Zero WIN

Towards Zero Waste in Industrial Networks

ZeroWIN Practical Demonstrators:

Demolition and New Buildings in Germany, Portugal and the United Kingdom

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Phil Wilding – Managing Director

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As a percentage of GDP how big is the UK Construction Industry?

3%

8%

13%

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As a percentage of total employment how many people does the Construction Industry employ?

2%

6%

10%

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As a percentage of all waste generated in the UK how much does the Construction Industry contribute?

3%

13%

23%

33%

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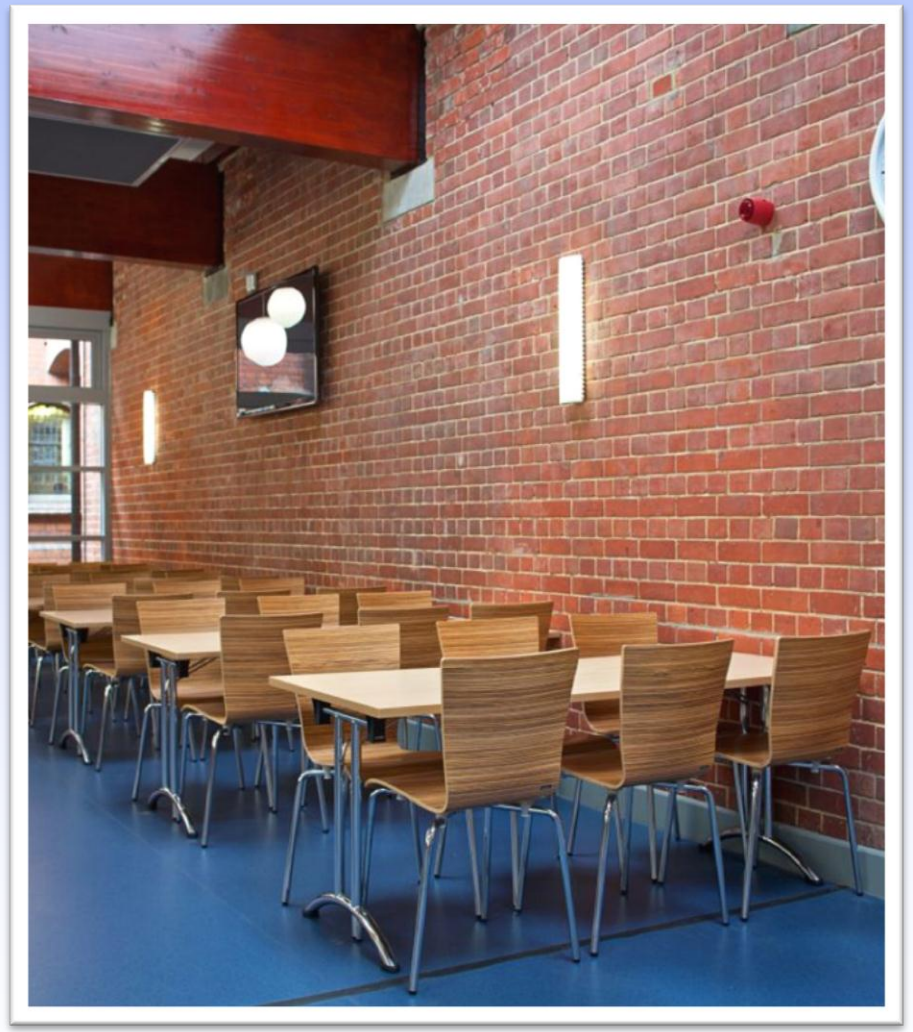

ZeroWIN's Practical Demonstrators

1. -
2. -
3. -
4. **Resource Efficiency Construction Networks in the UK**
5. **Resource Efficiency Construction Networks in Portugal**
6. **Sustainable refurbishment of Deutsche Bank HQ and construction of Schwabinger Tor, Germany**
7. **Demolition of End-of-Life buildings in the UK**
8. **Demolition of End-of-Life buildings in Portugal**
9. -
10. -

Practical Demonstrator 4 and 5

Aldershot - Reading School - Southampton | Environment Education Centre, Torres Vedras

Implementing the concept of sustainable construction in Portugal and the UK

- **Specifying sustainable products with recycled content as input materials**
- **Undertaking on-site segregation of output (waste) materials for recycling and reuse**
- **Off-site manufacture of input materials**
- **Reuse of materials/components resulting from on-site activities i.e. demolition of existing structures or unused building materials**
- **Reduce fresh water consumption on-site by identifying local industries/sources or using water efficient machinery**
- **Optimize logistics for inputs and waste management**
- **Influence suppliers to deliver materials to site efficiently and offer take back schemes**

