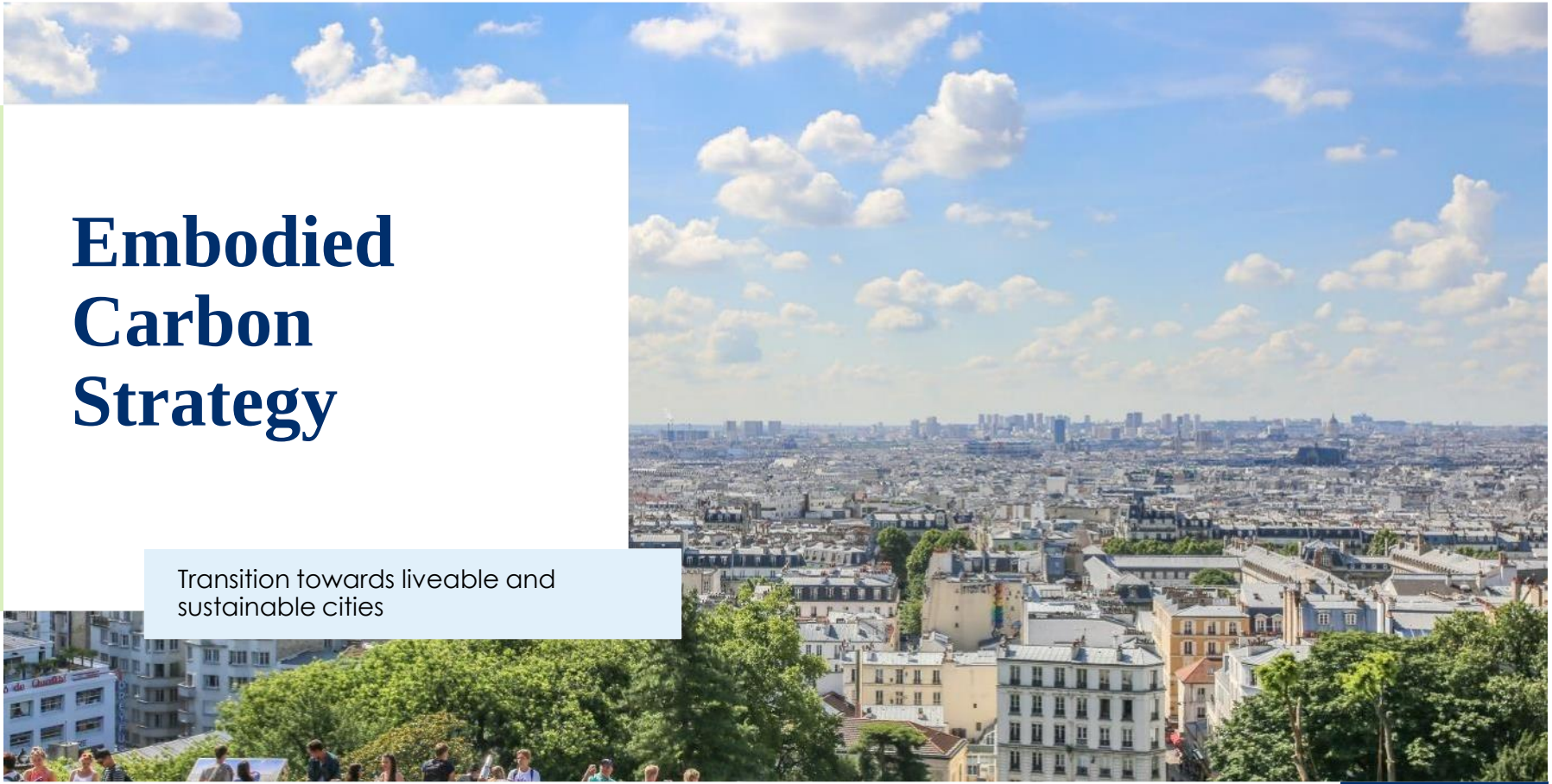
# Embodied Carbon Strategy



Transition towards liveable and sustainable cities

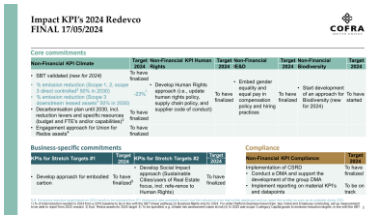
June 2024

REDEVCO

# Why implement an embodied carbon strategy?

## COFRA Impact KPIs 2024

- Main climate KPI: to make progress on overall absolute carbon emissions reduction (incl. embodied carbon)
- Redevco specific KPI: Deliver approach for embodied carbon
- Align with the COFRA Climate strategy's internal carbon pricing approach as a mechanism to incentivize choices that will drive reduction in overall carbon emissions



