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ReUse OF THE STEEL Structures

BY
CRISTINA CAMPIAN

Innovative circular economy training based on BIM and LCA technologies

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Structures ReUse

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Over the past 30 years, the number, scope and complexity of tools for assessing the environmental impact of buildings has increased dramatically. Examining the emergence of building sustainability assessment and benchmarking as a global phenomenon as well as some of their political and practical barriers can be useful in order to understand their possible role in realizing objectives of the 'New Urban Agenda' and the policies to be influenced by it.

UN-Habitat's mandate promote sustainable urban development through knowledge-creation and management and address some of these concerns and contribute to four objectives:

- Establish the rationale for building sustainability assessment and benchmarking

- Identify challenges and limitations that occupants, policy-makers and building practitioners face in applying or interpreting building sustainability assessment or benchmarking tools

- Provide a sample overview of some environmental sustainability assessment and benchmarking tools for buildings and housing as well as those attempting to measure social and economic impacts

- Identify pathways for the wider uptake of assessment tools by industry, professional bodies, policymakers, vocational and higher education, and other actors working within the built environment

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Traditionally the two main objectives of building sustainability assessment and benchmarking have been

1) to aid the design of sustainable buildings

to provide designers, local authorities and project managers with guidance to take more informed decisions about siting, facilities, building techniques, materials, design options, affordability, social inclusion and other considerations.

2) to help evaluate the sustainability of existing buildings.

gathers and quantifies actual information about the various impacts of a building. Several sustainability indicators are measured, weighted and evaluated, providing an overview of a selective—and by definition incomplete—list of local, regional and global impacts.

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What about steel structures ??

"When it comes to choosing the structural material, it's the normal decisions you should be taking: what is the best material for what you want the building to do? The same still applies to low or zero carbon buildings."

What material to chose?

What are the reasons , for now, immediatly beefits or for a longer periode, even after the building reached her „living time".

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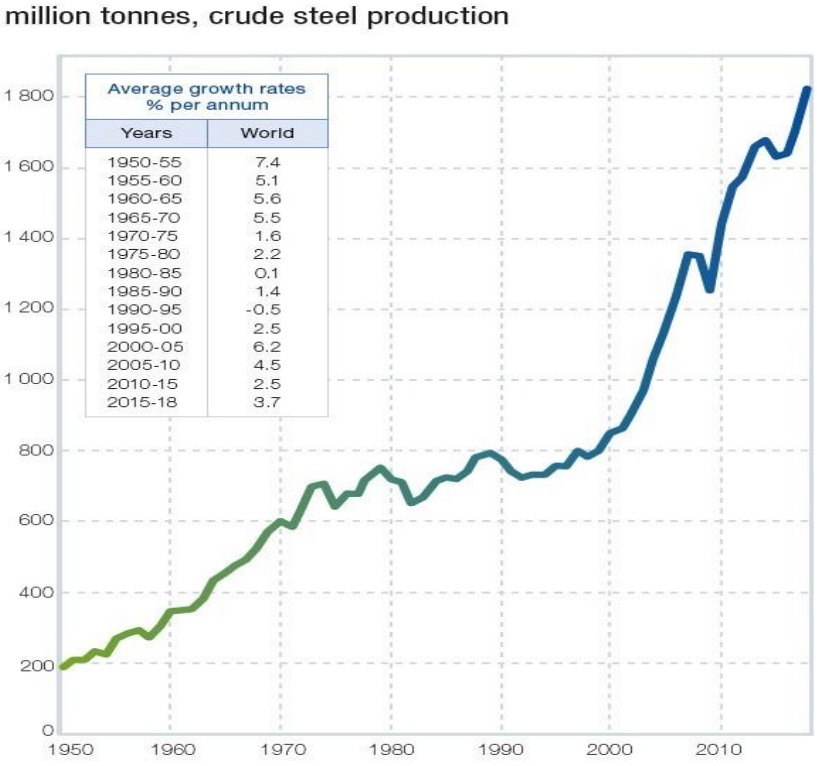
50% of all global resources will be allocated to building process

The total surface will double in 2060

Reducing with 2^{o} C of the global heating scenario impose that the steel sector reduce his emissions with 65% until in 2050

