



Biomass in Biebrza National Park – waste(d) opportunity

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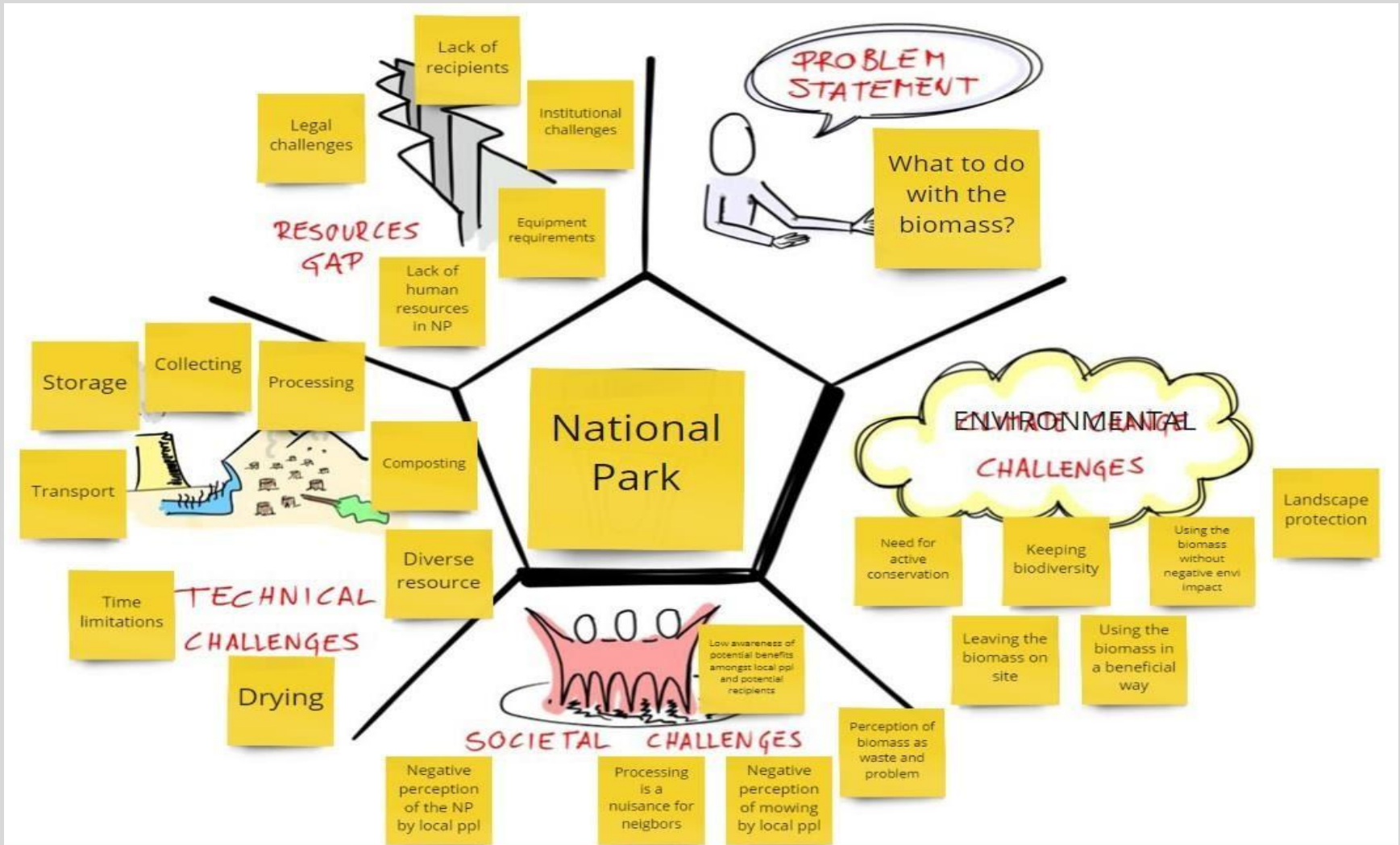


Biomass in Biebrza National Park



- area of active protection which require mowing of vegetation in conditions of low groundwater levels. Due to the large area, the park is not able to mow the entire area by itself. That is why every year the park announces tenders for mowing biomass.
- every year the park faces the problem of the lack of a market for the produced biomass.
- The following project has attempted to identify the causes of the problem which is: *Lack of using biomass from active protection in Biebrza National Park.*

Problems related to the biomass





Interviews with former contractors

Tabela 1. Interviews with former contractors, part I.

