Net Zero Pathway for our International portfolio

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Federated Hermes Limited

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Contents

Introduction

Our international portfolio consists of all assets outside the UK, with assets located in the USA, Canada, Australia and France. Assets are a mixture of pooled fund exposures, separate accounts, debt and directly managed assets across retail, office, industrial and residential.

In 2022 we carried out a detailed review of the portfolio's decarbonisation potential. For the purposes of modelling a net zero pathway, we included eight international funds directly managed by Federated Hermes Limited (FHL) Real Estate. Three indirect funds, where Federated Hermes Limited has no control were excluded from the following analysis.

We estimated the whole portfolio carbon footprint, which included applying the FHL loan to value (LTV) share to debt assets in the USA to reflect FHL's responsibility boundary.

As of Q2 2022 our international portfolio value modelled was €1.48 bn (£1.30 bn). This covered 72 assets (split into 77 separate buildings) from the USA, Canada, Australia and France.

We estimated the whole portfolio carbon footprint, which included applying the FHL loan to value (LTV) share to debt assets in the USA to reflect FHL's responsibility boundary. The largest contributors to the carbon footprint are residential properties, retail shopping centres and retail warehouses.

Figure 2 – FHL international portfolio breakdown by asset count, area and asset types GHG emissions

Stranded asset risk assessment

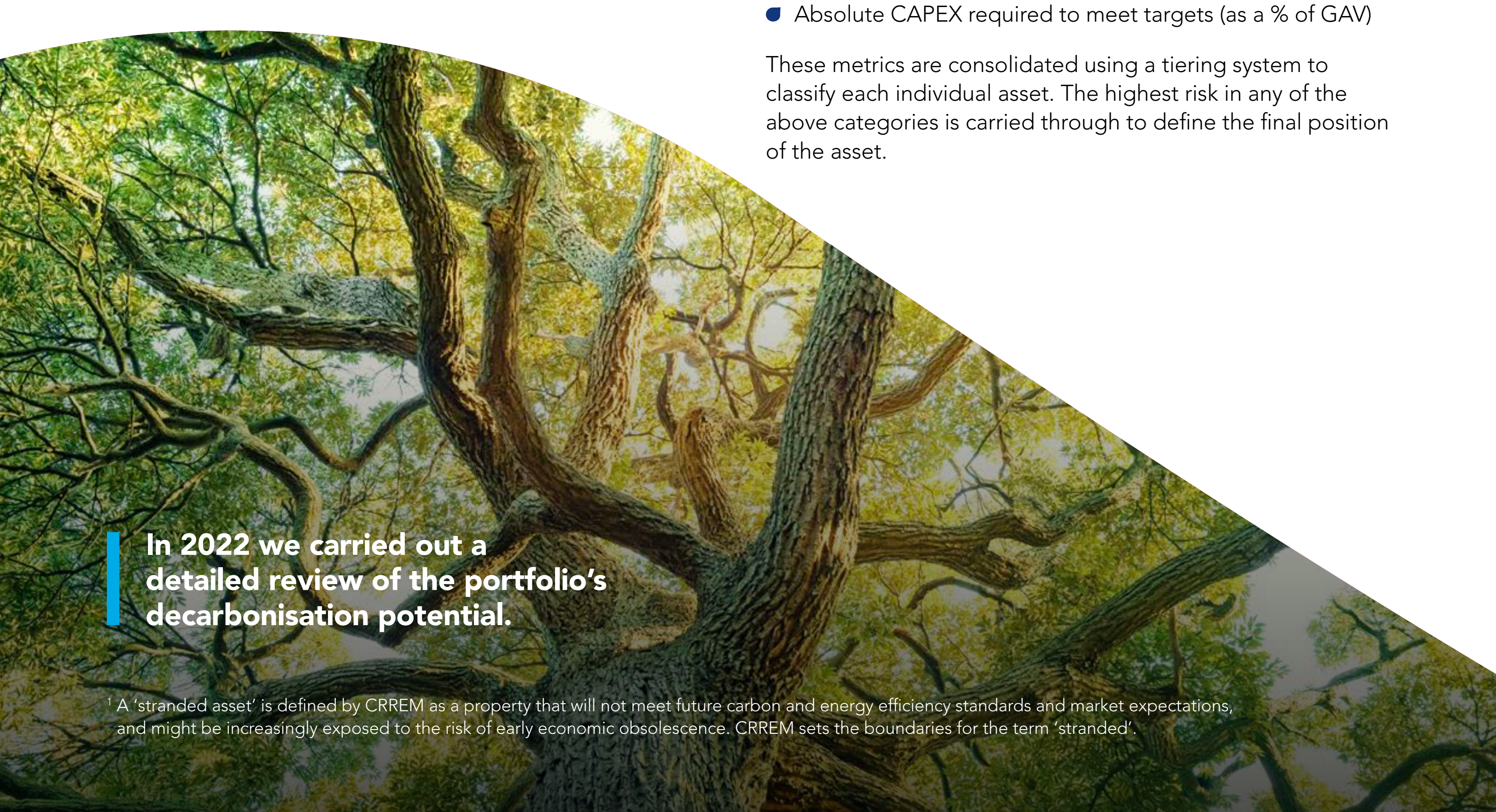
We have undertaken an assessment of the 'stranding risk' for each asset including the identification of assets which would require interventions in order to maintain alignment with the energy and carbon targets for before the end of loan periods for debt assets and to avoid 'stranding'[1] risk for directly managed assets.

