LONG SUMMARY

The urban waste, an inexhaustible source of energy, is an alternative for use in various fields. Besides garbage, it also contains waste from various fields of activity. The waste composition differs from one locality/area to another. An important issue is the fact that the waste is not sorted, and this can cause problems when it is processed. The waste contains significant quantities of non-combustible/non-biodegradable materials.

The incineration of solid urban waste (SUW) is a thermal method of elimination by complete oxidation at high temperatures.

Table 1 shows a classification and characterization of the various types of waste, and Table 2 shows the combustion conditions for various types of waste.

Table 1. Waste classification and characterization

Crt. no.	Waste / Characteristics	H_2O %	Ash %	Density kg/m3	Caloric power kcal/kg
1.	Type 0. Crumbled Paper, boxes, wood, cardboard, garbage, < 10% plastic and rubber	10	5	128 - 160	4723
2.	Type 1. Pieces Paper, boxes, wood, cardboard, garbage, < 20% food	25	10	128 - 160	3611
3.	Type 2. Refuse Mixtures of the above plus food	50	7	240 - 320	2389
4.	Type 3. Garbage Food, plant or animal remains	70	5	481 - 560	1389
5.	Type 4. Pathological Human or animal remains	85	5	721 - 881	550
6.	Type 6. Compact Documents, rubber, plastic, wood			561 - 801	4167
7.	Bark	10	3	192 - 320	5000
8.	Sawmill waste	10	3	160 - 192	4723
9.	Tyres		20 - 30	993 - 2000	5556
10.	Brown coal	3 - 12	4 - 36	1200 - 1400	3300 - 7200

Tabelul 2. Combustion conditions for various types of waste.

Parameters	Wood	Urban waste	Dangerous
Humidity, %	55 - 60	30 - 40	20 - 35
Injector thermal duty Gj/m^2h	8,5 - 11,4	3,4	5,7 - 8,5
Used O_2 moles / necessary O_2 moles (SR)	1,3 - 1,5	1,8 - 2,0	1,6 - 1,8
Air excess, %	25 - 30	80 - 100	60 - 80
Additional air, %	20 - 40	30 - 40	30 - 40

The objective of the project is the waste recovery by incineration and co-incineration respectively, as well as by obtaining biogas by means of anaerobic digestion.

Table 3 presents the relative energy potential of biogas coming from various sources, in the process of obtaining biogas.

Table 3. The relative biogas energy potential from various sources

Biogas sources	Energy potential [TWh/an]
Landfill	6
Communal and industrial effluents	
Organic waste from households and markets	18
Industrial organic waste	
Excrements	
By-products from agriculture and food industry	47
Materials from landscape conservation	
Planting of energy plants	141
Wood	187
Urine	4
Nutrients from effluents	5

Correlated with the topic, there have been made studies on two pilot installations, one for the co-incineration of urban waste, the other for obtaining biogas from urban waste by anaerobic digestion.

Figure 1 shows the scheme of the pilot installation for urban waste co-incineration, and figure 2 shows the scheme of the pilot installation for obtaining biogas from urban waste.

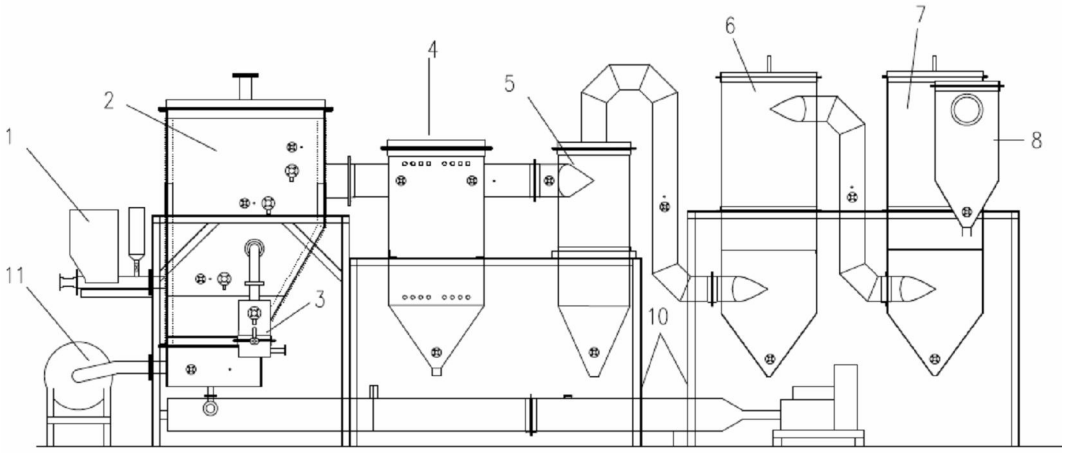

Fig. 1. Demonstrative installation for combined burning of biomass and/or urban waste with coal
1-Fuel bunkers, 2-Furnace, 3-Ash cooler, 4-Convection body, 5-Disc-bowl centrifuge, 6-Scrubber, 7-Neutralization reactor, 8-Drop eliminator, 9-Air tubes, 10-Metallic frame, 11-Extension furnace.

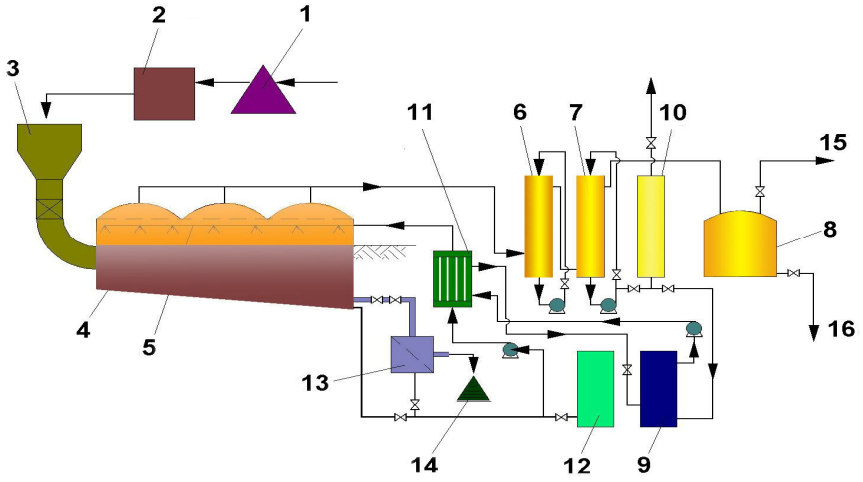

Figura 2 - scheme of the pilot installation for obtaining biogas from urban waste
1 –Urban waste dump, 2 - Mill, 3 – Supply system, 4 – Anaerobic digester, 5 – Nozzle system, 6 - H_2S retaining filter, 7 - CO_2 retaining filter, 8 – Biogas storage tank, 9 – CO_2 desorption vessel, 10 - CO_2 cooling vessel, 11 – Heat exchanger, 12 - pH correction vessel, 13 – Digested waste filter, 14 – Solid waste storage, 15 – Biogas user connection, 16 – Condensation water outlet valve

Knowing the characteristics of the used waste, we can make simulations in order to determine the variation of the specific parameters of the co-incineration process, and we can calculate the burning for the numerical determination of the possible obtainable values in the process.

In the case of the process of obtaining biogas by anaerobic digestion, too, it is possible to calculate the biogas burning correlated with its composition, and to determine the necessary adjustments for the use of a gas burner for the produced biogas.