

CARBON RISK REAL ESTATE MONITOR

CRREM: Assess, Manage & Avoid Carbon Risk

29.04.2020



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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PROPERTY VALUES ARE INCREASINGLY EXPOSED TO CLIMATE RISK

'CLIMATE RISK IS INVESTMENT RISK' (BLACKROCK, 2020)

assess, manage & avoid risk with the Carbon Risk Real Estate Monitor

CRREM pathways

- Paris-aligned decarbonisation & energy reduction pathways
- Per country and building type



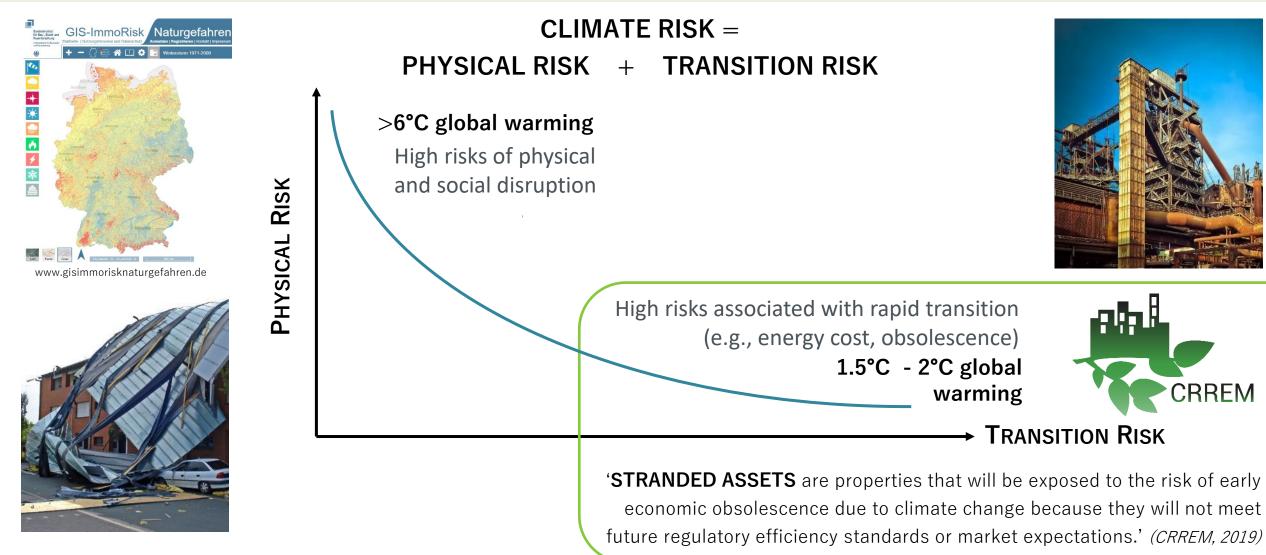
CRREM Tool

- Assess the carbon and energy performance of buildings and portfolios
- Benchmark against CRREM pathways and peers
- Derive indicators for risk management, reporting, disclosure





