CARBON RISK REAL ESTATE MONITOR

CRREM: ASSESS, MANAGE & AVOID CARBON RISK

ULI GREENPRINT MEMBER WEBINAR ON CRREM

12.01.2021

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 785058

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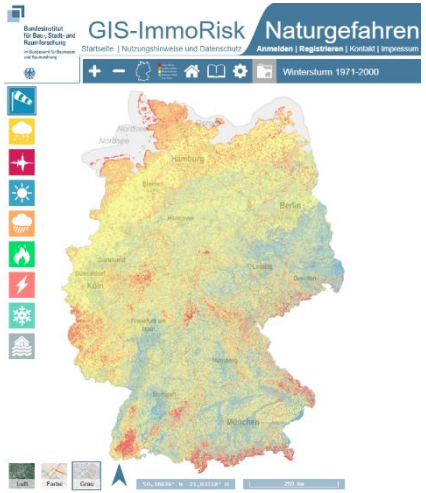
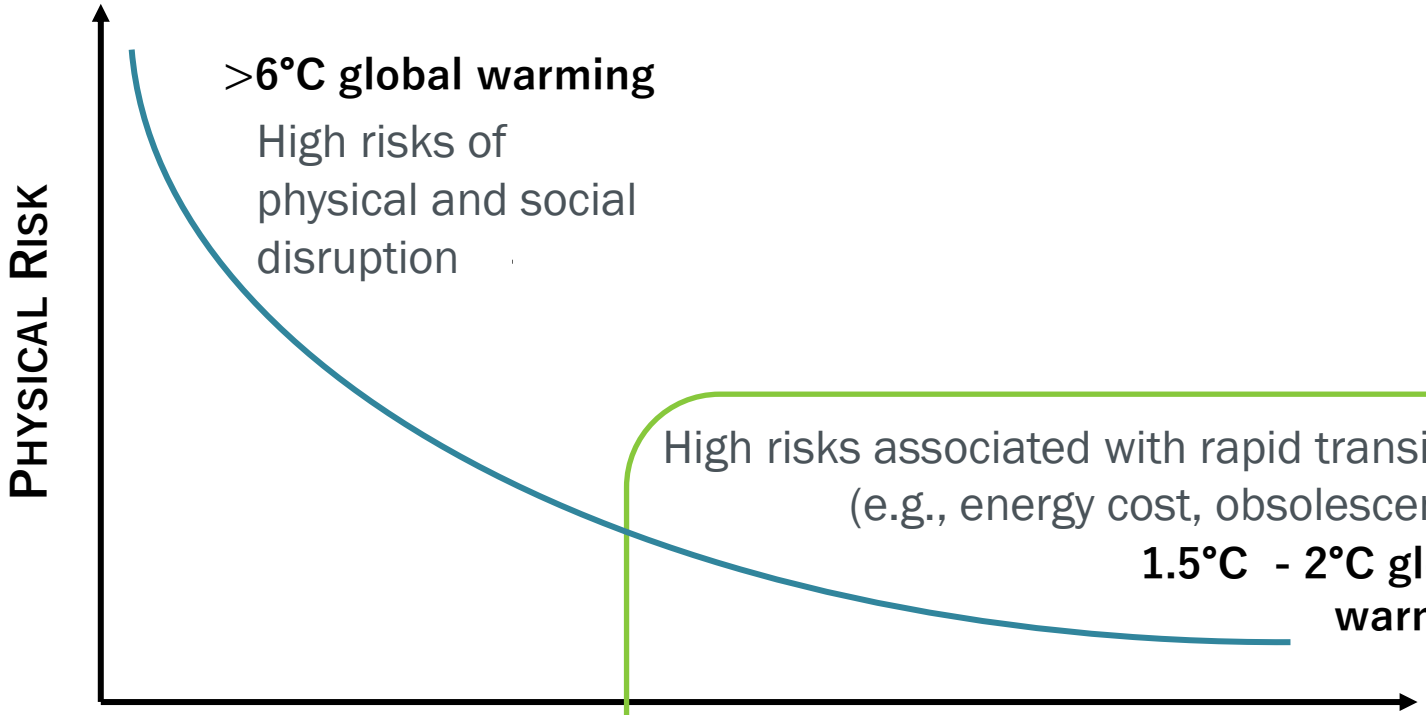


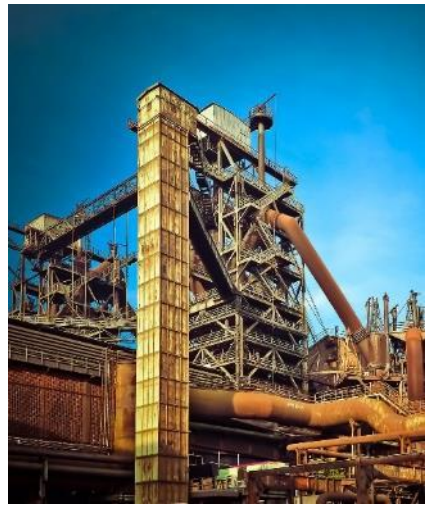
www.gisimmorisknaturgefahren.de

Source: TCFD Technical Supplement, 2017

CLIMATE RISK =

PHYSICAL RISK + TRANSITION RISK





High risks associated with rapid transition (e.g., energy cost, obsolescence)

1.5°C - 2°C global warming

'**STRANDED ASSETS** are properties that will be exposed to the risk of early economic obsolescence due to climate change because they will not meet future regulatory efficiency standards or market expectations.' *(CRREM, 2019)*