The highest risk in any of the above categories is carried through to define the final position of the asset.

The risk of each asset is classified as low, medium or high, based on the following metrics:

- Baseline performance against benchmark
- Absolute CAPEX required to meet targets (as a % of GAV)

These metrics are consolidated using a tiering system to classify each individual asset. The highest risk in any of the above categories is carried through to define the final position of the asset.



In 2022 we carried out a detailed review of the portfolio's decarbonisation potential.

[1] A 'stranded asset' is defined by CRREM as a property that will not meet future carbon and energy efficiency standards and market expectations, and might be increasingly exposed to the risk of early economic obsolescence. CRREM sets the boundaries for the term 'stranded'.

Net Zero pathway

As the international portfolio consists of directly managed and debt assets the level of influence is different and therefore, we will apply tailored approaches for different parts of our portfolio. For directly managed international assets the NZ strategy will align with that for UK directly managed assets, based on four NZ pathway pillars: avoiding the use of fossil fuels, increasing energy efficiency, using renewable energy and reducing embodied carbon in new development and major refurbishments.

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The key focus for the international portfolio is to maintain the alignment of its assets' energy use intensity (EUI) with CRREM targets until 2035. Once CRREM V2 targets are finalised, we will review these and update the targets accordingly.

Principles and recommendations for international debt assets and associated due diligence process

Debt assets within FHL international portfolio will follow the same set of net zero carbon principles and recommendations as those developed for FHL's debt portfolio.

The current coverage with actual data is relatively high

64% actual data for whole building consumption,

85% when debt asset scaled by LTV %, collected as of 2021.

Due to a reduced amount of operational control compared to direct investments and the resulting increased difficulty in achieving net zero carbon, the following three principles are our priorities for the pathway to net zero for the international portfolio.

1. Collect data.	The current coverage of actual data is relatively high (64% actual data for whole building consumption, 85% when debt assets are scaled by LTV% as of 2021). We aim to close this gap and obtain actual data across all assets including looking to require borrowers to provide consumption data as part of the lending conditions.
2. Engage with borrowers.	For high-risk assets, engage with borrowers to understand what actions they are taking and recommend that they undertake net zero carbon (NZC) audits. Borrowers should also be encouraged to set embodied carbon and material re-use targets and engage with their contractors/ suppliers to source low carbon materials with Environmental Product Declarations (EPDs).
3. Assess NZC performance and risk for new loans.	Integrate NZC criteria in future loans and associated due diligence processes. Screen assets with a risk assessment modelling and FHL's ESG screening tool during the due diligence process.

Appendix

A. Methodology

We modelled the baseline energy consumption of the international portfolio for the 2021 calendar year as the most recent representative year. The model then produced carbon reduction pathways, predicting the performance and cost impacts of a range of required carbon reduction interventions to align with CRREM[2] and National Frameworks[3] carbon and energy intensities pathways.

Outputs from the analysis included:

- A baseline of greenhouse gas (GHG) emissions of assets within the portfolio, and a comparison against benchmark intensities;
- Full technical potential for the portfolio (based on current standing assets);
- The scale of absolute investment required to achieve reduction targets;
- The indicative scheduling of investment to remain within defined reduction pathway;
- A risk analysis to identify and prioritise assets requiring further investigation.

As of 2021 the emissions associated with the building consumption are 45,603 tCO_2e, where FHL LTV scaled debt portfolio share is 31,068 tCO_2e.

