ZeroWIN - Towards Zero Waste in Industrial Networks

- **Coordinator: SAT**
- **30 partners from 11 countries**
- **Duration: May 1, 2009 – April 30, 2014**
- **Costs: 9,5 million €**

Austrian Society for Systems Engineering and Automation

Expected Results from the Call

To meet at least 2 of the 3 targets:

- **a decrease of at least 30% of greenhouse gases emissions,**
- **at least 70% of overall re-use and recycling of waste,**
- **a reduction of at least 75% of fresh water utilisation.**

Our vision

ZeroWIN envisions industrial networks that have eliminated the wasteful consumption of resources

Goal

- **to develop of innovative technologies, waste-prevention methodologies, strategies and system tools exportable into other European and worldwide contexts.**

- **to develop a structured and innovative production model based on industrial symbiosis for resource-use optimisation and waste prevention, also taking residues as secondary raw materials**

- **to demonstrate the innovative approach in practical demonstrators.**

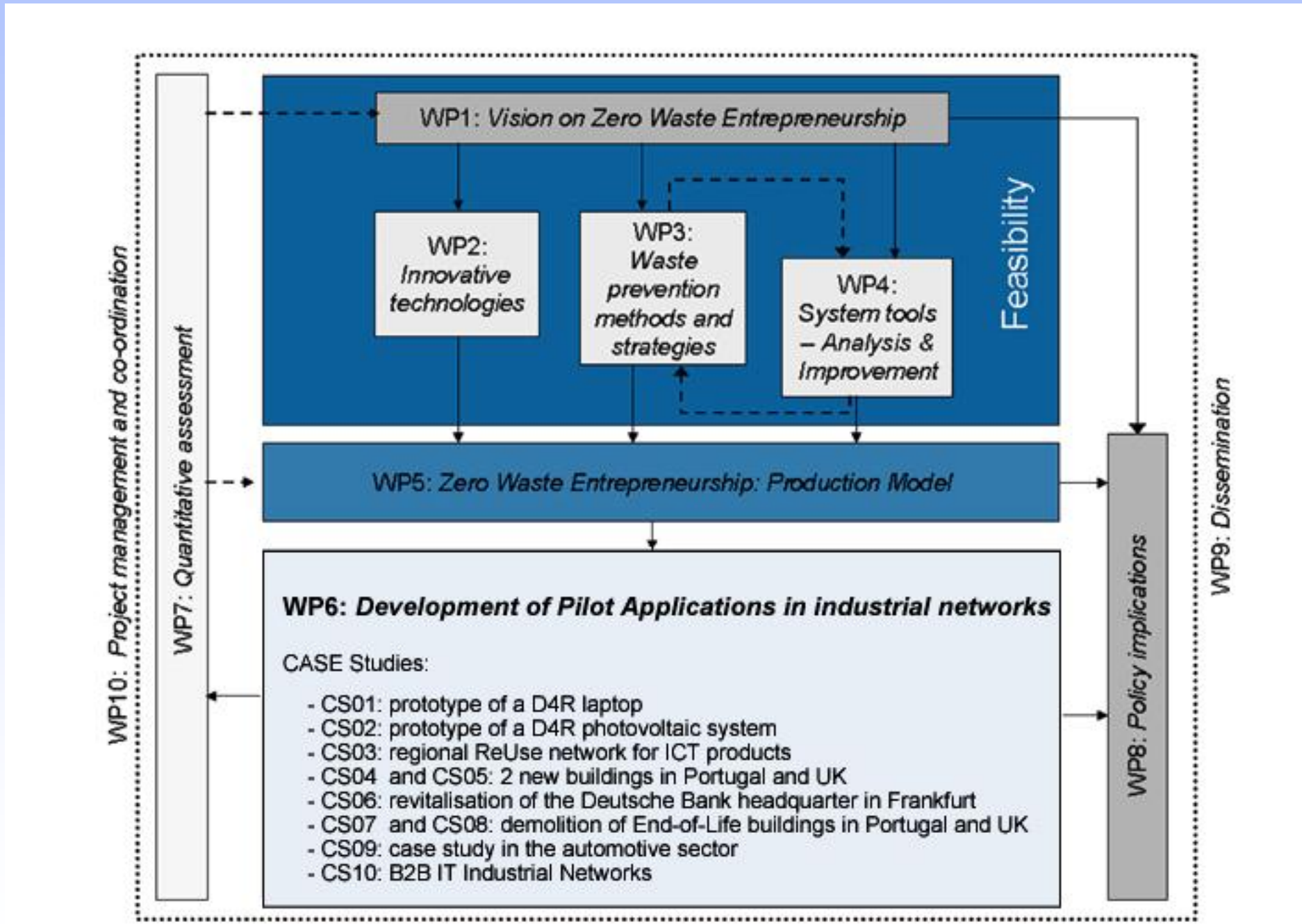
Sector focus

- **Electr(onics)**
- **Automotive**
- **Photovoltaics**
- **Construction**

Target Group

- **nearly 3 million companies (of which 80% are SMEs)**
- **with more than 2,8 trillion € turnover and a value creation of more than 800 billion €**
- **with more than 20 million employees**
