

1. GENERAL INFORMATION

S.C. Energoterm S.A. is located in Tulcea town, no. 73 Isaccei Street and it is recorded at the Commerce Camber with number J36/384/2005.

The company was established by the reorganization of the Thermal Services Direction Tulcea on 1st July 2005, on the basis of the Local Council Decision no. 144/26th May 2005 and it has as unique shareholder the Local Council Tulcea. The properties which form the public system of heating, owned by the Tulcea Municipality, and which used to be in the administration of Thermal Services Direction, were taken by S.C. Energoterm S.A. according to the contract of administration delegation by cession.

The main activity of the company is in D category of CAEN codes - Production and delivery of electrical and thermal power, gases, hot water and conditioned air, subcategory 35.30 - providing of steam and conditioned air.

The activity performed by the company is done using a centralized heating system which contains a hot water boiler (which uses natural gases), with a capacity of 50Gcal/h, transport nets, 15 thermal station, 48 heating and hot domestic water preparation modules, delivering nets and a heating system with 6 district power station using natural gases as fuel.

By 2004 the thermal power production for the centralized heating system used to be made with a hot water boiler of 100gcal/h using fuel oil.

Because the number of subscribers has got down about 45%, as the effect of the modernization and changing 17 heating stations into district power stations, the nominal parameters of the boiler got down too as much as it used to work only 1/3 of its capacity. Since the date above, we have given up the exploitation of the 100gcal/h boiler and we have been using the 50Gcal/h hot water boiler, owned by the local Municipality.

A. THE 50 Gcal/h HOT WATER BOILER PRESENTATION

The boiler is an assembly of:

- Burning installation with 6 burners AG1150 with reduced emissions of NO_x, 6 fans and a lighting installation;
- Installation for thermal agent circulation consisting of: 2 Wilo pumps, 2 pumps for supplying adding water;
- Automation installation which provides: combustion and thermal amount parameters, boiler's parameters check, protection, acoustic and optical alarm.

Technical features of the boiler:

- Caloric flow at the nominal load.....50 Gcal/h
- Caloric flow at minimal selected load.....12,5 Gcal/h
- Caloric flow at lasting minimal load.....7,0 Gcal/h
- Constant flow of water through the boiler.....402,8 Gcal/h
- Hot water pressure at the outlet of the boiler(maximum).....1,2 MPa
- Hot water pressure at the outlet of the boiler(minimum).....0,35 MPa
- Hot water pressure at the outlet of the boiler(working).....0,84- 0,86 MPa
- Water temperature rising into the boiler, at nominal load.....35°C
- Efficiency at nominal charge.....91%

B. PRIMARY NETS FOR TRANSPORT OF THERMAL ENERGY

It transports hot water through 11,6km and it's made of steel pipes with Ø 150mm-180mm, some of them fixed outside and some of them into concrete canals, underground.

The thermal isolation of the nets is a wrapping one with mattresses of mineral cotton-wool of 50-100mm for the underground pipes. They are also protected with zinned tin of 40-80mm for the underground pipes protected by bitumen carton.

Between 2005 - 2008 there have been replaced 25% of the steel pipes, classically isolated, with pre-isolated steel pipe in order to reduce the loss of water and thermal energy.

Nr.	Specification		UM	Value		
				2006	2007	2008
1.	Loss of energy in the transport net		Gcal/year	7043	5140	4014
2.	Loss of energy in the transport net/inlet thermal energy in the net		%	10.57	7.95	6.32
3.	Transport net characteristics	Pipe length	km	10.3	9.5	11.2
		Ø	mm	150-800	76-800	76-800
		Type(classical, pre-isolated)		95% classical 5% pre-isolated	80%classical 20% pre-isolated	75% classical 25% pre-isolated
4.	Percentage of rehabilitated transport net		%	5	15	25

C. INTERMEDIATE RE-PUMPING STATION

Through this intermediate re-pumping station, the pressure of the primary thermal agent is got up with bar. From here, through the primary nets, the thermal agent is delivered to the thermal items and thermal modules in the blocks of flats districts in the town.

The re-pumping station has solved the problem of a very high loss of pressure(over limits) in hillsides areas, insuring a proper hydraulic working for all the subscribers.

D. THERMAL ITEMS AND MODULES:

The thermal items delivers the thermal energy and prepares the hot domestic water. In each of them there are installed 3 groups of pumping equipped with Grundfos pumps with the following characteristics: flow between 19,7 m³/h and 160 m³/h, pumping high between 1 bar and 2 bar, electric engines between 1,1kW and 7,5 kW and rotation between 1500rot/min and 300rot/min, all of them for the circulation of the secondary thermal agent.

