

Re-Building Europe

Deep Dive Session "Circularity & Sustainability"

29 November 2023 – London

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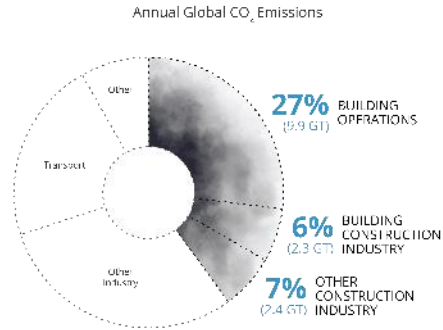


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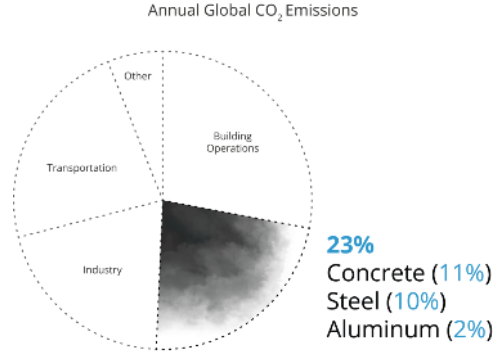


The impact of the construction to the climate change

Buildings and construction currently account for around 40% of CO₂ emissions



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Global building floor area is expected to double by 2060

In 2040, 2/3 of the global building stock will be buildings that exist today. Without upgrades, they will still be emitting GHGs.



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The impact of the construction to the climate change

Actions to reduce carbon footprint (on a yearly basis)

Cut one return flight from New York to Chicago



Save 1.000 kgCO₂e

Cut meat, dairy and beer from your diet



Save 2.000 kgCO₂e

Stop driving your car



Save 3.000 kgCO₂e

Achieve 20% structural steel embodied carbon reduction of a 200m high rise building



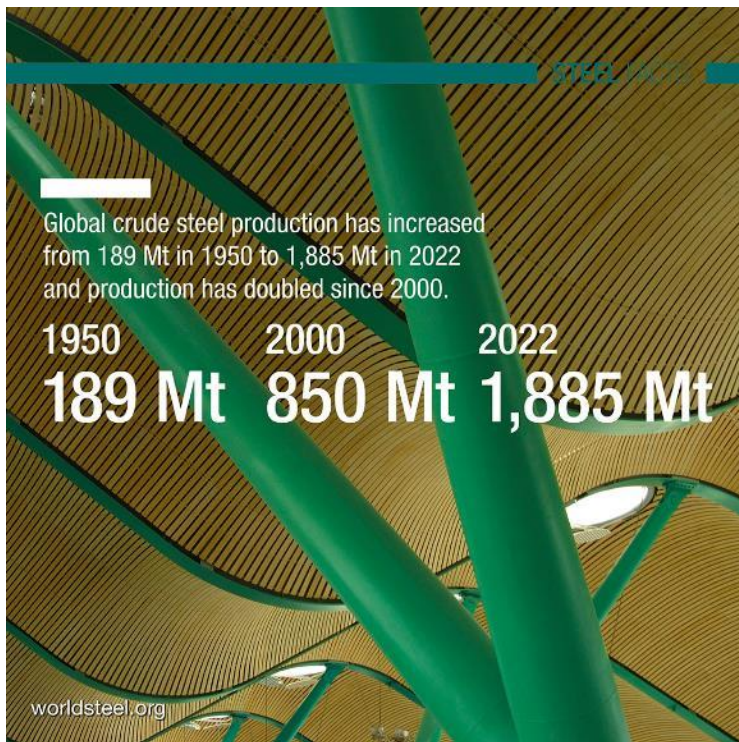
Save 6.000.000 kgCO₂e



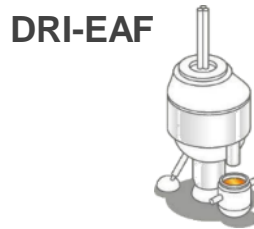
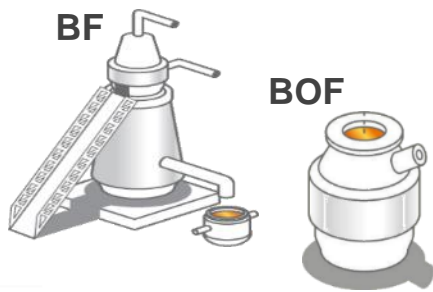
The structural engineer has more opportunity to reduce carbon emissions than most other people

