



Economic and Ecological Analysis of a Local Use of Biomass in an Agricultural Holding

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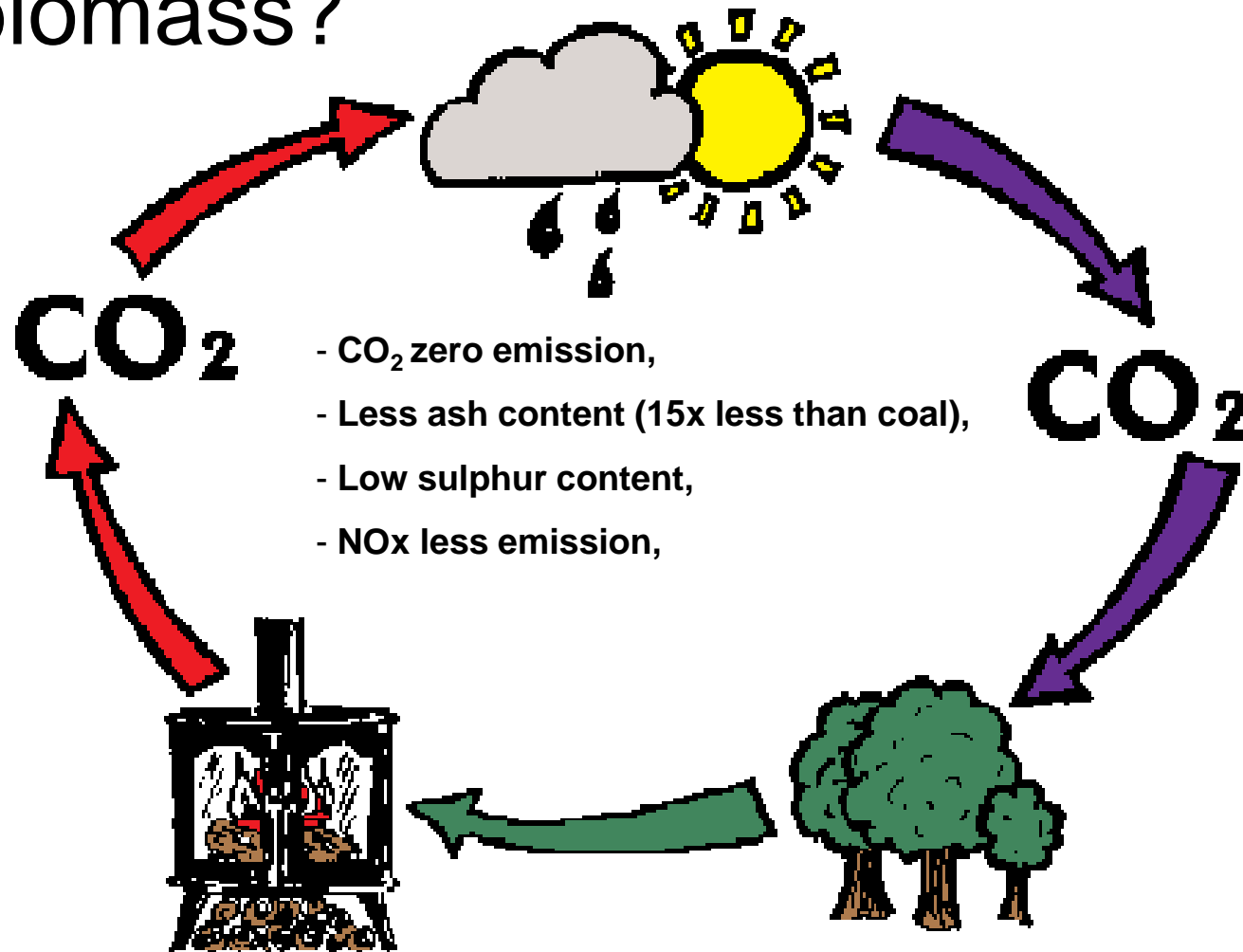
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Why biomass?





