

CARBON RISK REAL ESTATE MONITOR

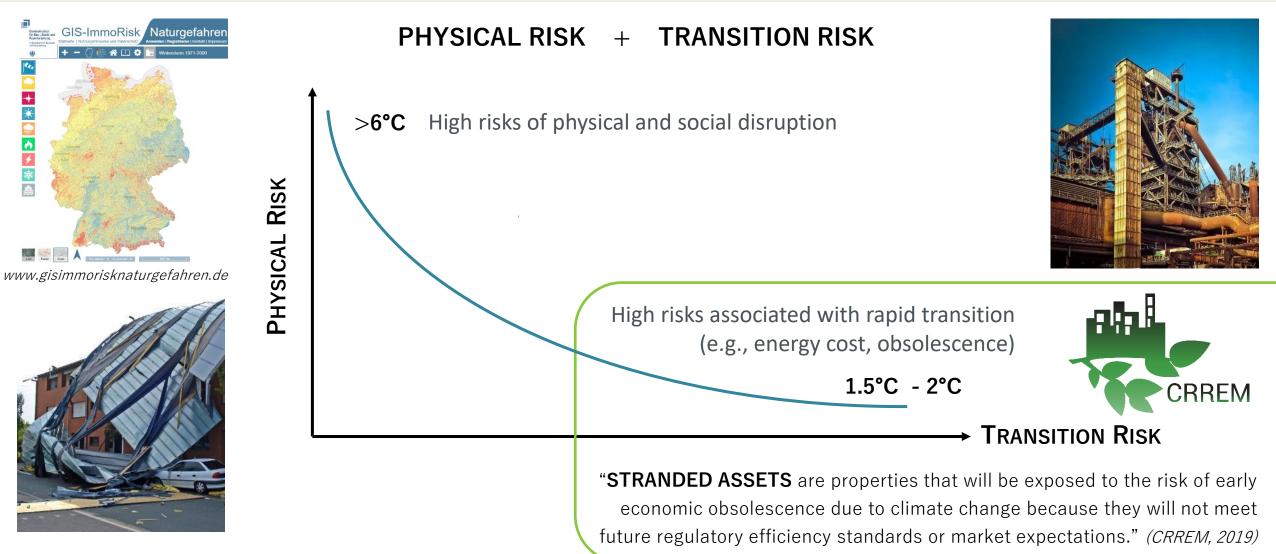
CRREM: Assess, Manage & Avoid Carbon Risk

09.04.2020

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



CLIMATE RISK



Source: TCFD Technical Supplement, 2017

CRREM Introduction
09.04.2020

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Slide 2 RREM 2020



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



CRREM pathways

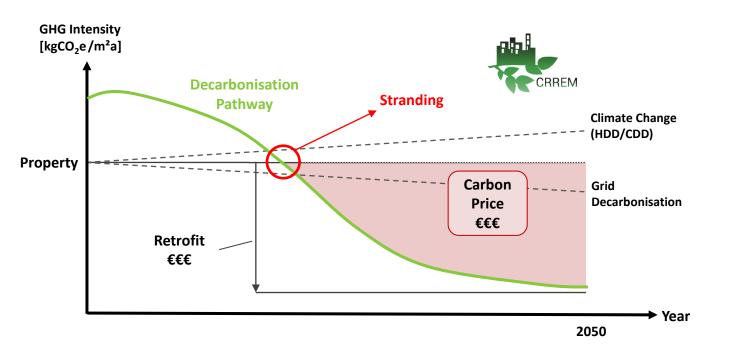
- Paris-aligned decarbonisation & energy reduction pathways
- Per country and building type

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



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



DECARBONISATION PATHWAYS

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

BUILDING'S CARBON PERFORMANCE

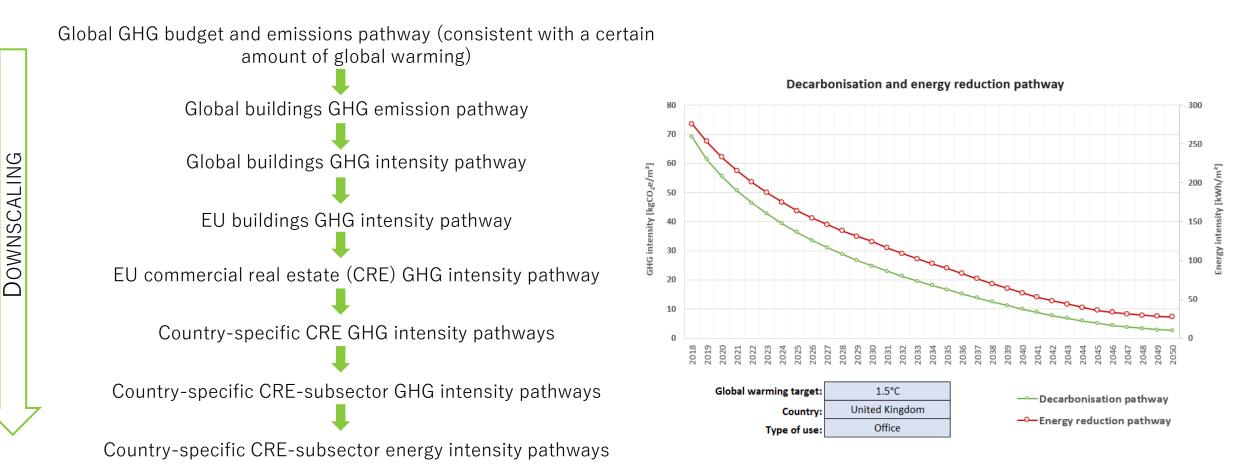
Energy consumption, carbon emission factors, grid decarbonsation), changed heating and cooling demand, normalisation