**ARE WE STILL
USING STEEL?!?**

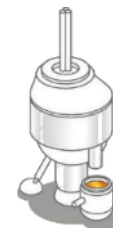
The big picture



Each steelmaking route has its own carbon footprint



**SCRAP-BASED
EAF**



**+ renewably
produced electricity**

Steelmaking route	Blast furnace-basic oxygen furnace (BF-BOF)	Direct reduced iron (DRI) followed by an EAF	Electric arc furnace (EAF)	EAF with renewably produced electricity
Main input	Coal and iron ore	direct reduced iron (sponge iron)	scrap	scrap
Main CO ₂ source	Chemical interaction between carbon (coal) and iron ore: iron reduction produces pig iron which is converted into steel.	Emissions from the use of natural gas as reductant Emissions from purchased electricity	Emissions from purchased electricity	Emissions from purchased electricity
Emissions (incl. rolling mill)	Between 2.25 / 2.8 t. CO ₂ /t	Between 1.12 / 1.35 t. CO ₂ /t	Between 0.62 / 0.85 t. CO ₂ /t	Around 0.3 t. CO ₂ /t

XCarb® recycled and renewably produced

Global warming potential (GWP) in kg CO₂e/tonne
(production stage, modules A1-A3)

Sections

333 kg CO₂e/t



Sheet piles

370 kg CO₂e/t



Rebars

300 kg CO₂e/t



Hot rolled coil

532 kg CO₂e/t



Magnelis®

797 kg CO₂e/t

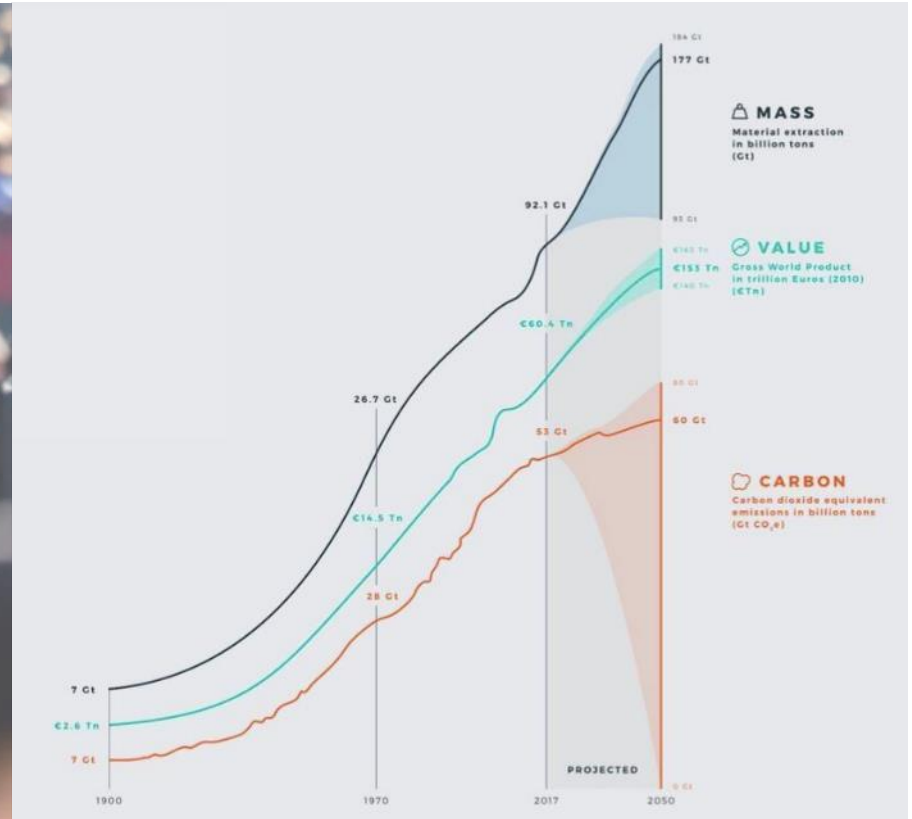


Organic coated steel coils

1030 kg CO₂e/t



Is the solution only focused decarbonizing material production?



Source : Circularity Gap Reporting Initiative 2022

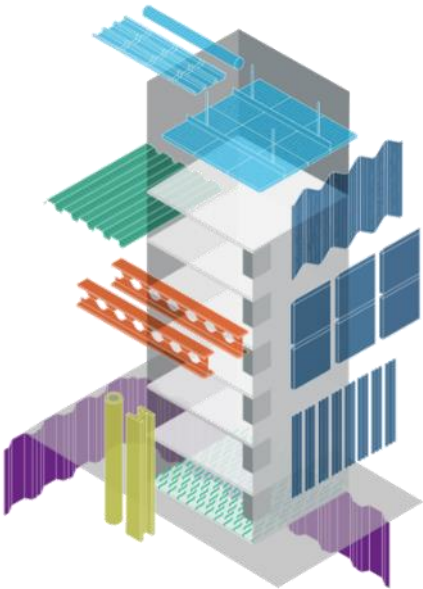
Low embedded carbon design

The image features a background with a color gradient transitioning from purple on the left to orange on the right. A large, white, geometric shape, resembling a stylized 'L' or a corner cut, is positioned in the bottom right area of the frame.

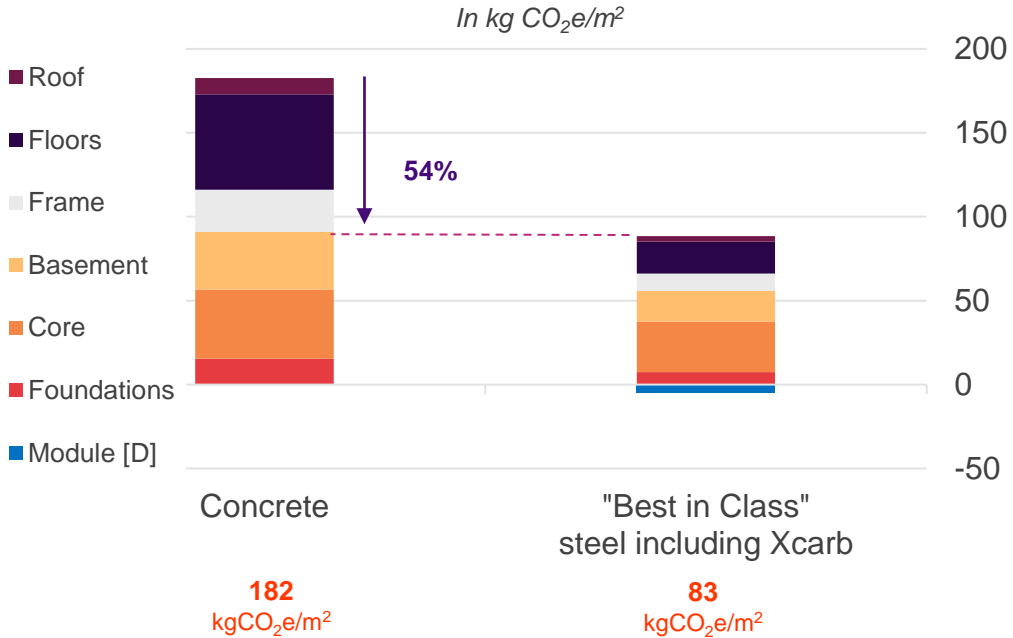
Intelligent material selection makes ALL the difference

