

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

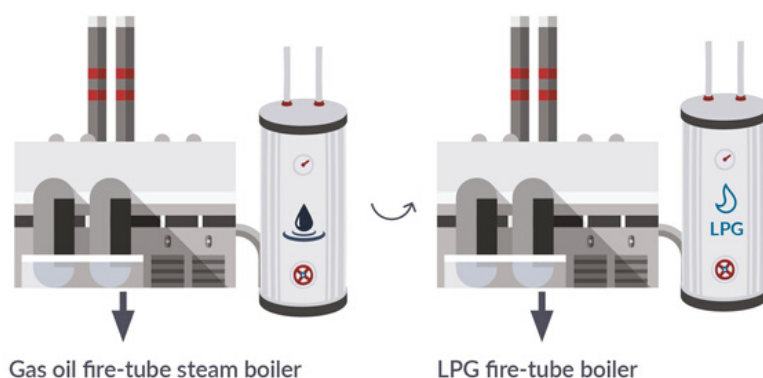
Italy represents 26% of EU-27's steam boiler production

# 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

Liquid Gas  
Europe



@LiquidGasEurope  
info@liquidgaseurope.eu  
[www.liquidgaseurope.eu](http://www.liquidgaseurope.eu)


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 fuelled 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 <sub>2</sub> reduction	Lifetime air pollution reduction
<b>Fire-tube boiler:</b> (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%)
<b>Water-tube boiler:</b> 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%)
<b>Back-pressure CHP:</b> (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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Europe



@LiquidGasEurope  
info@liquidgaseurope.eu  
[www.liquidgaseurope.eu](http://www.liquidgaseurope.eu)