



# Investigating green steel making and its impact on specialty lubricants

Lubricants and Bearing Expo - Düsseldorf

Özgür Ergün

Head of Steel Business and Value Selling Leader

**KLÜBER**  
LUBRICATION

a brand of  FREUDENBERG





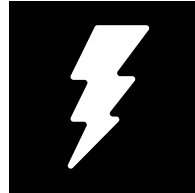
## Accelerate the world's transition to Green Steel by reducing carbon footprint and using energy efficient lubricants

DRI direct reduction of iron, EAF Electrical Arc Furnace, Electrolysis for hydrogen, Wind turbine and Solar for green energy and Energy Efficient oils.

# Steel plants' challenges



Steel plants responsible for **8% of global CO<sub>2</sub> emissions**



**Excessive electricity consumption**



**Electricity consumption will increase** as result of CO<sub>2</sub> reduction efforts



**Rising energy and electricity costs**



Pressure to **improve energy efficiency** (e.g. regulations, ISO 50001)

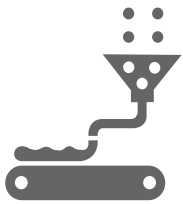


# Cold rolling mill case study results

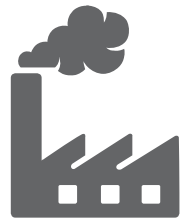
Energy consumption decrease 4,1%



**4 000 000 kWh**  
per year



**2 kWh/ton**  
decrease



