



PART E  
**SECTORAL  
OUTLOOK**

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# GUIDELINES FOR INDUSTRIAL SYMBIOSIS IMPLEMENTATION



## PART E - SECTORAL OUTLOOK

This document compiles information regarding the final assessment of the 100 most promising synergy types at EU level. The outcomes are divided into two information sections:

### Mapping activities

This section provides an overview of the SCALER industrial sectors involved in the study, a visual identification of the sites distribution across Europe and a global vision and characterisation of the potential synergic activities hotspots.

### Sectoral synergies potential

This section identifies and characterises the most promising synergies from the initial 100 inter-sectoral synergy types, considering their technical, environmental and socio-economic impacts. A final expected impact potential analysis for the full synergy types implementation and actual unexploited potential in the EU context is also presented.

This document references the report "Quantified potential of industrial symbiosis in Europe, available for download at [www.scalerproject.eu/resources/reports](http://www.scalerproject.eu/resources/reports)

- A - Introduction to industrial symbiosis (video)
- B - Intervening factors
- C - Overview of strategies for IS projects implementation
- D - Operational guidelines
- E - Sectoral outlook
- F - Strategic recommendations

This document is part of a series of guidelines that aim to assist industry players in their implementation of industrial symbiosis.

The full series is available for download at:

[www.scalerproject.eu](http://www.scalerproject.eu)

# SCALER MAPPING ACTIVITIES

The mapping activities presented below were created to identify and geolocate large process industry installations that could be involved with the SCALER 100 most promising synergies, for full implementation across Europe.



