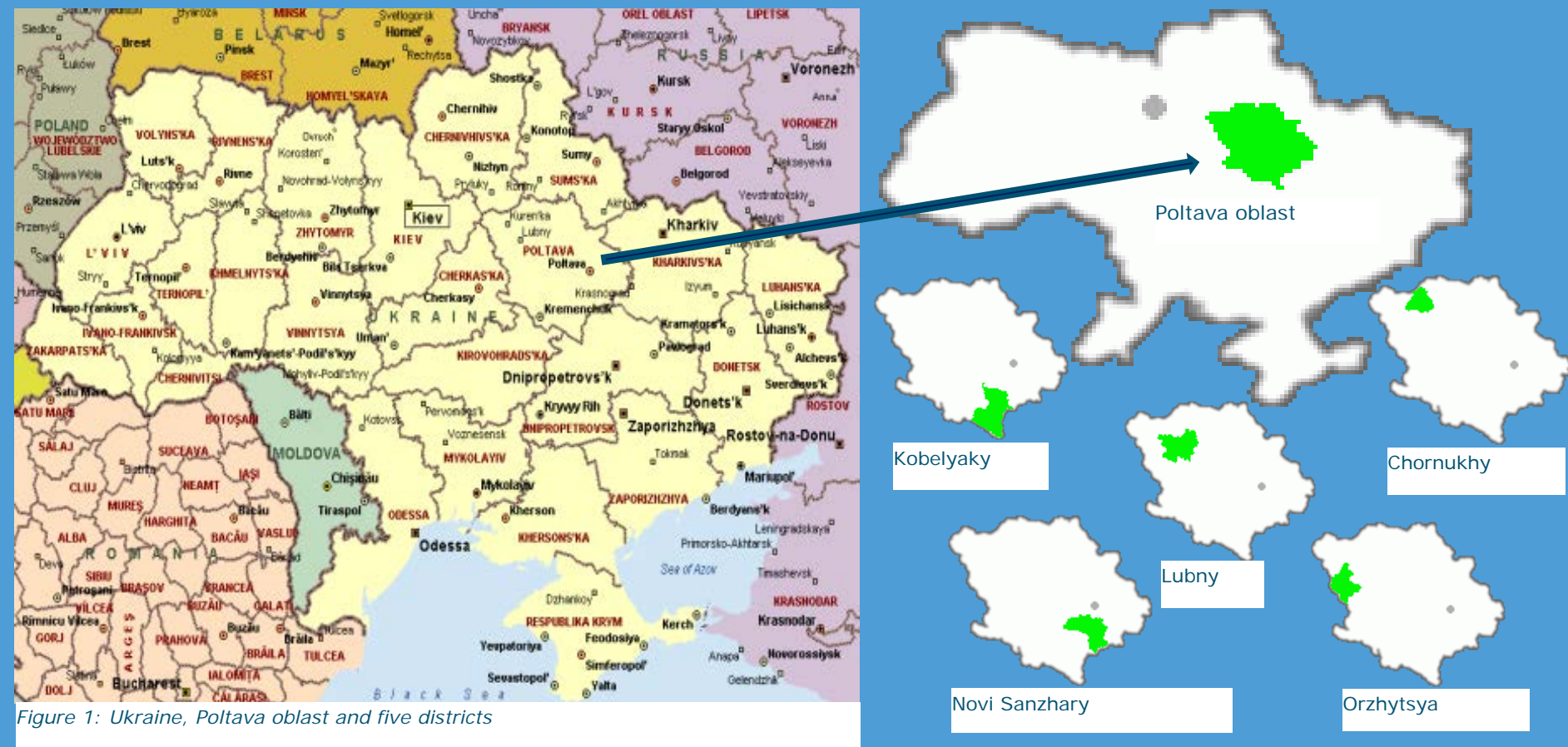
- Protect at least 20-25% of intensively managed reed lands (NL)
- Focus protection on shores and edges, protect them for 3-5 years
- In the Netherlands in total some 2850 ha or 30 % is being harvested in core reed lands (total 9000 ha)

Ukrainian experts:

- Harvest less than 50 %
- Harvest in mosaic pattern



# Poltava reed lands





# Poltava reed lands





# Poltava reed lands





# Sustainable reed harvest – site selection

- No presence of important bird, plant or amphibian species (Red List, protected etc)
- Exclusion of Ramsar sites, IBAs, OR
- Exclusion of sites with species of conservation interest, OR:
- **Species benefits from harvesting**



# Sustainable reed harvest - guidelines

- Harvesting in (late) winter (January-March)
- Exclude 25% of old stands of reed (up to 10 yrs old), shrubs, and pools as refuge for species
- Harvest reed at 15 cm height (for insects)
- Protect reed on shores and edges
- Avoid modification of terrain (e.g. soil compaction, roads, drainage)
- Regulate other activities (e.g. burning, hunting)

RSPB, SOVON, National Trust



# Sustainable reed harvest - inventory

- Baseline survey in area before harvest (reed land)
- Monitoring, regular repeat visit, to observe development & changes
- Choice: focus on birds, amphibians, flora (mammals indirect)
- Amphibians and birds are important indicators for sustainable biodiversity of wetlands



# Biodiversity observations/моніторинг

## біорізноманіття:

38	Soil fauna in A-horizont/грунтова фауна в А-горизонті :	a. Type/тип	
		Abundance/поширеність	

39	Bird observations/моніторинг птахів								

Common spadefoot & Red bellied toad  
Bern convention annex II

40	Plants/рослини								

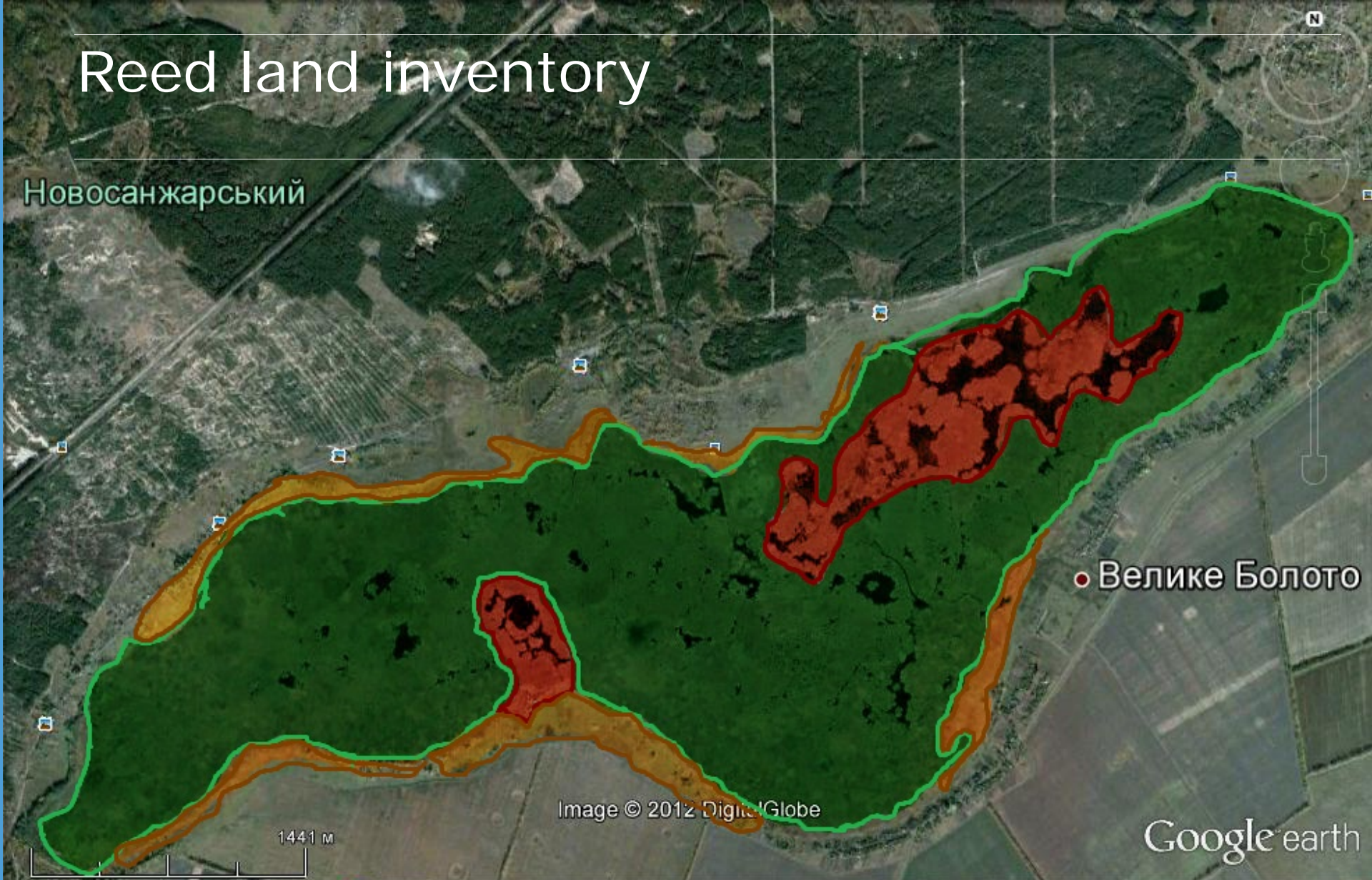
41	Fish/риби								
42	Mammals/ссавці								
43	Amphibians/амфібії								
44	Reptiles/рептилії								
45	Insects/комахи								
46	Photo number/номер								