Doar pe durata acestui curs
(in 50 min)
~200 000 tone CDW
(construction and demolition waste)
sunt generate in cele 28
tari ale EU



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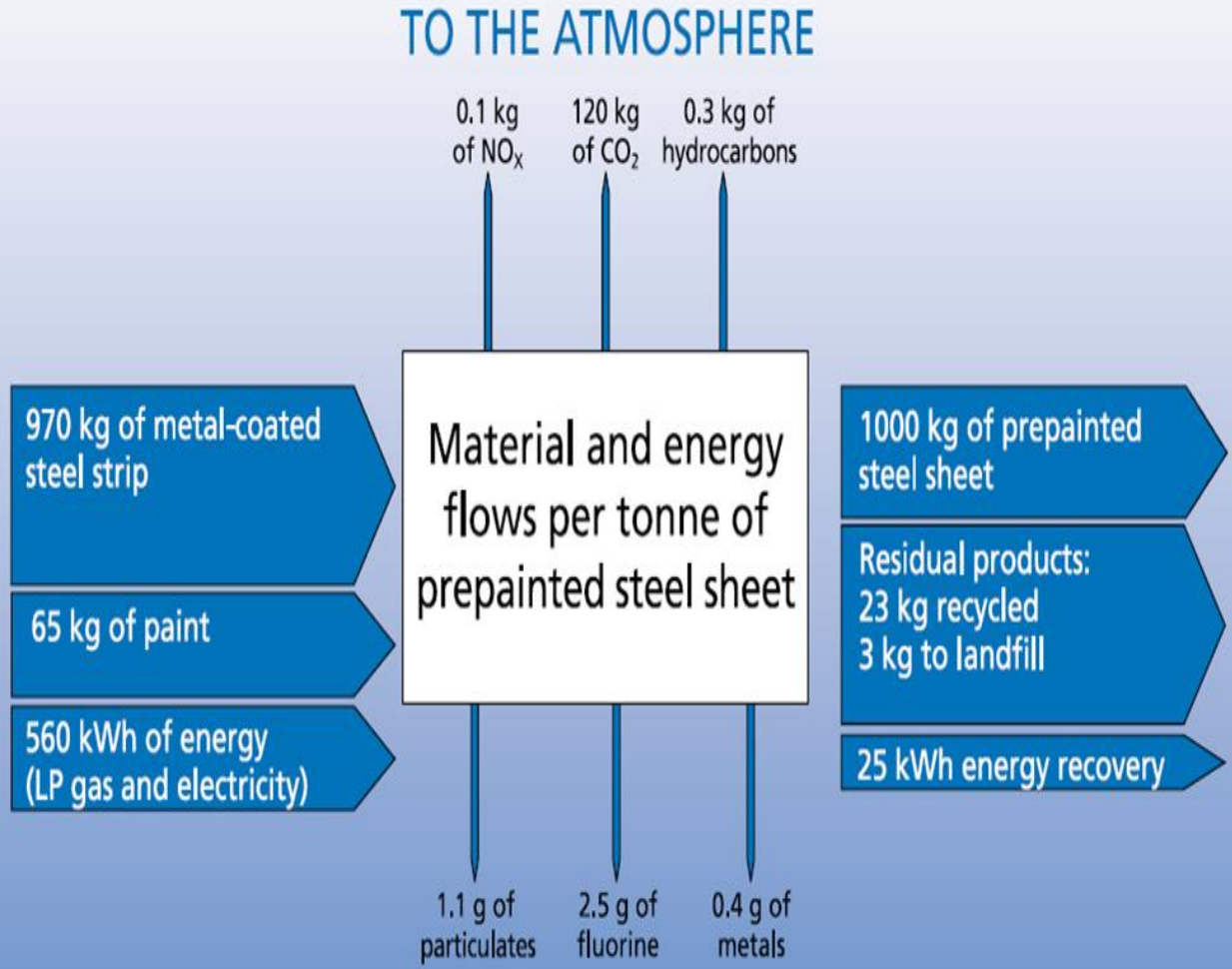