- **creating about 40% or more than 400 million tons of industrial waste**
- **using as much as 50% of all materials extracted from the earth's crust**
- **generating about 40% of all energy use and about 35% of all greenhouse gas emissions.**

Workplan


WP10: Project management and co-ordination
WP7: Quantitative assessment
WP1: Vision on Zero Waste Entrepreneurship
WP2: Innovative technologies
WP3: Waste prevention methods and strategies
WP4: System tools – Analysis & Improvement
Feasibility
WP5: Zero Waste Entrepreneurship: Production Model
WP6: Development of Pilot Applications in industrial networks
CASE Studies:
- CS01: prototype of a D4R laptop
- CS02: prototype of a D4R photovoltaic system
- CS03: regional ReUse network for ICT products
- CS04 and CS05: 2 new buildings in Portugal and UK
- CS06: revitalisation of the Deutsche Bank headquarter in Frankfurt
- CS07 and CS08: demolition of End-of-Life buildings in Portugal and UK
- CS09: case study in the automotive sector
- CS10: B2B IT Industrial Networks
WP8: Policy implications
WP9: Dissemination


Partners
MicroPRO-IE
HP-UK
WAMECO-PL
UL-IE
UCA-UK
W-B-UK
CONTINENTAL-DE
REMADE-UK
UNU-DE
TRICOM-DE
SCEE-UK
TUB-DE
UP-DE
WRUT-PL
BAUSERVE-DE
PE-DE
BIOIS-FR
SAFT-FR
WIFI-IKT-AT
LBP-DE
SAT-AT
INSEAD-FR
BOKU-AT
REC-HU
GREENTRONICS-RO
GAIKER-ES
GAIA-ES
TTA-ES
CEIFA-PT
AUO-TW