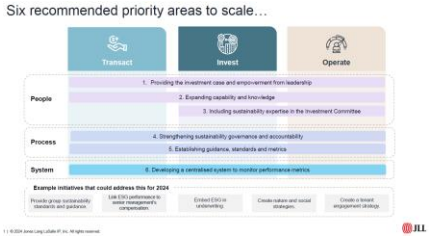

## JLL Recommended Priority Areas to Scale

Process:

- Strengthening sustainability governance and accountability
- Establishing guidance, standards and metrics

System:

- Developing a centralised system to monitor performance metrics




## WGBC NZC Buildings Commitment

- Achieve maximum reductions of embodied carbon in new developments and major renovations by 2030
- Compensate for any residual in-control upfront embodied emissions

# How Embodied Carbon Strategy contributes to Mission 2040

## Framing

- Set clear guidelines, threshold and metrics for sustainability related indicators in Investment Proposals
- Establish asset-specific embodied carbon (EC) targets for developments with specific guidance and measurable KPIs
- Track progress and report against established KPIs throughout development process

## Where does it appear

- Sustainable Design Brief
- Asset Performance Tool
- Investment proposals
- Risk management (transition risks related to carbon pricing regulations)
- Procurement conditions
- Lease agreements – Tenant Fit-Out Guide
- Emissions Management System

## Measures

- Carbon pricing mechanism to drive transparency and deliberate design and materials choices via:
  - Internal Carbon Fee (COFRA)
  - Shadow Price of Carbon (3PC)
- Retrofit first policy (Brief)
- Include NZC commitment in procurement conditions
- Include commitment to Redevco's NZC targets in lease conditions (via TFO Guide)

## Outcomes

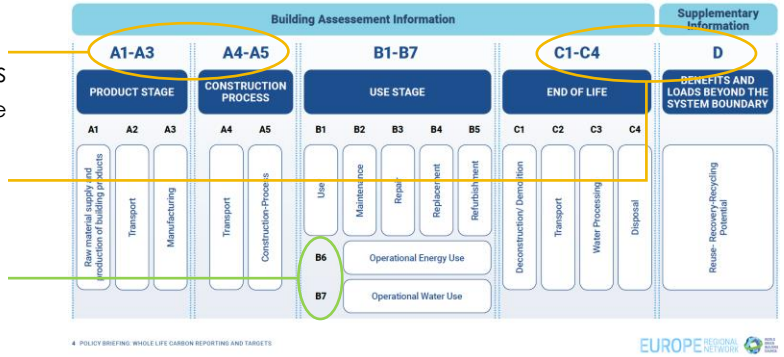
- Optimized design choices for as low an EC as possible in combination with holistic sustainability goals
- Increased understanding of the role of EC choices to drive Mission 2040 agenda (iterative learning and improvement)
- Decarbonization fund to compensate for residual EC emissions (COFRA)
- Shadow price of carbon as risk indicator (3PC)

# Whole Life Carbon modules

Whole Life Carbon as defined in the EU standard EN 15978 encompasses both the operational carbon of buildings through their use, and the upfront embodied carbon impact of the manufacturing, transportation, construction, as well as end-of-life phases of built assets.

Embodied Carbon boundary includes:

- A1-A5 upfront embodied carbon related to new construction works
  - We include redevelopment of existing assets (any structural works that touch the fabric of the building in question)
- Embodied carbon related to onsite deconstruction works (C1-C4 and D of the current life cycle end)



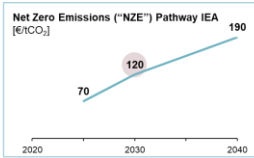

Already being tracked and monitored by Redevco:

- B6 Operational Energy Use (tenant emissions)
- B7 Operational Water Use
  - Currently only in Belgium and some assets in France and the Netherlands; to be extended to all countries

WLCA calculations are becoming market norm for (re)developments and are included as a requirement in our Sustainable Design Brief, yet not always monitored and delivered in all cases. More forceful follow-up to deliver the numbers will ensue.

# Redevco Embodied Carbon Case

**Carbon tax estimates of Net Zero scenario's**




Redevco's embodied carbon approach means that the embodied carbon relating to the deconstruction/demolition of existing structures and new build additions to the asset will be 'monetized' and integrated in the investment decision making process:

- For COFRA: an internal carbon fee (for 100% or for its share in JV redevelopments) will be charged to the development budget (and therefore impact returns)
- For 3PC (for now, unless they agree with an ICF): a shadow price of carbon for (their % share of) the embodied carbon of the (re)development will be transparently presented as a potential future risk indicator (but will not impact returns)

A carbon price of €120 / t $CO_2$ is in line with IEA Net Zero Emissions 1.5°C Pathway 2050, as proposed by COFRA as a benchmark.