CLIMATE RISK



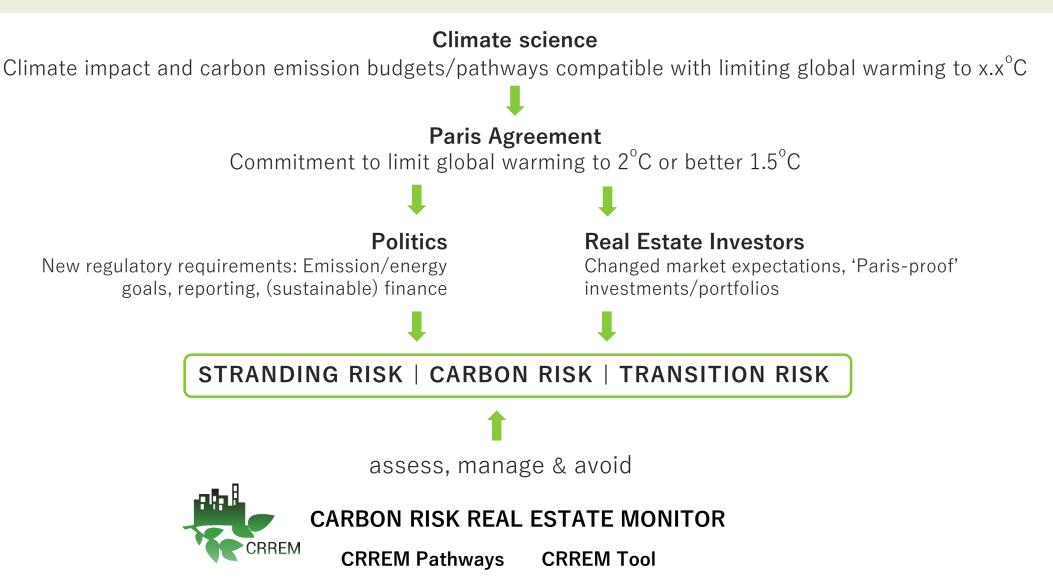
Source: TCFD Technical Supplement, 2017

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Slide 3 2020 RREM

24..04.2020





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Slide 4 CRREM 2020



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PROJECT PARTNERS



INSTITUT FÜR **IMMOBILIENÖKONOMIE** IIÖ Institut für Immobilienökonomie Coordinator | Austria



TiasNimbas Business School Tilburg University | Netherlands



University of Ulster | UK



Universitat d'Alacant Universidad de Alicante

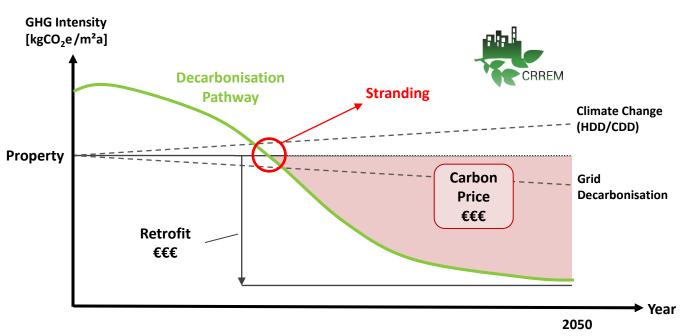
University of Alicante Spain



GRESB | The ESG Benchmark for Real Assets



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

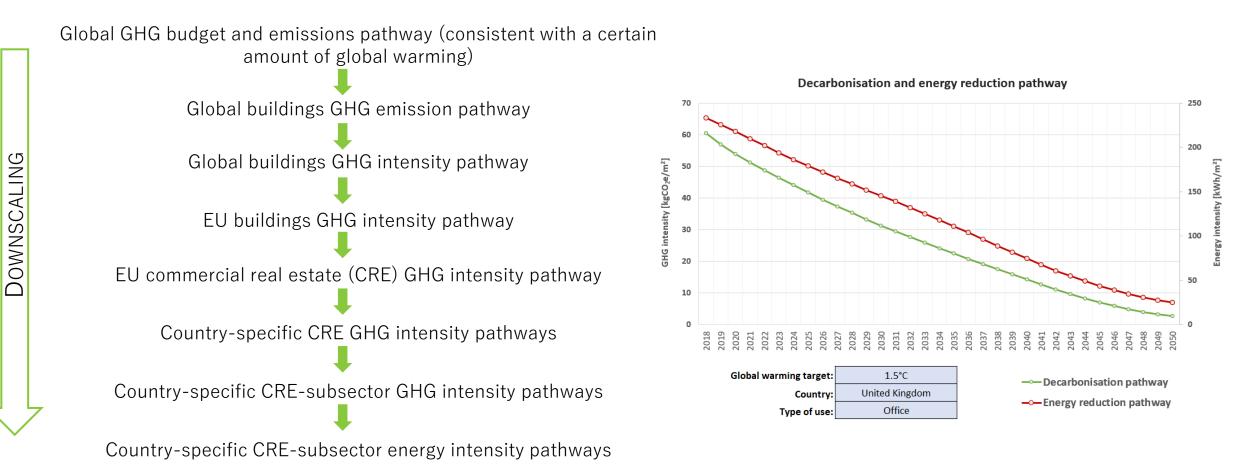
Energy consumption, carbon emission factors, grid decarbonsation, changed heating and cooling demand, normalisation..,