Entity	Biomass quantity	Biomass quality	Biomass production - who, when, how	Biomass processing - who, when, how	Biomass use - who, when, how	Possible solutions
1	approx. 5-10 K bales (1 staw bale= approx. 300 kg)	The biomass collected at the right time (before dew) is not (in his opinion) very humid. There is a lot of willow in the material that causes problems		The material was pressed without pre-treatment, it was sold in the form of bales	The biomass was sent to farmers as a bedding material.	<ol style="list-style-type: none"> 1. Biogazownia w Krasowie – Częstkach 2. Biogazownia Dzierżki 3. Finding a place where the biomass bales would be burned (e.g. district heating)
Issues	<p>Not every year is the same and not always the same number of farmers have decided to buy the same amount of biomass. It is difficult to do business in an unstable market. It would be better to have a regular customer and ensure the profitability of the biomass collection. According to the biogas plant: the biomass should be delivered in a cut form. Additional: to make the biomass collecting profitable, the costs of obtaining it should be at least equal to the costs of sales. The bales are sold for around 30-35 PLN/bale. Most of the biogas plants offer 100 PLN/ton.</p>					



Interviews with former contractors

Tabela 2. Interviews with former contractors, part II.

Entity	Biomass quantity	Biomass quality	Biomass production - who, when, how	Biomass processing - who, when, how	Biomass use - who, when, how	Possible solutions
2	It's hard to say. The park once allowed to collect the biomass and once not	Material of poor quality, unrepeatable, very wet and even partially frozen depending on the weather. It is necessary to dry it, which is not worth it at all	Pellets from such biomass give a lot of ash, it is not convenient. Nobody will use it at home	The biomass was collected and transferred to farmers as a bedding material, no special machines were used	Only as a litter material. Most often, the biomass landed on a heap and was not used anywhere	Nobody will be able to manage the biomass in a meaningful way, because of the lack of permanent biomass collection areas, permanent contracts and assistance from the Biebrza National Park.
Issues	The biomass is collected only because of the subsidies. Without this, most people would not decide to collect the biomass. The park has a lot of prohibitions / orders which is very burdensome during cooperation. There are many sanctions, passes, penalties and problems during the cooperation, and you have to endure a lot to persevere in this cooperation					



Interviews with former contractors

Tabela 3. Interviews with former contractors, part III.

Entity	Biomass quantity	Biomass quality	Biomass production - who, when, how	Biomass processing - who, when, how	Biomass use - who, when, how	Possible solutions
3	It's also hard to say, depends on the year.	Very poor quality of the biomass, in addition wet.		The biomass was collected and transferred to farmers as a bedding material, no special machines were used	The biomass was sent to farmers as a bedding material.	The production of compost does not make sense. Farmers have manure and do not need compost. Possibly for flowers, but according to him peat is better. The quality of such compost will be poor.
Issues	Poor pellets are obtained from this biomass. Adding sawdust or something similar improves the properties, but it is still not enough. The biomass is wet, which causes problems.					



