

CAIRN

Passive House at scale

'Design & Build for Performance' conference – November 2024

Built For Good



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Background to Cairn

2015

Established in 2015

430

Employees

17

Live on 17 sites
across Ireland



Largest Self-Build
Apartment Developer

+8,500

Delivered over 8500
high quality A-rated
homes in Ireland

c.2,200

sales completions in
2024

+22,000

People living in
Cairn Built Homes

+4,500

People working
across Cairn sites

A word on my journey through Sustainability



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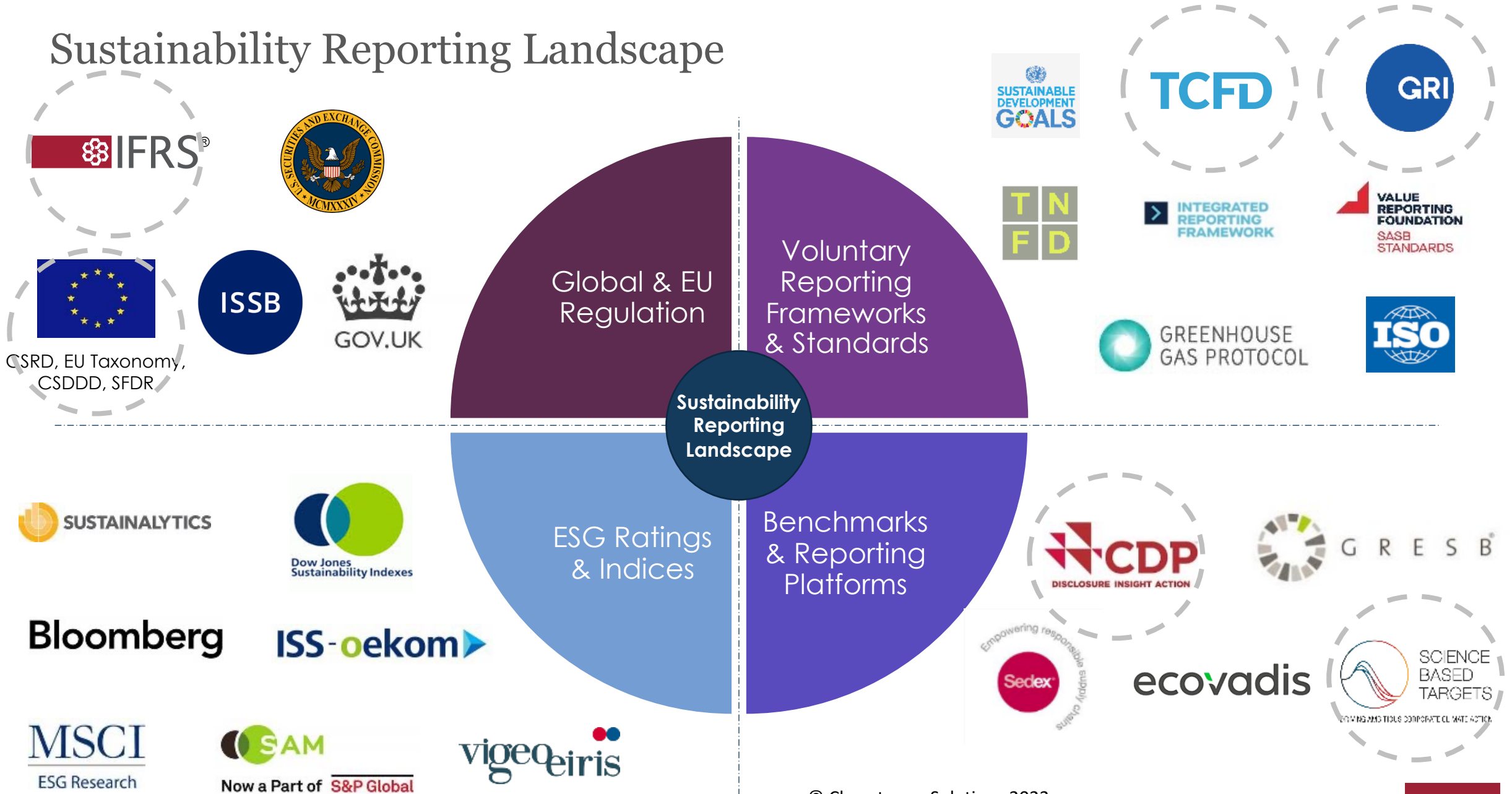
1.

Sustainability drivers

Why do Cairn need to think about this?