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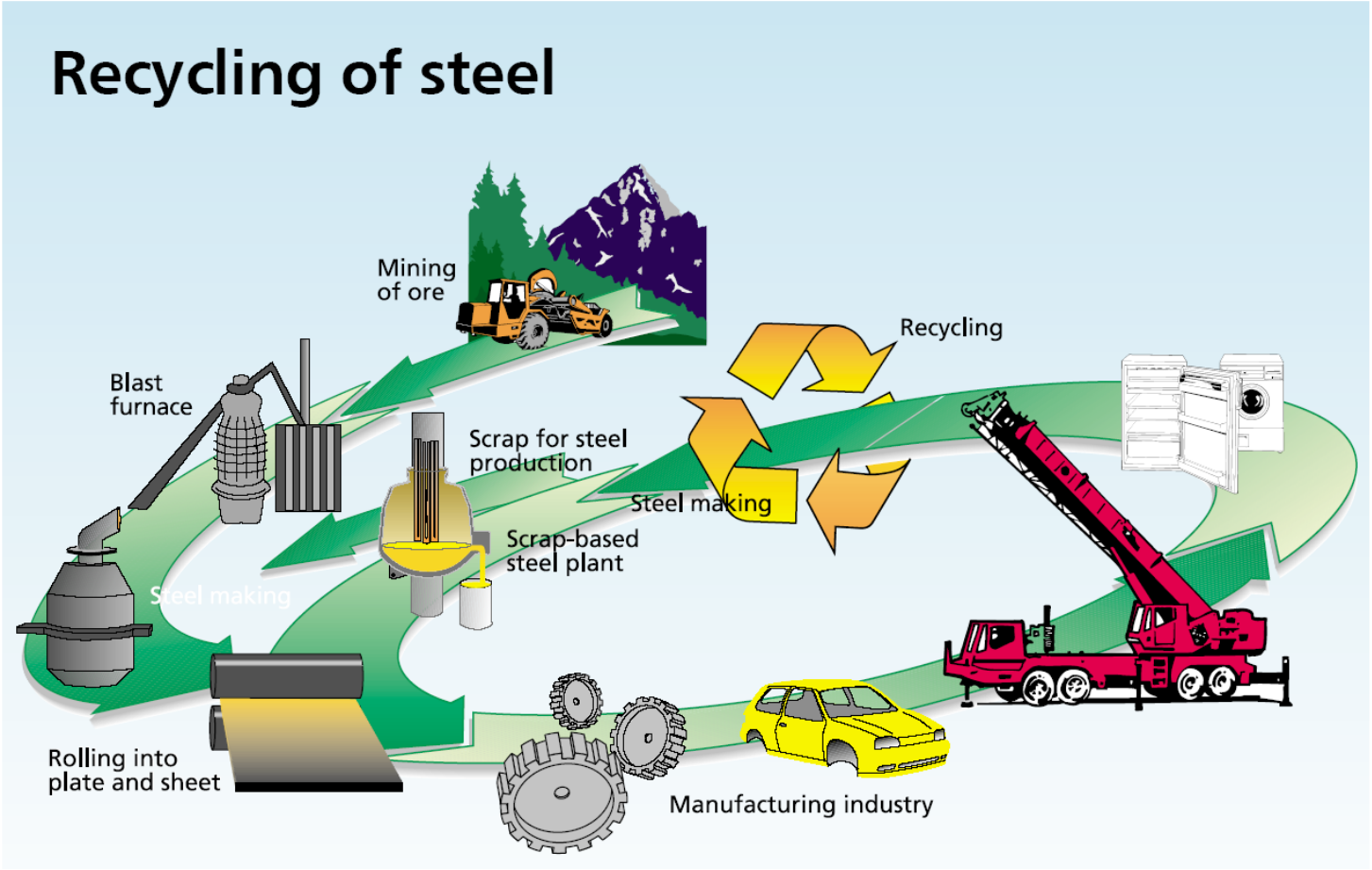

The interest of assessing the impact due to constructions is very huge: European buildings are responsible for using 50% of resources, 40% of energy consumption and produce 25% of a city's waste .(Vision 2030 & Strategic Research Agenda - Focus Area Cities and Buildings)

About 45% of the world's generated energy is used to allows the operation and maintenance of buildings and 5% for their construction. (The Chartered Institute of Building, UK-).