47	Additional remarks/додаткові п								
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# Reed land inventory



1 - areas for reed harvesting.

2 – reserve, available open water bodies, left for biodiversity development

3 – shrubs and sedge /cattail along the perimeter, for development of biodiversity



# Reed land inventory





# GHG emissions - assumptions

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- GHG calculation based on RED 2009/28/EC, but specified for all activities using local data and Biograce standard values
- Pellets for export NL (electricity) or local use (heating)
- Most reed (80%) harvested from non-flooded land
- Lower Heating Value (LHV) of reed 16 MJ/kg pellet
- Previous reed burning once every 5 years

# GHG calculation for EU RED 2009/28/EC

$$E = e_{ec} + e_l + e_p + e_{td} + e_u - e_{sca} - e_{ccs} - e_{ccr} - e_{ee}$$

**E** = total emissions from the use of the fuel;

**e<sub>ec</sub>** = emissions from the extraction or cultivation of raw materials;

**e<sub>l</sub>** = annualised emissions from carbon stock changes from land use change;

**e<sub>p</sub>** = emissions from processing;

**e<sub>td</sub>** = emissions from transport and distribution;

**e<sub>u</sub>** = emissions from the fuel in use;

**e<sub>sca</sub>** = emission saving from soil carbon accumulation via improved agricultural management;

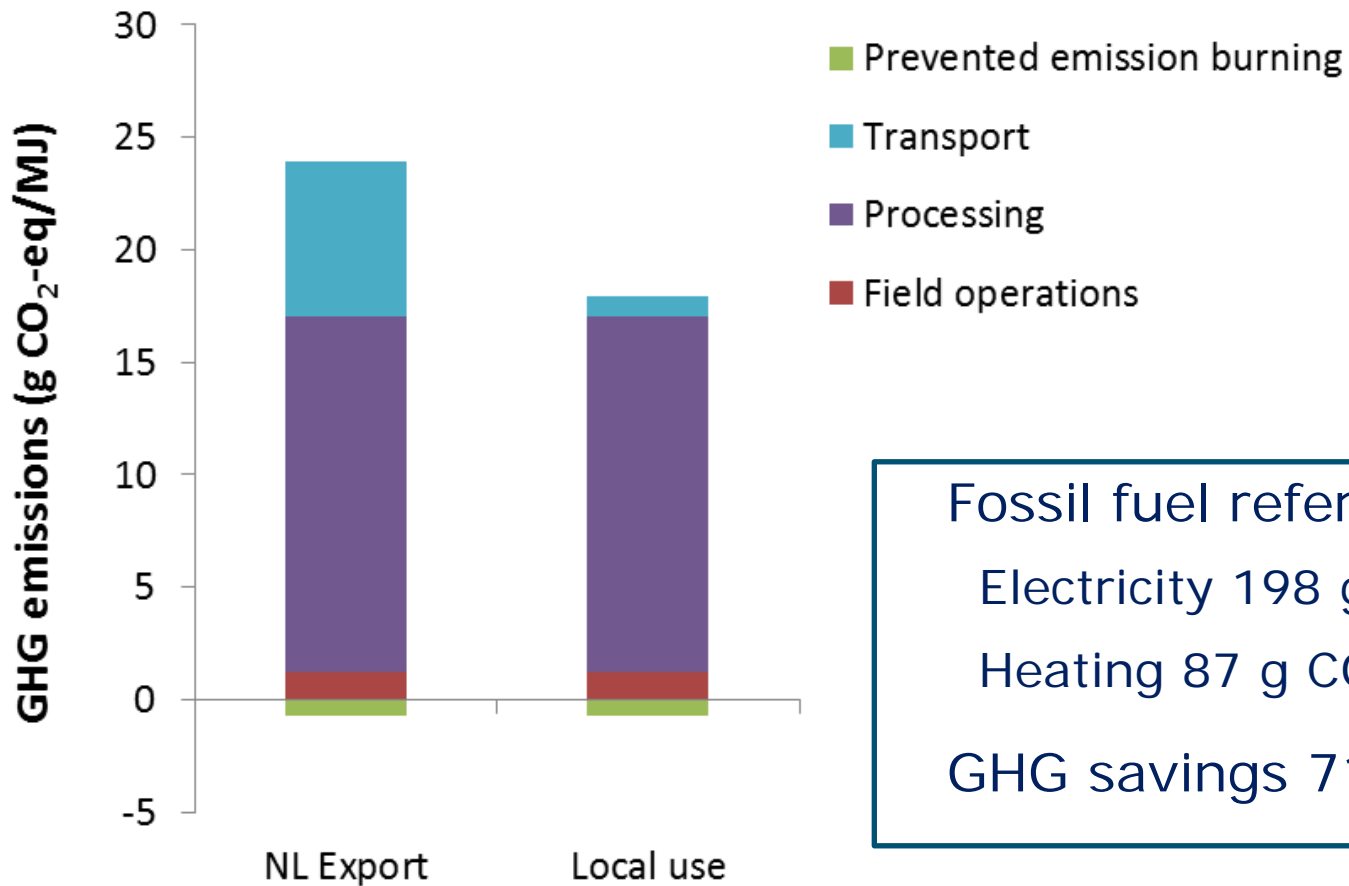
**e<sub>ccs</sub>** = emission saving from carbon capture and geological storage;

**e<sub>ccr</sub>** = emission saving from carbon capture and replacement; and

**e<sub>ee</sub>** = emission saving from excess electricity from cogeneration



# GHG calculation



Fossil fuel reference:

Electricity 198 g CO<sub>2</sub>-eq/MJ

Heating 87 g CO<sub>2</sub>-eq/MJ

GHG savings 71% and 80%