- low bulk density,
- low heating value,

4 x less energy per
volume than coal

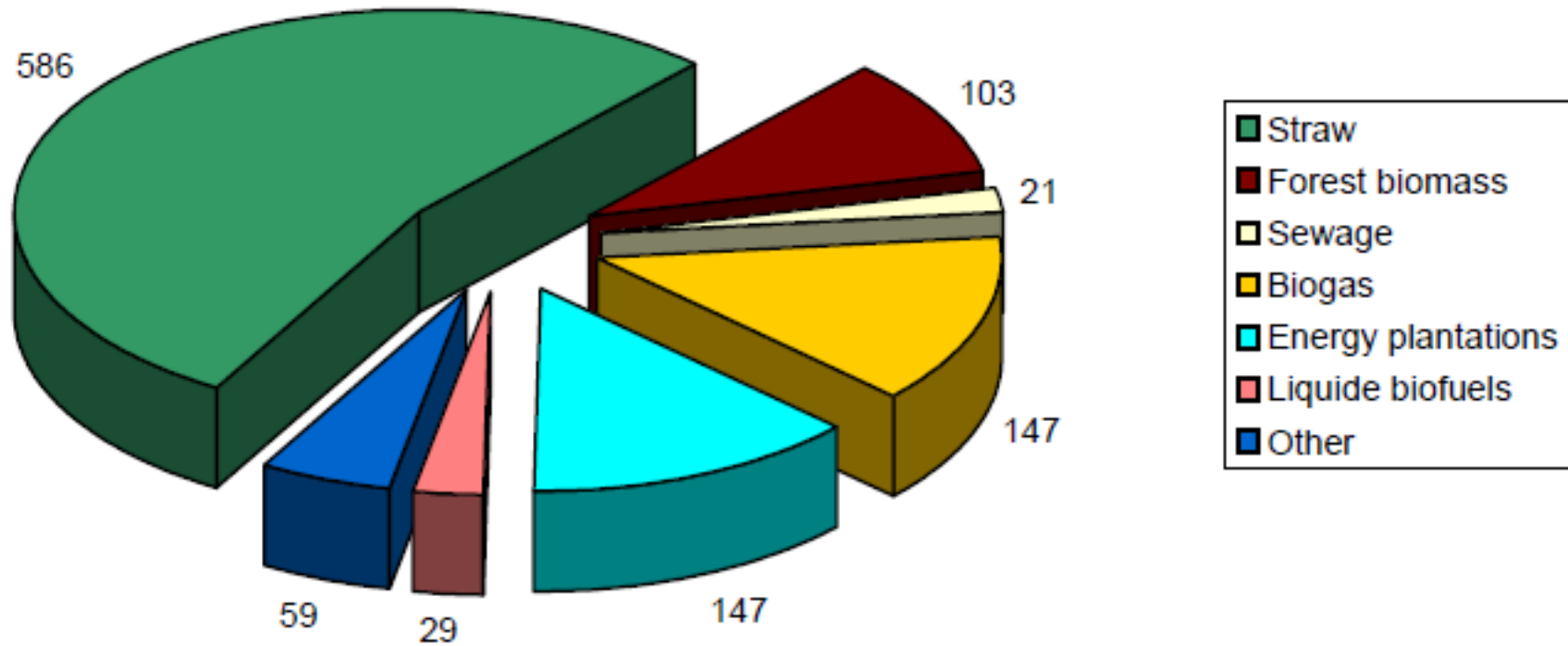
Problem: transporting of large volumes.