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With 95% of recycling (structural steel), steel is the most recycled construction material. Our industry works hard for always improving these figures as it is the only material 100% recyclable. But what makes steel extraordinary is that it is indefinitely recyclable without any loose of its characteristics in comparison to other construction materials.

Life is moving fast, needs as well. Buildings are not standing for ages at the same place with the same function any more.

When assessing the carbon footprint of materials, it is therefore very important to consider to whole life cycle of the construction products but more generally of the buildings themselves. It includes their lifespan and maintenance needs, the recyclability of the materials or even the reuse, which is the ultimate phase of a circular economy approach

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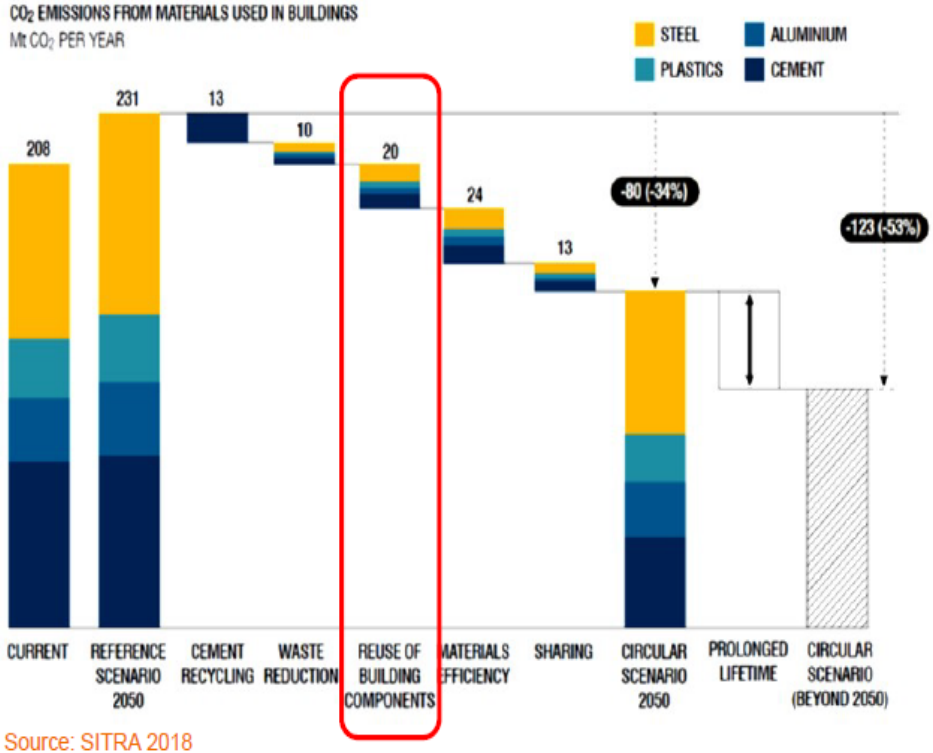
Reducing the carbon footprint of steel construction industry

According to the study published by SITRA in 2018, reuse of building components can save about 20 Mt CO_2e per year in Europe with a **major contribution form the steel sector**.



Source: SITRA 2018

2017-2020 GREATER REUSE OF STEEL STRUCTURES

to calculate environmental of reuse [webinar 3]

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The target of European Waste Framework Directive is that 70% of construction and demolition waste (CDW) should be recycled, reused and/or recovered by 2020. The focus area to achieve this goal is highlighted in the waste hierarchy.

The progress in waste recovery in several EU countries showed that the 70% target could be reached especially in the lower levels of the waste hierarchy (e.g. backfilling or downcycling of concrete) .