Sustainability Reporting Landscape



Carbon Footprint

Scope 1: Direct Operations

Scope 2: Purchased Electricity

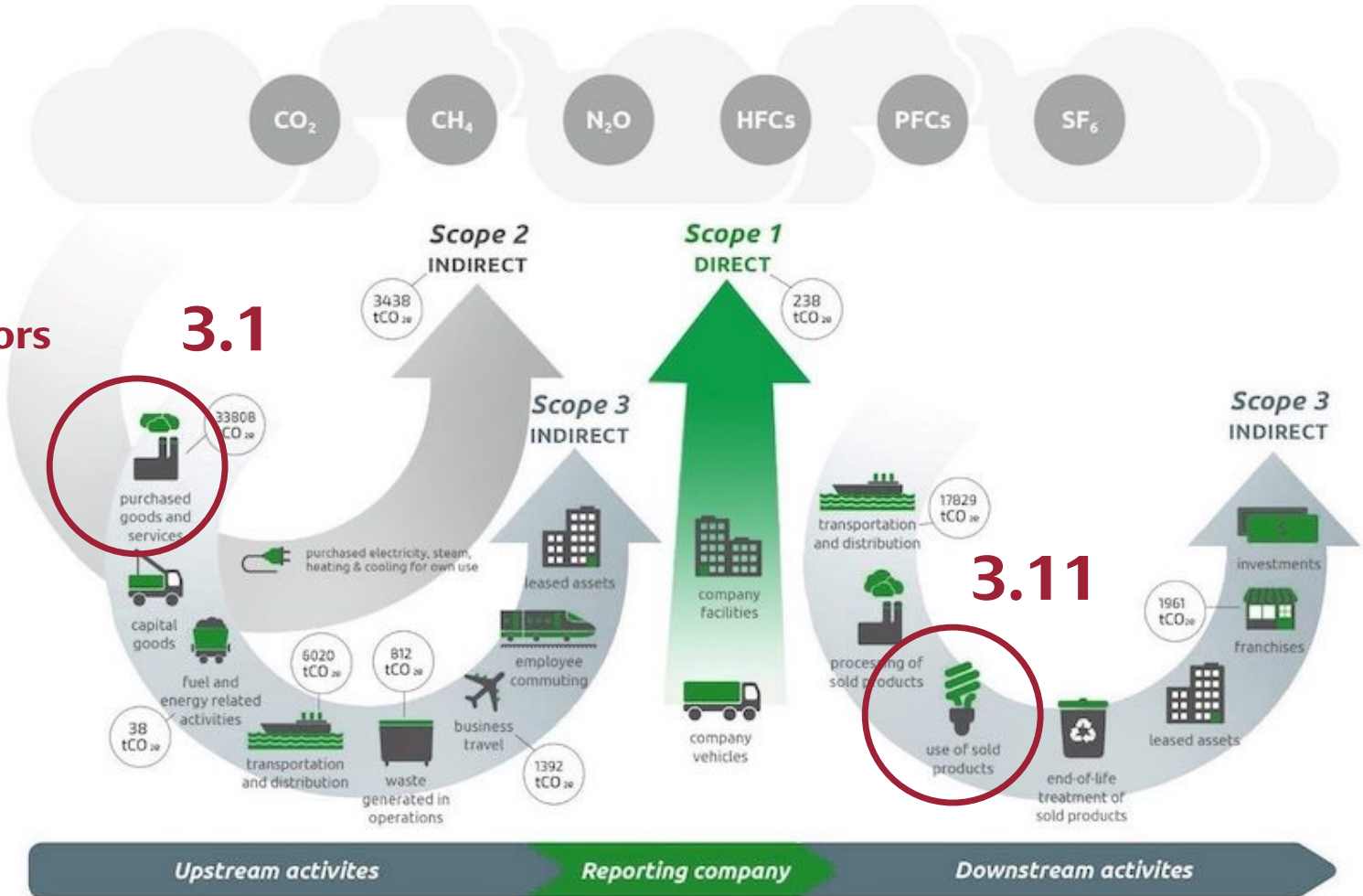
Scope 3: Value Chain

3.1: Purchased materials + Subcontractors

- ‘Embodied Carbon’
- 44% of total

3.11: Use of sold products

- ‘Operational Carbon’
- 54% of Total



Science-based Target to 2030



SCIENCE BASED TARGETS

DRIVING AMBITIOUS CORPORATE CLIMATE ACTION

Scopes 1 & 2

(Direct Operations & Energy Use)

- 46% absolute reduction

Scope 3

(Embodied & In-use Operational Carbon)