Industrial facilities included



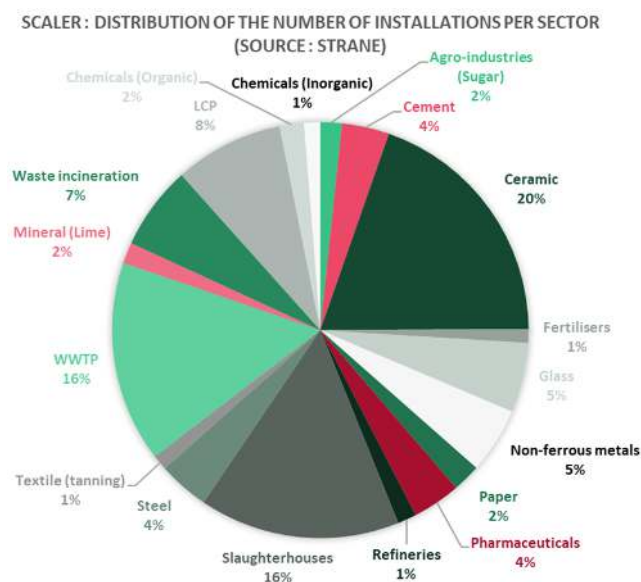
Sectors analysed



Activity segmentations

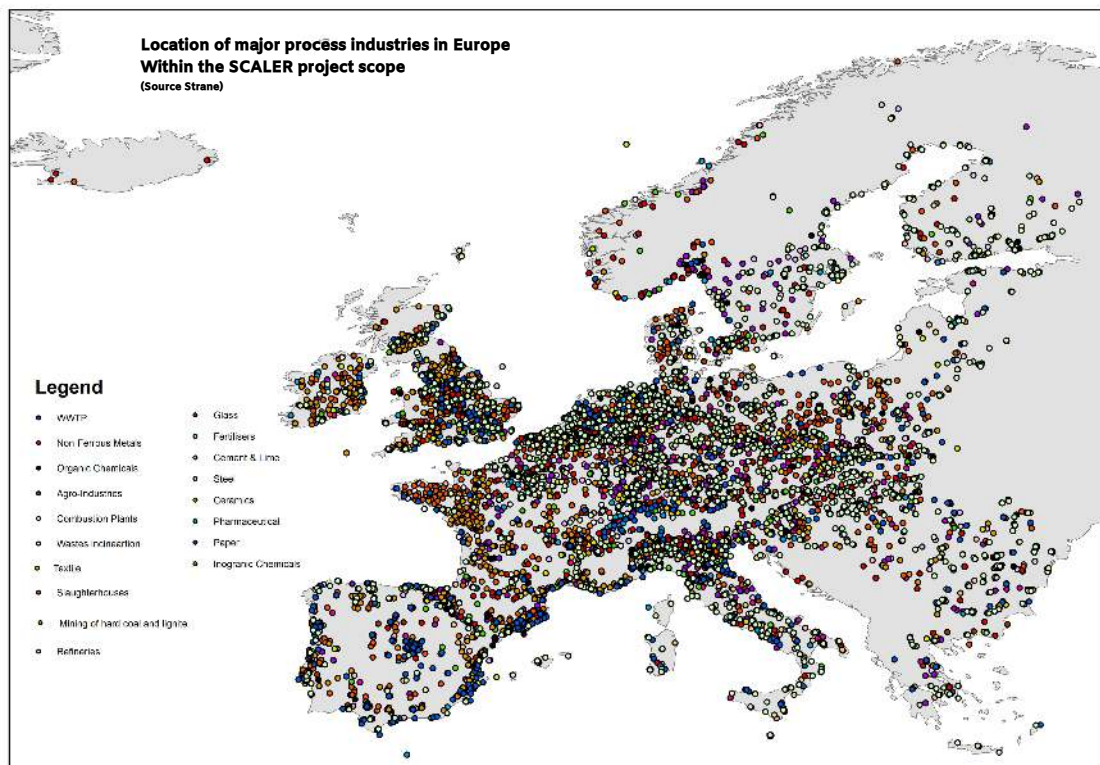
## SECTORS INVOLVED

Sectors	Number of installations	Share
Agro-industries	111	1,67%
Fertilisers	72	1,08%
Cement & Lime	353	5,30%
Ceramic	1302	19,56%
LCP	563	8,46%
Glass	360	5,41%
Inorganic chemicals	84	1,26%
Non-ferrous metals	341	5,12%
Organic chemicals	126	1,89%
Paper	145	2,18%
Pharmaceuticals	249	3,74%
Refineries	97	1,46%
Slaughterhouses	1038	15,59%
Steel	263	3,95%
Textiles	79	1,19%
Waste incineration	434	6,52%
WWTP	1041	15,64%
Total	6658	100%