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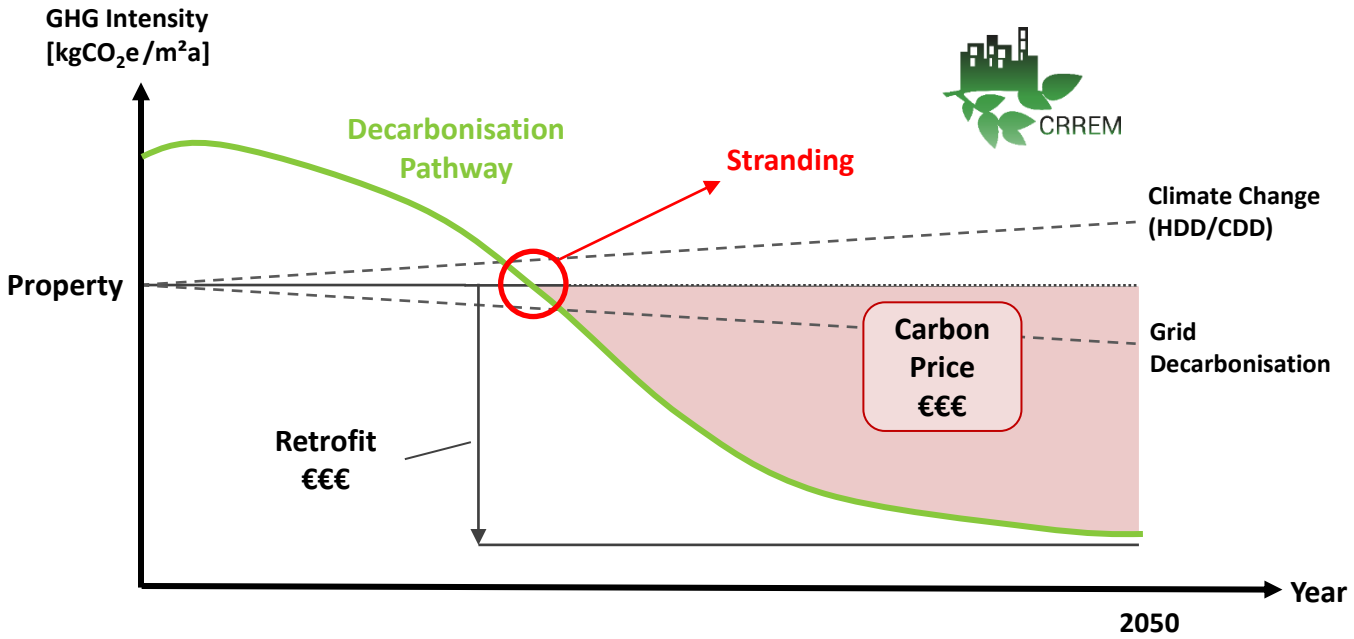
CARBON RISK ASSESSMENT & MANAGEMENT BASED ON QUANTITATIVE PERFORMANCE DATA AND TARGET SETTING

ASSET LEVEL STRANDING DIAGRAM



DECARBONISATION PATHWAYS

Aligned with 1.5°C and 2°C global warming, country- and building type specific

+

BUILDINGS' CARBON PERFORMANCE

Energy consumption, carbon emission factors, grid decarbonsation, changed heating and cooling demand, normalisation..,

=

CARBON RISK ANALYSIS

Year of stranding, excess emissions, carbon costs, energy costs, benchmarking

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Organisations & Firms supporting CRREM (extract)

AEW Europe
Hans Vrensen
Managing Director, Head of Research & Strategy

alstria
Alexander Dexne
CFO
Robert Kitel
Head of Sustainability & Future Research

APG Asset Management
Derk Welling
Senior Responsible Investment & Governance Specialist

Better Building Partnership
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European Public Real Estate Association
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PGGM
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Senior Director Private Real Estate

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Managing Director

Savills Investment Management
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Organisations & Firms supporting CRREM (extract)

Aberdeen Standard Investments
Aberdeen Standard Investments
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ESG Manager, Real Estate

World Green Building Council
Stephen Richardson
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Ista International
Hans Martin Hermann
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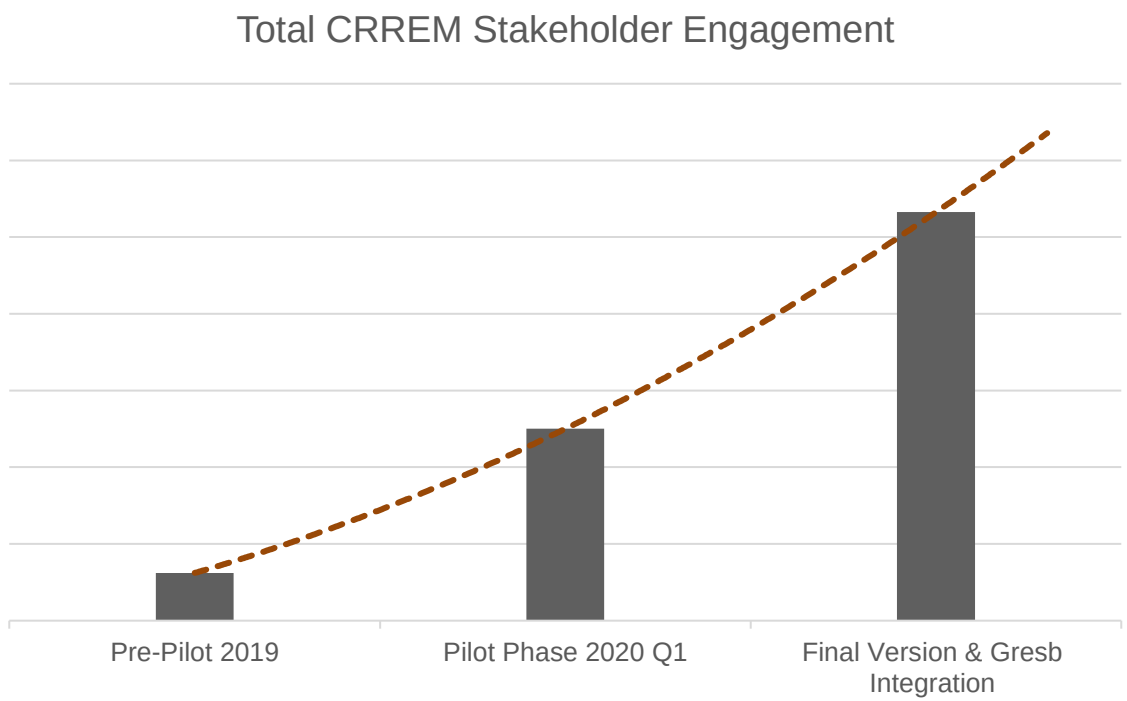
METRO
Metro AG
Olaf Schulze
Director Energy Management, Investments & Technical Solutions

UNEP Finance Initiative
Matthew Ulterino
Principal, UNEP FI

DWS
DWS Real Estate GmbH
Matthias Naumann
CIO



- **Over 1.500 assets** optimized and **over 6 million** square meters of **lettable space** analysed
- Total funds of with over **300 bn. Euro AuM** used the tool

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ENERGY TO CO_2-EMISSIONS

WHOLE BUILDING ENERGY

Tenant electricity — kWh → Tenant controlled (pruchased & consumed)

Common area electricity — kWh → Landlord controlled (passed on to tenant)

Heating energy — kWh → Purchase by landlord

- **Tenant 1** *Consumption*
- **Tenant 2** *Consumption*
- **Tenant 3** *Consumption*

$$\frac{\Sigma \text{ All consumption (kWh)}}{\text{Rented area (m²)}} =$$

INTENSITY INDICATOR 1
Energy consumption per **m²**
(kWh/**m²**)