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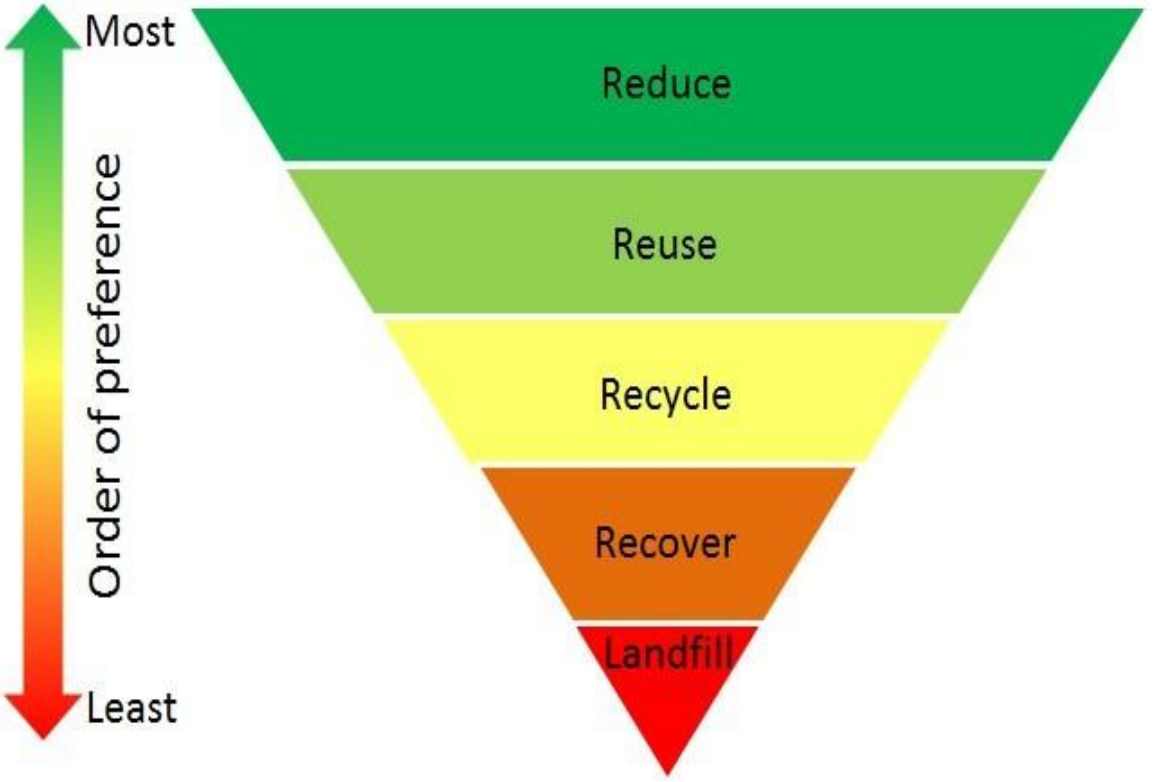
Construction sector needs to improve its resources efficiently



Waste management hierarchy

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End of life scenarios

Deconstruction and reutilization

Demolition and crushing

More than 80% of the materials obtained by demolition are mineral products that are not accepted to be left in nature, but the reutilization ratio is very small