**400 Tons CO<sub>2</sub>**  
per year  
(Scope 2)



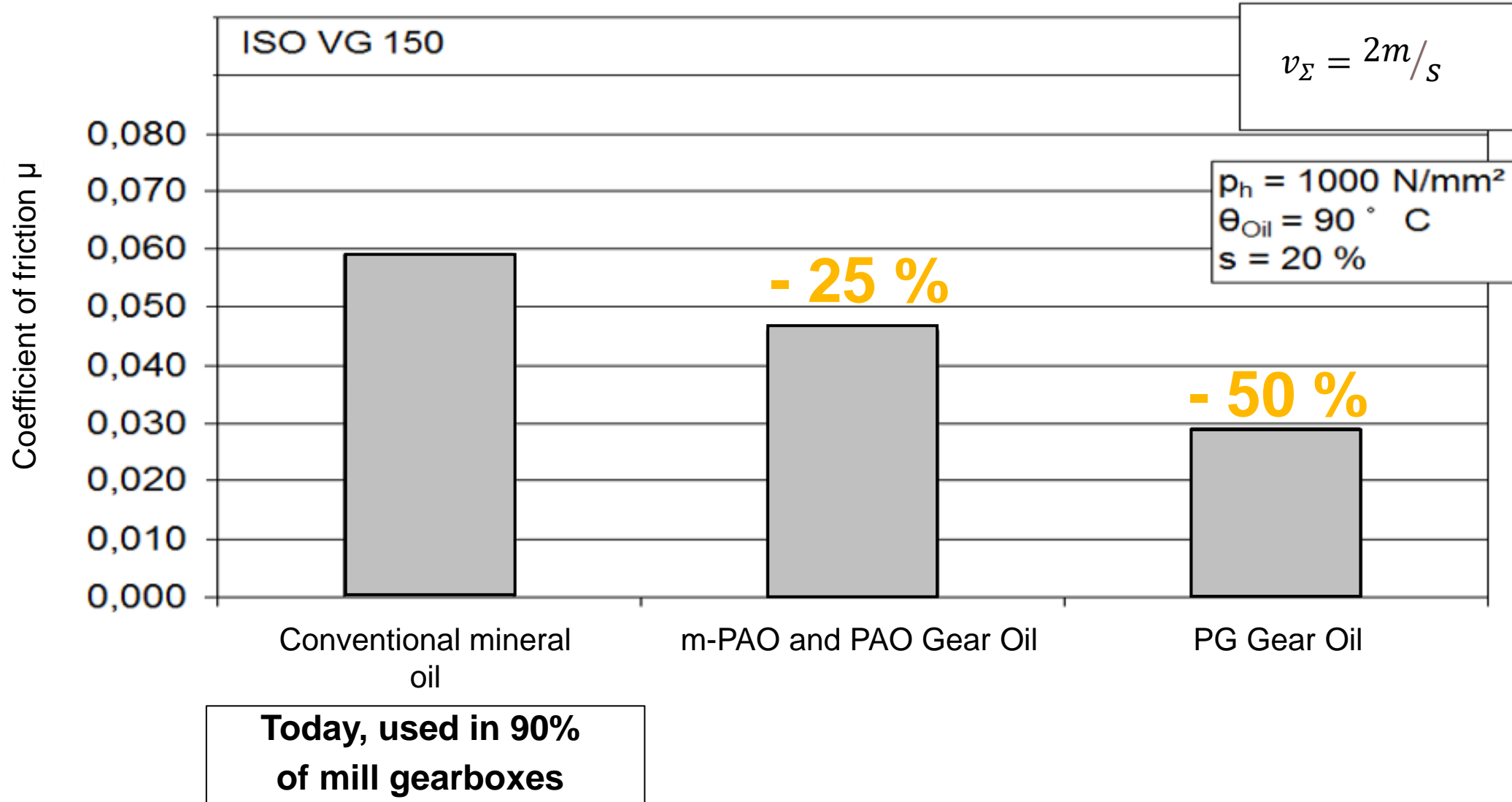
**400 000 Euro**  
per year



**Arcelor Mittal Brazil**

# Why energy efficient lubricants can help to save electricity

Coefficient of friction of Klüber energy efficient gear oils



# What is in for a single mill?

Reduce electricity cost by  
€192k-960K+. Per mill! Every year!



Pay back time  
usually < 1 year

		Power rating of gearbox, MW				
		20	30	40	50	60
Electricity Savings	3%	192 000 €	288 000 €	384 000 €	480 000 €	576 000 €
	4%	256 000 €	384 000 €	512 000 €	640 000 €	768 000 €
	5%	320 000 €	480 000 €	640 000 €	800 000 €	960 000 €
		20 000	30 000	40 000	50 000	60 000
		Oil volume, liters				

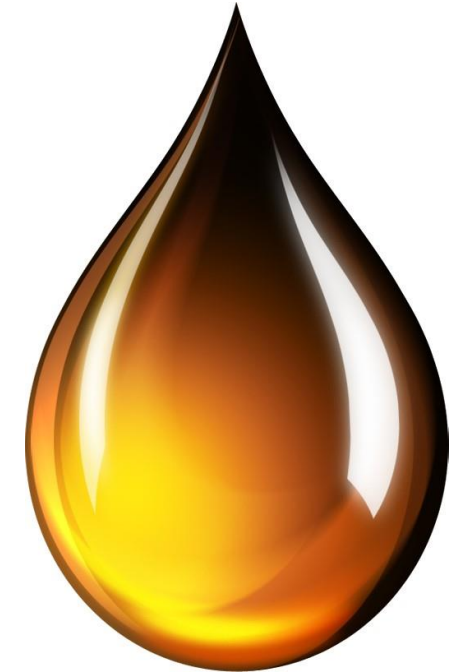
Electricity cost  
savings per year.

# Rolling mill cost benefits analysis

60 MW power rating; gearboxes oil volume 60 000 liter

**15% Oil leakage  
(9 000 liters/year)**

	Payback time	Electrical energy savings per year	Scope 2 CO2 emission savings	Cost Savings per year
No leakage	8 months	5 760 000 kWh	2 770 ton	576 000 Euro
15% oil leakage				522 000 Euro