Two example carbon cases:

| Glasgow, Minerva Way - SFP | Embodied Carbon | 100% to €120/t | COFRA Internal Carbon Fee 10% | JV Shadow Price 90% |
|---|---|---|---|---|
| Upfront Embodied Carbon (A1-A5) | 14,607 t $CO^2e$ | € 1,752,840 | € 175,284 | € 1,577,556 |

| Groningen, Herestraat - COFRA | Embodied Carbon | 100% to €120/t | COFRA Internal Carbon Fee 100% | JV Shadow Price 0% |
|---|---|---|---|---|
| Upfront Embodied Carbon, new build resi (A1-A5) | 431.7 t $CO^2e$ | € 51,804 | € 51,804 | € 0 |

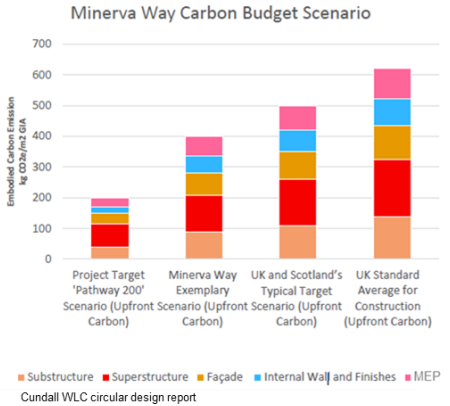
# Impact of ICF on returns – Glasgow, Minerva Way

| Glasgow, Minerva Way – SFP<br>Investment: €139.8 m<br>Upfront Embodied Carbon (A1-A5) | Embodied Carbon t CO2e | ICF to €120/t | COFRA Internal Carbon Fee 10% | JV Shadow Price 90% | Dev Profit ex ICF/SP | Dev Profit incl ICF/SP | Dev IRR ex ICF/SP | Dev IRR incl ICF/SP |
|---|---|---|---|---|---|---|---|---|
| Upfront Embodied Carbon intensity – Current Minerva Way design score - **400** kg/m2 | 14,607 | €1,752,840 | €175,284 | € 1,577,556 | €46,538,115 | €44,785,275 (-3.7%) | 17.14% | 16.51% (-0.63%) |
| Upfront Embodied Carbon intensity – Redevco Design Brief budget - **200** kg/m2 | 7,304 | €876,420 | €87,642 | € 788,778 | | | | |
| Upfront Embodied Carbon intensity – UK & Scotland's best practice budget - **500** kg/m2 | 18,259 | €2,191,050 | €219,105 | € 1,971,945 | | | | |
| Upfront Embodied Carbon intensity – UK standard average budget - **620** kg/m2 | 22,677 | €2,721,284 | €272,128 | € 2,449,156 | | | | |

The Glasgow WLC circular design report by Cundall came with 3 carbon budget scenario references:

1. The Design Brief carbon intensity budget of 200 kg/m2, which appeared beyond reach in Glasgow.
2. The UK & Scotland best practice budget of 500 kg/m2.
3. And the UK standard average performance of 620 kg/m2.

The different scenario's show the carbon impact per scenario, where the actual case shows the impact on profit if the ICP would be taken as a cost at handover (end of development stage).



Cundall WLC circular design report

# Impact of ICF on returns – Groningen, Herestraat

| Groningen, Herestraat – COFRA<br>Investment: €22.8 m<br>Upfront Embodied Carbon (A1-A5) | Embodied Carbon t CO2e | ICF to €120/t | COFRA Internal Carbon Fee 100% | JV Shadow Price 0% | Dev Profit ex ICF/SP | Dev Profit incl ICF/SP | Dev IRR ex ICF/SP | Dev IRR incl ICF/SP |
|---|---|---|---|---|---|---|---|---|
| Upfront Embodied Carbon intensity – Current FDP Groningen design score - **155** kg/m2 | 431.7 | € 51,804 | € 51,804 | € 0 | € 4,300,049 | € 4,248,245 (-1.2%) | 14.53% | 14.35% (-0.18%) |
| Upfront Embodied Carbon intensity – Redevco Design Brief budget - **200** kg/m2 | 557.0 | € 66,844 | € 66,844 | € 0 | | | | |

The Groningen Sustainability report by abtWassenaar shows a calculation of upfront embodied carbon of 155 kg/m2, within Redevco's design brief carbon budget requirement of 200 kg/m2.

The actual case shows the impact on profit if the ICP would be taken as a cost at handover (end of development stage).

# Leadership Team Endorsement Request

The LT is asked to endorse an embodied carbon approach, which entails:

- Adoption of an Internal Carbon Fee (ICF) for COFRA assets (or COFRA's share in JVs/Funds) charged to the development budget
- Adoption of a Shadow Price of Carbon (SP) for all 3PC assets (or their share in JV's/Funds) and presented as a risk indicator
- Adoption of a carbon price of €120 per tonne $CO_2e$
- Application of an ICF or SP on the upfront embodied carbon related to (re)developments (RIBA stages A1-A5) already under management
- Application of an ICF or SP on the upfront embodied carbon related to forward funding/acquisition of new-build developments (RIBA stages A1-A5)

- The ICF will be used to fund carbon credits to compensate for the residual embodied carbon emissions of the projects in question to enable communication that the developments themselves can be considered net zero