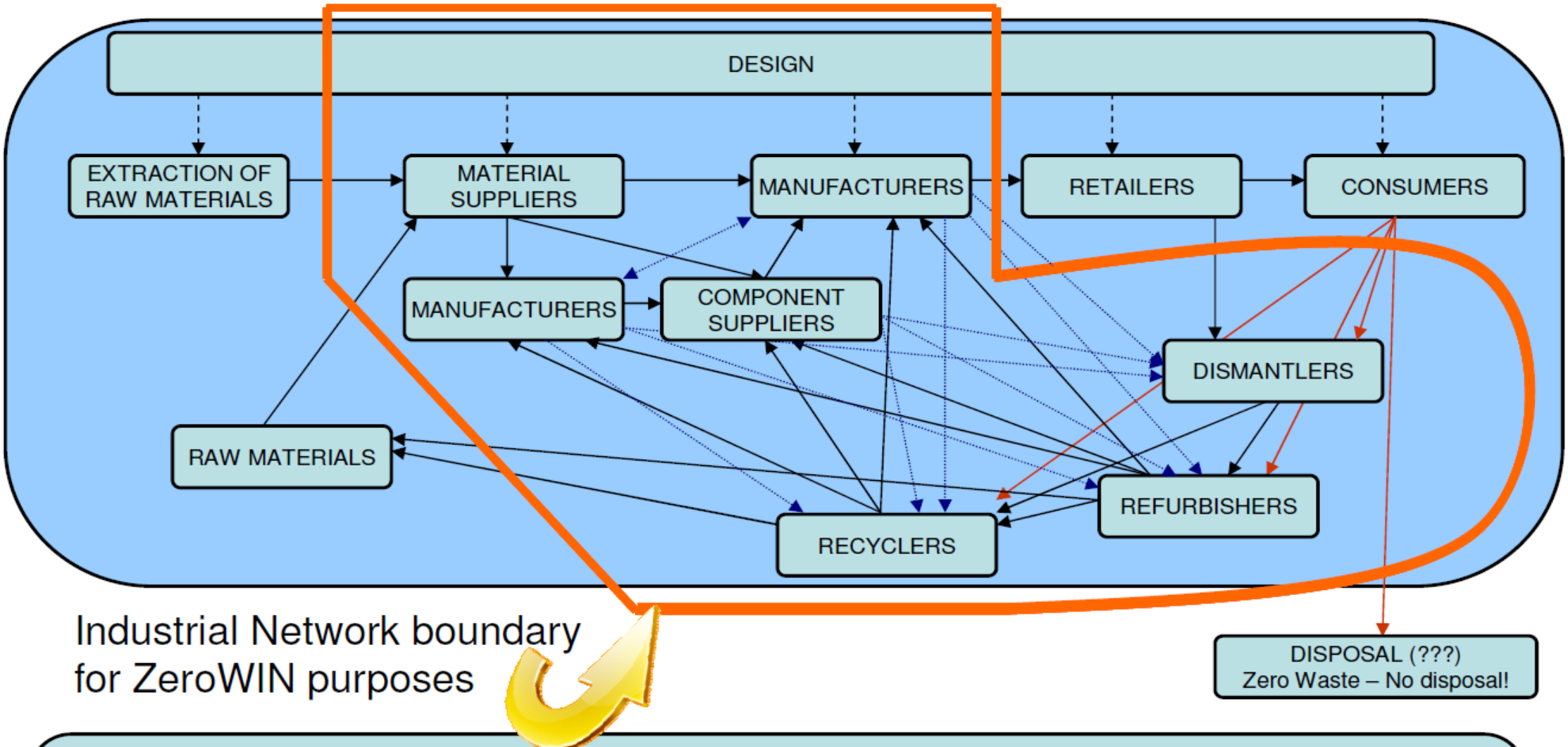
Selected ZeroWIN results

- Literature review fed into ZeroWIN Wiki online
- Individual Producer Responsibility (IPR) applied to the 4 sectors (position papers)
- Technology roadmap for RFID in waste management
- Enabling technologies for re-use (Identification and smart condition monitoring)
- Various papers on innovative waste prevention methods and strategies in the different sectors
- Analysis, improvement and practical application of assessment tools
- ZeroWIN Production Model
- Online Guide on Zero Waste Entrepreneurship and Waste Prevention in Industrial Networks
- Resource Exchange Platform (RXP) online
- Development of policy recommendations (policy briefs ...)
- Practical Demonstrators in the 4 sectors with quantitative assessments

Practical Demonstrators

1. D4R Laptop (Prototype)
2. D4R PV System (Prototype)
3. ReUse Network and Resource Exchange Platform
4. New construction in the UK
5. Resource Efficiency Construction Networks in Portugal
6. Refurbishment of the Deutsche Bank headquarter in Frankfurt am Main and new construction project in Germany
7. Demolition of End-of-Life buildings in the UK
8. Demolition of End-of-Life buildings in Portugal
9. Using recyclates from IN in a sensitive car component
10. Business to Business (B2B) Information Technology (IT) Industrial Networks