This covers any landlord emissions (Scope 1 and 2) as well as some Scope 3 (downstream leased assets from tenant operations). Other Scope 3 categories such as carbon from purchased goods and services, capital goods and waste and water have not been included in this analysis.

B. Data inputs

1. Fund data

Verco provided FHL with a data request form, covering the following:

- Verco data request forms including entries for:
  - Asset type
  - Area breakdown
  - Energy Use
  - Asset value, loan value and loan expiry
  - Existing PV installations
  - Heating type and presence of cooled storage

Due to the availability of consumption data, and turnover of assets the International fund was modelled with a 2021 baseline. Heating type was assumed to be gas boilers where this information was not otherwise provided.

All standing assets in the direct funds, as of Q2 2022, were included in the modelling exercise. The two developments in Sentinel Australia were excluded from the modelling as they have no associated operational emissions in the baseline year. The embodied carbon associated with their construction has been estimated and should be assigned to the year of planned completion.

2. Carbon conversion factors

Different mixes of fossil fuel-derived energy and renewable energy means that each country has a different carbon intensity associated with electricity (expressed in terms of $kgCO_2e/kWh$ of electricity delivered). The National Frameworks pathway utilises the factors from analysis conducted by the European Commission[4], Australia's emissions projections[5] and US Environmental Protection Agency[6] (for predicted values) and a proprietary dataset from the International Energy Agency (for the baseline). The CRREM project provide their own estimations on how these will change up to 2050. Both pathways base the implementation of carbon abatement measures on these national grid average emissions factors. Both pathways are therefore aligned with the location-based methodology for carbon accounting, rather than the market-based approach[7].

3. Benchmarks

Where real energy data was not available, building consumptions for all assets other than in the USA were estimated using median energy end use benchmarks, derived from the UK Government's Building Energy Efficiency Survey (BEES, 2016)[8]. BEES provides a breakdown of total energy consumption per unit floor area per year ($kWh/m^2/year$) for 38 different 'sub-sectors' of the non-domestic building stock. The area breakdown for each asset was used to apportion the extent of landlord and tenant activities into BEES sub-sectors and thereby derive the estimated energy consumption for each individual tenant spaces, where required. For this reason the actual energy use at the asset level may deviate significantly from the median value presented in BEES for the overall asset type.

[2] CRREM has issued a V2 targets in October 2022, which is currently under consultation and will influence the international portfolio modelling results. Once revised CRREM targets are finalised we will update the modelling.

[3] Refer to section 6 of the Appendix for an explanation of the National Frameworks pathways.

[4] https://energy.ec.europa.eu/data-and-analysis/energy-modelling/eu-reference-scenario-2020_en

[5] https://www.industry.gov.au/sites/default/files/2020-12/australias-emissions-projections-2020.pdf

[6] https://www.epa.gov/egrid/summary-data

[7] https://ghgprotocol.org/sites/default/files/Scope2_ExecSum_Final.pdf

[8] https://www.gov.uk/government/publications/building-energy-efficiency-survey-bees

For US assets, building consumptions were benchmarked using the Commercial Buildings Energy Consumption Survey (CBECS) and Residential Energy Consumption Survey (RECS), two major surveys conducted by the US Energy Information Administration to provide a relevant source of data on US specific energy consumption. As the RECS benchmarks are provided on a per unit basis, instead of a per unit floor area basis, an average unit size was assumed for all US residential assets based on a survey of known US residential assets.

All benchmarks then underwent a degree day adjustment to provide representative heating and cooling loads.

C. Data screening

The data screening process was conducted for all provided consumption data, to verify that the data was fully representative of each asset before it was used for modelling. This stage also gave us the opportunity to clarify any points of uncertainty, within the provided data, which could then either be accepted, rectified or rejected.

The following discrepancies were identified and updated where relevant before being input to the A4Z model:

- Gas consumption for Calgary was very low, but was corrected as had originally been provided from a calculation based on the wrong units.
- Lionstone Hermes Real Estate Venture – consumption for 100 M Street was low – this was due to spaces being leased, but not occupied.
- Consumption for the majority of US residential assets was higher than expected. Minneapolis apartments were confirmed to be 1950s microunits and therefore high intensity with additional energy uses such as a swimming pool.

D. Base build versus tenant activities

The split of landlord to tenant areas varies between asset types. As part of the dataset underpinning the A4Z model, Verco has defined a set of assumptions regarding this split for each asset, based on energy end uses. Where the landlord/tenant split was known for specific assets, these assumptions were updated to ensure the associated emissions were allocated to the correct scopes. It is also useful in allocating actual energy use for specific areas – for example, where the provided energy data only covers landlord-controlled areas. This allows for a more detailed prediction of the total energy consumption of each asset, which in some cases was a composite of real energy data and estimated energy data.