To prepare the secondary thermal agent, in the thermal stations, there are installed 2 heat exchangers Alfa Laval having a thermal power between 1,5 and 2 Gcal/h.

The hot domestic water is prepared in 2 heat exchangers Schmidt Sigma 37- NCL.

The heating modules which are also used for preparing hot domestic water P-H/DHW- Schmidt are compacted and completely automated having high performances and they can insure a considerable energy economy.

A module produces thermal agent into the first heat exchanger with plates and prepares hot domestic water into the second one which is parallel linked, without accumulation.

Its working is completely automated and it doesn't need assistance from the stoker. The delivery temperature of the heating agent is automatically controlled, according with an adjustment curve depending on the external temperature. The temperature of the hot domestic water is always at the same level.

By now there have been installed 48 modules for heating and hot domestic water preparation.

E. DISTRIBUTION NETS FOR THERMAL ENERGY

The secondary net transports hot water on 27.6km. It is made of steel pipes with $\varnothing=50-250\text{mm}$, fixed underground in concrete canals. The nets' thermal isolation is of wrapping type with mattresses of mineral cotton-wool protected with bitumen carton.

Between 2005- 2008 there have been replaced 35% of the steel, classical isolated pipes, with pre-isolated steel pipes in order to reduce the loss of water and thermal energy.

Nr.	Specification	UM	Value			
			2006	2007	2008	
1.	Thermal energy delivered in the transport net	Gcal/ye ar	70 471	70 061	67 751	
2.	Loss of energy in the transport net for heating and hot domestic water	Gcal/ye ar	13 100	9 524	8 362	
2.	Loss of energy in the transport net for heating and hot domestic water/inlet thermal energy in the distribution net	%	19	13.6	12.4	
3.	Transport net characteristics	Pipe length	km	31	29	27.6
		\varnothing	mm	50-250	50- 250	50- 250
		Type(classical, pre-isolated)		80% classical 20% pre-isolated	70% classical 30%pre-isolated	65% classical 35% pre-isolated
4	Percentage of rehabilitated transport net		%	20	10	5

F. DISTRICT THERMAL POWER STATIONS

Thermal power stations have been started between 1999- 2007.

Their working is based on the producing of thermal agent in 3 boilers with burners using gas fuel. Depending on the number of subscribers, in each station, there are 2, 3 or 4 boilers with capacities between 0.4 and 2 Gcal/h.

The stations are completely automated, each boiler having its own automated board which accomplishes its safely working. The delivery temperature of the heating thermal agent automatically checked according with an adjustment curve depending on the external temperature. The temperature of the hot domestic water is always at the same level.

2. APPRECIATIONS ABOUT THE CENTRALIZED SYSTEM WORKING

- a. Hot water boiler of 50Gcal/h works only to provide the thermal energy for heating during the cold season (November- March). It can't produce thermal energy for hot domestic water during April - October because the necessary thermal energy is less than the caloric flow at minimal designed load.
- b. The district power stations deliver thermal energy for heating during the cold season and for hot domestic water all over the year.
- c. The subscribers:

No.	SPECIFICATION		2004	2005	2006	2007	2008
1.	Total subscribers (hot water boiler and thermal power plants)	Flats	9419	9153	9351	9650	10667
		Public institutions	10	10	12	9	8
		Services	94	94	99	115	140
		Industry	0	0	0	0	0

Now, there are 10667 flats connected when the total possible is 16500.

- d. The amount of used thermal energy for heating and for hot domestic water during a year is 75.000Gcal with the possibility of increasing it to 125 000- 130 000Gcal/year.

3. AIMS OF THE LOCAL AUTHORITIES ON SHORT AND MEDIUM TERM

- a. To build a cogeneration installation for the centralized system of urban heating in Tulcea town.
During winter this source will provide:

- Electrical energy
- Thermal energy as hot water at 90/70°C
- Hot domestic water

During summer it will provide:

- Electrical energy
- Hot domestic water

- b. Transport and delivery nets rehabilitation.
c. Thermal items and power stations modernization.

Under these circumstances there is a necessity to accomplish feasibility studies and technical projects to build the cogeneration installation and to reach the other 2 targets.

To design the cogeneration installation there will be taken in account:

- Number of connected subscribers and those who could be connected too
- The possibility to link the district power stations to the new installation
- The possibility to design it with thermal engines in the district power stations

The aim of these studies and projects and their fulfill is:

- To reduce the production price
- To reduce as much as possible the technological loss
- To reduce the emission of toxic gases(NOx,CO2,CO)