

GOOD PRACTICES IN SME

Biomass



Designed by freepik

The following document was developed using European Union financing as part of the “Technical support for the promotion of energy audits and energy efficiency investments in small and medium-sized enterprises in Poland”. The opinions presented in this document should not be treated as the official stance of the European Union.

The project was financed by the European Union as part of Structural Reform Support Programme (SRSP) and realized by the Polish National Energy Conservation Agency (KAPE SA) in cooperation with the European Commission on behalf of the Ministry of Climate and Environment.

What is biomass?

Biomass is an organic plant or animal material origin, which undergoes biodegradation and originates from agricultural and forestry production. Burning biomass is used to produce energy. Some types of biofuels include wood, sawdust, straw, energy crops, vegetable oils, biogas from biological refuse. We distinguish three generations of biofuel:

- I generation– conventional fuels consisting of resources which could be used in food production (e.g. grains, sugar cane, vegetable oils),
- II generation – fuel from plant refuse, and inedible plants which can grow in poor quality soil,
- III generation – algae based, which do not need soil to grow.



Pic. 1 pixabay



Pic. 2 pixabay

What are the benefits of burning biomass?

Biomass is considered a renewable energy source because the CO₂ emitted in the burning process was absorbed by it during its production (photosynthesis). Moreover, burning biomass is preferable in comparison to burning fossil fuels, due to a lower harmful substance (among other sulphur) content when compares to coal.

Burning biomass is particularly cost-effective for companies which produce their own refuse biomass such as sawdust, woodchips or straw. In these cases, waste management generates energy savings.

Example of a biomass boiler investment

An industrial forestry plant uses an old coal boiler (P= 22 kW) with an efficiency of $\eta=60\%$. On average, the boiler is in operation for $t=3\ 000$ hours annually and fired by coal with a calorific value of $W_o = 25\text{MJ/kg}$ and a price of $k=800\text{PLN/t}$. The plant decides to replace the old boiler with a biomass boiler with an efficiency of $\eta=88\%$ and use woodchips produced as a by-product of their own industrial production as fuel. How quickly will the investment pay for itself if the new biomass installation costs 30 000 PLN?

The annual cost of firing a coal boiler can be calculated using the formula:

$$\text{cost} = \frac{0,36 \cdot P [\text{kW}] \cdot t [\text{h}] \cdot k \left[\frac{\text{PLN}}{\text{t}} \right]}{W_o \left[\frac{\text{MJ}}{\text{kg}} \right] \cdot \eta [\%]}$$

Annual fuel cost for the old boiler:

$$\frac{0,36 \cdot 22 \text{ kW} \cdot 3\,000 \text{ h} \cdot 800 \text{ PLN/t}}{25 \text{ MJ/kg} \cdot 60} = 12\,672 \text{ PLN}$$

Simple payback time:

$$\frac{30\,000 \text{ PLN}}{12\,672 \text{ PLN/year}} = 2,4 \text{ years}$$

Source: KAPE



Ministry of Climate
and Environment



European Union



Krajowa Agencja
Poszanowania Energii S.A.