FACULTY of INFRASTRUCTURE AND ENVIRONMENT
CZESTOCHOWA UNIVERSITY OF TECHNOLOGY

ENVISAFEBIOC
ENVIRONMENTAL SAFETY OF BIOSOLIDS IN THE CIRCULAR ECONOMY

APPLYING OF BIOMASS IN POWER GENERATION

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What is Biomass?

Biomass is a renewable fuel from organic materials.

It is a sustainable source of energy used for electricity and heat production [1].

Examples of biomass fuels [2]:

- scrap wood;
- wood chips;
- energy crops;
- manure;
- some wastes eg. sewage sludge.

Calorific values of some biomass fuels

	Biomass type	LHV [MJ/kg]
1	Wood chips	10,4
2	Yellow straw	14,3
3	Gray straw	15,2
4	Waste wood	16,0
5	Willow	18,6 ÷ 19,3

1

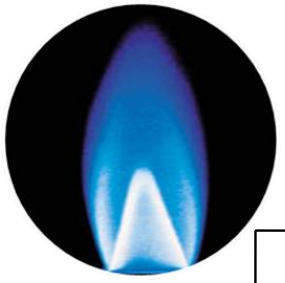
2

5

4

3

Conversion Technologies



Biochemical Platform (Sugar)

Biomass Feedstock

Biogas Platform (Anaerobic Digestion)

Thermochemical Platform
- Pyrolysis
- Gasification

Combined Heat & Power, Fuels, Chemicals, and Materials

Carbon Rich Chains Platform (Biodiesel)

Biomass utilization in the power industry

In 2019 there were 52 biomass boilers in Poland as well as 31 biomass co-firing installations, according to URE [7]

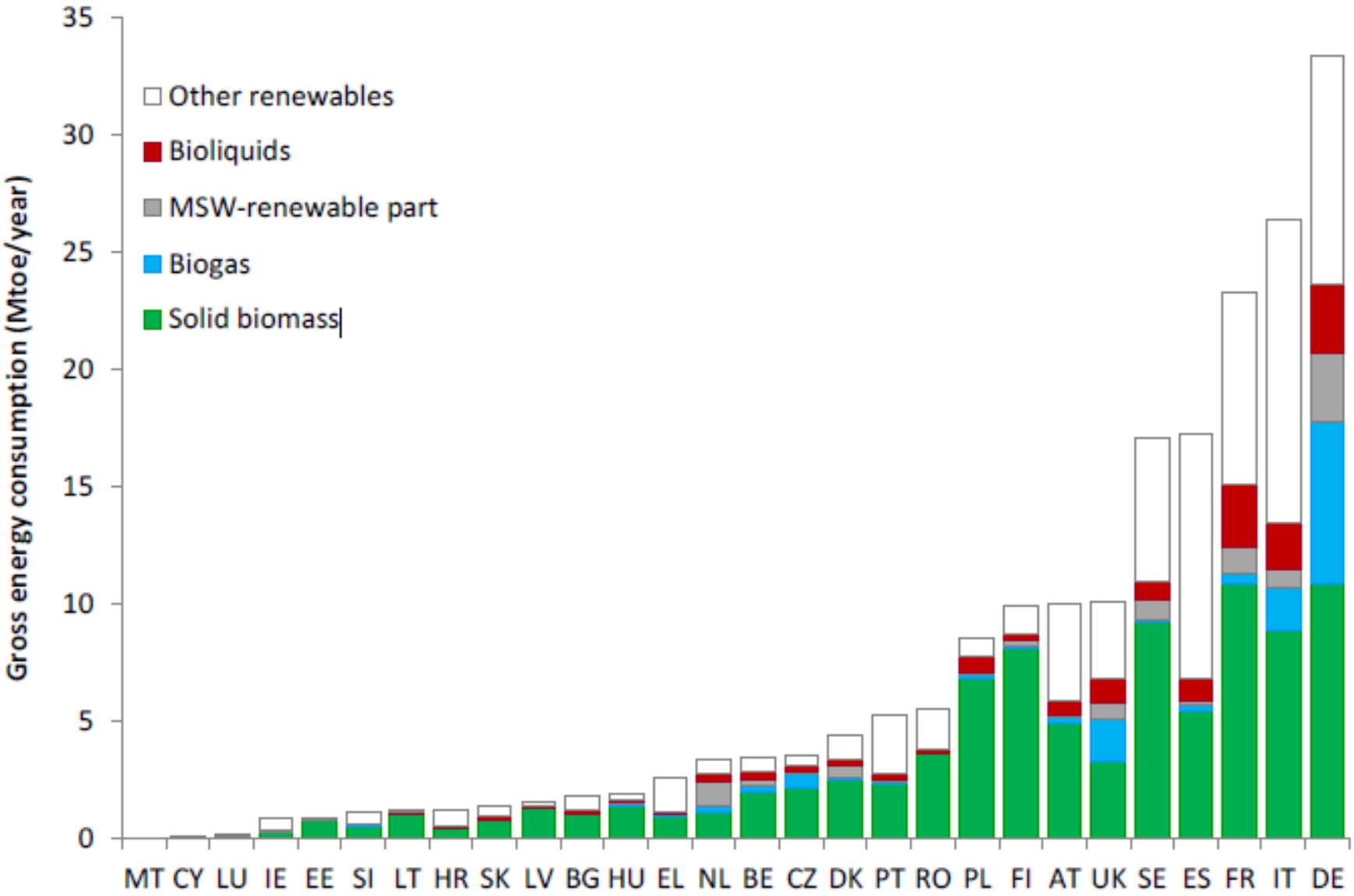
National production of solid biomass amounted to 263 PJ in 2017 (equals to 6,3 Mtoe – tonnes of oil equivalent) [8]

