STEAM AUDIT – Greece, nr. 10
FACTSHEET

Greece

Production of Expanded Polystyrene Products

Total (estimated) Investment

~€ 110.400

Total (Estimated) Savings

0,527 GWh/yr

Companies connection to energy efficiency

The enterprise has been granted the following certifications:

- Quality Management System certificate ELOT EN (ISO 9001:2008)

Steam system

The enterprise was founded in 1982. Its main activity is the production of Expanded Polystyrene Products (EPS) and Extruded Polystyrene Products (XPS) for Insulation. Its production plant is located near the industrial zone of Thessaloniki in the Prefecture of Central Macedonia. EPS is the common term that is used for Expanded Polystyrene. The raw material is produced by the polymerization of styrene and the addition of pentane (5%). EPS producers use steam to expand EPS. In this expansion process pentane acts as the expanding gas. The expanded raw material has 50 times bigger volume than before and has the form of beads. The products of Expanded Polystyrene (EPS) can be used in Insulation, Construction, Decoration and Packaging. Their structure is just EPS foam, which consists of closed cells containing air. The volume of the final product is 98% air and this is the reason why EPS has excellent thermal insulation properties. It does not contain CFCs or HCFCs. The enterprise' production plant operates throughout the year, 8 hours a day, 5 days a week.

Steam boiler information

Boiler's Size:
Steam Boiler: 3,915 MWth,
Nominal steam capacity: 6.000 kg/h @ 7,5 bar,
Boiler's operation: Steam Boiler: 2000 hours/year
Kind of fuel: Natural Gas

Steam system problems identified

- ✓ The majority of the steam pipes checked are insulated but some areas of the pipe network are un-insulated.
- ✓ Thermography results show that a lot of the hot surfaces (steam boilers, , hydraulic valves, flanges, economizers etc.) are un-insulated
- ✓ Energy losses caused by the increased flue gas temperatures can be reduced by installing a ceramic economizer that uses flue gases in a heat exchanger to preheat the make-up water (for the enterprise' plant the waste heat recovery can be used to heat up the steam boiler feedwater).
- ✓ There are significant heat losses to the unburnt excess air (as shown by the 7,7% oxygen measured in the flue gas of the steam boiler.
- ✓ The waste heat contained in the steam condensate that ends up in the cement tank (50 0C) can be used to preheat the boiler feedwater

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

- ✓ Insulate un-insulated steam distribution lines: Energy savings in fuel consumption: 20.360 kWh/years => Simple payback < 6 months,
- ✓ Insulate un-insulated hot surfaces (steam boiler, hydraulic valves, flanges etc.): Energy savings in fuel consumption: 41.320 kWh /year => Simple payback < 2 years.
- ✓ Installation of a flue-gas economizer for waste heat recovery : Energy savings in fuel consumption: 400.337 kWh/year => Simple payback ~4,2 years.
- ✓ Waste heat recovery of steam condensate: Energy savings in fuel consumption: ~65.000 kWh/year => Simple payback = 5-10 years
- ✓ Install a 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:

- ✓ Reduction in maintenance needs.
- ✓ Good Quality of steam
- ✓ Less CO_2 or other GHG emissions
- ✓ Reduced water consumption
- ✓ Reduction in maintenance needs.