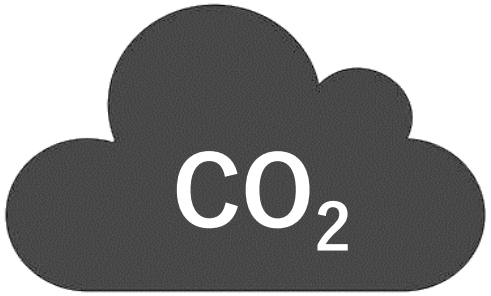
CO2 CONVERSION FACTORS

$$\frac{\text{E.g. per kWh}}{0.475\ (kgCO_2e)}$$

Or 0 ($kgCO_2e$)

$$\frac{\text{E.g. per kWh}}{0.203\ (kgCO_2e)}$$

BUILDING EMISSIONS



$$\frac{\Sigma \text{ All emissions } (kgCO_2e)}{\text{Rented area (m²)}} =$$

INTENSITY INDICATOR 2
CO_2 Emissions per **m²**
($kgCO_2e$/**m²**)

Source: Alstria, 2020

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CRREM PATHWAYS: DOWNSCALING FROM GLOBAL EMISSIONS TO CARBON INTENSITY PATHWAYS

DOWNSCALING

Global GHG budget and emissions pathway (consistent with a certain amount of global warming)

↓

Global buildings GHG emission pathway

↓

Global buildings GHG intensity pathway

↓

Country-specific residential GHG intensity pathway

↓

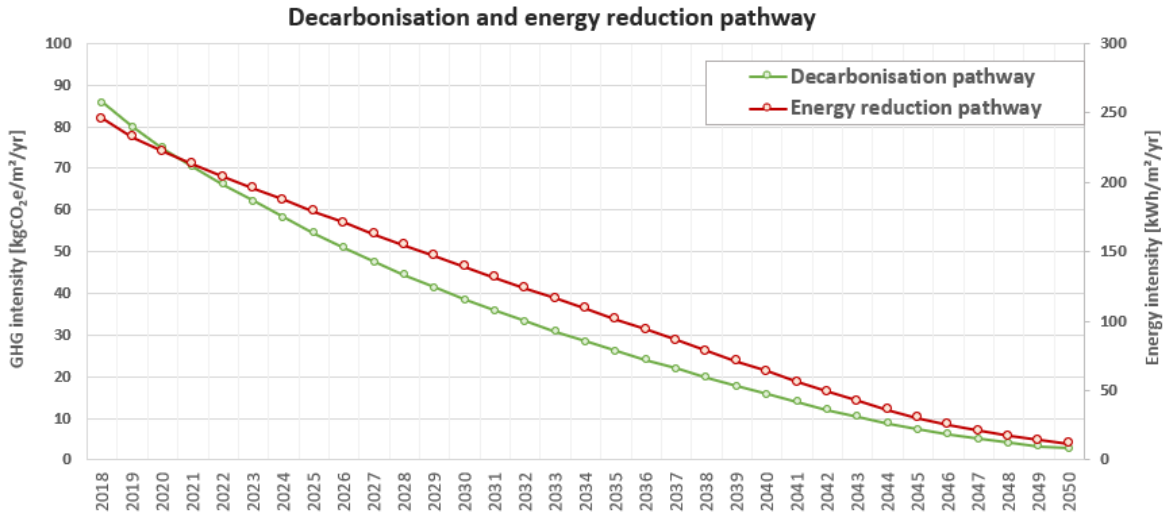
Country-specific CRE GHG intensity pathways

↓

Country-specific CRE-subsector GHG intensity pathways

↓

Country-specific CRE-subsector energy intensity pathways



Global warming target:	1.5°C
Country:	USA
Type of use:	Office

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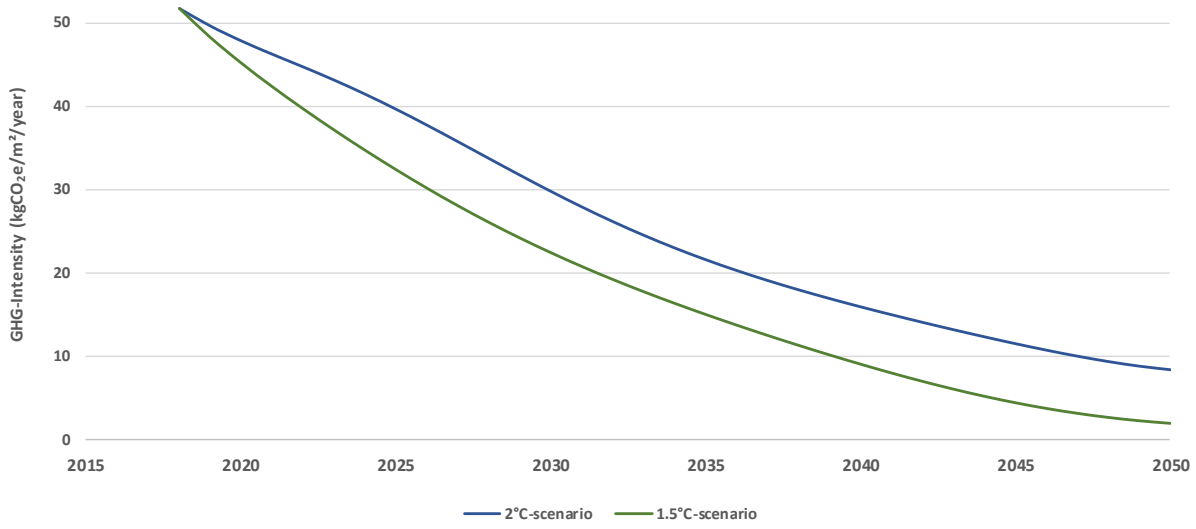
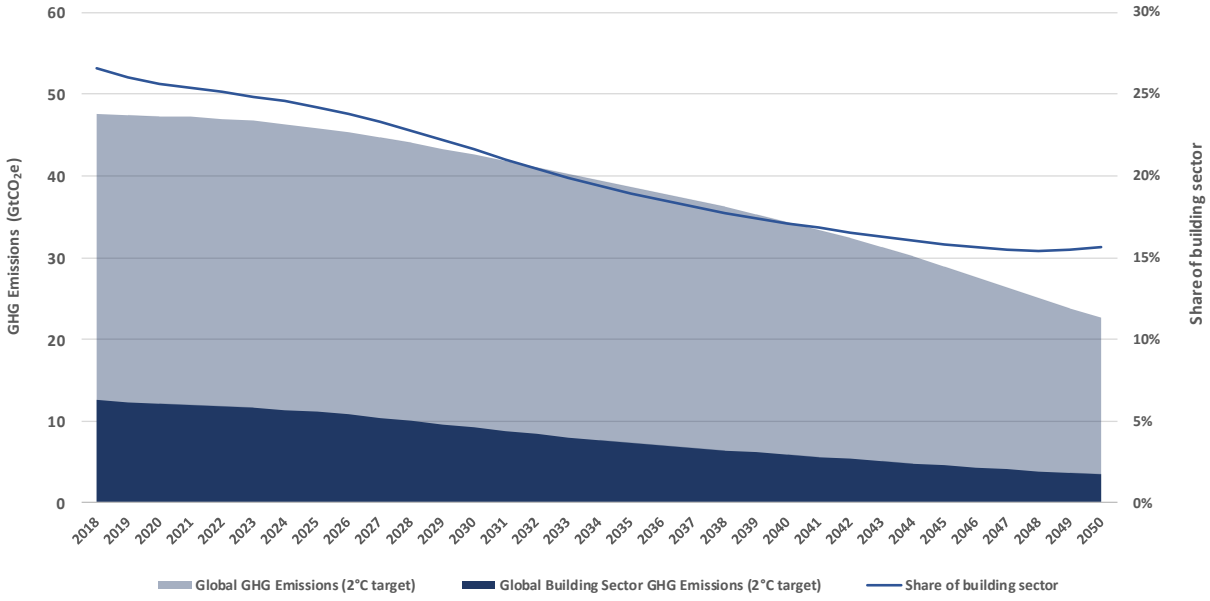
CRREM PATHWAYS: DOWNSCALING FROM GLOBAL EMISSIONS TO CARBON INTENSITY PATHWAYS