Practical Demonstrator 4 and 5

Aldershot - Reading School - Southampton | Environment Education Centre, Torres Vedras

Main Results

- **At least 70% overall reuse and recycling?** ✓
- **At least 30% greenhouse gas emissions reduction?** ✓
- **At least 75% fresh water use reduction?** ✗

➡ **<u>Achieved ZeroWIN aim to meet 2 out of the 3 targets</u>**

Also:

•Top level buy-in is crucial (from the client, and key supply chain actors)

•Cohesive European legislation would drive the sector to resource efficiency

Practical Demonstrator 6

Refurbishment of Deutsche Bank´s Head Office & New Construction Schwabinger Tor

REMADE SOUTH EAST · CEIFA ambiente · bauserve DIENSTLEISTUNGEN · WILDING BUTLER Building with Care · UNIVERSITY OF Southampton

Efficient Construction Logistics

- **Selecting downstream companies using residues from construction process as raw material for their own production**
- **Residues separation already on construction site into several material fractions**
- **Optimizing transportation of building materials to and residual materials from installation point on site**
- **Just-In-Time delivery**

Optimizing an efficient logistical supply chain of both delivery and disposal to establish and **support efficient structure of an Industrial Network**

LEED Platin (USA) **DGNB Gold (DE)** **Logistics Service Award 2010**

Practical Demonstrator 6

Refurbishment of Deutsche Bank´s Head Office & New Construction Schwabinger Tor

Main Results

- **At least 70% overall reuse and recycling?** ✓
- **At least 30% greenhouse gas emissions reduction?** ✓
- **At least 75% fresh water use reduction?** ✓

➡ **<u>Exceeded ZeroWIN aim to meet 2 out of the 3 targets</u>**

Also:

•Increased resource efficiency by 43% in project I and 68% in project II

•Efficient construction logistics saves energy, resources and costs

Practical Demonstrator 7

Demolition of four buildings in the UK

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Implementing a resource efficiency demolition network in the UK

- Undertaking selective demolition to increase segregation of output material
- Develop a network of companies to reclaim, reuse and recycle output materials
- Develop end markets for ‘difficult to recycle waste materials’ from mixed waste streams
- Use secondary aggregates directly on-site
- Optimize logistics for waste management
- Reduce fresh water consumption by identify local industries to provide waste water or source grey water locally

2 buildings before 1950

2 buildings 1950 - 1980

Practical Demonstrator 7

Demolition of four buildings in the UK

Main Results

- **At least 70% overall reuse and recycling?**
- **At least 30% greenhouse gas emissions reduction?**
- **At least 75% fresh water use reduction?**

➡ **Exceeded ZeroWIN aim to meet 2 out of the 3 targets**

Also:

•Successful demonstration of industrial network development

•Various improvements implemented showing clear environmental benefits, without necessarily increasing costs

Practical Demonstrator 8

Escola Secundária de Paços de Ferreira & da Maia, and industrial pavilions in Amadora

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Implementing a resource efficiency demolition network in Portugal

- **Implementation of a selective demolition procedure**
- **Segregation on site of the major material streams**
- **Substitution of primary aggregates from stone extractions by secondary aggregates produced from CDW recycling (crushing)**
- **Reuse and alternative use of building elements**
- **Use of grey water or treated water for on-site dust control**

Practical Demonstrator 8

Escola Secundária de Paços de Ferreira & da Maia, and industrial pavilions in Amadora

Main Results

- At least 70% overall reuse and recycling? ✓
- At least 30% greenhouse gas emissions reduction? ✓
- At least 75% fresh water use reduction? ✓

