

# BIOMASS

## Demonstration Project

# TASCA

## (Romania)

By the year 2010, 12% of the gross inland energy consumption of the European Union is to be covered by renewable sources of energy. To meet this goal, intensified use needs to be made of biomass, both for heating purposes and for power generation. Timber and forestry residues are available in ample quantities, but the required investment costs are a barrier to the broad-based use of this energy source. The sawdust project developed in the village of Tasca demonstrates that a modern combustion technology can provide a viable solution to two problems: an environmental problem caused by uncontrolled sawdust dumping and an energy-related problem concerning heat supply to the local population.

## THE CITY

Tasca is a village with 3,700 inhabitants of the Neamt County. It is located in the north-eastern part of Romania in a region with many forests. The main industry is wood working industry.

### Climatic data:

Mean annual temperature: 7.6 °C



## CONTEXT

In 1998 an agreement was signed between the municipality of Tasca and the Danish Environmental Protection Agency (DEPA) under the Danish Ministry for the Environment for implementing a demonstration project in the village of Tasca. This involved co-operation between the following organisations and companies:

Name of Project Partner	Role in Tasca Project
Municipality of Tasca	Beneficiary
DEPA	Donor
Local Environmental Protection Agency in Piatra Neamt	Mapping wood waste resources
Edil Project Consulting Engineers – Piatra Neamt	Design of buildings, tendering of buildings and construction works.
Grue & Hornstrup Consulting Engineers A/S - Denmark	Project management, general design and implementation.

The objective of the demonstration project in Tasca was to reduce the illegal and uncontrolled dumping of wood waste from sawmills in the nature by utilising the wet wood waste as fuel in a new district heating system.

# EXPERIENCE OF TASCA

The demonstration project includes the new logistic equipment (tractors, wagons and front end loaders), sawdust storage, boiler plant building, biomass boiler system, pre-insulated distribution pipe network, sub-stations in buildings (mixing coil of hot water for space heating and heat exchanger for production of domestic hot water) and the replacement of existing heating pipes under buildings. In tasca, single-family houses are spread all over the village whereas most public buildings (town hall, school, kindergarten etc.) and blocks of flats are concentrated in the centre of Tasca. The new biomass based district heating system is designed to supply hot water to buildings located in the centre of Tasca.



Project details were finalised and an invitation to tender was launched in the autumn 1998. The demonstration project in Tasca was officially commissioned on 10<sup>th</sup> November 1999.

The demonstration project was extended to accommodate a new drying chamber (kiln) with a drying capacity of 50 m<sup>3</sup> (wood planks) commissioned in May year 2002. The objective is to operate the biomass boiler system for more hours and with a higher load during the summer season, thus providing additional incomes to the municipality of Tasca as kiln owner and operator.

## Technical data

Subject	Unit	Data
Heat output capacity of the biomass boiler system	MW	2.5
Inhabitants supplied with heat from the biomass boiler system	%	50 % of the inhabitants in Tasca.
Fuel		Mostly sawdust, woodchips and bark
Water content of biomass fuel	%	Up to 50
Efficiency of flue gas cleaning system (multi cyclone and bag filter unit) at 10 % dry oxygen.	mg/Nm <sup>3</sup>	CO emissions < 250 NO <sub>x</sub> emissions < 500 Dust emissions < 40
Sawdust production in Neamt County	tons/year	Approx. 40 – 50 000
Sawdust consumed by the biomass boiler system in Tasca (excluding kiln).	tons/year	Approx. 2500 (5 – 7% of sawdust production in Neamt County)

## Investment costs

The demonstration project in Tasca could be implemented thanks to a considerable grant from DEPA under the Danish Ministry for the Environment and financial support from the Neamt County (funds paid by Municipality of Tasca came from the Neamt County). Total investment costs amount to USD 1100,000

The financing scheme for the demonstration project in Tasca is presented below.

- Municipality of Tasca 10 % - USD 110,000<sup>1</sup> (€ 94,017)
- DEPA (grant) 90 % - USD 990 000 (€ 846,154)

In addition to the above mentioned grant for purchasing technical equipment, DEPA also financed the expenses related to consultant services.