CRREM translates long-term policies (COP21) into clear science-based targets

Global building sector GHG intensity pathway (1.5°C and 2°C target)



Global carbon emissions (2°C target) of all economic sectors and the building sector



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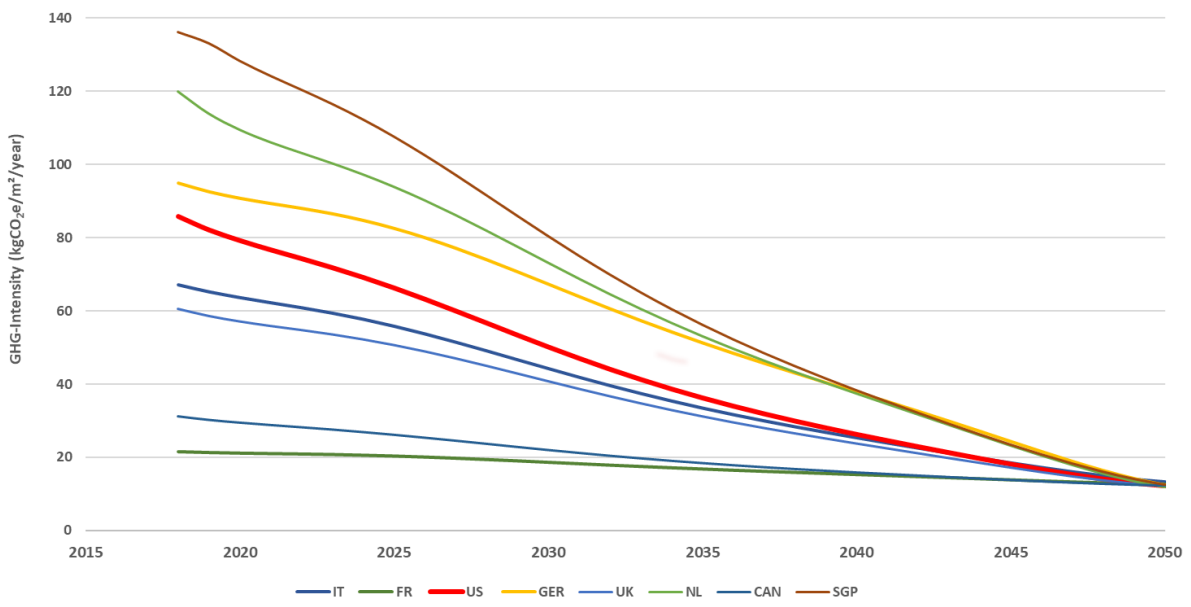
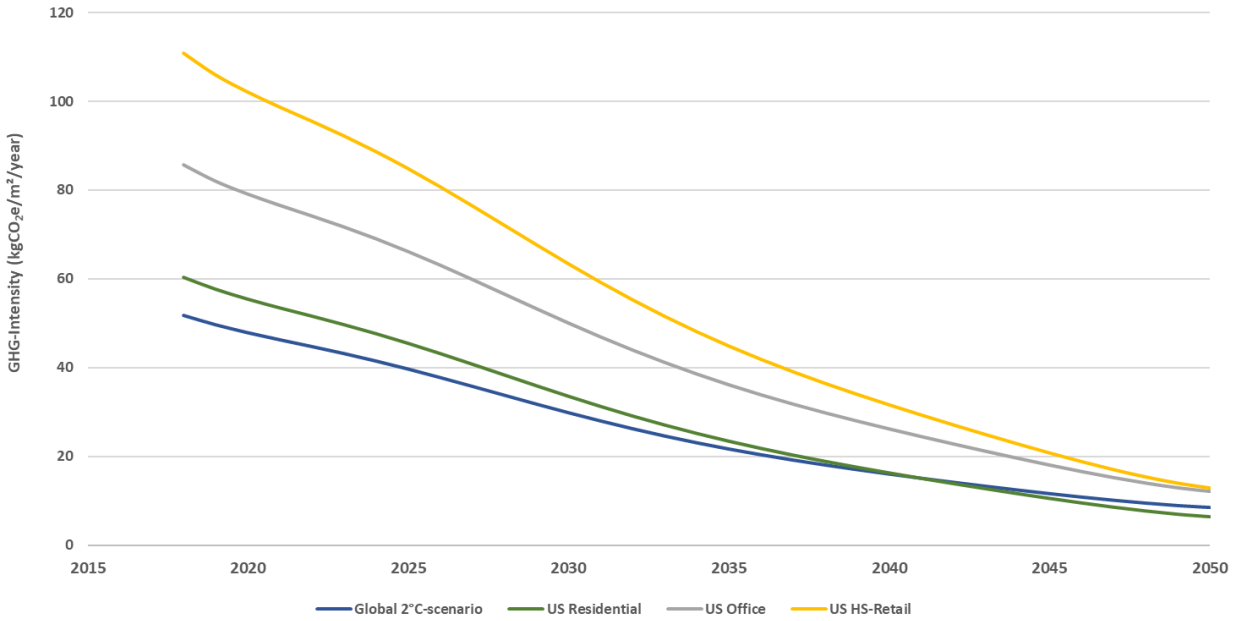
CRREM PATHWAYS: DOWNSCALING FROM GLOBAL EMISSIONS TO CARBON INTENSITY PATHWAYS