➡ **Exceeded ZeroWIN aim to meet 2 out of the 3 targets**

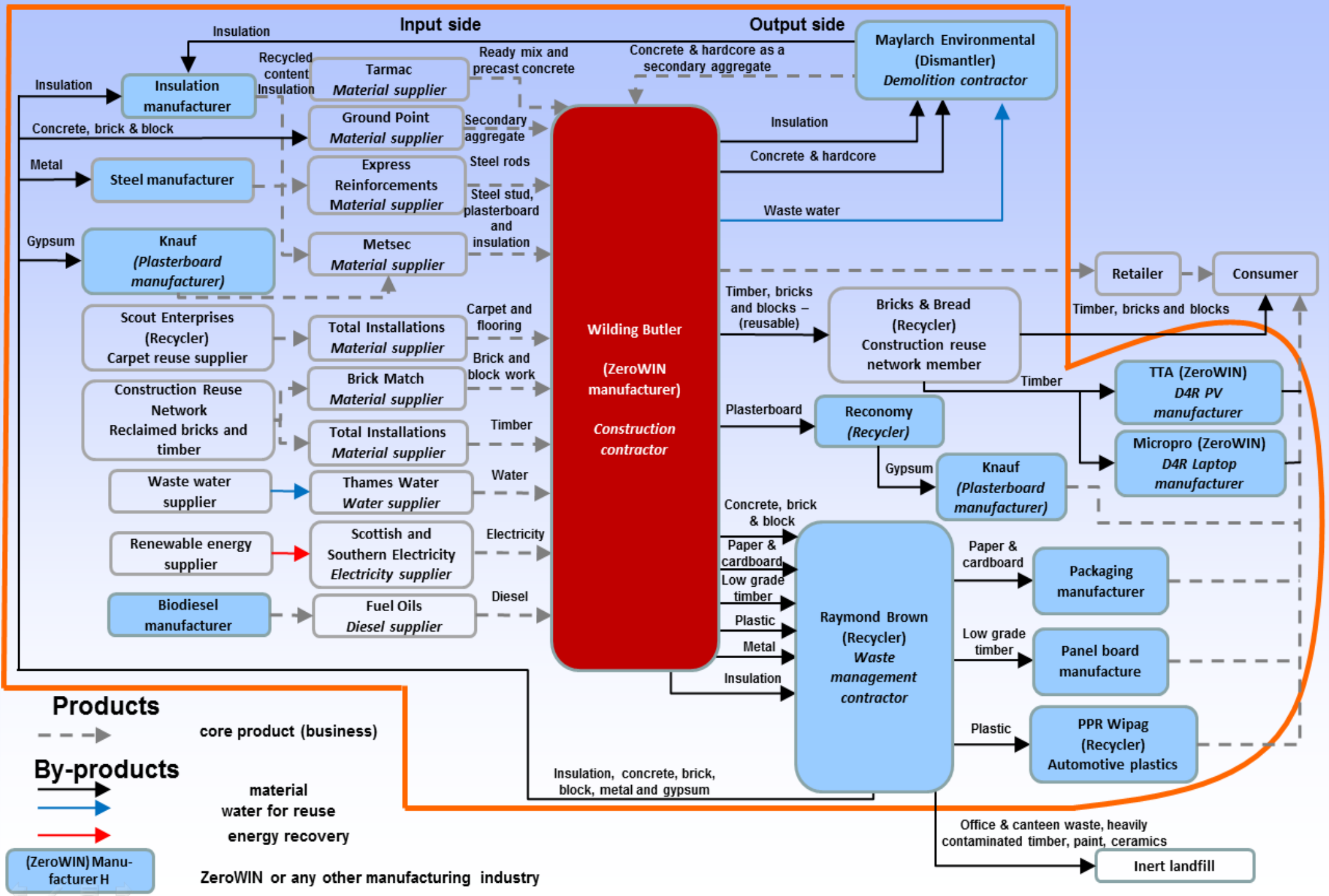
Also:

- **Successful demonstration of selective demolition practice**
- **Strong waste prevention strategies implemented on sites**

Overcoming barriers

- Influencing specifications – engage early
- Good practice on site
- Develop network – suppliers and end markets

ZeroWIN Sustainable Construction Industrial Network



Improvements and innovations

Improvements in material use
(baseline site to sites 2 and 3)

Material	Notes on change in source/quality of material
Bricks	40% reused bricks on site 3
Concrete blocks	55% recycled content concrete, reduced embodied carbon 50%+ recycled aggregate fill material generated on site from the demolition
Wood	Use reused hardwood; use timber beams in place of concrete roof frame
Metals	25% reused steel on site 3; remainder 98% recycled content
Mineral wool	Use mineral wool with high recycled content
Plasterboard	80% recycled content gypsum; used in place of block material in partitions so 750 litres water saved by not having to mix cement to lay the blocks
Carpet	Use reused carpet tiles in place of new

Improvements and innovations

Improvements in material recovery
(baseline site to sites 2 and 3)

Material	Proportion recovered		Notes on change in quality of second use
	Baseline	*Improved sites*	
Bricks	75%	100%	Segregate 15%+ for re-use, recycle remainder
Concrete blocks	75%	100%	Crush and reuse on-site where possible rather than off-site
Wood	57%	100%	Segregate and reuse ~10%, recycle remainder
Metals	95%	100%	Segregate on site, avoids contamination in mixed waste
Mineral wool	80%	94%	Recycle to new insulation, input to horticulture industry
Plastics	32%	60%	Segregate on site, avoids contamination in mixed waste
Paper, card	60%	95%	Segregate on site, avoids contamination in mixed waste

General findings

Core construction materials already highly recycled

Input substitution more important than EOL recycling

Material exchange platforms and information required

Work culture changing – over-ordering, quick disposal

Continuing challenges

Resource reclamation and recovery already near maximum in parts of EU…but low-grade

Deconstruction methods already near technical state-of-the-art...but not widespread

More information

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