Hence biomass should be considered as

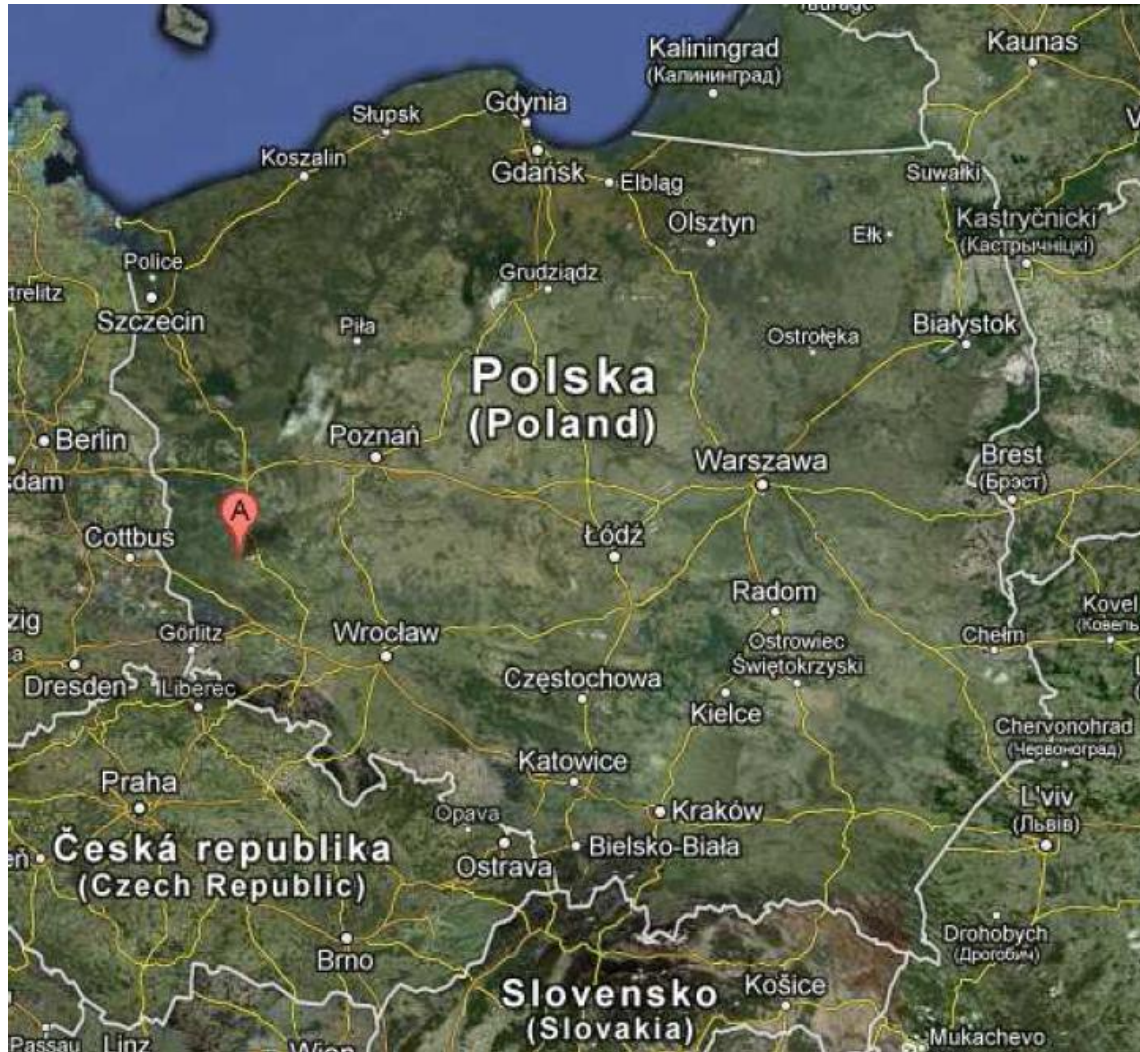
local resource!!!

RES potentials in Poland

Energy source	EC BREC			GHG reduction Strategy [30]	Report for World Bank [30]
	2000 [30]	2005 [31]	2007 [32]		
Biomass	895	755	927	128	810
Hydroenergy	43	49	18	50	30
Geothermal	200	220	12	100	200
Wind	36	281	2582 ?	4	4-5
Solar	1340	445	19	55	370
Total	2514	1750	3552	337	1414



Dakowski M., Wiąckowski S., Biomass potential in Poland [PJ], 2005



Case study:

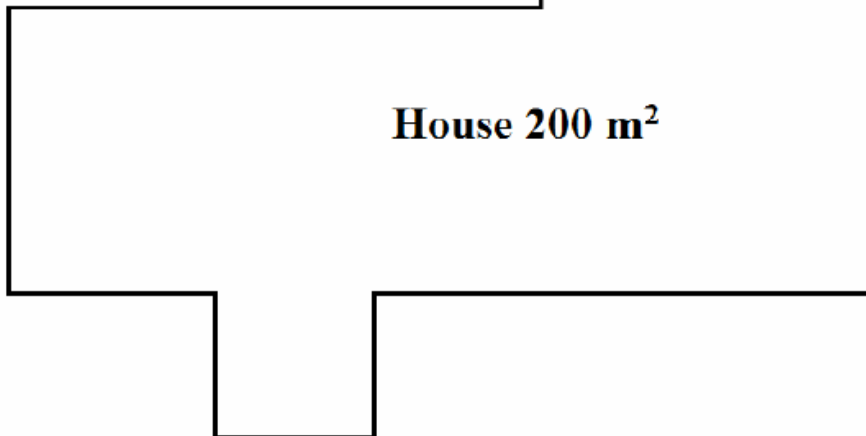
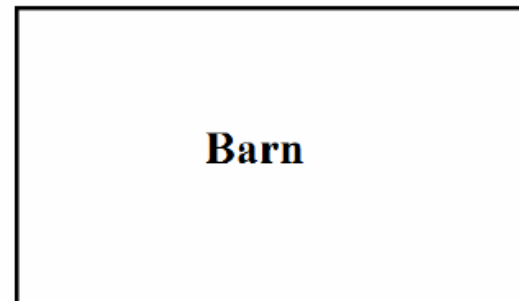
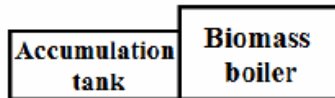
Village: Wichów