CARBON RISK ANALYSIS

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



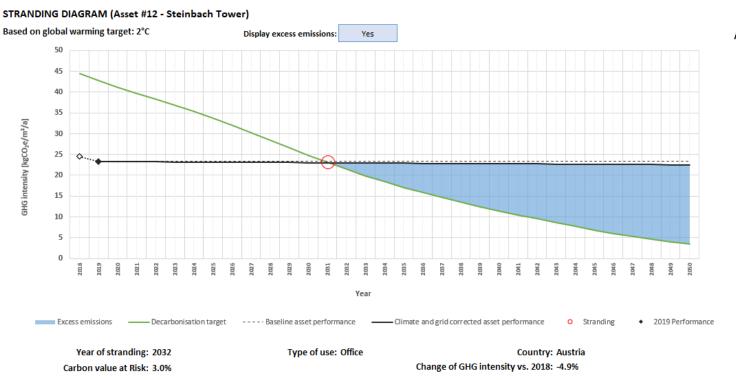
CRREM DOWNSCALING: FROM GLOBAL EMISSIONS TO CARBON INTENSITY PATHWAYS





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

BUILDING'S CARBON PERFORMANCE

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

CARBON RISK ANALYSIS

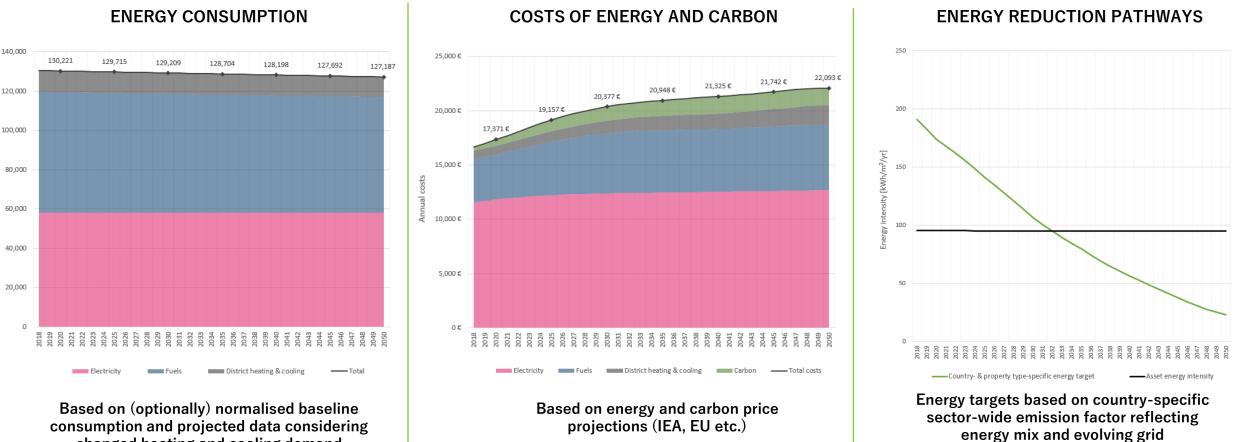
Year of stranding, excess emissions, carbon costs, energy costs, benchmarking



on [kWh]

