ALLIANCE TO SAVE ENERGY

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- Between 8-10 April 2002, a seminar on "*Financing Energy Efficiency*" took place in Kiev (Ukraine). The event, organized under MUNEE regional program, by the International Institute for Energy Conservation (IIEC) and Alliance to Save Energy (SUA), gathered representatives of non – governmental organizations, companies and banks from 8 CEE countries. Representatives of international financing organizations have also been there. Based on the presentations and on the exchange of opinions and experience, an analysis has been performed on the obtained results and the met barriers (by the beneficiaries and the financing entities) when implementing financing mechanisms for energy efficiency projects. APER delegation was formed by Mrs. Elena Andrei (financing consultant) and Ms. Ioana Ionescu (PR manager) and presented the experience on financing municipal projects by municipal bonds.

- The Romanian Government has recently decided to externalize several thermo power plants and to transfer them from the patrimony of the main Romanian producer – TERMOELECTRICA – to the patrimony of the Local Councils. This measure is in line with the acceleration of utilities' privatization process and the investments attracting process.

- Between 9-14 April, APER delegation visited 16 municipalities situated in Romania's North and West regions. They discussed with representatives of the local decision – makers and with specialists from the local energy utilities on the objectives and the evolution of MUNEE program. *"MUNEE caravan"* covered more than 2000 km, collecting information on the energy situation of the municipalities, the local concerns about its optimization and the project proposals in the energy efficiency field, the need for investments and for assistance in some projects' promotion. There have also been made proposals regarding the collaboration in establishing municipal energy efficiency offices.

- Further to the suggestion of ATT Sighisoara director, APER invited REEN members representing municipalities from Banat, Transilvania and Maramures to participate in the seminar "*Promoting EE Projects*". The event, held between 17 – 19 April, under MUNEE program, gathered 19 participants from 15 municipalities. Representatives of international financing organizations, commercial banks and energy efficiency equipment producers offered interesting information on financing mechanisms, investors' requirements, high performance technical solutions and professional management. Copies of the presentations are available from APER.

THE ENERGY PLAN OF FOCSANI MUNICIPALITY

Elaborated by GLOBAL ENERGY SERVICES

1. THE NEED FOR A MUNICIPAL ENERGY PLAN

The legal factor obliges local administration to establish municipal energy programs. The **Law no. 199/2000 regarding the efficient use of energy** establishes that all *"economic agents that consume a yearly energy quantity of over 1,000 tones oil equivalent, and the local public administration from the municipalities with a population of more than 20,000 inhabitants, must establish their own energy efficiency programs that will include:*

- short- term measures,of low cost and no cost type;

- long- term measures, for 3 to 6 years, regarding an investments program for which fesability studies will be established."

Additionaly, the **EO 29/2000 regarding heat reabilitation of the existing buildings and stimulation of heat savings,** stipulates in article 10 that: *"the activity of rehabilitation and heat modernizing of the existing buildings and enclosed equipments will be ensured:*

*a) by the departments and/or services of urbanism and territorial planning **within district councils**..., **municipalities**, towns ..., for:*

- the release of buildings' energy certificate;

- checking and supervising buildings' heat rehabilitation documents, financed through local budgets;

b) by the local public administration for sustaining activities co-ordinated by MLPTL, referring to generating positive opinions, favourable to saving the energy used for buildings heating and domestic hot water supply."

Economic and social factors are also of great importance in making the decision for elaborating the Municipal Energy Plan (MEP). In Romania, energy efficiency is 3-3,5 times lower against the industrial countries. The high cost and low quality parametres of the services offered to the clients by the local utilities, generated lack of confidence in the releationships between citizens and local authorities (energy utilities included).

The programs and measures for reducing the energy consumption for municipal services were not complete. Regies or local utilities were taken into consideration separately, instead of regarding municipality as a whole.

2. THE MUNICIPAL ENERGY PLAN'S STRUCTURE

This article refers to the concrete situation of Focsani municipality,*which has a complex energy structure*, power and heat in *co generation* being produced by a source – economic entity - whose actions belong to the Municipality and that cover the main part of the heat need of the consumers from the centerlized heat networks.