### Environmental aspects

The demonstration project in Tasca has resulted in environmental benefits and proved that a local environmentally friendly energy source (wood waste) could be used as fuel in district-heating systems in Romania.



By substituting a CO<sub>2</sub> neutral fuel (wood waste) for a fossil fuel (oil), the new biomass boiler contributes to reducing greenhouse gas emissions. The estimation of saved CO<sub>2</sub> emissions as a result of implementing the demonstration project in Tasca is based on the following assumptions.

Subject	Unit	Data
Quantity of wood waste combusted (sawdust)	tons/year	2500
Heat calorific value of wet sawdust (50% water content)	GJ/ton	8.27
Typical emission factor - oil	kg CO <sub>2</sub> /GJ fuel used (based on lower calorific values)	77.30
CO <sub>2</sub> emission reduction generated by the demonstration project in Tasca	tons/year	Approx. 1600

### Economic Aspects

Heat consumer price in Tasca was approx. 24.2 USD/MWh<sup>2</sup> (20.7 €/MWh) in the heating season 2001-2002, while the maximum consumer price registered by the ministerial office of competition in Bucharest was 51.8 USD/MWh (44.3 €/MWh) for the same period. In 2001 - 2002 heat production costs based on oil and natural gas reached 94.9 USD/MWh (81.1 €/MWh) and district heating companies could only provide discontinuous heat supply once state subsidies were used up.

In Tasca, waste wood is collected free of charge from sawmills. During the heating season 2001/2002, heat production price reached the same level as heat consumer price, i.e. 24.2 USD/MWh (20.7 €/MWh) and the plant did not make any profit. Heat consumer price consists of operation and maintenance costs, while refinancing (depreciation) is not included.

Furthermore, only a minor part of heat consumers in Tasca paid their space heating and domestic hot water bills for 2001-2002. In spite of this, the heat supply from the new biomass based district heating system was maintained throughout the entire heating season.

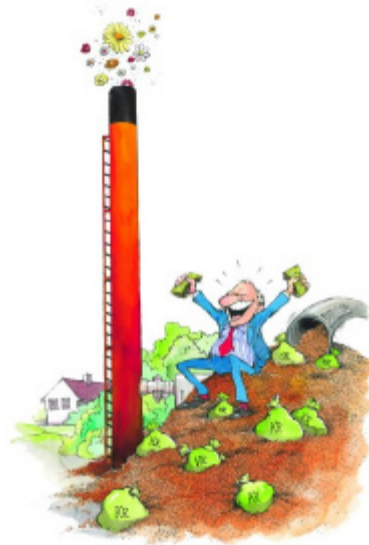
<sup>1</sup> Exchange rate as at 1<sup>st</sup> January 1999: € 1 = USD 1.17

<sup>2</sup> Exchange rate as at 1<sup>st</sup> January 1999: USD 1 = ROL 9,964

# EVALUATION AND OUTLOOK

The implementation of the project resulted in the following benefits:

- reduction of river water pollution caused by waste wood dumping,
- conservation and maintenance of existing forests by using sawdust and waste wood as fuel in the thermal plant,
- increased comfort in houses and in other private and public buildings,
- reduced air pollution in the village of Tasca due to the replacement of many old stoves and oil fired devices,
- CO<sub>2</sub> emission savings,
- local job market (the plant employs 2/3 persons during the day and 1 person during the night).



The happy Mayor with the waste wood based heating system

The demonstration plant provides an attractive alternative in terms of energy production as well as a satisfactory solution to sawdust utilisation problems.

## FURTHER INFORMATION

**Søren Jellesø, Lars Grue**

Grue & Hornstrup Consulting Engineers  
Østergade 18, 7500 Holstebro  
Denmark

Tel: +45 96 10 13 30

Tel: +45 96 10 13 41

Fax: + 45 97 40 45 20

E-mail: Soeren.Jellesoe@Grue-Hornstrup.dk

<http://www.grue-hornstrup.dk>

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