CRREM translates long-term policies (COP21) into clear science-based targets

National Pathways: Convergence of the carbon intensity pathway of the building sector (office) in individual countries to the global pathway (2°C)



Residential and Commercial sector: Decarbonisation pathways of global buildings sector, US office buildings, High street retain and US residential (2°C)



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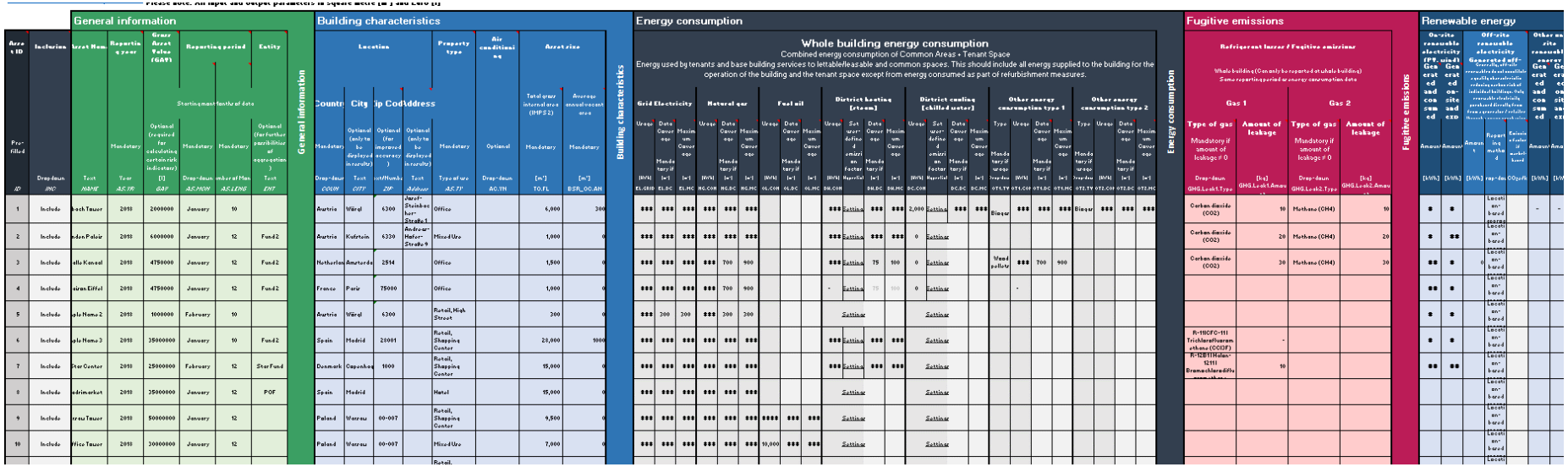
Stepwise integration of CRREM Risk Analysis and GRESB

(1) Download CRREM Risk Assessment Tool pre-filled with data company's GRESB participation

(2) GRESB participants to receive results of CRREM Risk Analysis within GRESB Portal

GRESB & CRREM

Property types and input parameters are aligned with GRESB ESG Benchmark:



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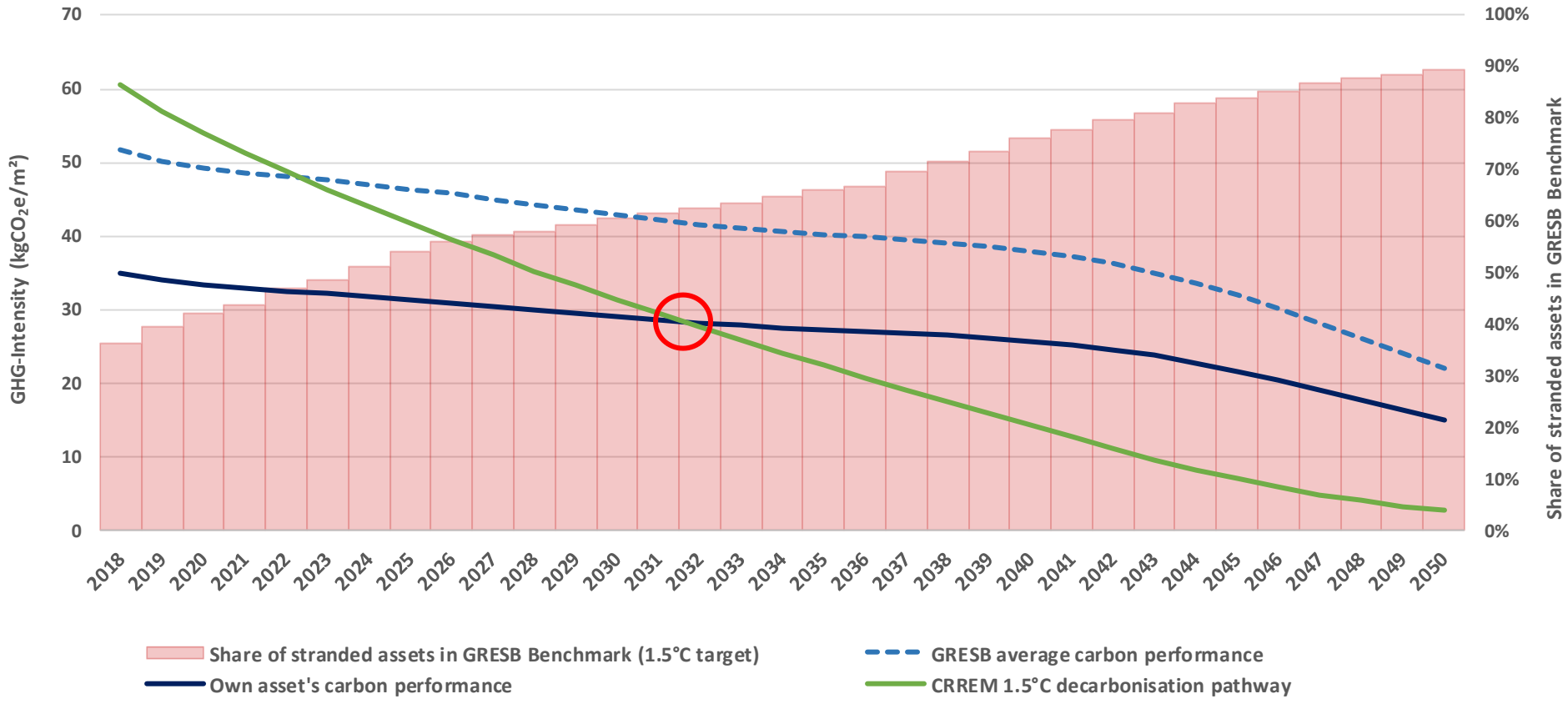
Stepwise integration of CRREM Risk Analysis and GRESB