E. Embodied carbon of new developments

In the Australian multifamily portfolio, due to the presence of developments in the fund, the associated embodied carbon is a significant proportion of the fund's footprint, and therefore was calculated and included as a standalone output in the results presentation. Embodied carbon was estimated based on the floor area and asset type for each development. The appropriate carbon factor for each asset type was taken from a research report by the Scottish Futures Trust which was then applied to the floor areas. The embodied carbon of each new development should be attributed to the year of planned completion.

F. Intervention modelling

Having established the baseline energy consumption for each asset within scope, the A4Z model predicts the impacts of a range of interventions for the reduction of carbon emissions. These include energy efficiency measures, deep retrofit, and on-site renewable energy technology. **The model prioritises the implementation of these interventions in order of cost-efficiency of carbon abatement.** The impact that each intervention has on the carbon emissions of a portfolio is highly dependent on the asset types within the portfolio (for example, warehouses have much greater capacity for PV installation than offices). Consequently, the cost range of each intervention (per m^2) will vary depending on the composition of each fund. The approach and data sources used as the basis for the carbon reducing predictions are outlined in Table 2.

It should be noted that the A4Z model does not consider the use of hydrogen as a heating fuel in buildings. Verco is leading a BEIS research study looking at this which has found that there are a large number of unanswered questions to be able to confidently model the large scale transition of buildings to hydrogen, for example:

- The carbon intensity of hydrogen production
- Implications of on-site storage vs. grid transmission
- Safety
- Competition in demand with other uses such as industry and transport.

A further point to note is that the deep retrofit measures cover both current technological capabilities and future, not yet realised, technology. Due to the uncertainty in scope of this measure, deep retrofit is included as a necessity for reaching any targets that cannot be reached through the implementation of other measures. It is therefore not related to the technical potential of an asset, unlike the other interventions.