CARBON RISK ANALYSIS

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



CRREM PATHWAYS: DOWNSCALING FROM GLOBAL EMISSIONS TO CARBON INTENSITY PATHWAYS

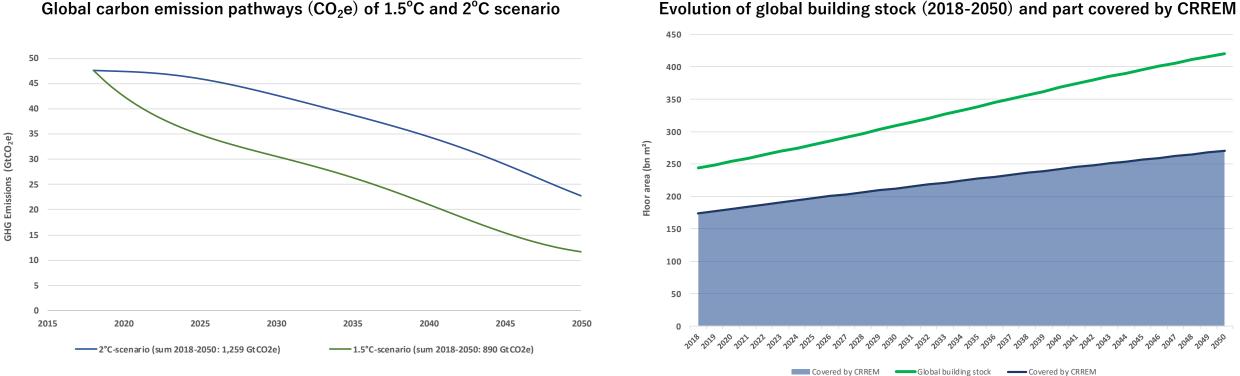


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CRREM PATHWAYS: Downscaling From Global emissions to Carbon intensity pathways

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



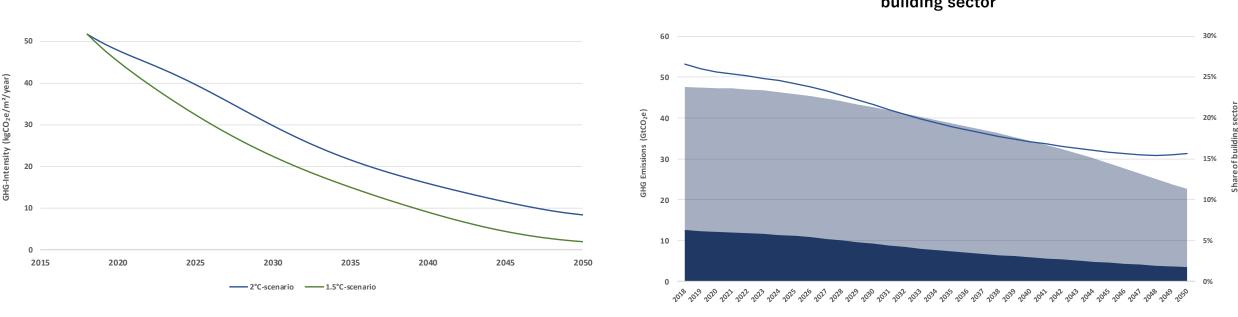
Global carbon emission pathways (CO₂e) of 1.5°C and 2°C scenario



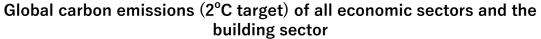
Share of building sector

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)



