

390,000 manufacturing enterprises in Italy

10% share of oil energy consumption in manufacturing

The top three oil-consuming industrial sectors consume 46% of the final industrial energy consumption

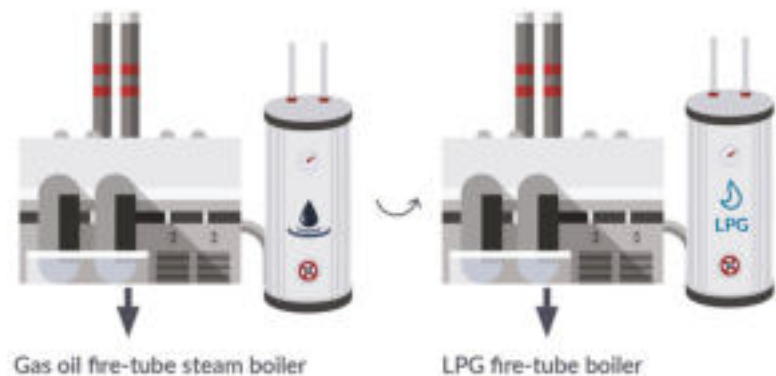
Italy represents 26% of EU-27's steam boiler production

ITALY

Case study: industrial heating
#BeyondTheGasGrid

Manufacturing accounts for 16% of Italy's economy, and oil represents 10% of energy consumption in the industrial sector. The sectors that consume the most oil are non-metallic minerals, machinery, and the chemical & petrochemical sector.

This analysis considers the monetary and health impact of a machinery manufacturer switching from a fire-tube steam boiler that is fuelled by oil to a fire-tube boiler fuelled by LPG.



LPG annual CO2 savings: 15%

BioLPG annual CO2 savings: 78%

76% NOx emissions savings

96% Lifetime PM emissions savings

€374,880 Annual energy bill savings

Capital cost payback = < 2 years

From 2030 onwards, it is assumed that the industrial boiler is fuelled by bioLPG.

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Alternative technology options available:

The table below compares how alternative technology options compare to an existing fire-tube boiler that is fueled by oil. These range from a fire-tube boiler fuelled by LPG, a water-tube boiler fuelled by coal and a biomass-fuelled CHP system.

 performs worse than existing oil-fired fire tube boiler

 performs better than existing oil-fired fire tube boiler

| Technology Options | Upfront cost* | Running cost | Lifetime CO ₂ reduction | Lifetime air pollution reduction |
|---|---|---|--|--|
| Fire-tube boiler: (LPG fuelled) | Same | Lower than oil-fuelled system, assuming efficiency improvements are achieved | Lower than existing oil-fired system (15% if LPG used, up to 80% if bioLPG used) | Substantially lower than existing oil-fired system (more than 70%) |
| Water-tube boiler: Coal-fuelled | 1-2 times more expensive than an oil-fuelled system | Substantially lower than oil-fuelled system. Price of industrial coal is very cheap | Considerably higher than oil-fired system. Coal has a relatively higher carbon intensity (up to 50%) | Lower NOx emissions (up to 40%) but higher PM emissions (up to 300%) |
| Back-pressure CHP: (fuelled by wood pellets) | 3-4 times more expensive than oil-fuelled system | Substantially lower than oil-fuelled system. Price of pellets/logs is low | Substantially lower than current oil-fired system (more than 90%) | Lower NOx emissions (up to 30%) but higher PM emissions (up to 100%) |

*Upfront cost differences are case-specific; in this case the upfront cost for a heating system is modelled for an energy demand of ~25,000MWh/annual.

Sources: PwC, European Commission, Fraunhofer, US Department of Energy, Covenant of Mayors, European Commission Oil Bulletin and Argus Media



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