The Steligence® office building

CO₂e saving can be as high as 54%



Cradle to cradle | [A-C] + [D]

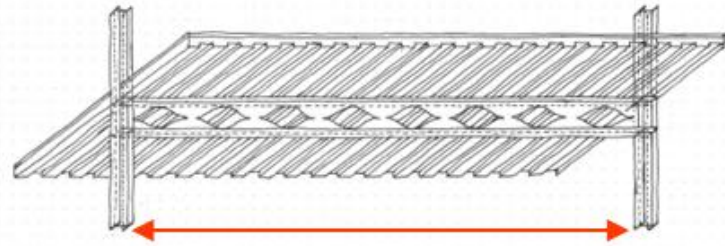
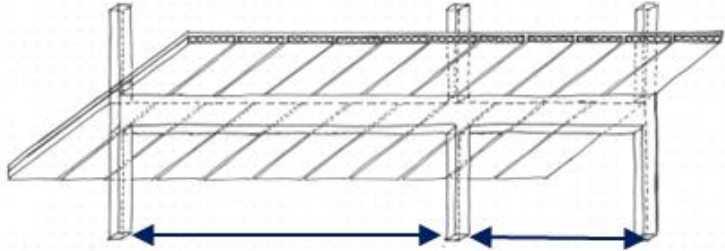


Designing a building in the right way can already decrease its carbon content by 35-55%.



Design for adaptability

Key principles for circularity | Structure reuse (or design for adaptability)



Key principles for circularity | design for adaptability

ArcelorMittal new headquarter



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Re-use of structural elements

Refurbish & Re-use: European Court of Justice in Luxembourg



Dismantling of the of building piece by piece



Re-conditioning and reuse of each piece in the new building



**View of the Main Lobby after
re-construction**

Re-use : Mundo LLN (Belgium)

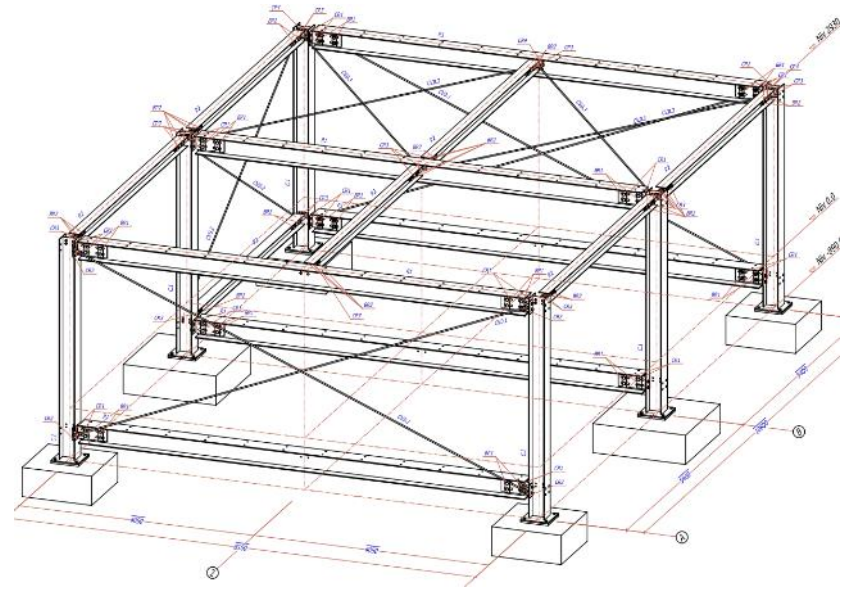


mando
Louvain-la-Neuve



Design for disassembly

Key principles for circularity | Design for disassembly - Pilot Project: la Petite Maison



Thank you



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