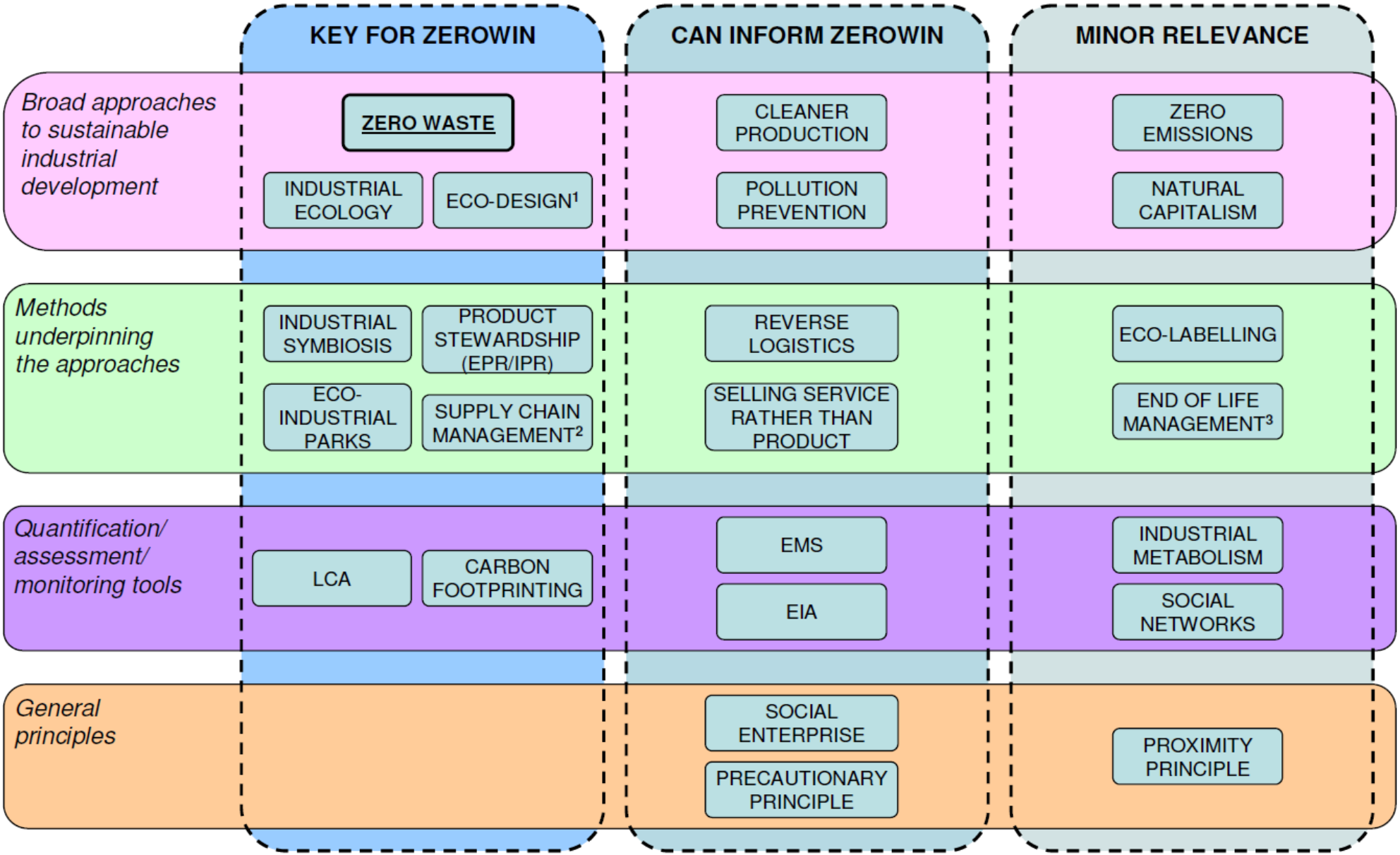
ZEROWIN SCOPE AND BOUNDARY



NOTES:

- The diagram represents a network of potentially diverse industries working together in symbiosis.
- The transport associated with material, product and waste flows are implied within the arrows.
- 'Manufacturers' is taken to include construction activities (something is produced).
- 'Dismantlers' is taken to include Materials Recycling Facilities, demolition activities and automotive dismantling activities.
- 'Refurbishers' is taken to include remanufacture, re-use and repair activities.
- 'Manufacturers' appears twice, to represent those that make individual/basic products and those that integrate materials, components and other products to create more complex products or services, for example construction sites and the automotive industry.
- Manufacturers produce final products but they also create waste materials/sub-products that shall be considered (blue dotted arrows).
- IPR/take-back scheme flows are not indicated to avoid confusion, but they are expected.
- Red arrows indicate downstream, post-consumer flows.

ZEROWIN CONCEPTS MIND MAP



NOTES:
1 Includes relevant aspects of de-materialisation, prolongation of product use and green chemistry methodologies.
2 Includes relevant aspects of remanufacturing methodology; SCM herein has been adapted to meet the needs of ZeroWIN.
3 End of life management remains as an assessment tool, but is beyond the boundary of a ZeroWIN industrial network.

