

### Companies connection to energy efficiency

The enterprise has developed, implemented and maintains a Quality Management System based on the international standard ISO 9001: 2008 since 2003. The enterprise aiming at the continuous improvement of its performance, while showing particular interest in the wider environment in which operates and grows, has developed and implemented since 2012 an Environmental Management System based on the international standard ISO 14001:2004. Since 2015 the enterprise is certified with ISO 140001:2004. Regarding its energy efficiency policy, the enterprise has started an extensive energy audit in all respective processes in order to comply with the European directive 2012/27/EU and local legislation 4342/2015.

### Steam system

The Enterprise was founded in the 1960s. It initially produced only boards of expanded EPS used for thermal insulation of buildings. As from the early 1970s the company's main activity switched to the production of EPS, as a raw material. Main use of steam: Styrene polymerization (main process), EPS beads drying. Production of expanded polystyrene blocks for quality control reasons (live steam)

### Steam boiler information

Size: 3,3MWth  
Nominal steam capacity: 5.000 kg/h @ 10 bara kg/h  
Boiler's operation: 6.336 hours/year  
Kind of fuel: Heavy fuel oil

### Steam system problems identified

- The flue gas temperature is slightly higher than the normal operating conditions (206 °C) and has an effect to the overall efficiency of the steam boiler.
- The steam boiler has many heat leakage areas all over its envelope and pipework. The front part of the boiler is partly insulated resulting in many heat losses. The rear part of the boiler as well as the boiler chimney provide with high heat losses.
- The majority of the steam pipes checked are insulated but some areas of the pipe network are rusted and un-insulated.
- Average TDS in the boiler is calculated at 270ppm, which is very low and shows that blowdown rates (12,5%) are higher than needed.

### Proposed energy saving measure(s), investments, and expected results (in figures)

- **Insulate un-insulated Steam distribution:** 331,200 kWh/year => Simple payback ~ 2,5 months, Cost : 2.500 €/100m, Annual fuel savings (€):13.600
- **Insulate un-insulated condensate lines:** 128,000 kWh/year => Simple payback ~ 5 months, Cost : 2.500 €/100m, Annual fuel savings (€):5.900
- **Insulate steam boiler:** 89,000 kWh/year=> Simple payback < 1 year, Annual fuel savings (€):3.300
- **Use feedwater economizer for waste heat recovery:** 133,000 kWh/year, Simple payback = 3,5 years, Cost: 17.000€, Annual fuel savings (€):4.900
- **Use feedwater ceramic economizer for waste heat recovery:** 565,000 kWh/year, Simple payback = 2,6 years, Cost: 53.700€, Annual fuel savings (€):20.800



Greece

Industrial - Insulation material

Styrene polymerization (main process), EPS beads drying, Production of expanded polystyrene blocks

Number of employees: 97

---

**Total (estimated) Investment**

€ 54.300

**Total (Estimated) Savings**

0.9 GWh/yr

**Non Energy Benefits**

Reduced maintenance costs

Prediction and repair of malfunction of the system

Better safety control

- **Install an automatic blowdown control system:** 222,000 kWh/year, Simple payback = 13 months, Cost: 9.000€, Annual fuel savings (€):8.200
- **Energy consumption monitoring system**
- **Use feedwater ceramic economizer for waste heat recovery:** 565,000 kWh/year, Simple payback = 2,6 years, Cost: 53.700€, Annual fuel savings (€):20.800
- **Install an automatic blowdown control system:** 222,000 kWh/year, Simple payback = 13 months, Cost: 9.000€, Annual fuel savings (€):8.200
- **Energy consumption monitoring system**
- **Install an automatic blowdown control system:** 222,000 kWh/year, Simple payback = 13 months, Cost: 9.000€, Annual fuel savings (€):8.200
- **Energy consumption monitoring system**

**Implemented proposed energy saving measure(s), investments and results achieved (in figures)**

The proposed measures are not yet implemented.

**Achieved and/or expected Non Energy Benefits (NEBs) as result of implemented and/or proposed measures and investments involved**

Expected NEBS as a result of proposed measures

- ✓ Avoid corrosion of pipes by deaerating makeup water, expanded lifetime of the system
- ✓ Reduce maintenance costs
- ✓ Prediction and repair of malfunction of the system
- ✓ Facilitation of the personnel to control and supervise the system

**Involvement of internal stakeholders**

Top Management of the enterprise is committed to implement over the next years an Energy Management System based on the international standard ISO 50001:2011. Regarding energy consumption the management has approved a new project -to be implemented within 2018- in order to monitor and improve the energy consumption throughout all production processes.