# The most effective way to save energy in Heavy industry

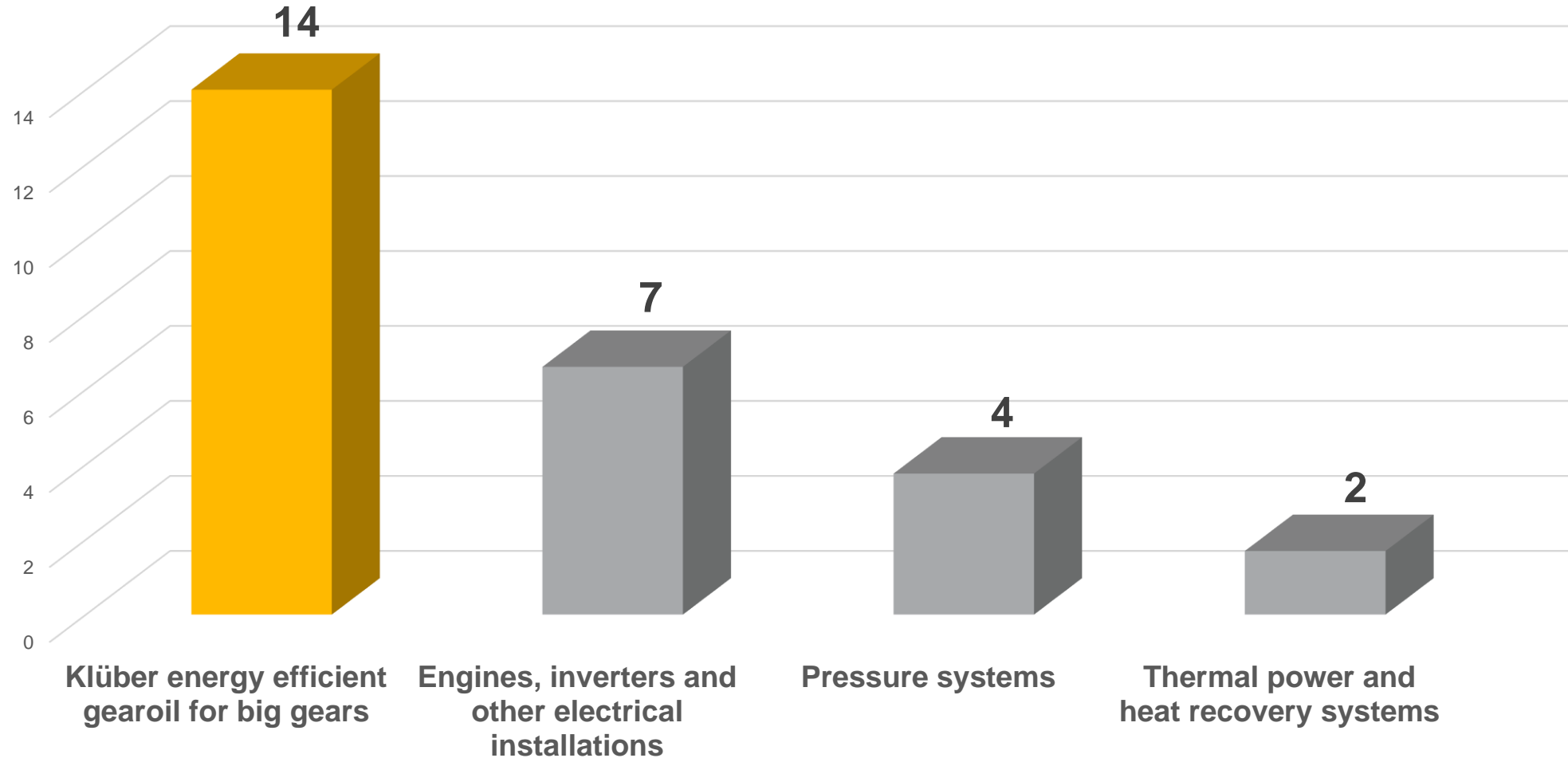
Optimization measure	Average Investment, Euro/project	Average annual savings, MWh/year
Air compression systems	77 335	291
Engines, inverters and other electrical installations	463 052	3 059
Thermal power and heat recovery systems	8 635 000	14 631
<b>Klüber energy efficient gearoil for Rolling mills</b>	<b>320 000</b>	<b>4 480</b>

Source: Department of Industrial Engineering (DIEF), University of Florence; 2 DUEE-SPS-ESE Laboratory, Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA)  
**Technological Energy Efficiency Improvements in Cement Industries** <https://www.mdpi.com/2071-1050/13/7/3810>