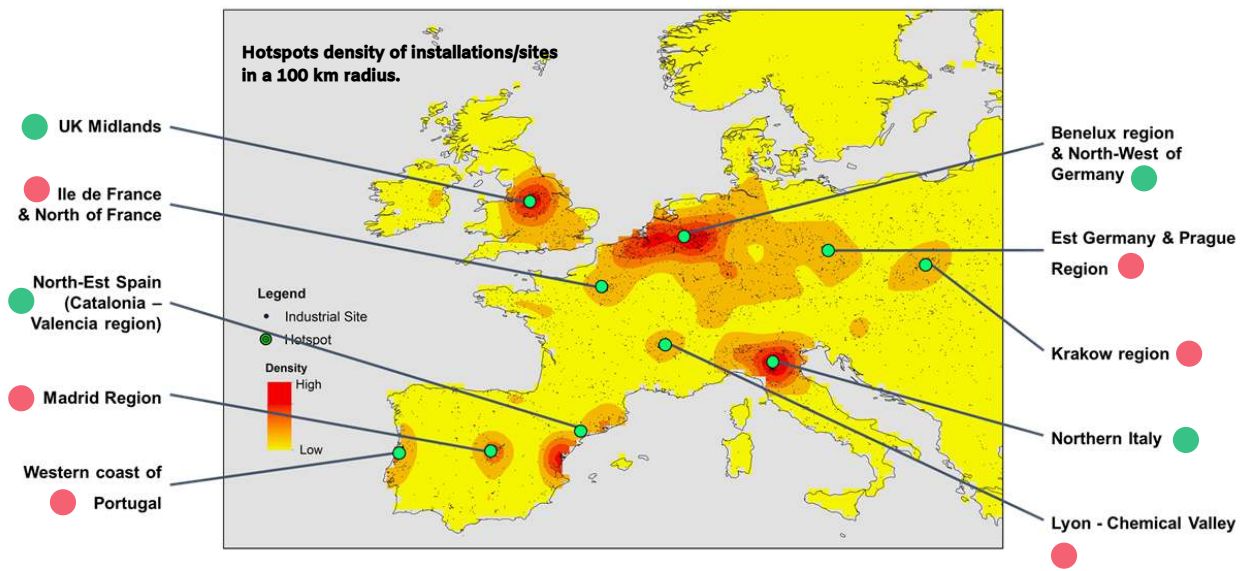


More information available at [www.scalerproject.eu/resources/reports](http://www.scalerproject.eu/resources/reports)

## SCALER INDUSTRIES DISTRIBUTION MAP



## SCALER HOTSPOTS MAP



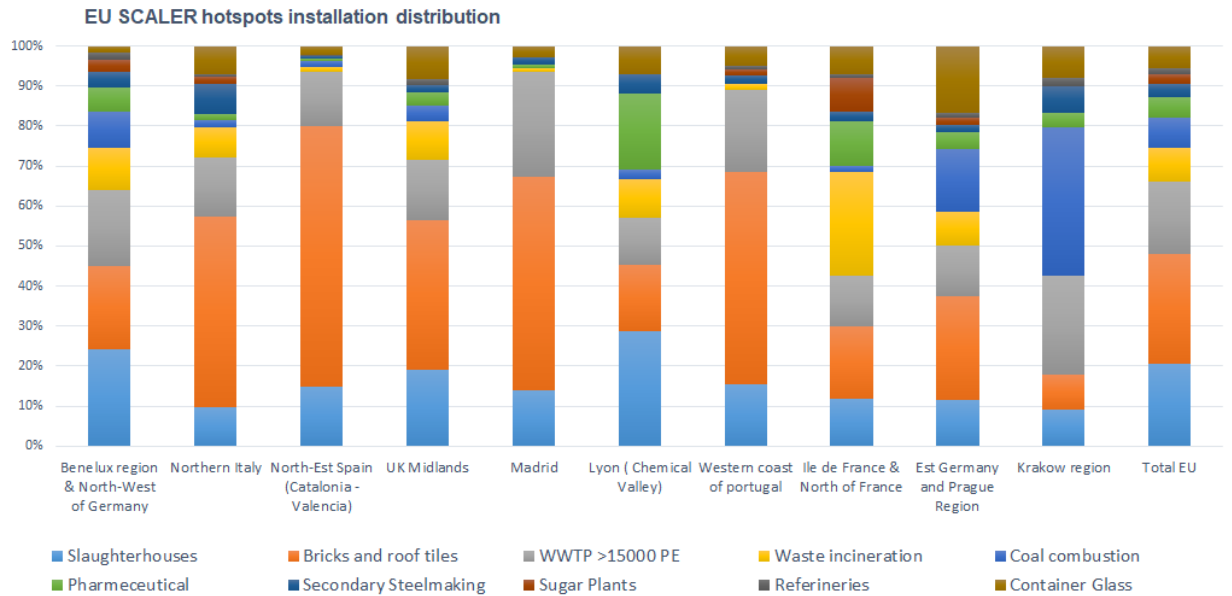
4

Major hotspots  
(between 105 - 120 sites)

6

Medium hotspots  
(between 45-60 sites)