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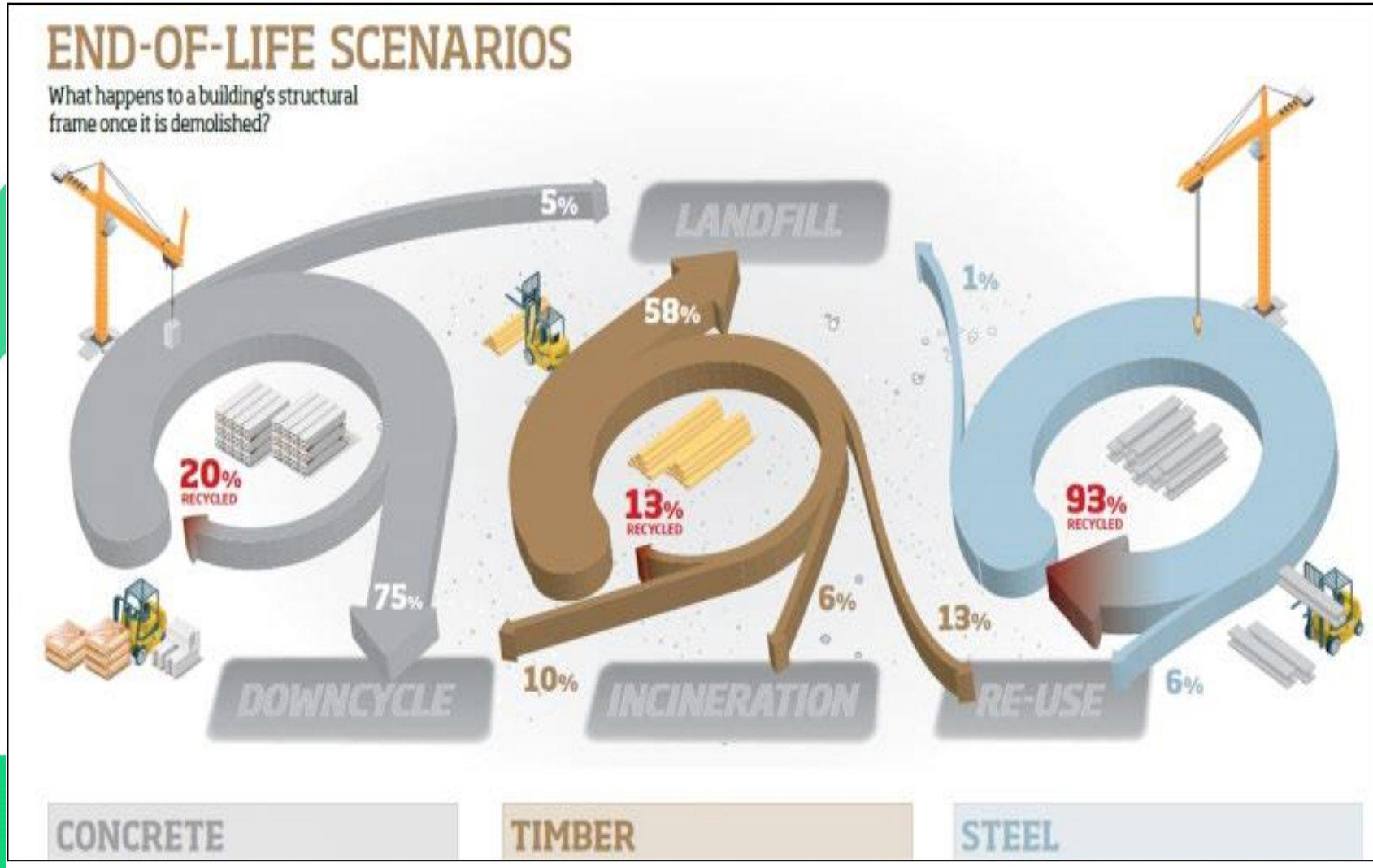

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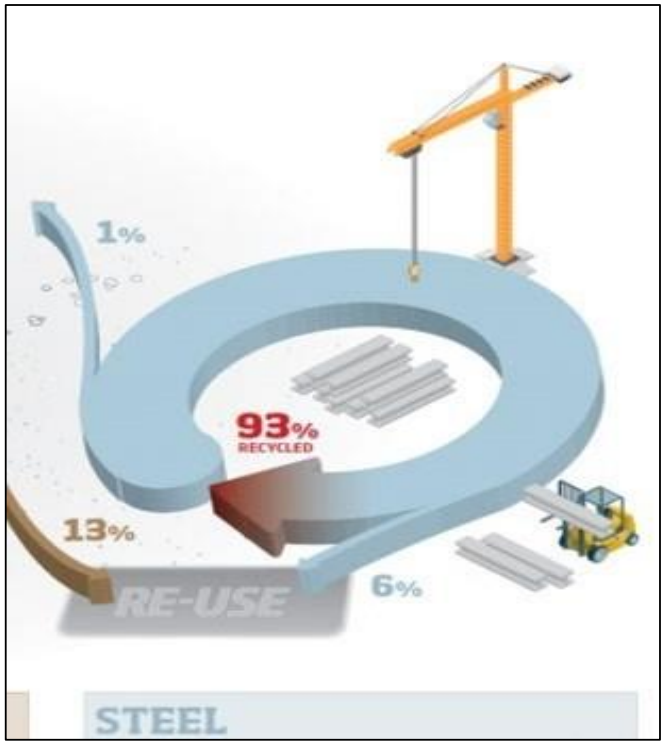
Recycling Steel