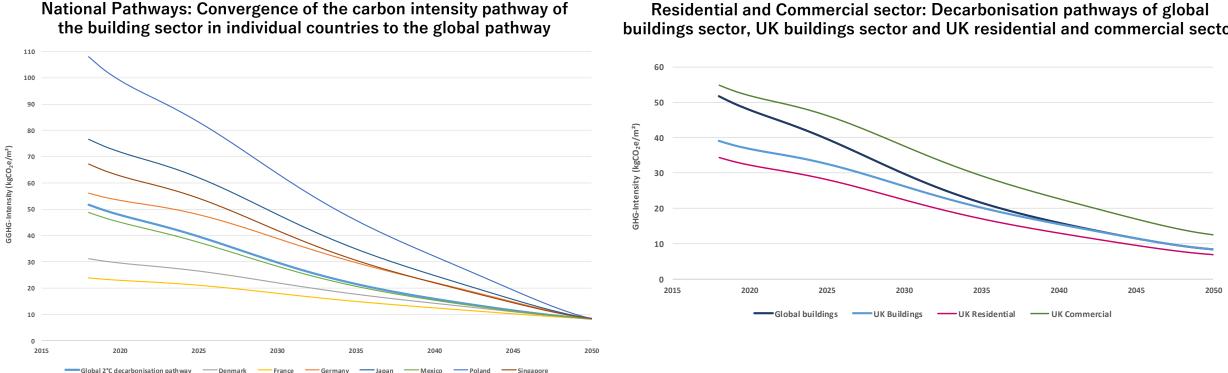
Global Building Sector GHG Emissions (2°C target)

Global GHG Emissions (2°C target)



CRREM PATHWAYS: Downscaling From Global emissions to Carbon intensity pathways

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



buildings sector, UK buildings sector and UK residential and commercial sector

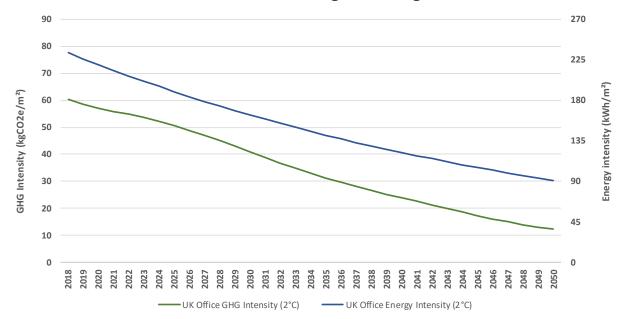


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CRREM PATHWAYS: DOWNSSCALING FROM GLOBAL EMISSIONS TO CARBON INTENSITY PATHWAYS

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

Subsectors of commercial real estate: Decarbonisation and energy reduction pathway for UK office buildings (2°C target)

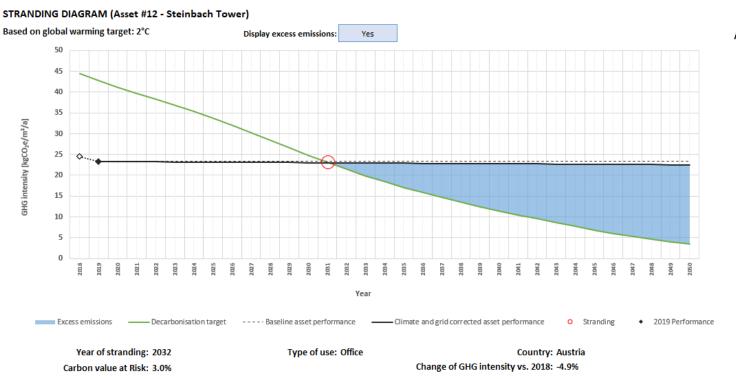


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CARBON RISK ASSESSMENT & MANAGEMENT BASED ON QUANTITATIVE PERFORMANCE DATA AND TARGET SETTING

CRREM TOOL STRANDING DIAGRAM



DECARBONISATION PATHWAYS

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

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BUILDING'S CARBON PERFORMANCE