BENCHMARK YOUR ASSET(S) AGAINST YOUR PEERS



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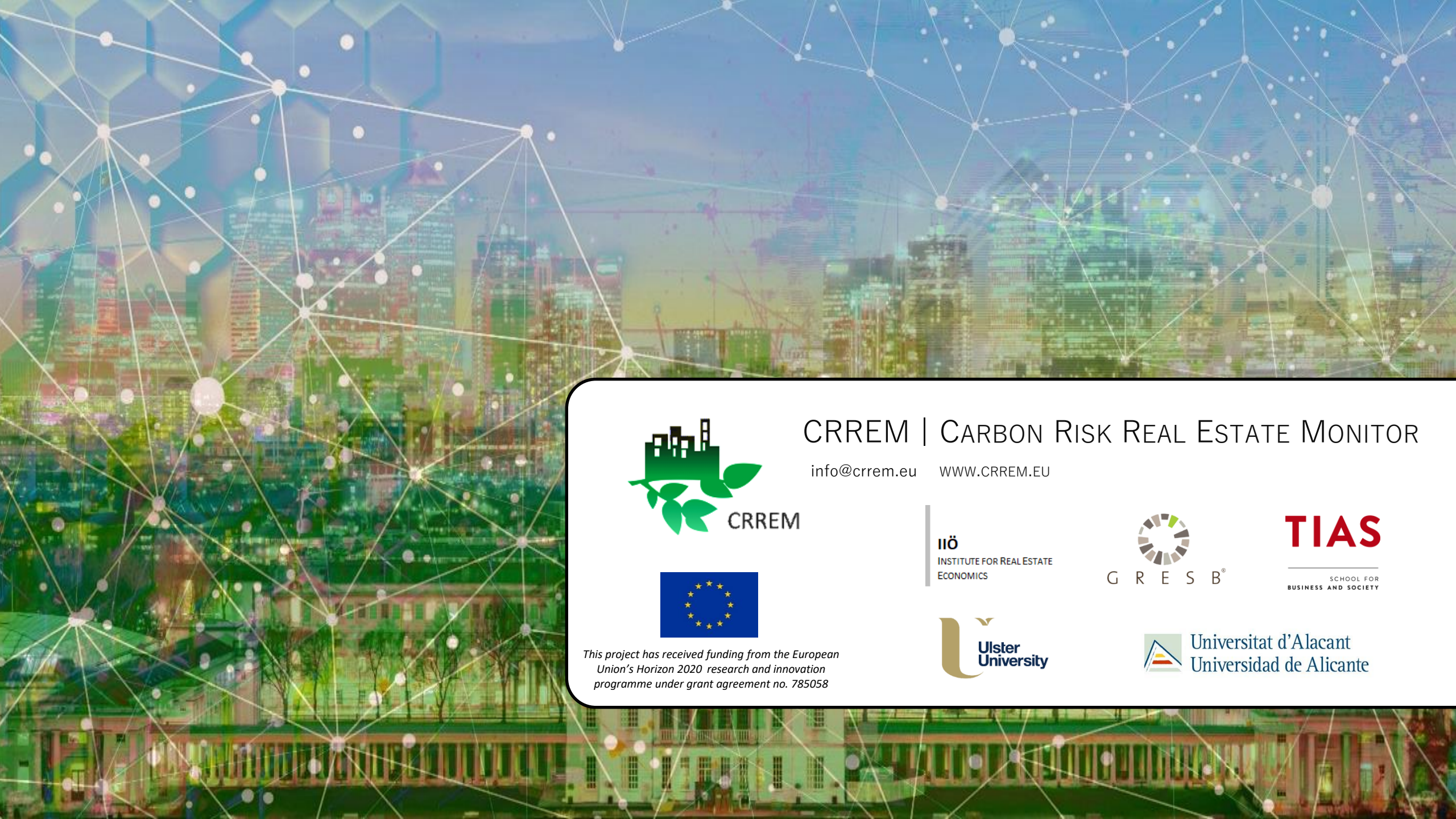

CRREM | Carbon Risk Real Estate Monitor

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CRREM

IIÖ
Institute for Real Estate Economics

GRESB

TIAS
School for Business and Society

Ulster University

Universitat d'Alacant
Universidad de Alicante

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Low-carbon Strategies

1. EMISSIONS IN OPERATION

- Expand electrification, alternative types of heating (FW, WP)
- Enabling energy flexibility, eMobility and Load Management
- Renewable energies on site(production and storage)
- Reduce energy demands
- When replacing technology, focus on efficient and low-tech models

2. BUILT-IN EMISSIONS

- Continuous use of the building materials!
- In construction, use as little concrete and steel as possible!
- Simple and robust construction!
- Use low carbon (e.g. wood) and recycled building materials!

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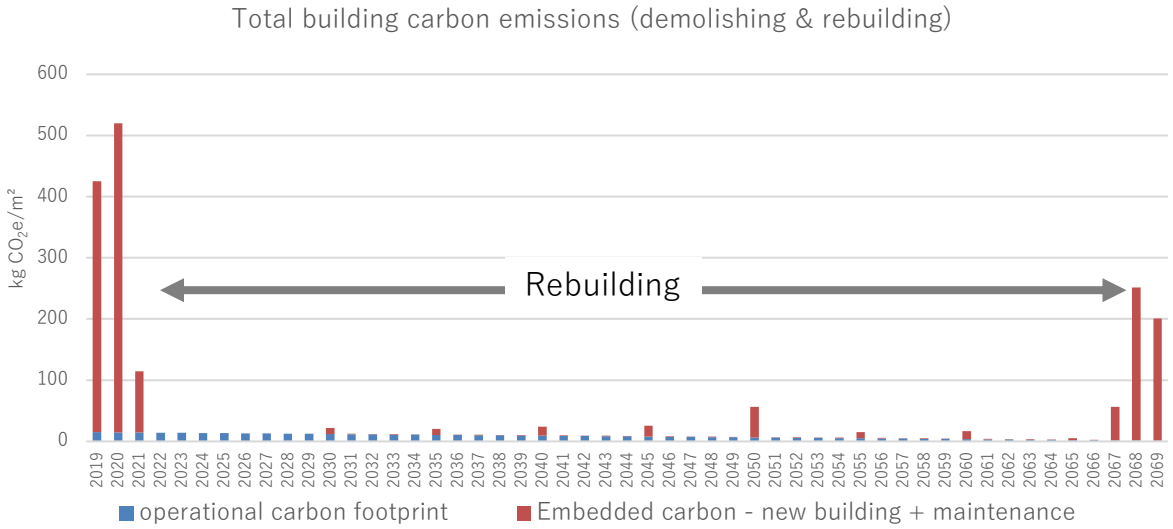
BEST IMPACT: REFURBISH & REUSE