QUANTITATIVE CARBON PERFORMANCE AND RISK INDICATORS

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



changed heating and cooling demand

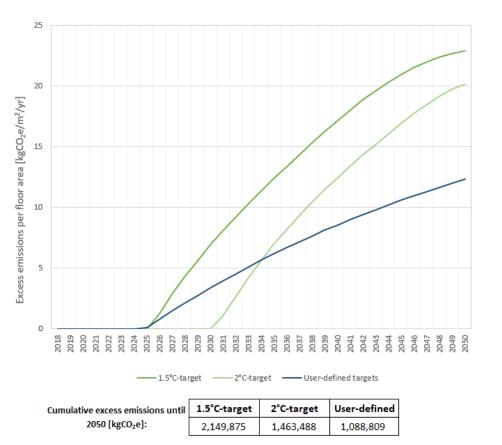
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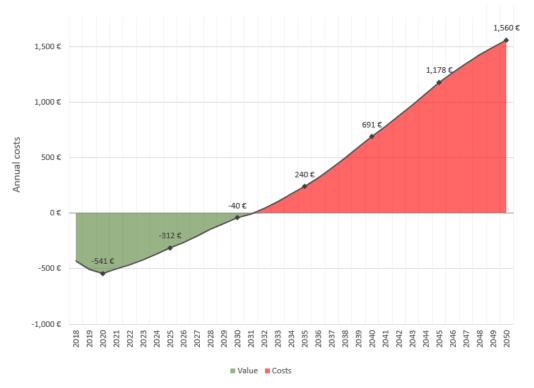
decarbonisation



QUANTITATIVE CARBON PERFORMANCE AND RISK INDICATORS

EXCESS EMISSIONS PER FLOOR AREA



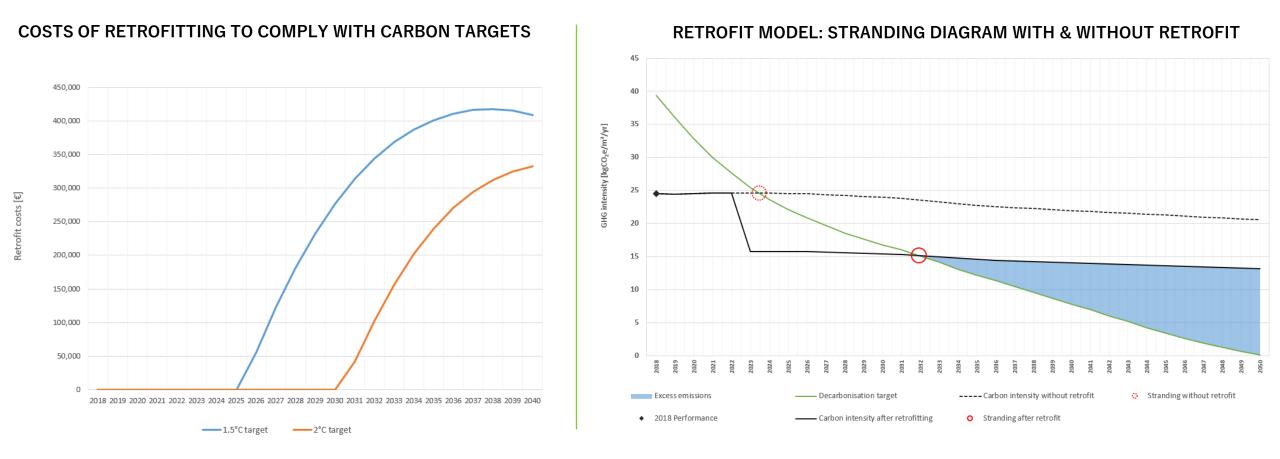


Analoguous to the NY City model with penalties for each ton of emission above emission limit (and possibility of trading emission credits)

COSTS OF EXCESS EMISSIONS ABOVE TARGET



QUANTITATIVE CARBON PERFORMANCE AND RISK INDICATORS



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



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 depict the asset ID.

2°C Climate target:



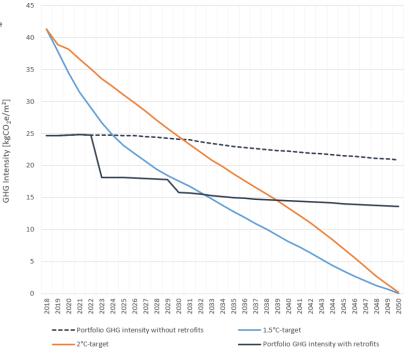
O Stranding events (area of circles corresponds to floor area of asset)

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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GHG



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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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





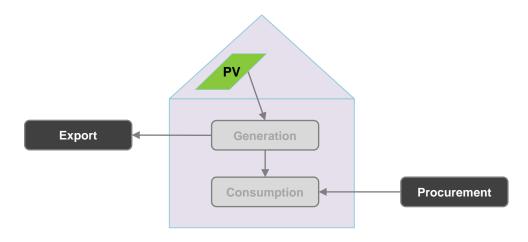
ENERGY REDUCTION PATHWAYS: BASED ON NET-ENERGY DEMAND

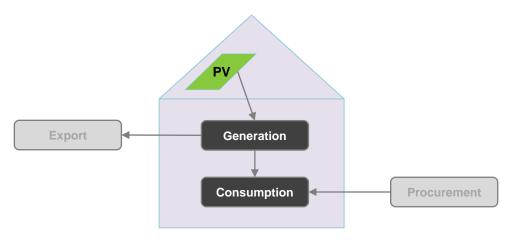
Net-energy demand

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Procured energy – Exported energy

Consumed energy – (**On-site**) Generated energy





CRREM Introduction
09.04.2020