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

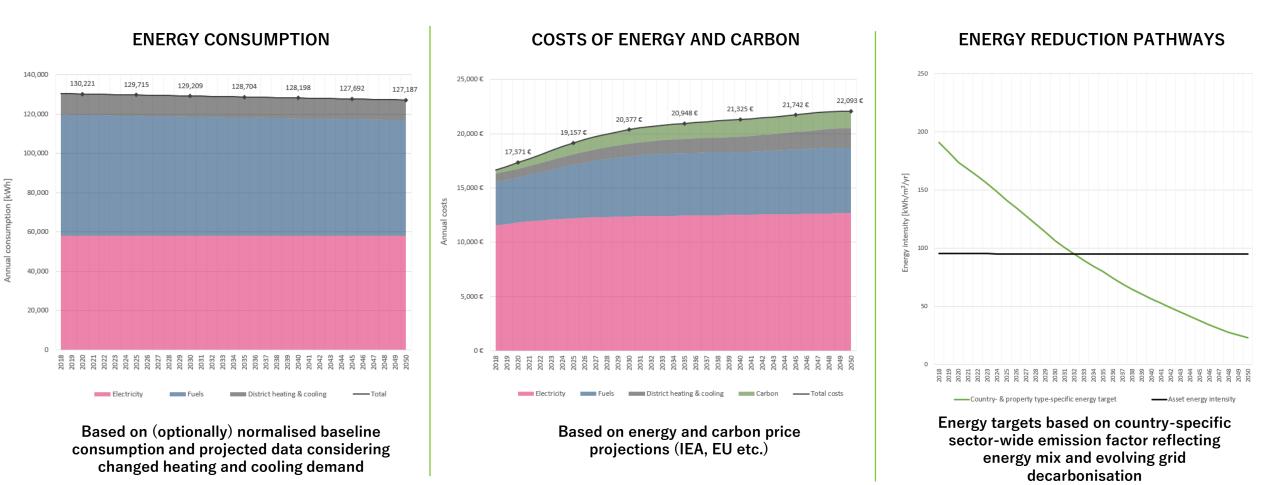
CARBON RISK ANALYSIS

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



QUANTITATIVE CARBON PERFORMANCE AND RISK INDICATORS

Year of Stranding, Carbon Value at Risk, Year-to-Year Improvement, Costs of Carbon...

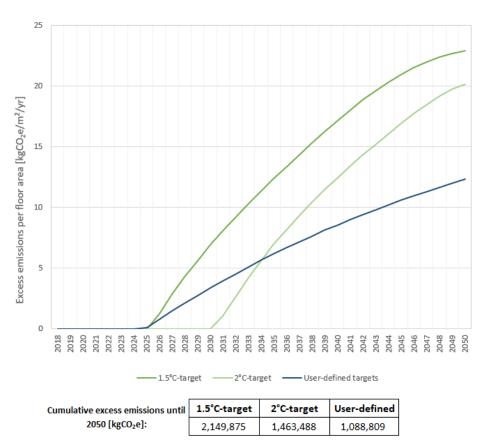


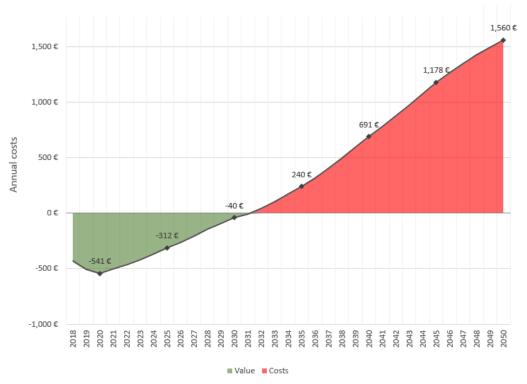
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QUANTITATIVE CARBON PERFORMANCE AND RISK INDICATORS

EXCESS EMISSIONS PER FLOOR AREA





Analoguous to the NY City model with penalties for each ton of emission above emission limit (and possibility of trading emission credits)