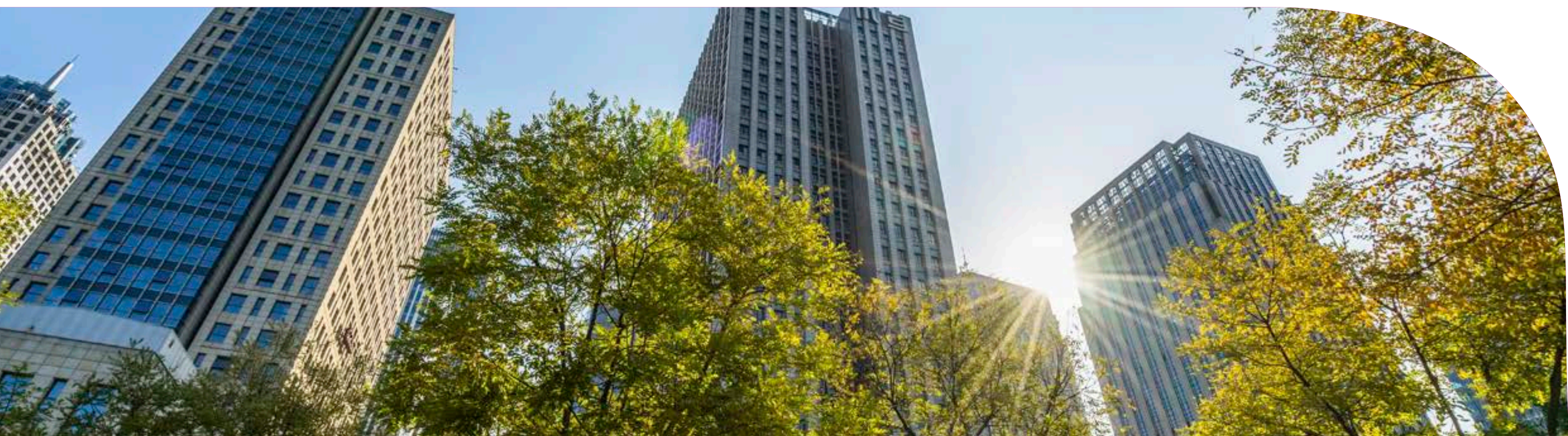

Table 2 – Intervention stages

Intervention stage	Approach	Data sources	Level of asset-specific tailoring
Energy efficiency measures (<3 yr payback)	The UK Government's Building Energy Efficiency Survey provides a comprehensive database of pre and post-energy efficiency energy end use benchmarks for 38 different types of non-domestic building. The performance and cost impacts of bringing each building from its starting baseline to a post-energy efficiency performance was modelled for this research and this data is used in the A4Z model	**Building Energy Efficiency Survey** (UK Government, 2016-17). A comparable dataset of energy efficiency benchmarks for other European countries is not available but we anticipate the energy efficiency potential to be comparable due to similar use patterns across Europe	●●● While specific measures need to be confirmed through a site visit, the majority of buildings demonstrate common energy management and efficiency opportunities that can be generalised.
Energy efficiency measures (>3 yr payback)	This typically leads to a 20-40% reduction in energy use intensity and includes measures such as optimisation of HVAC and BM systems, LED lighting, insulation and fabric upgrades.		
On-site Renewable Energy Sources (solar PV)	PV potential generation based on approximated (unless provided) available roof-space, which differs for each asset type. A UK specific energy production value is adjusted to reflect the varying solar intensities within different regions. Our recommendations are idealised maximum values and do not take into consideration specific technical constraints, commercial considerations of roof leasing and other similar external factors such as local grid capacity.	**Benchmark calculations for solar potential** and FHL asset roof areas. The cost of solar PV systems is modelled using data from Verco's extensive net zero carbon audits programme and corroborated by reference to cost data from cost consultancy Currie and Brown.	○●● Solar PV technical potential informed by property information from asset managers.
Heat decarbonisation	Buildings using gas boilers or direct electricity for heating and hot water are switched to electric heat pumps. The capital costs of system replacement are based on the system size.	Verco's ongoing work for BEIS on a study to assess the cost of low carbon HVAC technologies (2019-21). A comparable source of heat pump costs across all other European countries is unavailable.	○●● Heat decarbonisation options can usually be predicted with reasonable confidence without a site visit
Deep retrofit	Scheduled when required to meet pathway targets. Where this intervention occurs before all tenant areas are vacant, the asset is flagged as high risk. The costs are normalised by floor area and are based on Verco's understanding of the typical costs of such projects, which depend on the specific interventions.	NABERS ratings, Enerfit standards, PassivHaus standards.	○○● A precise account of the measures required can only be determined through a site visit

Key: level of asset-specific tailoring

○○● = no/minimal sensitivity of intervention impact/timing based on asset-specific data
○●● = moderate sensitivity of both impact/timing, or high sensitivity to one of the two
●●● = high sensitivity to both timing and adjustment

G. Decarbonising pathways

The above interventions were applied to each asset on a five-year basis, placing the intervention within the latest time period possible to ensure that certain future targets would be met. For this purpose, two modelling scenarios arise based on the two sets of targets used – a CRREM 1.5°C carbon pathway and a National Frameworks pathway (developed by Verco and derived from predicted national renewable energy capacities and frameworks outlined by the UK, French and Dutch Green Building Councils). Both sets of targets focus on operational data, rather than EPC ratings, National Frameworks using energy intensity (kWhe/m^2) and CRREM using carbon intensity (kgCO_2e/m^2). The targets to achieve 'net zero' were brought forward to 2035 under the National Frameworks pathway to align with the FHL existing commitment to achieve net zero by this date. Figure 3 provides further detail on each pathway.

Both sets of targets focus on operational data, rather than EPC ratings, National Frameworks using energy intensity (kWhe/m^2) and CRREM using carbon intensity (kgCO_2e/m^2).

Figure 3 – Decarbonising pathways

National Frameworks:

'Top-down' approach developed by Verco based on national energy regulation and renewable energy supplies

National Frameworks targets utilise the existing national frameworks and regulations (UKGBC, French ELAN and Dutch GBC) and extend targets to all countries and asset classes using a similar Paris-proof methodology

Strengths:

- Includes local level policies and extend the same percentage reduction in energy to all countries
- Projected renewable energy generation

Limitations:

- Uses educated estimations to extend NZC definitions and targets to additional countries

Carbon Risk Real Estate Monitor (CREEM):

'Top-down' approach based on national carbon budgets

The only published and internationally recognised asset level NZC pathway.

Provides energy and carbon reduction pathways by country and asset type

Strengths:

- Industry backing
- Flexibility across countries and asset types
- Consistent methodology provides comparable results

Limitations:

- Targets do not capture local and national level policies
- 2050 energy use intensity (EUI) targets are implausibly low, and much lower than other industry targets
- Does not account for the high EUI of cooled storage

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