## HOTSPOT INSTALLATION DISTRIBUTION



## OTHER MAPS AVAILABLE

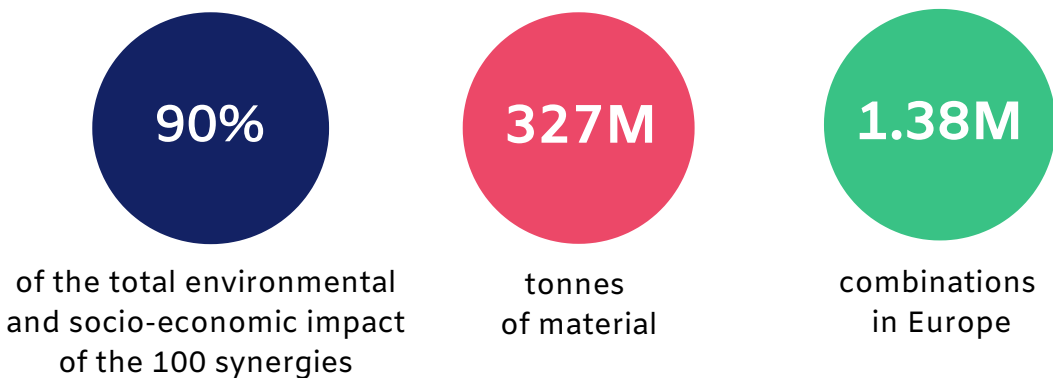
- General maps - all industrial activities
- Waste Water Treatment Plants (WWTP)
- Livestock farming
- Mining and quarrying operations
- Industrial installations locations/Cities/Functional Urban Areas (FAU)
- District heating assesment

Other SCALER maps presented refer to the report "Quantified potential of industrial symbiosis in Europe" available at [www.scalerproject.eu/resources/reports](http://www.scalerproject.eu/resources/reports)

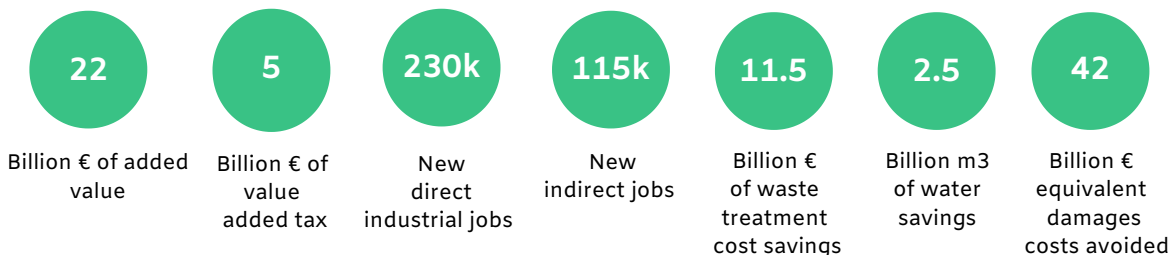
# SECTORIAL SYNERGY POTENTIAL

For the 100 synergies analysed within the SCALER project, the 38 most impactful synergy types were prioritised considering their technical feasibility, their environmental impacts and their socio-economic impacts.

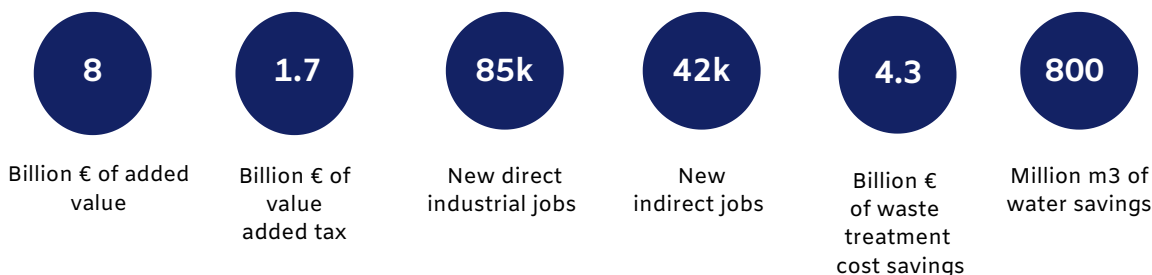
**These 38 synergies were found to be profitable and would generate socio-economic benefits corresponding to:**