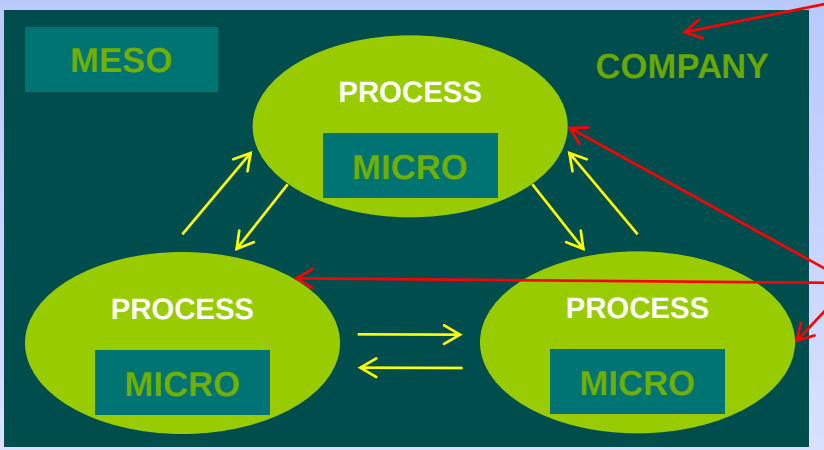
Structure of the Production Model

PROCESS

LEVEL 1

Structure of the Production Model

COMPANY



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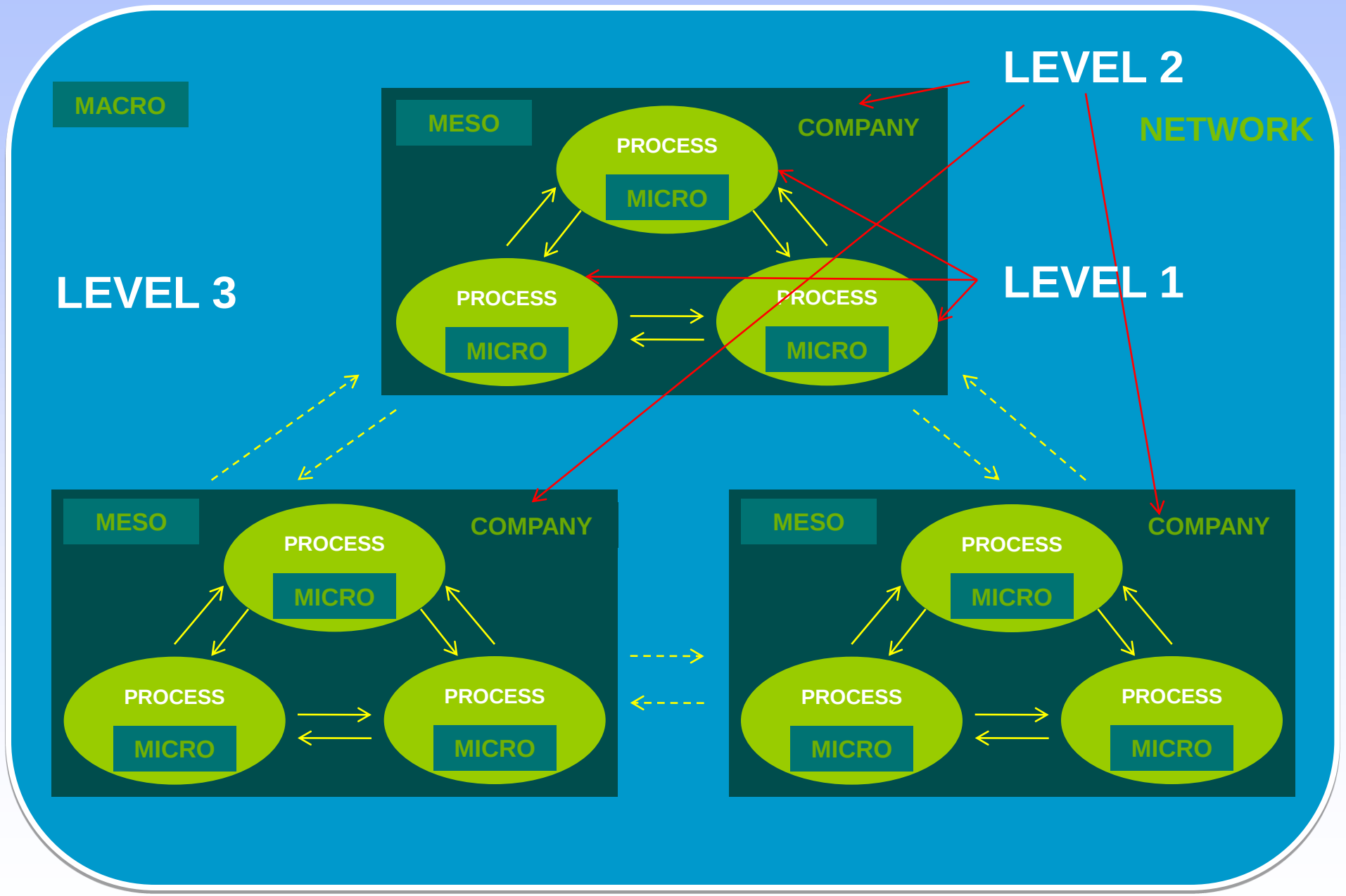