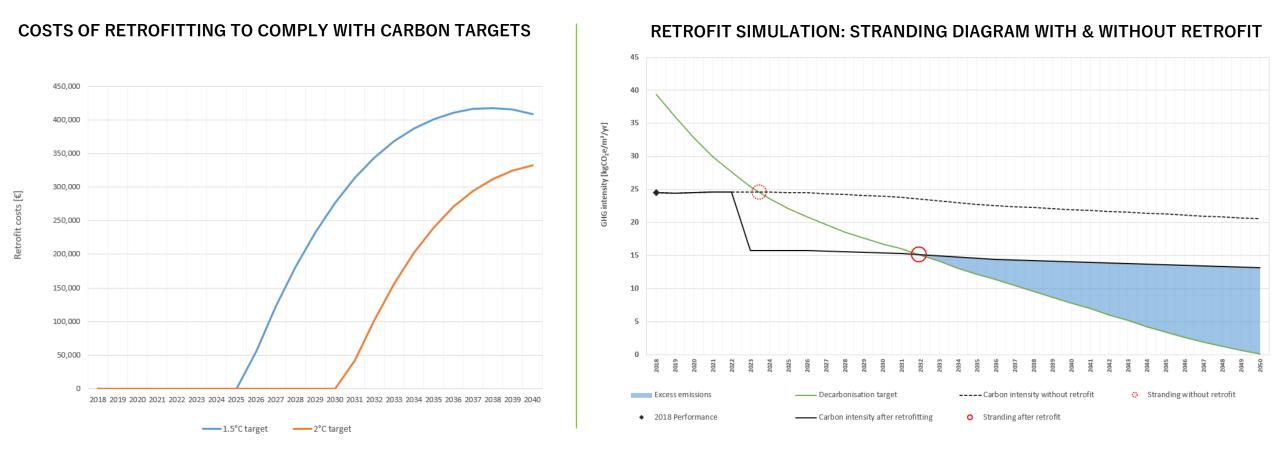
COSTS OF EXCESS EMISSIONS ABOVE TARGET

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QUANTITATIVE CARBON PERFORMANCE AND RISK INDICATORS



Simulation of investment in energetic retrofit and its effect on carbon risk indicators (based an marginal abatement costs)

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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.

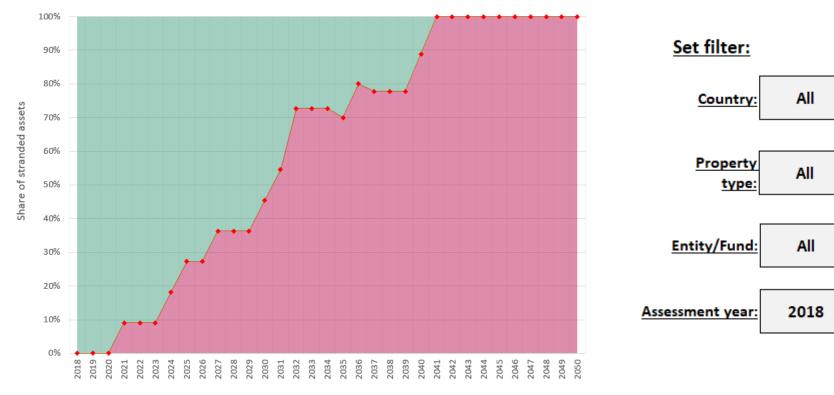
Asset ID	Include	Sell in year
1	Yes	Don't sell
2	Yes	Don't sell
3	Yes	Don't sell
4	Yes	Don't sell
5	Yes	Don't sell
6	Yes	Don't sell
7	Yes	2035
8	Yes	Don't sell
9	Yes	Don't sell
10	Yes	2037
11	Yes	Don't sell

Climate target:

2°C

Show shares based on:

Number of buildings



Share of stranded assets



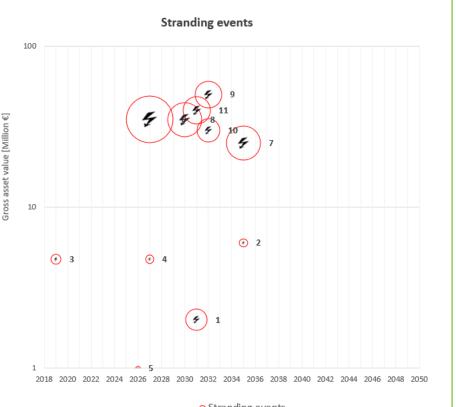
CARBON RISK IN REAL ESTATE PORTFOLIOS

STRANDING EVENTS: NEED FOR ACTION?

The graph on the right provides a summary of stranding events in the course of time. Each circle corresponds to one asset not complying with its decarbonisation pthways for the first time. Circle size (floor area) and y-axis (gross asset value) indicate the importance of an asset within the portfolio.

The area of the circles corresponds to the Gross floor area of the stranded asset. Choose below which global warming target to apply. The numbers next to the circles depit the asset ID.

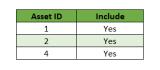
Climate target: 2°C



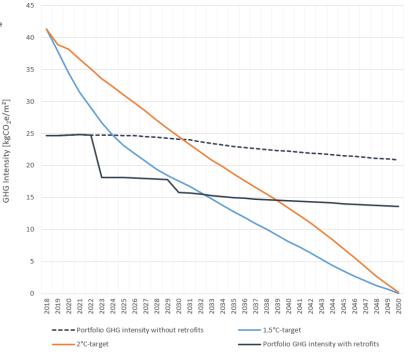
 Stranding events (area of circles corresponds to floor area of asset)

GHG INTENSITY OF PORTFOLIO vs. 1.5°C- & 2°C-TARGETS

The graph on the right presents the GHG intensity of the selected portfolio (black line), benchmarking it against the floor-area-weighted decarbonisation pathway (orange: 2°C, blue: 1.5°C). Exclude individual assets by means of the table below.



Average Portfolio GHG Intensity vs. Paris Targets



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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



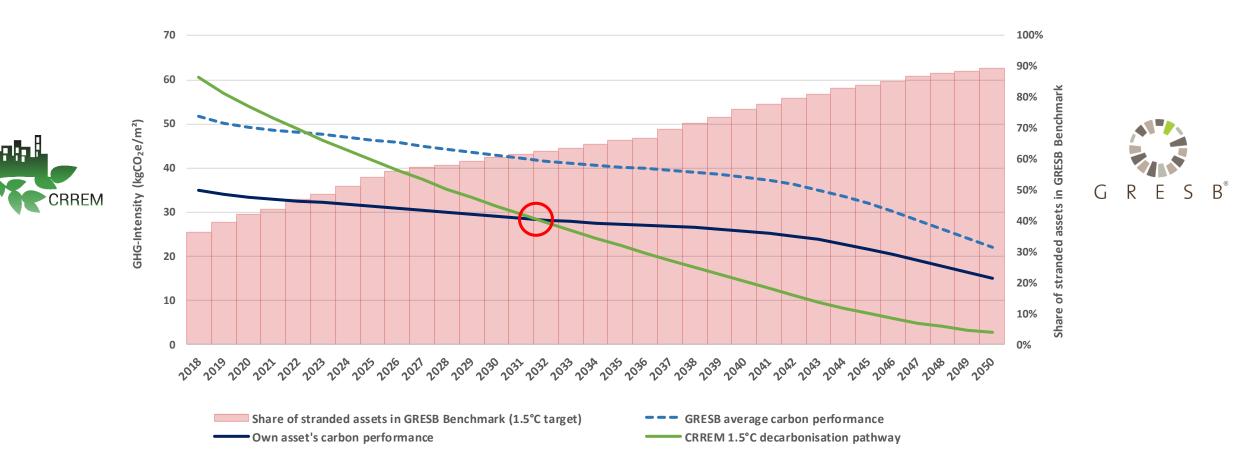
Property types and input parameters are aligned with GRESB ESG Benchmark:

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Stepwise integration of CRREM Risk Analysis and GRESB

BENCHMARK YOUR ASSET(S) AGAINST YOUR PEERS

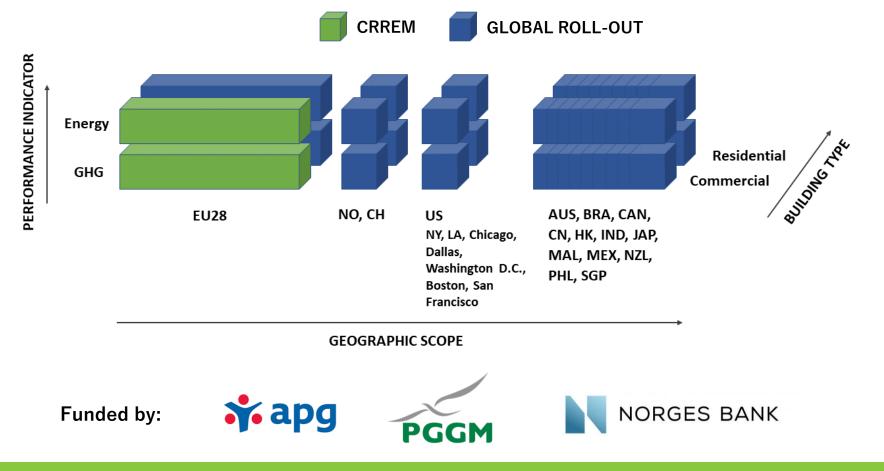


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Extension of CRREM pathways: www.CRREM.org INCLUDING RESIDENTIAL BUILDINGS & KEY GLOBAL REAL ESTATE MARKETS (PUBLICATION OF CRREM GLOBAL PATHWAYS FOR PUBLIC CONSULTATION IN MAY 2020)



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European Investor Committee EIC: Institutional investors & corporate partners

Aberdeen Standard	<i>Land Securities</i>
Ruairi Revell (ESG Manager, Real Estate)	Fernanda Amemiya <i>(Sustainability Reporting Manager)</i>
AEW Europe	Metro AG
Hans Vrensen (Managing Director, Head of Research & Strategy)	Olaf Schulze (Director Facility, Energy & Resource Management)
<i>alstria</i> Alexander Dexne (CFO) Robert Kitel (Head of Sustainability & Future Research)	Nelson Group Carlos Morgado (Project Manager)
APG Asset Management	PGGM
Derk Welling (Senior Responsible Investment & Governance Specialist)	Mathieu Elshout (Senior Director Private Real Estate)
BNP Paribas Real Estate Consult	RE-sponsibility
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ista International	Zurich Insurance Group
Hans Martin Hermann <i>(Senior Manager Public Affairs)</i>	Roger Baumann (COO Global Real Estate & Head Product Development)



European Investor Committee EIC: Industry bodies and academics

BBP Better Buildings Partnership
Christopher Botten (Programme Manager)

CDP

Alberto Carrillo Pineda (Director Science Based Targets and Renewable Energy)

DGNB German Sustainable Building Council Anna Braune (Director Research and Development)

DGBC Dutch Green Building Council Martin Mooij (Head of Certification and Project manager DGBC Deltaplan sustainable renovation)

EPRA European Public Real Estate Association Gloria Duci (ESG Officer) INREV European Investors in Non-Listed Real Estate Federica Miano (Public Affairs Manager)

ULI Greenprint Center for Building Performance Marta Schantz (Senior Vice President)

University of Cambridge Franz Fürst (Professor of Real Estate and Urban Economics)

World Green Building Council Stephen Richardson (Technical Lead - Energy Efficiency Mortgages)

ZIA German Property Federation Philipp Matzke (Consultant Energy and Climate Protection, Facilities Engineering)













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

Universitat d'Alacant Universidad de Alicante