Potential applications of biomass

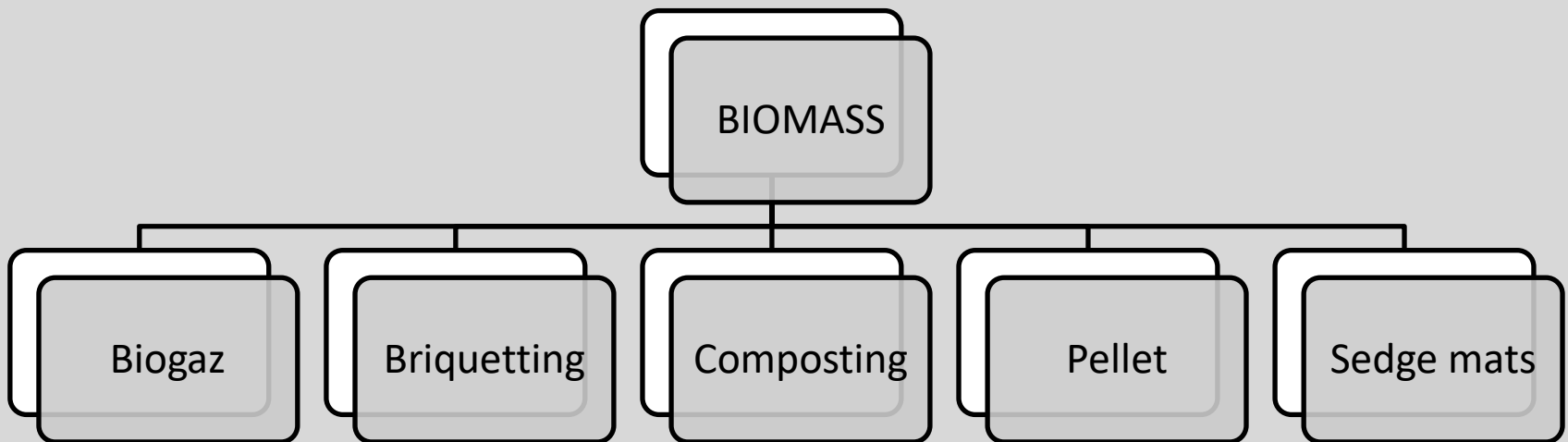


Fig. 1 Potential biomass applications discussed in this project



Biogas

Interested biogas plants:

- EKO-FERMENERGIA Sp. z o.o.,
- Upały-ROL.

Relevant information:

- biomass can be wet,
- it is necessary to establish the price of biomass and its transport.

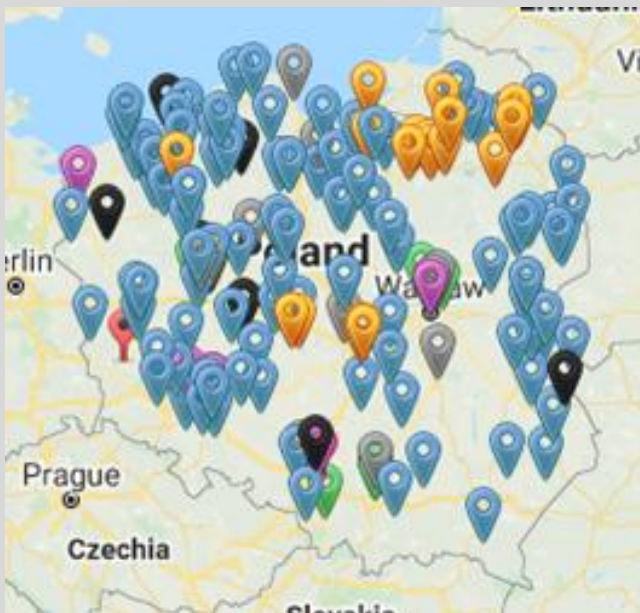


Fig. 2 Biogas plants in Poland [1]



Interested biogas plants

Table 4. Interested biogas plants, part I.

	Company name	Address	Contact	Interest in biomass	Biomass parameters	Issues
1.	EKO-FERMENERGIA Sp. z o.o.	Lotników Lewoniewskich 11A 16-100 Sokółka	Michał Głuszyński tel: 695 621 113	YES	The biomass can be wet, that's not a problem at all The biogas plant is flexible when it comes to raw material, they process various things and according to them, carex are not a problem	If the price per ton of biomass fluctuates around PLN 50, it will not be profitable
	Other	<p>-Whether the park wants to earn on this biomass or simply put it in good hands? The biogas plant usually does not pay for the raw material.</p> <p>-Most of it is waste and by taking it away they do someone a favor.</p> <p>-Moreover, this biogas plant usually charges a fee for receiving the raw material (discussion topic).</p> <p>-The biogas plant also thought about setting up a pellet mill and drying the wet biomass using large amounts of heat generated during the biogas production</p>				



Interested biogas plants

Table 4. Interested biogas plants, part II.

	Company name	Address	Contact	Interest in biomass	Biomass parameters	Issues
2.	EKO-Progress Sp. z o.o.		tel: 795 443 794	YES/NO		The biomass has too much lignin, it is difficult to process. A crust is formed from this
3.	Upały-ROL	Upały Małe	tel: 607 447 051	YES	The wet biomass is not a problem, the tractor will squeeze everything during prism, and this can also be used for biogas production	The transport would have to be on the park side, unfortunately the biogas plant is far away and it will not be profitable
	Other	The biomass must be delivered in a chopped form				



Composting

Potential advantages:

- + Mineralization of organic matter into stable components
- + The product of composting can be safely stored and used in the environment, it is aesthetically acceptable
- + The mass and volume of bio-waste is reduced

Potential barriers:

- High variability in composition
- Composition of the biomass is difficult to define
- Sedges and reeds from the NP contain large amount of moisture



Fig. 2 Composting prisms of “green” waste



Composting – waste plants

Table 5 Interviews with representatives of different waste plants in Podlaskie province