Tab. 2. Production of electricity from biomass in Poland [4]

Year		2015	2016	2017	2018
Electricity produced from biomass [GWh]	combustion	4 736	4 619	3 514	4 057
	co-combustion	4 260	1 194	1 000	833
Electricity produced from biogass [GWh]		875	1006	1035	1010

Source: Ministry of Economy (2013)

Role of different biomass types in relation to overall renewable energy production in the different EU Member States in 2013 [5].



Source: EU policy landscape (Biomass Policies, 2014) updated to 2013 based on Eurostat.

Advantages of Biomass

- Contribution to the security of energy supplies
- Creation of stable jobs, especially in rural areas
- Developing technologies and knowledge base offers opportunities for technology exports
- Carbon dioxide mitigation and other emission reductions (SOx, etc.) [6].

Drawbacks of Biomass

- Generally low energy content
- Competition for the resource with food, furniture and paper industries
- Generally higher investment costs of biomass conversion into energy in comparison with fossil alternatives [6].

Summary

Energy of biomass – is particularly useful in reducing the use of fossil fuels and in reducing greenhouse gas emissions. In the most cases, biomass is also economically viable alternative.


Thank
you!!

References

[1]Ściążko M., Kubicka K.: „Applying of biomass in power generation” Instytut Chemicznej Przeróbki Węgla

[2] Mirowski T., Mokrzycki E., Uliasz-Bocheńczyk A. : Energetyczne wykorzystanie biomasy. Instytut Gospodarki Surowcami Mineralnymi i Energi¹ Polskiej Akademii Nauk. Wydawnictwo IGSMiE PAN Kraków 2018

[3] http://www.crses.sun.ac.za/technologies-bio-fuel

[4] Sala K.: „Industrial Use of Biomass in Poland. Conditions and Barriers” Studies of the Industrial Geography Commission of the Polish Geographical Society, 31 (4). 2017, ISSN 2080-1653, DOI 10.24917/20801653.314.10

[5] Source: EU policy landscape (Biomass Policies, 2014) updated to 2013 based on Eurostat.

[6] https://www.nationalgeographic.org/encyclopedia/biomass-energy/

[7] https://www.ure.gov.pl/pl/oze/potencjal-krajowy-oze/8108,Instalacje-odnawialnych-zrodel-energii-wg-stanu-na-dzien-31-marca-2019-r.html

[8] https://www.eurobserv-er.org/pdf/solid-biomass-barometer-2018/