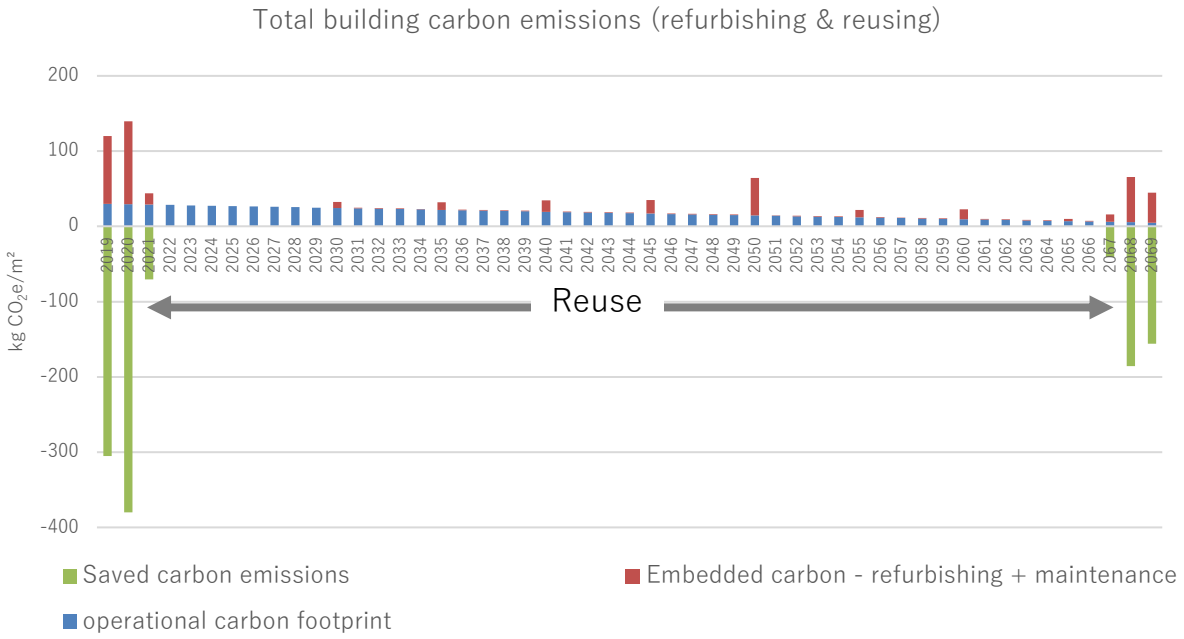
Rebuilding: approx. 1.000 kg CO_2e/m² (NGF)

operation (office): approx. 25-50 kg CO_2e/m² (NGF)

Emissions from rebuilding equal Emissions of 25-50 years in opearation!

Refurbish & Reuse:

60 – 80 % of embedded emissions reusable
→ equals emissions of 25-35 years!



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Climate science

Climate impact and carbon emission budgets/pathways compatible with limiting global warming to x.x°C

↓

Paris Agreement

Commitment to limit global warming to 2°C or better 1.5°C

↓ ↓

Politics

New regulatory requirements: Emission/energy goals, reporting, (sustainable) finance

Real Estate Investors

Changed market expectations, 'Paris-proof' investments/portfolios

↓ ↓

STRANDING RISK | CARBON RISK | TRANSITION RISK

↑

assess, manage & avoid

CARBON RISK REAL ESTATE MONITOR

CRREM Pathways **CRREM Tool**

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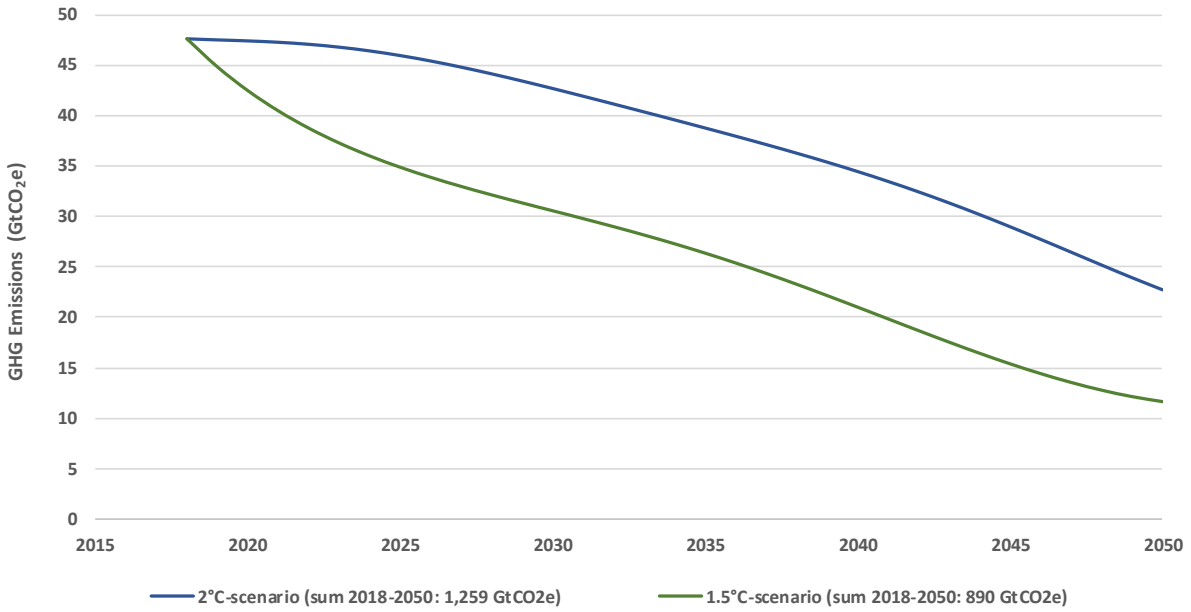
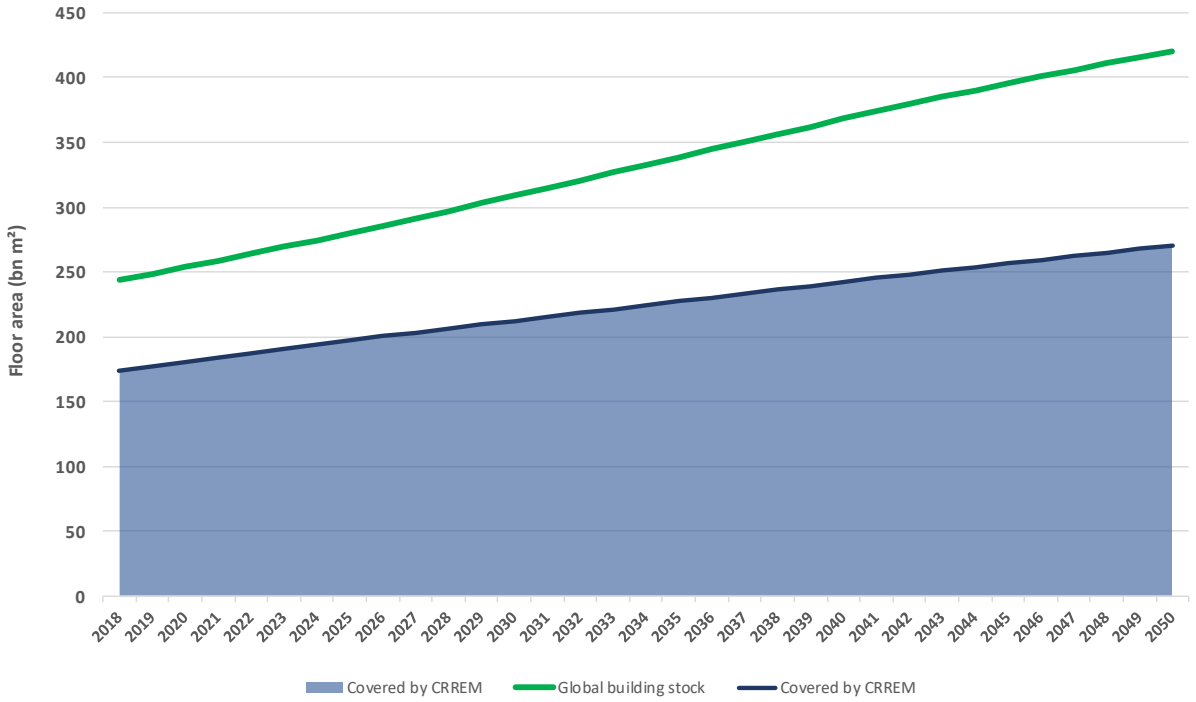
CRREM PATHWAYS: DOWNSCALING FROM GLOBAL EMISSIONS TO CARBON INTENSITY PATHWAYS