WASTE PLANT	INTERVIEW DESCRIPTION
Northern region	
Municipal Waste Processing Plant in Suwałki 150a Buczka Street 16-400 Suwałki Contact number:	The man who picked up the phone provided feedback on strict assignment of the waste plants to particular regions. Waste processing plant in Suwałki is way too far away from Biebrza National Park to transport the biomass, especially when it's wet.
Waste Management Plant trunk road no.65 19-200 Koszarówka Contact number:	The lady who picked up the phone in the office asked if I could send all the information and questions by email, so the waste plant's management could take a position on the idea of receiving the biomass from Biebrza National Park. The email has been sent, but still it remains without an answer.
Western region	
Waste Processing and Neutralization Plant in Czerwony Bór 18-300 Zambrów Contact number:	The company manager said that there is absolutely no possibility to receive biomass from the Biebrza National Park. As an explanation she pointed out the lack of stoves for drying wet biomass in the composting plant.



Sedge mats

Sedge mats application:

- as a cover for an existing mesh or an old fence
- as a casing for pots
- as a casing for trees during winter
- to protect property from wind, noise or neighbours eyes



Fig. 3 An example of reed mats usage



Briquetting

- Biomass from late mowing can be used as a material for briquette production
- Higher content of substances such as lignin, cellulose and hemicellulose compared to biomass from summer mowing.
- Lignin makes the raw material more suitable for the compaction process
- Cellulose fibres make biomass resistant to compression



Fig. 4 Biomass briquettes



Pellet

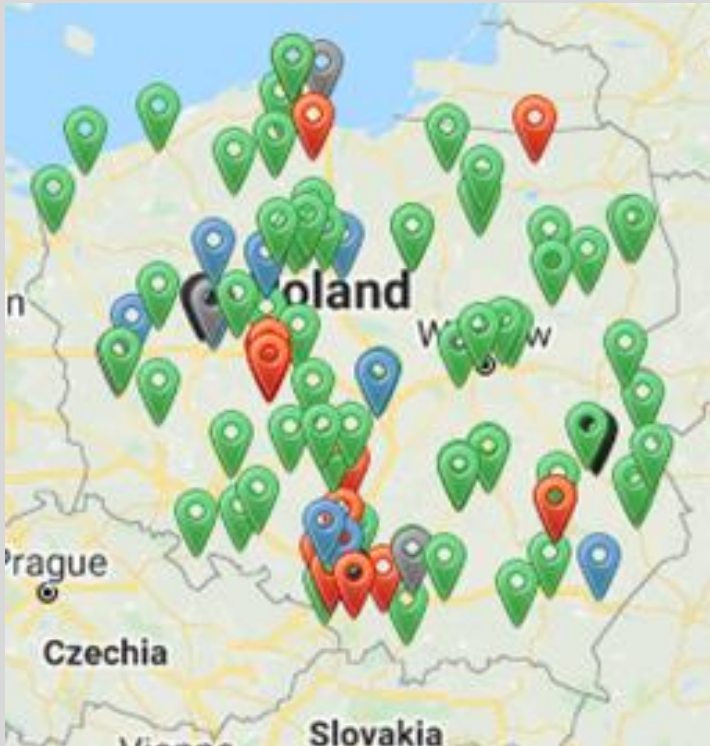


Fig. 3 Pellet plants in Poland [2]

- burning pellets from biomass from BbPN produces a lot of ash,
- no subsidies for burning such pellets,
- wet biomass was the result of an increase in production costs,
- no interest in pellets made from biomass from BbPN.



Summary

Pioneers



- biomass is a by-product of conservation activities and its processing. Current uses of plant biomass from Biebrza NP are principally animal fodder and bedding. The main issues raised by Biebrza NP current and former contractors were: high variability of biomass properties depending on the time and place of collection, unreliability of demand for biomass and its products, high content of silica, high wetness, high costs of transport.
- Pelleting of the biomass has already been attempted and failed due to biomass properties (high silica content, high yield of ash, high water content), which led to processing difficulties and low quality of the final product.
- Due to biomass properties and low demand for compost, composting does not seem to be a promising solution.
- Biogas plants expressed interest in receiving plant biomass from Biebrza NP. If the park or the contractors were willing to cover the transportation costs, it could be considered as viable options for more efficient and sustainable biomass management in Biebrza NP and researched further.
- Biebrza NP could encourage the use of plant biomass in local communities to reduce the transportation costs. Further research should include: good practices in campaigns and educational projects promoting plant biomass; projects providing support to farmers who incorporate environmentally-friendly practices in their work; initiatives of local governments investing in biomass processing facilities; projects supporting local handicraft based on sedge.