Energy consumers are representatives of different caregories. The industrial consumers use heat as steam. The residential and the commercial ones use in the same time power (for inside lighting and household appliances), and heat (hot domestic water and burned fuel). For public lighting and water pumping, it is used water and for the public transport- disel oil.

Taking all these into account, the **Municipal Energy Plan** has been structured (figure 1).

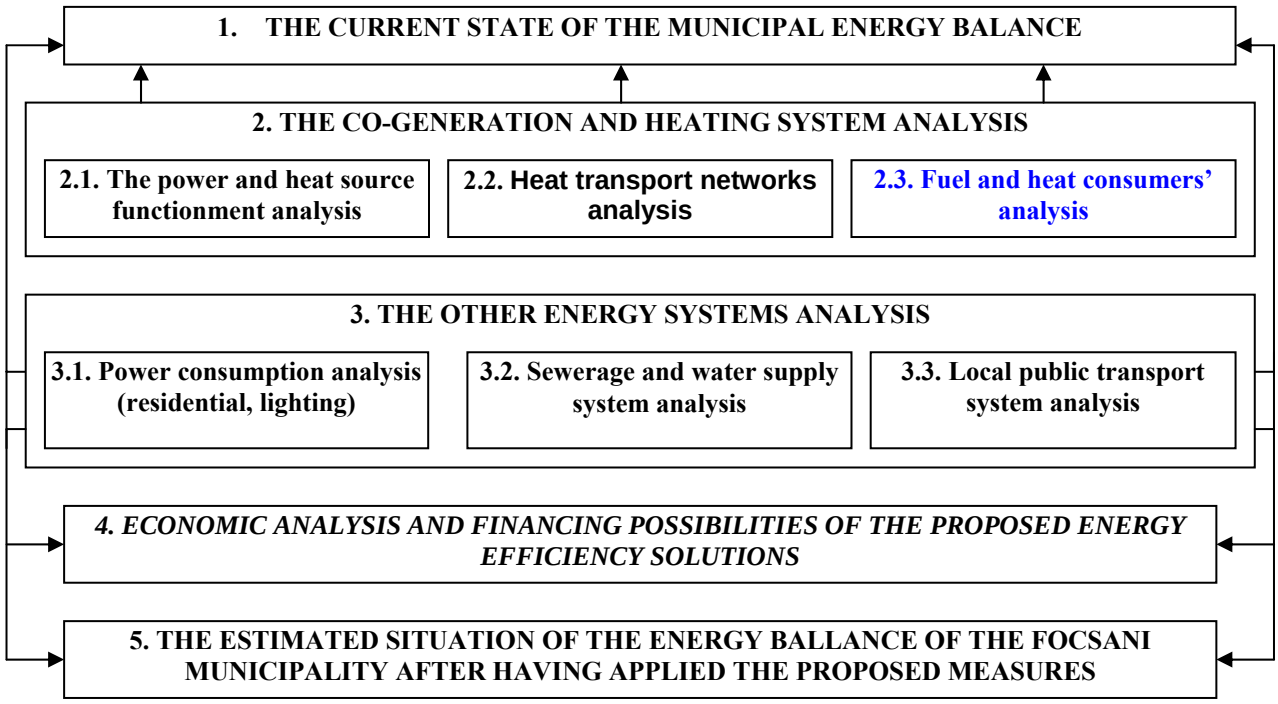

Figure 1. *Municipal Energy Plan Structure*

3. Focsani Municipality's energy balance

The main energy source of Focsani Municipality is CET ENET SA, independent producer of power and heat. The annual power consumption is of approx. 116 MWh, while the average power need is of approx. 13 MW. The distribution of the power consumption according to the consumer category is presented in the figure bellow.