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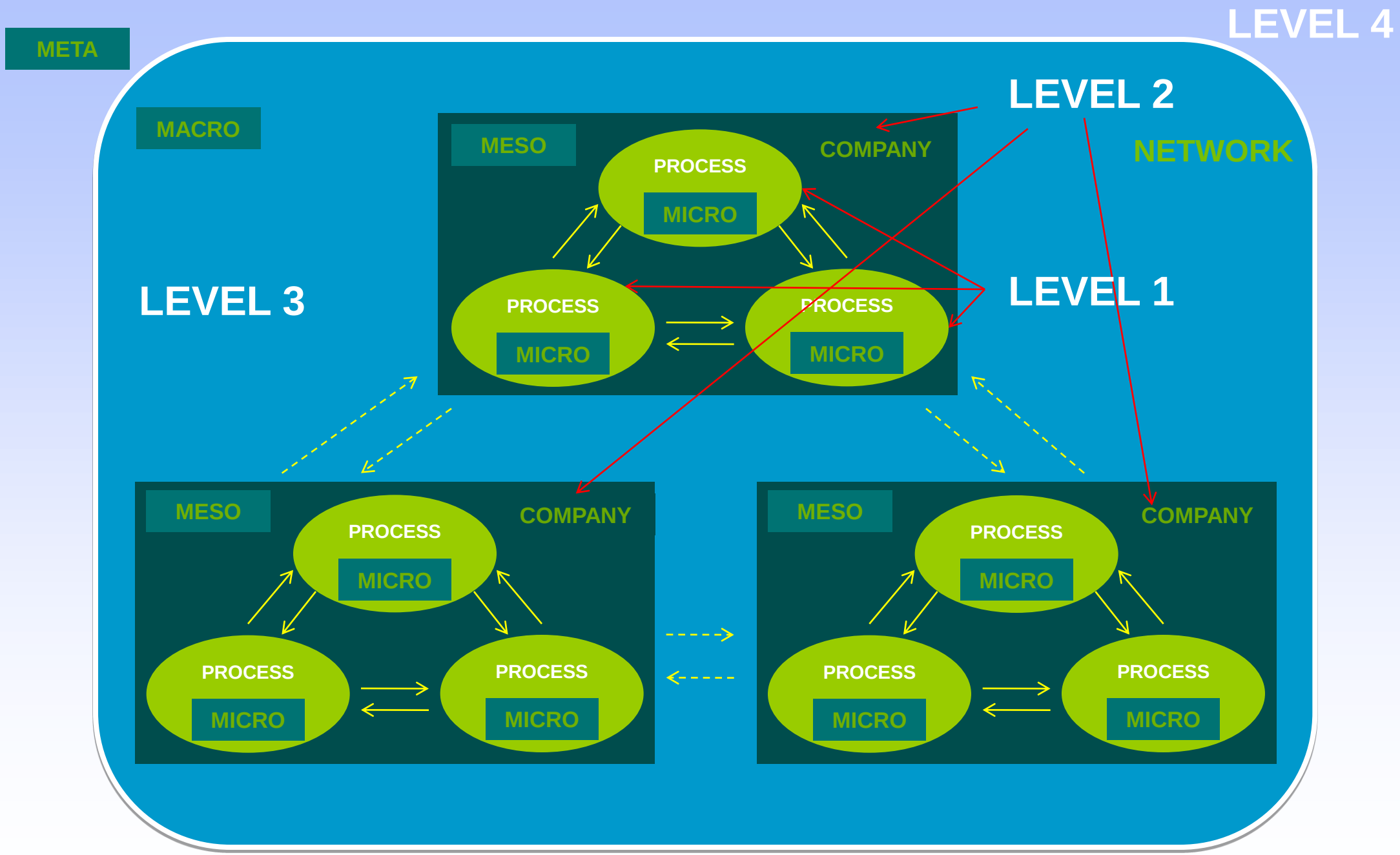