**Potential impact if 100% of the 38 synergy types analysed were implemented in the EU**



**Actual unexploited potential impacts at EU level from the 38 synergy types analysed**



# SCALER 38 most impactful synergies

- Synergy types with very high or significant environmental and socio-economic impact
- Synergy types with very high or significant environmental impact
- Synergy types with very high or significant socio-economic impact

AVAILABLE RESOURCE	SENDER SECTOR (S)/ PROCESS (P)	ELEMENT OF INTEREST	RECEIVER SECTOR (S) / PROCESS (P)
BASIC OXYGEN FURNACE SLAG	S : STEEL P : BASIC OXYGEN STEELMAKING AND CASTING MANUFACTURING	SILICIUM; ALUMINIUM; CALCIUM;IRON	S : CEMENT P : RAW MATERIALS PREPARATION
SULPHURIC ACID	S : NON FERROUS METALS INDUSTRIES P : LEAD AND TIN PRODUCTION	SULPHURIC ACID	S : INORGANIC CHEMICALS P : SULPHATE PROCESS
PROCESS GASES	S : ORGANIC CHEMICALS P : STEAM CRACKING	HYDROGEN	S : REFINING MINERAL OIL AND GAS P : HYDRODESULPHURISATION PROCESS
REFRACTORY PRODUCTS	S : STEEL P : ELECTRIC ARC FURNACE STEELMAKING AND CASTING MANUFACTURING	REFRACTORY PRODUCTS	S : GLASS P : CONTAINER GLASS MANUFACTURING WITHOUT ABATEMENT SYSTEM
SLAG	S : COMBUSTION PLANT P : COAL COMBUSTION	SLAG	S : GLASS P : STONE AND SLAG WOOL MANUFACTURING
SLAG	S : STEEL P : BLAST FURNACES MANUFACTURING	SILICIUM; ALUMINIUM; CALCIUM	S : CEMENT P : RAW MATERIALS PREPARATION
SALT SLAG	S : NON FERROUS METALS INDUSTRIES P : SALT SLAG	ALUMINIUM OXIDES	S : CEMENT P : RAW MATERIALS PREPARATION
EAF SLAG	S : STEEL P : ELECTRIC ARC FURNACE STEELMAKING AND CASTING MANUFACTURING	SILICIUM; ALUMINIUM CALCIUM	S : CEMENT P : GRINDING CEMENT MILL
COKE OVEN GAS	S : STEEL P : COKE OVEN PLANTS	COKE OVEN GAS	S : COMBUSTION PLANT P : IRON AND STEEL PROCESS GASES COMBUSTION
BLAST FURNACE AND CONVERTER SLAG	S : STEEL P : BLAST FURNACES MANUFACTURING	BLAST FURNACE SLAG	S : CERAMIC P : BRICKS_AND_ROOF_TILES_MANUFACTURING
FLY ASH	S : COMBUSTION PLANT P : COAL_COMBUSTION	SILICIUM; ALUMINIUM CALCIUM	S : CERAMIC P : BRICKS_AND_ROOF_TILES_MANUFACTURING
WOOD WASTE	S : PRODUCTION_OF_PULP_PAPER_AND_BOARD P : THE SULPHITE PULPING PROCESS	WOOD WASTE; BARK SAWDUST	S : COMBUSTION_PLant P : INTEGRATED GASIFICATION COMBINED CYCLE
CARCASE	S:SLAUGHTERHOUSES_AND_ANIMAL_BY_PROD UCTS_INDUSTRIES P : POULTRY SLAUGHTER PROCESS	CARCASE	S : CEMENT P : BURNING
WOOD WASTE	S : PRODUCTION_OF_PULP_PAPER_AND_BOARD P : THE SULPHITE PULPING PROCESS	WOOD	S : LIME P : LIME MANUFACTURING LONG ROTARY KILN
COOLING WATER	S : PRODUCTION_OF_PULP_PAPER_AND_BOARD P:MECHANICAL_PULPING_AND_CHEMMECHANICAL_PULPING	COOLING WATER	S : REFINING MINERAL_OIL_AND_GAS P : ALL_PROCESSES
HEAT	S : DIFFERENT: SEE ANNEXED TABLES (D 3.1) P : DIFFERENT: SEE ANNEXED TABLES (D 3.1)	HEAT	S : DIFFERENT: SEE ANNEXED TABLES (D 3.1) P : DIFFERENT: SEE ANNEXED TABLES (D 3.1)
GYPSUM	S : COMBUSTION PLANT P : COAL COMBUSTION	GYPSUM	S : CEMENT P : GRINDING CEMENT MILL
OFF_GAS	S : ORGANIC CHEMICALS P : STYRENE MANUFACTURING BY DEHYDROGENATION	HYDROGEN	S : REFINING MINERAL OIL AND GAS P : ISOMERISATION PROCESS