# Discussion: P4P - Critical research themes

- **Greenhouse gas balance**
  - Harvest in “wetlands” (NTA 8080 – Principle 2)
  - GHG emissions in unmanaged reed lands
  - Harvest may neutralize emissions from burning and rotting
  - Reed has a very positive GHG balance (No inputs required)
  - Not yet clear whether natural CH<sub>4</sub> emissions from reed are reduced due to reed harvesting
- **Harvest window**
  - Ice thickness in winter harvesting
  - Snow cover
- **Biodiversity**
  - Harvesting helps maintain reedland
  - Set aside vulnerable areas (25%)
  - Rotational harvest system
- **Biomass quality**
  - Winter harvest reduces ash and moisture



*Burned reed field in Ukraine*



# Poltava Bioenergy project - benefits

- One ha. of reed replaces approximately 2000 liters of heating oil (which equals ca. 6 tons of CO<sub>2</sub> emissions)
- Agreements with communities results in conservation agreement – no burning
- No burning of diverse reed lands
- Conservation of old reed stands which benefits in particular marshland birds
- Harvest stops succession from reed into forest land





# Conclusions

- Good potential for bioenergy harvesting from reed land in Ukraine
- After 3 years of P4P project we conclude we can sustainably harvest reeds as alternative bioenergy source in Ukraine
- Profitable for GHG emission reduction
- If carefully managed, reed lands can be harvested at the benefit of biodiversity and local communities, but care must be taken of:
  - Timing of harvest: winter
  - Scale of harvest and spatial configuration of habitat: mosaic pattern, small scale
  - Leave refuge for species
  - Careful monitoring important!



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# Thank you

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