‘Translating’ the Five Prevention Practices

Meso Level	Macro Level
Process Design Development of the process to maximise resource recovery, recovery efficiency and by-product values whilst minimising process waste generation	**Network Design** Extending the process design principles to a new or not existing industrial network including possible feedback loops at the company level. Balancing of economic, social and ecological considerations. Various sectors and sizes of enterprises to be considered in the network design
Input Substitution Use of less toxic, more effective and/or renewable reagents and process auxiliaries (including energy sources)	**Primary Resources Substitution** Avoidance of raw materials, pre-treatment of secondary resources when needed and renewable energy sources
Plant Improvement Application of more efficient plant designs, unit operations and equipment	**Network Infrastructure Improvement** Efficient storage and treatment facilities, improved logistics and information management (e.g. resource exchange platform)
Good Housekeeping Continuous improvement in operation and maintenance practices and systems	**Cooperative Network Responsibility** Continuous improvement in network operation
Reuse, Recovery & Recycling Reuse, recovery and recycling of process waste streams, preferably at the site where the waste stream originates	**Exchange of Resources** Reuse, recovery and recycling (up-cycling) of by-products, preferably in the network. If reutilization in the IN is not possible, approach local industries nearby

Five Resource Productivity Themes

Meso Level	Macro Level
Effective Resource Utilization and Materials Efficiency Extracting the maximum amount of valuable products out of the mined resource with the minimum possible amount of reagents	**Effective Resource Utilization and Materials Efficiency** Extracting the maximum amount of valuable resources out of secondary materials/flows by minimizing cross-contamination
Reduction of Process Waste and Enhancement of Co-product Values Reducing the volume of processing wastes and turning the residual waste into valuable by-products	**Reduction of Waste and Enhancement of By-product Values** Flexible tolerance requirements of by-product qualities and optimize the reuse in cascading steps
Reduction of Water Use and Impacts Reducing the volume of water required and the pollutant load in process effluents	**Reduction of Water Use and Impacts** Establishing of water reuse within industrial networks and cascading uses of water resources
Reduction of Energy Consumption and Greenhouse Gas Emissions Reducing process energy requirements, recovery of discharged process heat and use of low carbon and renewable fuels and reductants	**Reduction of Energy Consumption and Greenhouse Gas Emissions** Energy generation from waste (e.g. methane), waste heat exchange. Substitution of fossil energy sources; when fossil fuels are needed, efficiency of this use can be increased through co-generation. Synergies in transport, services (e.g. high-pressure air), purchasing and facilities
Improvement of Control of Minor Elements and Toxic Materials Controlling the deportment of non-target wastes into valuable by-products	**Improvement of Control of Minor Elements and Toxic Materials** Promotion of green chemistry in the industrial network, applying stream separations and recovery

Company Networking Saves Resources

Welcome!

The following guideline is the practical result of the ZeroWIN project showing you different opportunities and ways to deal with your valuable by-products.

Please choose an area of interest and click on the button/topic you are interested in.

Tutorial

Imprint

Login

This project has received funding from the European Union's Seventh Programme for research, technological development and demonstration under grant agreement No. 226752.

Our Guide to Save Resources

Please choose your professional background or have a look at the complete guide

Producer

Supplier

Service Provider

Cluster Manager

Environmental Organisation

Complete Guide

Our Results

Practical Demonstrators

ZeroWIN Wiki

Resource Exchange Platform

Waste Prevention Tool

Policy Recommendations

Studies & Papers

Webinar June 12, 2013
The ZeroWIN Project, the ZeroWIN Vision and Practical Demonstrators 1, 2 and 6

Our Events

Dissemination Events

March 24, 2014: Farnham, UK
April 3, 2014: Lisbon, Portugal

Going Green – CARE INNOVATION 2014
November 17 – 20, 2014: Vienna, Austria

Our Project

Learn more about the background of the ZeroWIN project.

More information

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