RED MUD	S : NON FERROUS METALS INDUSTRIES P : ALUMINA PRODUCTION	IRON	S : CEMENT P : RAW MATERIALS PREPARATION
STEAM	S : DIFFERENT: SEE ANNEXED TABLES (D 3.1) P : DIFFERENT: SEE ANNEXED TABLES (D 3.1)	STEAM	S : DIFFERENT: SEE ANNEXED TABLES (D 3.1) P : DIFFERENT: SEE ANNEXED TABLES (D 3.1)
BLAST FURNACE GAS	S : STEEL P : BLAST FURNACES MANUFACTURING	BLAST FURNACE GAS	S : COMBUSTION PLANT P : IRON AND STEEL PROCESS GASES COMBUSTION
BASIC OXYGEN FURNACE GAS	S : STEEL P : BASIC OXYGEN STEELMAKING AND CASTING MANUFACTURING	BASIC OXYGEN FURNACE GAS	S : COMBUSTION PLANT P : IRON AND STEEL PROCESS GASES COMBUSTION
SOLID WASTE FUEL FEEDSTOCK	S : DIFFERENT: SEE ANNEXED TABLES (D 3.1) P : DIFFERENT: SEE ANNEXED TABLES (D 3.1)	VARIOUS WASTE - SEE ANNEXED TABLES (D 3.1)	S : WASTE TREATMENTS INDUSTRIES P : WASTE TREATMENT AIMED PRODUCE MATERIAL USED AS FUEL
LIMESTONE FINES	S : INORGANIC CHEMICALS P : SOLVAY PROCESS	LIMESTONE FINES	S : CEMENT P : RAW MATERIALS PREPARATION
COOLING WATER	S : REFINING MINERAL OIL AND GAS P : ALL PROCESSES	COOLING WATER	S : COMBUSTION_PLant P : COAL COMBUSTION
EMISSIONS	S : STEEL P : ELECTRIC ARC FURNACE STEELMAKING AND CASTING MANUFACTURING	Zn	S : NON FERROUS METALS INDUSTRIES P : ZINC PRODUCTION
FLY ASH	S : COMBUSTION PLANT P:INTEGRATED_GASIFICATION_COMBINED_CYCLE	SILICIUM; ALUMINIUM CALCIUM	S : GLASS P:CONTAINER_GLASS_MANUFACTURING_WITH_ABATEMENT_SYSTEM
CRUDE ATMOSPHERIC DISTILLATION WASTE WATER	S : REFINING MINERAL OIL AND GAS P : CRUDE ATMOSPHERIC DISTILLATION	OIL	S : STEEL P : BLAST FURNACES MANUFACTURING
OIL	S : WASTE TREATMENTS INDUSTRIES P : WASTE TREATMENT AIMED PRODUCE MATERIAL USED AS FUEL	OIL	S : DIFFERENT: SEE ANNEXED TABLES (D 3.1) P : DIFFERENT: SEE ANNEXED TABLES (D 3.1)
COKE OVEN GAS	S : STEEL P : COKE OVEN PLANTS	HYDROGEN	S : REFINING MINERAL OIL AND GAS P : HYDROCRACKING PROCESS
COKE OVEN GAS	S : STEEL P : COKE OVEN PLANTS	METHANOL	S : REFINING MINERAL_OIL_AND_GAS P : ISOMERISATION_PROCESS
COKE RESIDUES	S : ORGANIC CHEMICALS P : STEAM CRACKING	COKE	S : STEEL P : SINTER PLANTS MANUFACTURING
OFF-GAS	S : NON FERROUS METALS INDUSTRIES P : PRIMARY COPPER SMELTING PYROMETALLURGICAL ROUTE	SULPHURIC ACID	S : INORGANIC CHEMICALS P : SULPHATE PROCESS
BITUMEN	S : WASTE TREATMENTS INDUSTRIES P : WASTE TREATMENT AIMED PRODUCE MATERIAL USED AS FUEL	BITUMEN	S : DIFFERENT: SEE ANNEXED TABLES (D 3.1) P : DIFFERENT: SEE ANNEXED TABLES (D 3.1)
SALT	S : NON FERROUS METALS INDUSTRIES P : SALT SLAG	SALT	S : INORGANIC CHEMICALS P : SODIUM CHLORATE PRODUCTION
GAS OIL	S : WASTE TREATMENTS INDUSTRIES P : WASTE TREATMENT AIMED PRODUCE MATERIAL USED AS FUEL	GAS OIL	S : DIFFERENT: SEE ANNEXED TABLES (D 3.1) P : DIFFERENT: SEE ANNEXED TABLES (D 3.1)
SLAG	S : STEEL P : BLAST FURNACES MANUFACTURING	SLAG	S : GLASS P : STONE AND SLAG WOOL MANUFACTURING
SALT SLAG	S : NON FERROUS METALS INDUSTRIES P : SALT SLAG	ALUMINIUM OXIDES	S : GLASS P : STONE AND SLAG WOOL MANUFACTURING
SULPHURIC ACID	S : NON FERROUS METALS INDUSTRIES P : LEAD AND TIN PRODUCTION	SULPHURIC ACID	S : INORGANIC CHEMICALS P : PRECIPITATED SILICA AND SILICA GEL MANUFACTURING