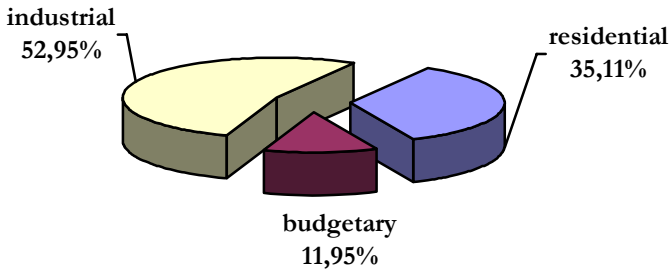

Figure 2. *Distribution of Focsani power consumption according to consumers category*

With an installed power of 8 MW_e, CET cannot deliver to the system, after having covered its own power services, more than a maximum extrapolated power of 4.33 MW_e when the average delivered power is of 2.59 MW_e.

Heat transport networks:

- **steam network**, of branch type, is made of 3 main pipelines, supplies 21 urban (U.M.), industrial and agricultural consumers and is characterized by hydraulic and thermal unbalances. Average heat loss is of 57.5%. The current steam production capacities can supply more consumers.
- **tap water network**, of bi - tubular type, is hydraulically balanced, being able to transport a flow of 2900 m^3 / h under a thermal difference of 80^0 C (150 / 70 ^{0} C), that is a heat power of 268 MW_t. During the winter season, heat losses are of 7.33%, while during summer - 13.54%.

The substations have been modernized, having been equipped with plate heat exchangers and heat meters on the main and secondary tap water networks.

The secondary distribution networks are rather old and have losses of 10 - 15 %.

The heat consumers supplied in the centralized system are groups of blocks of flats, public buildings and commercial consumers. Focsani need for heat is of approx. 254 MWt, calculated for a minimum external temperature of - 18 C.

The equipments installed in the blocks of flats or apartments are generally under – sized, many of them facing a poor technical condition due to their age and low level of maintenance, mainly in the common parts. The inhabitants' lack of thermal comfort is emphasized by the insufficient thermal insulation of the blocks of flats. The absence of heat and water meters in the residential buildings hinders the calculation of the real losses in the external secondary distribution.

The heat consumers in decentralized system: 1056 residential buildings equipped with apartment boilers, 982 buildings - with gas stoves and 2208 houses - with solid fuel (wood and coal) stoves.

The urban public transport system comprises 10 lines serviced by 33 buses and 7 micro - buses, with an annual Diesel oil consumption of 550 t.

The main aspects identified further to the analysis of the current situation of Focsani energy system:
A. The **heat and power source**:
- power **deficit** of approx. 64 %
- heat **deficit** at peak of 30 %

B. Approx. **80 %** of the residential users are connected to the centralized system for heat supply.
C. In the **heat transport and distribution network**:
- **sufficient capacity for the transport** of steam and tap water in the heat networks
- heat **losses** of **maximum 14 %** in the domestic hot water transport networks (for residential consumers and administrative buildings)
- heat **losses** of **10 - 15 %** in the hot water distribution networks (for residential consumers and administrative buildings)
- high heat **losses, over 50 %,** in the steam transport networks (for industrial consumers).

D. Heat losses at the **residential consumers** connected to the centralized system.
E. Losses in the **water and sewerage networks** and high power consumption in the pumping stations
F. High fuel consumption in **the public transport network (550 t / year)**

4. SCENARIOS FOR INCREASING THE EFFICIENCY OF FOCSANI ENERGY SYSTEM

The main aspects approached in the Municipal Energy Plan:
A. At the **power and heat source**:
- The possibilities of extending the power production capacity for reducing the dependency on the National Energy System
- Modernization in the DH field for increasing the capacity and the availability.

B. In the **heat transport and distribution network**:
- Modernizations or refurbishment in order to reduce the heat and thermal agent losses.

C. At **heat residential consumers** from collective buildings
- Envelope rehabilitation,
- Improved management of heat and natural gas,
- Introduction of compact thermal stations in the buildings.

D. In the **water transport and distribution network**:
- Modernization / refurbishment for reducing the water losses and the power consumption.