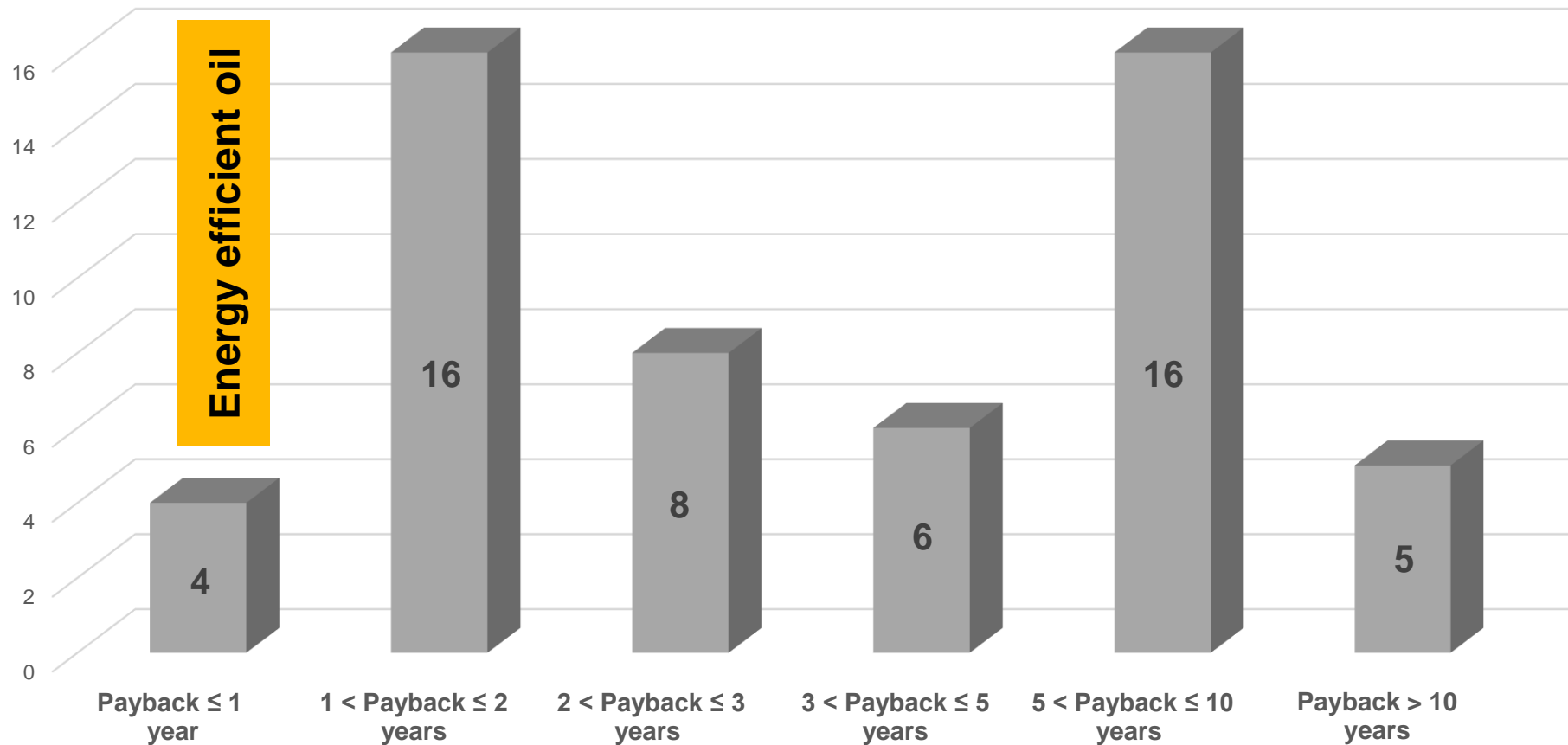
# One of the most cost effective ways to save energy in Heavy industry

Cost-effectiveness indicator, kWh/Euro



# Shortage of quick payback energy saving projects in Heavy industry

## N° energy optimization projects (55 in total)



Source: Department of Industrial Engineering (DIEF), University of Florence; 2 DUEE-SPS-ESE Laboratory, Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA)  
**Technological Energy Efficiency Improvements in Cement Industries** <https://www.mdpi.com/2071-1050/13/7/3810>

# Big gearboxes references

Others claim we prove

[Click here](#) or scan QR Code to view case study on ball mill



Industry	Location	Machine	Motor power, kW	Gear oil volume, liters	Electricity savings, [%]
Steel	Brazil	Cold rolling mill	4 x 6 500	30 000	4,15 %
Mining	Brazil	Roller Press	2 000	1 000	9,1%
Chemistry	Brazil	Banbury mixer	3 000	1 400	2,5 %
Cement	UK	Ball mill	5 000	4 800	3,10 %
Wind	Brazil	Wind turbine	2 000	340	2,5 %