- Versatile more than 3,500 grades
- Durable and strong
- Infinitely recycled
- No loss of properties
- Magnetic properties assist recovery and sorting
- Economic value ensures recovery
- Global infrastructure for trading scrap steel

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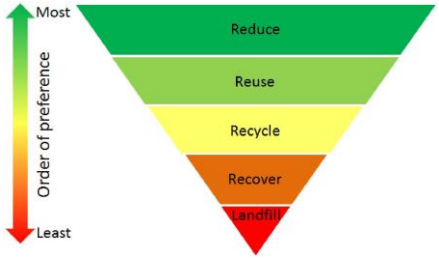
Going beyond recycling to reuse

Recycling → Reuse



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Although steel reuse does happen…..






…there are many barriers in currently configured suplly chains

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2017-2020 PROGRESS PROVISIONS FOR GREATER REUSE OF STEEL STRUCTURES

Demolition VS Deconstruction

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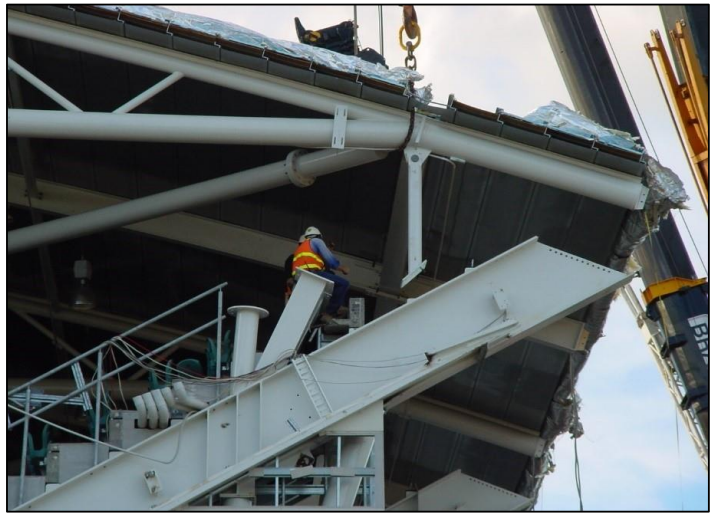
Recycling VS Reuse

Demolition



Deconstruction

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2 scenarios

Reuse today

Reuse in the future

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The level of reuse

- individual
- structural assembly (ex :truss)

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one level steel buildings

It represents a large part of the metal constructions market in the EU
It is the easiest type of building to be deconstructed and reused Relatively short-lived buildings
Applicable to several construction sectors
Existing reuse market in some sectors, e.g. agriculture

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The deconstruction system is facilitated (the elements of the structure are visually exposed);
The "layers" of the construction are easily removable;
They usually have a repetitive structural approach, which allows good possibilities for standardization;
the possibility of having a significant number of elements with the same cross-section;
The considerable length of the elements, in their original form - without major changes;
The elements are easily accessible and at relatively safe working heights;
They are easy to disassemble and can be easily reassembled

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Design for adaptability and relocation

- Environmental loads: snow

Country	s_k (kN/m²)			Class
	Min.[a]	Country average[b]	Min. European value	
Finland	2.00	2.75	2.00	S1
France	0.45	0.65	0.70	S3
Germany	0.45	0.85	1.00	S2
Ireland	0.40	0.55	0.70	S3
Italy	0.60	1.00	1.00	S2
The Netherlands	0.70	0.70	0.70	S3
Norway	1.50	3.50	2.00	S1
Portugal	0.10	0.30	0.40	S4
Romania	1.50	2.00	2.00	S1
Spain	0.30	0.40	0.40	S4
Sweden	1.50	2.50	2.00	S1
United Kingdom	0.45	0.65	0.70	S3

[a] Assuming the average altitude for the less critical zone of the country

[b] Assuming the average altitude for the zone representing most area of the country

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TAKK SKAL DU HA

THANK YOU

GRACIAS

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