



### Circular bioeconomy on the example of municipal ecological heating plant in Frombork

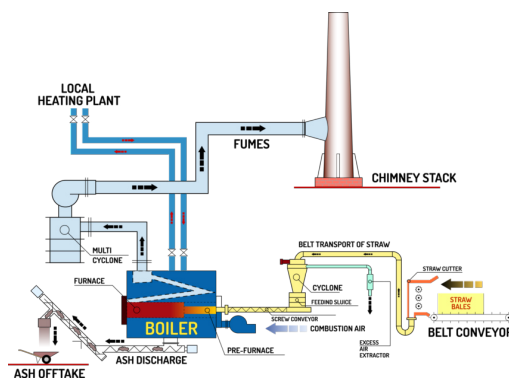
In 2002, the city of Frombork began the modernization of the municipal heating network, investing in biomass boilers. Currently, the city has a centralized heat energy supply system based on biomass combustion. The whole value chain takes a holistic approach that includes the plant operator, municipal authorities, farmers, public institutions and local inhabitants.

In the municipal heating plant there are 3 automatic grate boilers with a total nominal power of 6.5 MW and energy efficiency of 85%. Energy is obtained from the combustion of raw materials such as grassy energy plants (*Miscanthus Giganteus*) and green fodder from meadows covered by agri-environmental packages, which, due to the delayed mowing date, have no fodder properties. The input also consists in small percentage of compressed straw (cereals such as wheat, rye, oat and rape). Leoterm utilizes resources of its own approx. 100 ha plantation of *Miscanthus Giganteus* to collect biomass with the use of a prototype disc mower equipped with a proprietary, innovative compactor designated for hard materials such as energy plants. The collection covers 2/3 of demand. Cereal straw stems from purchase from local farmers. In return for the loss of organic matter, farmers receive storage waste (straw) mixed with ashes to be reused for fertilization purposes. The remaining waste (straw and ashes) goes to *Miscanthus Giganteus* plantation.

The investment project also included the construction of a straw storage, the installation of 67 district heating substations with regulated supply for water and central heating, and the construction of a 5.98 km long network. 423 recipients were connected to the new heating plant, including 18 new ones (2 institutions and 16 households), without raising heating fees. Currently, the company supplies heat to 80% of residential buildings and 90% of public institutions. A gas emissions research was carried out already after the first operation year and showed a substantial reduction of SO<sub>2</sub> and CO<sub>2</sub>, NO and dust emissions compared to previously applied fossil-based solutions. Total project cost amounted to PLN 10.51 million. The heat energy sales increased to approx. 9,000 GJ/year.



Source: Leoterm



Heating plant layout scheme

#### KEY WORDS

circular bioeconomy, biomass, straw, heating plant

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<https://nbnpl.uwm.edu.pl/en/nbn-pl/best-practices/>

## ADDITIONAL INFORMATION

The **circular economy** is a model of production and consumption, which involves sharing, leasing, reusing, repairing, refurbishing and recycling existing materials and products as long as possible. In this way, the life cycle of products is extended.

In practice, it implies reducing waste to a minimum. When a product reaches the end of its life, its materials are kept within the economy wherever possible thanks to recycling. These can be productively used again and again, thereby creating further value.

This is a departure from the traditional, linear economic model, which is based on a take-make-consume-throw away pattern. This model relies on large quantities of cheap, easily accessible materials and energy.

Benefits of circular economy:

- protect the environment
- reduce raw material dependence
- create jobs and save consumers money

Source: <https://www.europarl.europa.eu/>

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Source: Leoterm

## ABOUT BRANCHES

BRANCHES is a H2020 “Coordinaton Support Action” project, that brings together 12 partners from 5 different countries.

The overall objective of BRANCHES is to foster knowledge transfer and innovation in rural areas (agriculture and forestry), enhancing the viability and competitiveness of biomass supply chains and promoting innovative technologies, rural bioeconomy solutions and sustainable agricultural and forest management.



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## THE PARTNERSHIP