E. In the **public transport system:**
- Route optimization.

The scenarios for increasing the energy efficiency are differentiated according to the estimated technical effects. The energy effects specified for each scenario are registered after the implementation of the planned measures. The largest time span (10 years) corresponds to the projects on increasing the energy efficiency in collective residential buildings. The

"continuity scenario" refers only to the measures necessary for the increase of the security in the source (CET ENET) equipments.
The global technical and economic effects of the measures for increasing Focsani energy system's efficiency are presented in Table 1.

5. CONCLUSIONS AND RECOMMENDATIONS

The investments needed for the implementation of the proposed scenarios are between 6000000 $ şi 50000000 $.

* For the cogeneration and heating system:

1. By the implementation of the measures proposed for the source, for the same thermal power produced by CET ENET Focsani (49,17 MW_t), the net electric power of the plant increases from 6 % la 18 % (from the thermal power produced by burning the fuel).
2. The measures proposed for the heat transport network is estimated to lead to losses decrease from 26 % to 11 %.
3. In the standard variant, **the heat supplied to consumers increases** from 43 % to 53 %, by the reduction of network losses. In the maximal scenario, with mixed cycle, it becomes 46 %, by the increase of the electric power produced.
4. The amount of own power and heat services (SPT and SPE) remains the same for all the scenarios.

Tabelul 1. *Efecte tehnico-economice globale în scenariile propuse*

Scenario	UM	Current situation	Continuity scenario	Minimal scenario	Average scenario	Maximal scenario
Fuel consumption in CET	tcc	90386	83117	84441	86000	97382
Average thermal power developed by burning the fuel	MW_t	83,907	77,244	78,474	79,923	90,501
The net electric power CET	MW_e	4,18	4,4	5,39	6,76	15,66
CET Losses	MW	12,062	10,759	10,999	11,078	12,756
Net electric power delivered from CET	MW_t	51,82	49,17	49,17	49,17	49,17
Own power services SPE	MW_e	1,664	1,583	1,583	1,749	2,406
Own heat services SPT	MW_t	6,341	5,576	5,576	5,576	5,576
Heat losses on the steam network	MW_t	4,14	4,14	3,2	2,6	2,02
Heat losses on the hot water network	MW_t	14,38	14,38	14,38	7,793	7,793
Thermal power savings in rehabilitated buildings	MW_t	0	0	3,436	5,11	8,03
Electric power savings in the public lighting system	MW_e	0	0	0,05	0,05	0,05
Electric power savings in the water supply and sewerage system	MW_e	0	0	0	0,219	0,326
Thermal power savings in the public transport system	MW_t	0	0	0,23	0,23	0,23
Global electric and thermal power savings	MW	0	0	4,656	13,736	17,343
The electric power needed from the system	MW_e	9,32	9,1	8,11	6,74	-2,16
Estimated investments	$	0	2500000	6074500	16414500	49574500
Investment cost /Global savings	mil.$/MW	-	-	1,3	1,2	2,9

* For the increase in the efficient use of energy:

1. *In the maximal scenario (with GTI)* Focsani could **reduce its dependency** on the power purchased from the system
2. Further to the implementation of the proposed scenarios the equivalent consumption (power, heat and fuel) is estimated to decrease with **4,7 - 17,5 MW**. Thus, favourable premises are created for **taking over new heat consumers without extending the transport and distribution capacity**.

The ratio effort / results is optimal in the average development scenario, the investment effort in reducing the consumption with 1 MW being lower that the one for installing it in a modern source (for example, with GTI). The maximal scenario is more expensive, the investment in increasing the energy efficiency being higher even than installing the saved MW in a nuclear plant.
We think that, regardless to the scenario chosen by the local authorities for the energy development of the municipality, **the sequence of the projects** that will be approached should take into consideration a **correct prognosis of the energy needs**. At the same time, the actions developed for the modernization of the heat transport and distribution infrastructure should be correlated to the programs that will be developed for increasing the energy efficiency in the collective residential buildings.

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