

## A network for integrated heat production and distribution

The current urban heating system in Kosice is a heritage that dates back to its' communist period. It is managed by three companies. TEKO runs the heat production station. Another company, KOSIT, which collects and recycles municipal waste, participates in this heat production by injecting the heat issued from its waste incineration process. Finally, the TEHO company takes charge of the heat distribution network within the city. The cooperation of these three actors explains the good performances in supplying heat, the cost to consumer and its environmental impact. There is still a good deal of room for improvement in terms of energy efficiency, but the concerted efforts have already bore fruit.

### Three companies, one efficient urban heating system

The mission of these three companies is to reduce the costs of production and transport of heat, while simultaneously looking for new ways to diversify their sources of energy and minimize the environmental impacts of their operations.

#### TEKO : for an astute and socially-minded production

TEKO is the heat production company which feeds the city of Kosice's network of remote heating, to which 85% of the city is connected. Its principal goal is to provide enough heat to meet the community's needs. And in order to assure low prices that are among the least expensive of the entire Slovak market, it set up a system of cogeneration. In actuality, the electricity produced, being a by-product of heat, then creates consequent profits. The company is thus able to propose appealing tariffs for kWh of heat that are also very stable.

TEKO, with a production of 855 MW, is the largest producer of heat in both Slovakia and the Czech Republic together. The company is independent in its operation but belongs to the "bottom of the national property of Slovakia". It is, thus, a government enterprise financially independent from the state.



The TEKO station for heat production



The waste incineration operations at KOSIT

#### KOSIT : waste worth its weight in gold

The company KOSIT is in charge of the treatment and the valorization of waste of Kosice and its 14 neighboring villages. Its activities are organized around collecting, sorting, storage and incineration of communal waste. It is one of only two incineration stations in all of Slovakia. It's ownership in shares is as follows: 34% by the town of Kosice and 66% by various Italian economic entities.

Waste is first sorted and compressed and then sold to specialized recycling companies. The company also invests considerably in awareness campaigns that pertain to recycling. Any additional waste that can't be recycled is incinerated, thereby producing heat which offers even more value and utility. This heat is sold in the form of steam by another local company, TEKO.

### A brief overview

#### TEKO

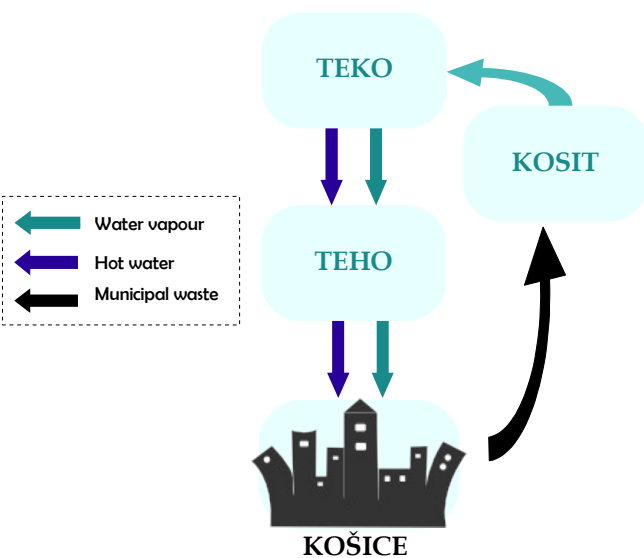
Production data :  
Heat : 855 MW  
Electricity : 121 MW  
Energetic efficiency : 90%

#### KOSIT

Quantity of waste received (from Kosice and its surroundings) and burned:  
**74,000 tons per year**  
Capacity of its incinerators : **60,000 tons**  
Heat production:  
in winter : 12 MW  
in summer : 3-4 MW  
Turnover due to sales of water vapour : **12,500 € per year**

#### TEHO

Services **85%** of the city  
Length of the distribution pipelines : **200 km**  
Temperatures :  
hot water : 150/60 °C  
water vapour : 220 °C,  
**10 bars**  
Energetic efficiency of the pipelines : **95.5%**



Flowchart of the exchanges between these four actors

#### TEHO : distributing heat at minimal energetic cost

The municipal service enterprise TEHO, owned in full by the city of Kosice, is responsible for the distribution network of heat that alimnts 85% of the city. It buys 72% of the heat produced by TEKO. The heat is transported in the form of hot water (85% of the total) and steam. The company plans to replace its system of distribution of water vapour, which experiences greater energy losses, with a system that uses hot water instead. The performance monitoring and management of the city's 220 heat exchangers (with a capacity of 4 or 1 MW for the most recent) is maintained by very advanced software. A long process of improving the energetic efficiency of the network is underway and concerns just as much the exchangers as it does the pipes.