# Unique support from Klüber Lubrication



**Inhouse energy Experts**  
running the EE projects



**> 500 successful cases**  
experience in various industries



**Energy Performance Contract**



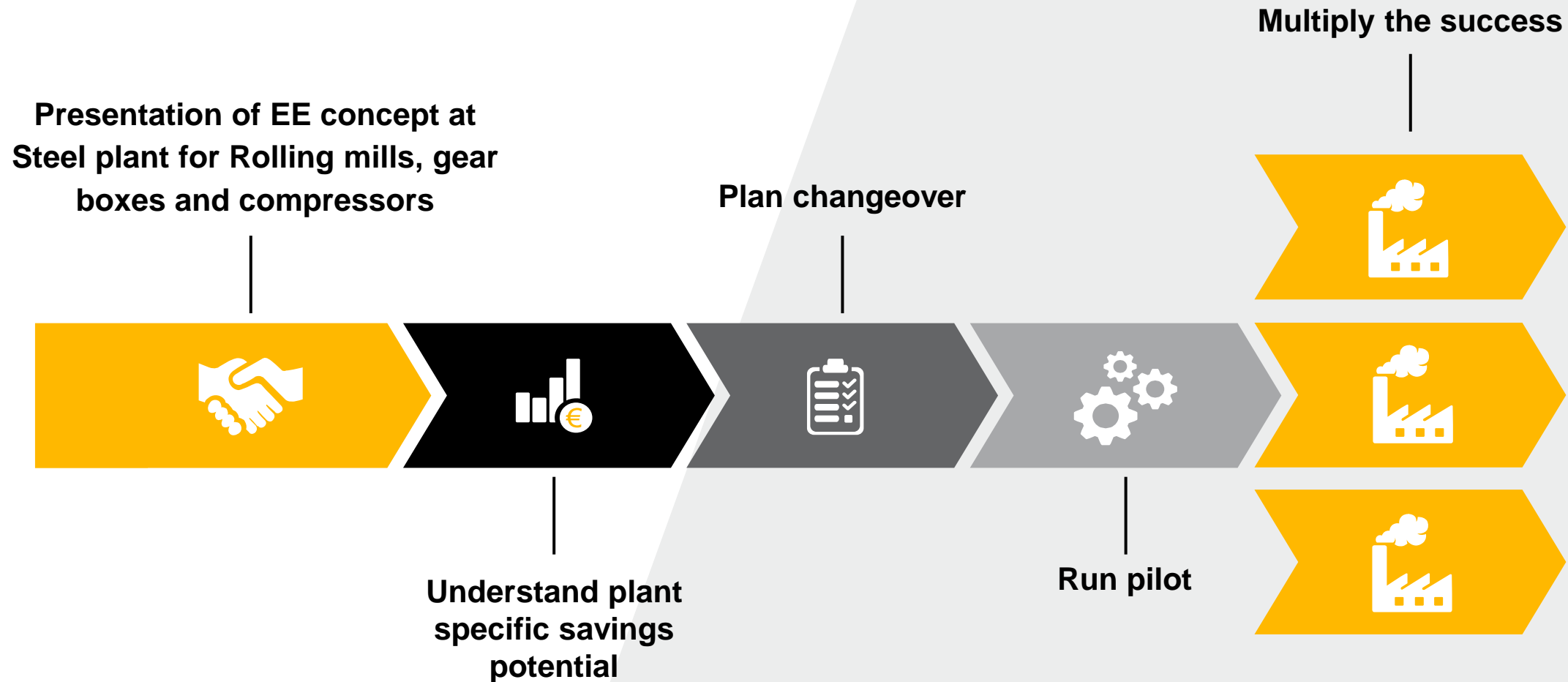
**Certified  
analysis methodology**



**The most energy efficient oils**



# Getting started to exploit electricity savings



# Partners who trust us.

**End-users.** We supply 800 steel customers in the world.



**OEMs.** All of the leading OEMs approve our lubricants or use them.



**Awards.** Our innovativeness and sustainability efforts get recognized.



*Innovation Award 2018  
Energy Efficient Lubricants*



*Innovation Award 2017 + 2018  
Energy Efficient Lubricants*



*Our sustainability efforts rank  
among the top 5% companies*



# What does this mean for the steel industry?

Steel industry has opportunity to save €300 mil with energy efficient lubricants on rolling mill gears and more than **€1bn** for all gears



€ 18 mil



ArcelorMittal

€ 12 mil

**TATA STEEL**

€ 5 mil



€ 1,5 mil

**NUCOR**

€ 4 mil

**NIPPON STEEL**

€ 8 mil



**GERDAU**

€ 2,5 mil



thyssenkrupp

€ 2 mil



€ 2,5 mil

**HYUNDAI STEEL**

€ 3 mil



€ 2,5 mil

**SSAB**

€ 1,5 mil

**JSW Steel**

€ 3 mil

*Are you also interested in saving more than 100.000€ per year in your company?*

Source: Klüber Lubrication Energy Efficiency Study for the Cement Industry (2021)

Key assumptions: Average electricity cost = 0.1 EUR/kWh. Energy savings from Klüber Lubrication energy efficient lubricants = 3%. Machinery in scope = gearboxes of rolling mills.

## Özgür Ergün

Head of Global Steel Industry and Value Selling Leader

Klüber Lubrication München GmbH & Co. KG

Munich, Germany

E-mail: [oezguer.erguen@klueber.com](mailto:oezguer.erguen@klueber.com)

Mobile: +49 172 9752254

## Rodion Rodionov

Market Development Manager – Heavy Industry

Klüber Lubrication München GmbH & Co. KG

Munich, Germany

E-mail: [rodion.rodionov@klueber.com](mailto:rodion.rodionov@klueber.com)

Mobile: +49 173 5326172

//  
**KLÜBER**  
LUBRICATION

a brand of  FREUDENBERG

# Energy Efficiency with Klüber

## Lubrication