CRREM translates long-term policies (COP21) into clear science-based targets

Global carbon emission pathways (CO_2e) of 1.5°C and 2°C scenario



Evolution of global building stock (2018-2050) and part covered by CRREM



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CARBON RISK IN REAL ESTATE PORTFOLIOS

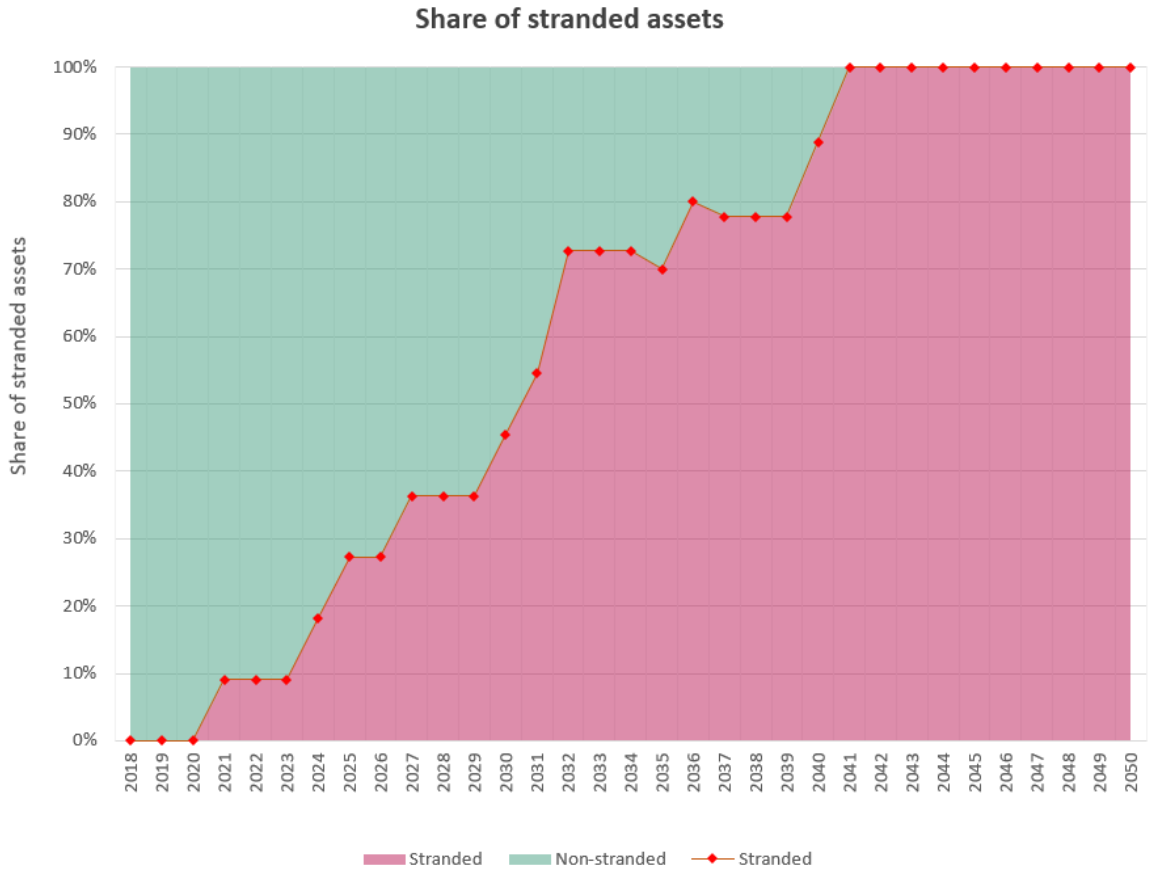
EVOLUTION OF STRANDING WITHIN PORTFOLIO

Diagrams on the right display the evolution of stranding within your portfolio. Upper graph: Relative share of stranded assets. Lower graph: Absolute figures. Choose whether to display data based on the number of buildings, gross floor area (GFA) or gross asset value (GAV). Choose whether to exclude individual assets or exclude them from a certain year on.

Asset ID	Include	Sell in year
1	Yes	Don't sell
2	Yes	Don't sell
3	Yes	Don't sell
4	Yes	Don't sell
5	Yes	Don't sell
6	Yes	Don't sell
7	Yes	2035
8	Yes	Don't sell
9	Yes	Don't sell
10	Yes	2037
11	Yes	Don't sell

Show shares based on: Number of buildings

Climate target: 2°C



Set filter:

Country: All

Property type: All

Entity/Fund: All

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