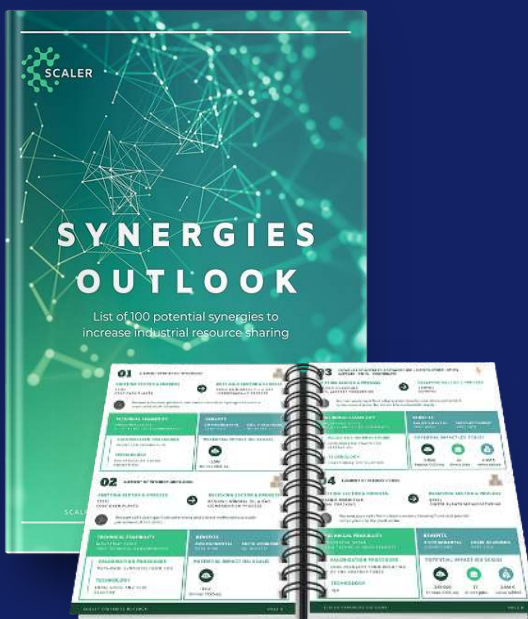
# MORE SCALER GUIDES



## Quick Guides – Helping industries increase efficiency through resource sharing

These guides offer quick insights into how businesses can start industrial resource synergies with other companies to minimise their waste and create more value from their production.

[Download](#)



## Synergies Outlook – List of 100 potential synergies to increase industrial resource sharing

This repository provides a list of 100 promising synergies that could be implemented in the European process industry, helping companies identify potential waste exchange with other firms.

[Download](#)



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