### The advantages of this system

➤ **Reasoned energy management on all levels of the process for better energy efficiency.**

Energy efficiency both generates larger profits for the 3 companies and allows a total reduction in CO<sub>2</sub> emissions due to the production of heat and electricity. The CHP (combined heat and power) process itself assists such energy efficiency, even if when certain steps are carried out individually.

➤ **Controlling polluting emissions.**

Controls are performed in a very stringent way by both KOSIT and TEKO. Techniques of denitrification, electrostatic separation and smoke filtering make it possible to greatly decrease the emission rates (of nitrous oxide, sulfur dioxide, and mobile particles in particular), which are thereby much lower than the national standards.

➤ **A low, stable price for kWh of heat.**

The profits generated by the sale of electricity and the economies of scale obtained make it possible to guarantee a low and dependable price. The citizens of Kosice would probably make others jealous...

➤ **A pool of employment.**

These 3 companies alone employ more than 1000 people.

### KOSIT : all for awareness-building

In order to optimize domestic recycling, and therefore its upstream efficiency, the company KOSIT has deployed a very active strategy of communication and awareness-raising for its citizens.

Garbage bins and recycling containers are set up throughout the city and garbage bags of 3 different colors are distributed for sorting purposes, along with flyers and instruction leaflets. Attention is also focused on children. It was found that youth are among the most receptive and the effort, therefore, has a stake in the future. Educational tours of the station are organized for younger participants. Some classes even visit 2 times a week. KOSIT also offers classroom presentations, organizes shows for children and participates in events of the city. The company offers a wide range of media presentations and a reception hall. It has created a cassette for children and a magazine that tells the adventures of the mascot, "the hedgehog that sorts." In an effort to disseminate its know-how, KOSIT also trains environmental students on awareness techniques for children.

### The assets of TEKO and their results

Since its construction in 1968, TEKO uses a complex mixture of gas and coal of which the parameters are governed by national law. Overall, as a yearly average, the share of the mix is about 70% coal and 30% gas, with an exclusive use of gas in summer. This enables the plant to increase its output by more than 50% compared to a factory running purely on coal. The four boilers used in electricity production have an output of 90%, two of them are cogenerative.

The coal-gas mix is burned according to demand for heat but also for electricity. If there is no demand for electricity, only the non-CHP boilers are put to work. The production of electricity intervenes exclusively to cover periods of peak consumption. The cogeneration, or CHP, system combined with that of the classic boiler allows the company to be very flexible and responsive; hence its ability to meet peak consumption. This is why the redemption rate is very high, which makes the « under-production » of electricity a lucrative business decision.

**A future based on renewable energies:** The profits generated by the sale of electricity allow the company to guarantee a low and stable price but also to invest in improving their heat production systems. The introduction of high-tech filters for smoke is a current example of such investment, but other projects will be rolled out in the near future. First of all, one can expect to see the incorporation of wood waste to ensure a share of the production of heat (5%). Then, the company's large project for the next 5 years is to exploit the geothermic potential of the region. Their goal is to produce 50% of annual heat from renewable sources. This is a good example of how district heating can be a real asset in the exploitation of renewable resources.

### The keys to success

Financial independence is a considerable advantage which can enable an enterprise possessed in part by various external structures, including public structures, to take the initiative.

The municipal director of energy plays an important role. He is in control of the various actors involved in the territory's energy and guarantees coordination between them. This contributes greatly to the efficacy of the system.

### For more information...

The city of Košice's website :

[www.kosice.sk](http://www.kosice.sk)

Websites for the 3 companies (in Slovak) :

[www.teko.sk](http://www.teko.sk) ; [www.teho.sk](http://www.teho.sk) ; [www.kosit.sk](http://www.kosit.sk)

Articles about Košice from our blog :

<http://challengestour.blogspot.com/>

### Who to contact in Košice ?

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