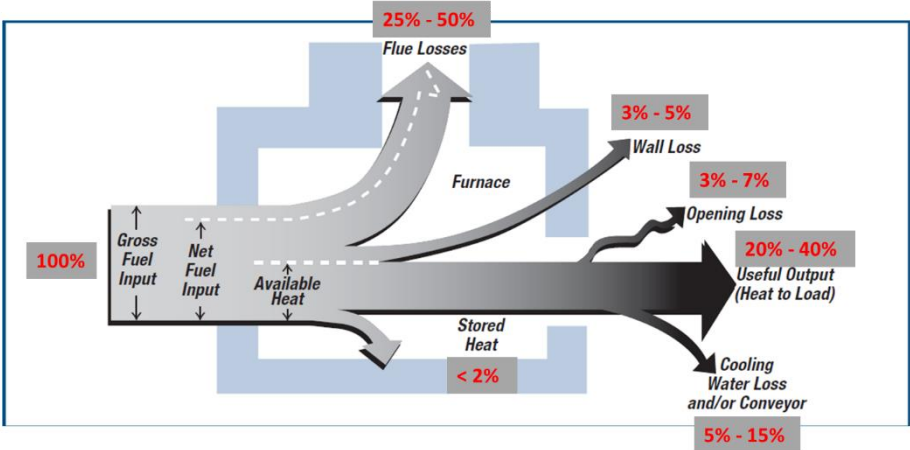| Best Practice	OPTIMIZATION OF THE PRODUCTION SYSTEM AND DISTRIBUTION OF PROCESS HEAT	INDH-01
Application	Process heating, industrial furnaces	
SME sector	Industrial	
SME Sub-sector	Petrochemical, steel, food, glass and cement, paper	
Technical description	A great part of the thermal energy coming from fuels is lost during industrial processes, and this is particularly evident in the case of an industrial furnace (see the figure)	

Recommendation for optimisation	The most common actions with the greatest potential for energy reduction are:
	
	• Heat generation optimisation
	  - Air/fuel ratio control
	  - Use oxygen-enriched combustion air
	
	• Improve heat transfer
	  - Advanced burners and controls
	  - Clean surfaces and furnace walls
	
	• Heat containment
	  - Reduced wall heat losses
	  - Furnace pressure control
	
	• Production optimisation
	  - Use of part load compatible equipment
	  - Reduced low-capacity operation
	  - Adapted furnace temperature
	
	• Heat recovery
	  - Preheat combustion air, this is a major potential, which uses the exhaust heat from combustion gas to preheat new combustion air
	  - Fluid or load pre-heating
	  - Absorption cooling
	  - Electricity generation through Organic Rankine Cycle	

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Schemes and diagram	 Heat losses in an industrial furnace
Economics	Pre-air heaters: from about 1,400 EUR Insulation 15 EUR/m
Energy savings	5-30%
Economic savings	Pre-air heater: 3%
Average Payback Time	From 3 up to 10 years
Emissions	Particulate Matter = 10 mg/Nm^3 NOx=350mg/Nm^3 Data referring to each Nm^3 of exhaust gasses
Environmental benefits	Reduction of CO_2, NOx, and PM emissions
Main NEBs (Multiple benefits)	☐ Environmental benefits ☒ Increased productivity ☒ Work environment/ Health/Safety ☒ Increased competitiveness ☐ Maintenance
	Multiple Benefits Example: *Surface Treatment Industry*

	https://www.mbenefits.eu/static/media/uploads/site-6/library/Cases%20and%20examples/metal-surface-treatment-example-multiple-benefits-11dec2018v2.pdf
Replicability	High This measure is usually a low-risk, high-yield opportunity. Low hanging fruit
Related measures	• **INDH-02:** Follow up of temperature control, timers
Case study	Heat recovery system for energy efficiency, company: "Forgital"(Italy, 2011) • **Initial Situation:** Forgital Spa is an important company operating ades in the steel industry in Velo d'Astico in the province of Vicenza. In the Forge section, 6 heating furnaces discharge the hot gases directly into the atmosphere without recovering the residual energy. • **Description of the optimisation:** Gilberti Srl has installed 2 thermal energy recovery systems. The inclusion of a Pratt & Whitney 250 kW electric cogeneration group is in an advanced design phase. • **Implementation costs:** 520,000 EUR • **Payback Time:** 3 years
References	Kulterer, K., Mair, O., Horvath, C.: Leitfaden für Energieaudits in Kältesystemen, klimaaktiv energieeffiziente betriebe, Vienna 2017

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