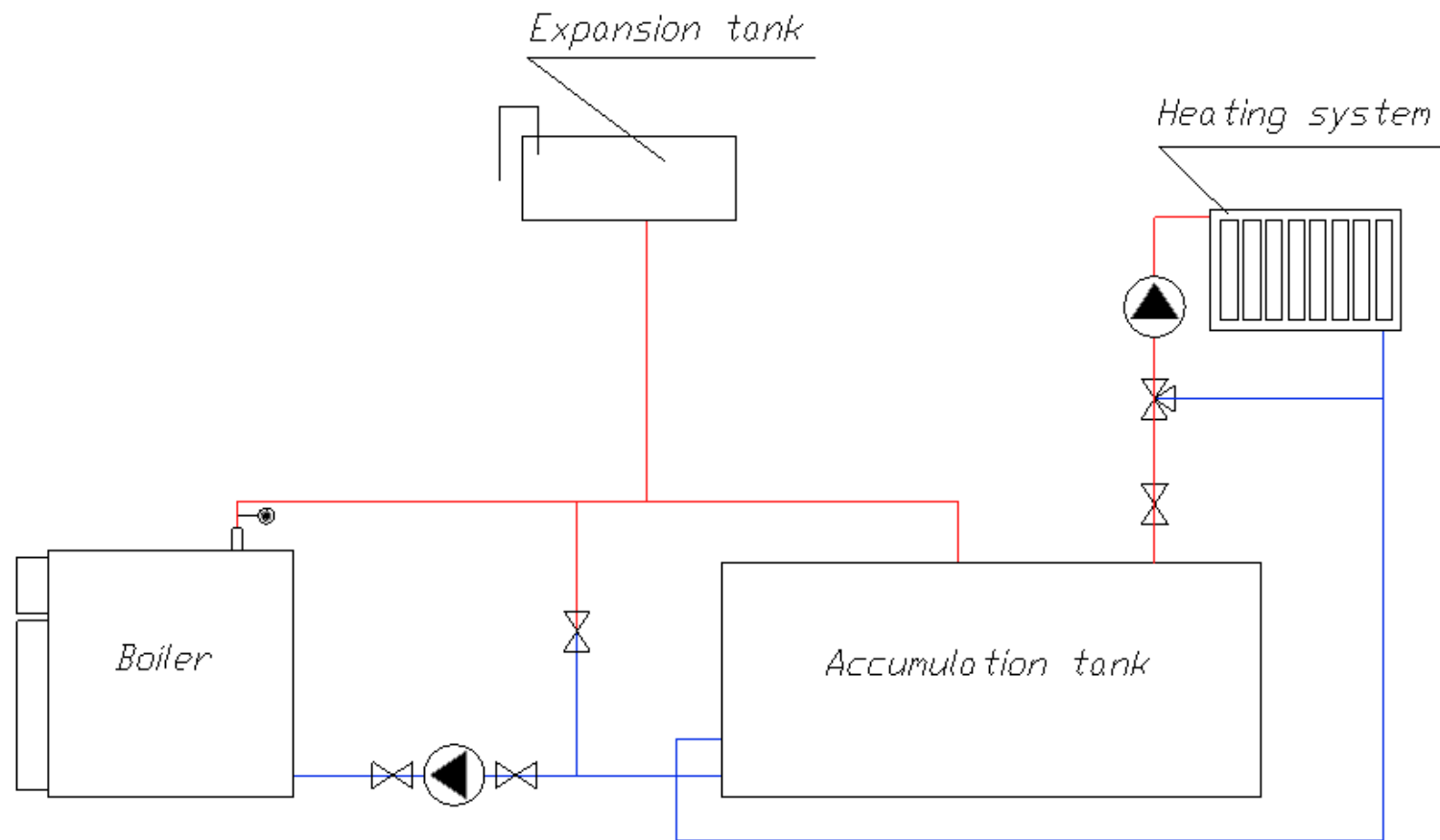
Holding: 8 ha for cereals

Family of 4 people



- 40kW,
- 3 straw bales 80x40x40 cm,
- accumulation tank 5m³,
- heated area: 200m²,
- cost 20000 PLN (~ 5000 EUR).



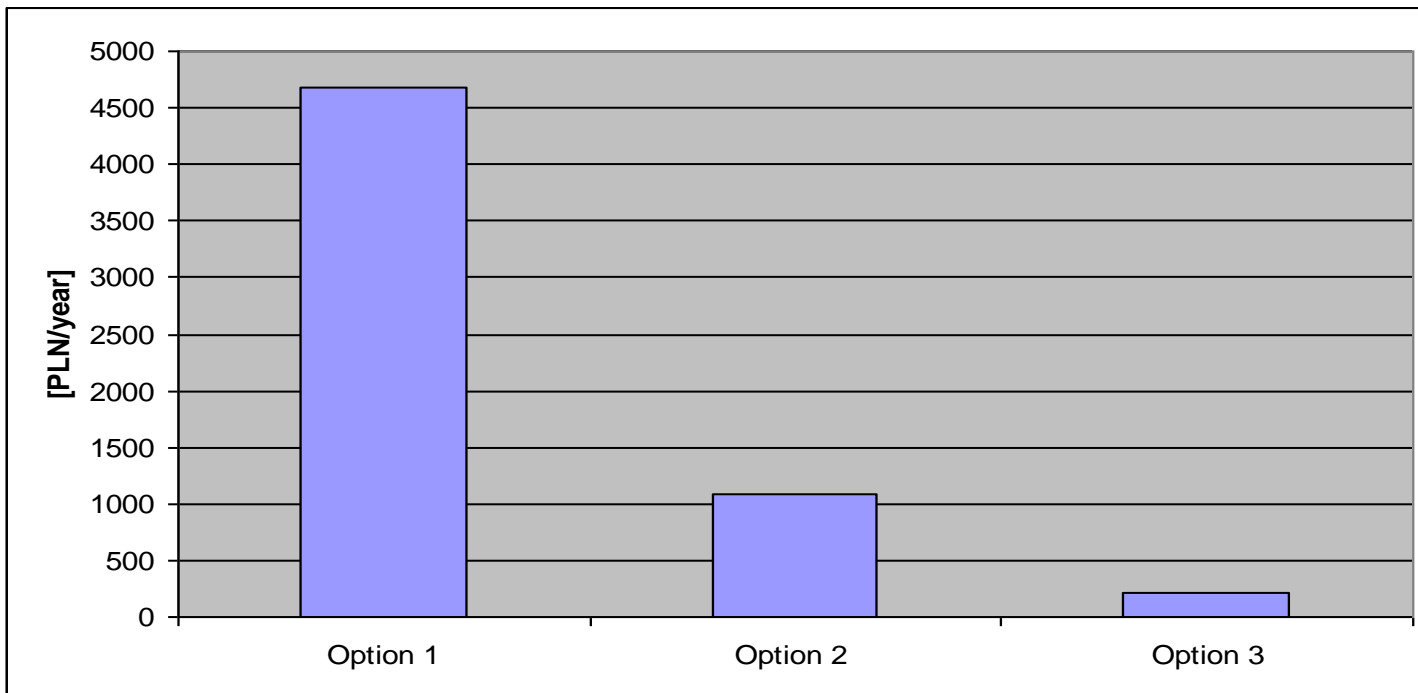


- ⊗ - valve
- ⊙ - circulation pump
- ⊗ - three-way valve
- ⊙ - thermometer

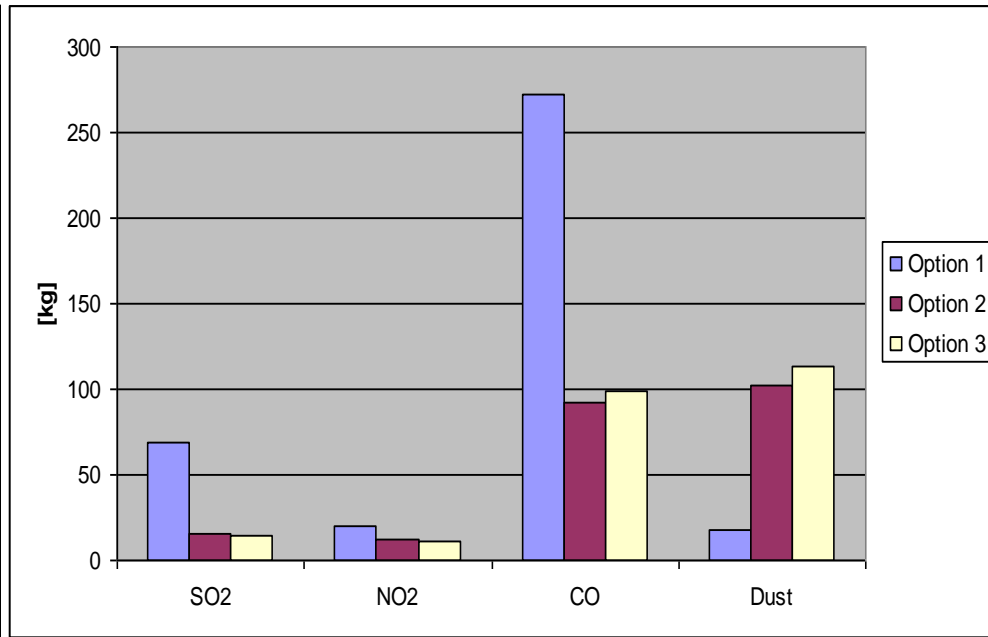
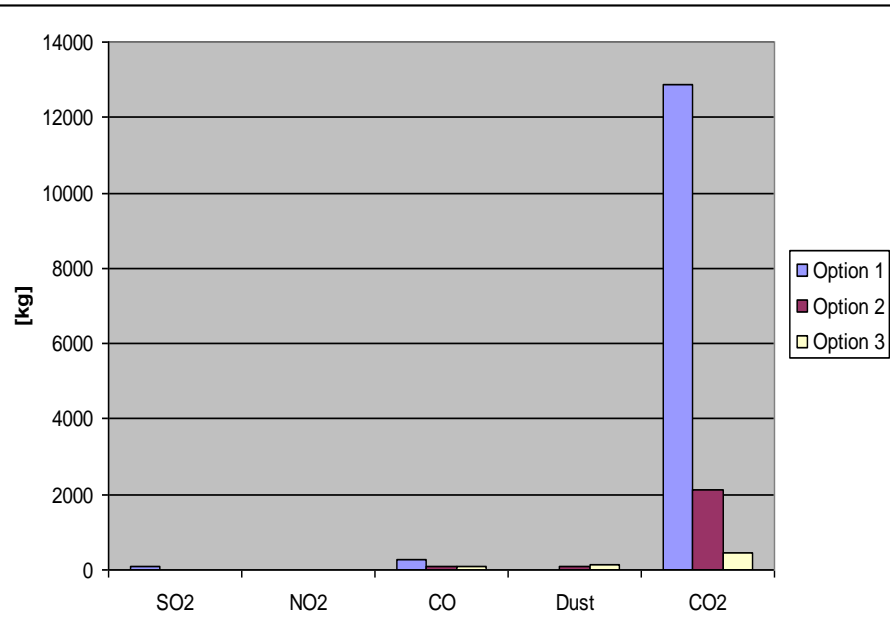
- - hot water loop
- - cold water loop

Option number	Heating system	Domestic hot water
Option 1	Coal boiler	Electric water heater
Option 2	Biomass boiler	Electric water heater
Option 3	Biomass boiler	Biomass boiler

	Option 1	Option 2	Option 3
Fuel cost	3780,00	0,00	0,00
Electricity cost – summer operation	0,00	0,00	34,22
Electricity cost – winter operation	0,00	186,16	186,16
Electricity cost – electric water heater	891,95	891,95	0,00
Sum [PLN]	4671,95	1078,11	220,38
Payback time [years]	X	~5	~4



emission [kg/a]	Option 1	Option 2	Option 3
SO ₂	68,9	15,8	14,0
NO ₂	19,6	12,2	11,1
CO	272,6	92,1	99,4
Dust	17,5	101,7	113,9
CO ₂	12 852,7	2 118,5	433,1





Next step:

Replication on the village scale

Creation of a local straw exchange
(market)



Thank you for your attention !