- 61% intensity reduction (per sqm)

Carbon footprint breakdown - 2023

Scope 1 Direct Emissions → Diesel, Petrol, Natural Gas

Scope 2 Purchased Power → Electricity

Scope 3 Indirect Emissions → broken down into:

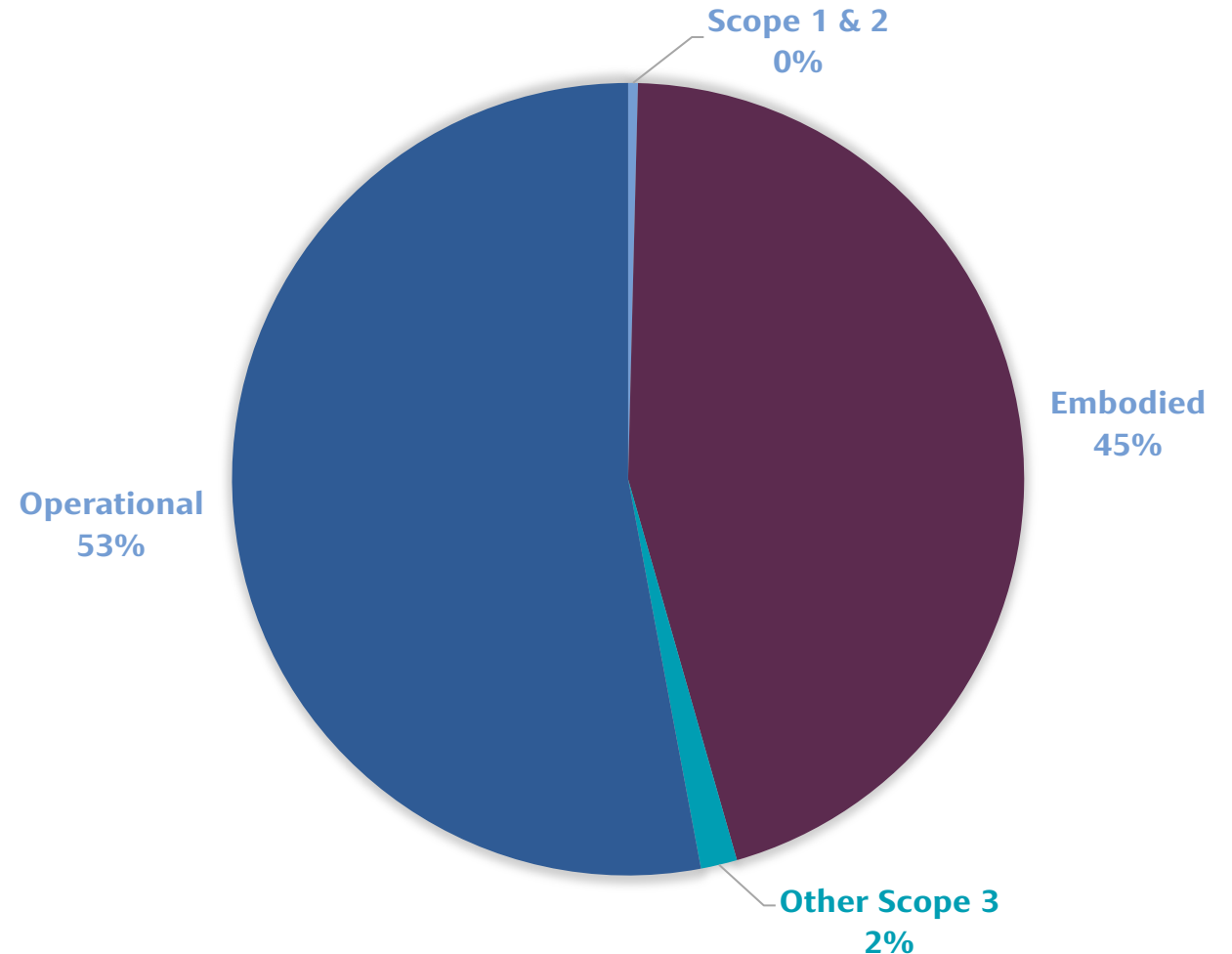
Scope 3.1 Purchased Goods & Services

(‘Embodied Carbon’) → e.g. Building Materials and components, Water etc.

Scope 3.11 Use of Sold Products

(‘Operational Carbon’) → e.g. Energy in Use of our houses

Other Scope 3 Capital Goods → e.g. IT equipment
Employee Commuting, Waste



Carbon footprint breakdown - 2030

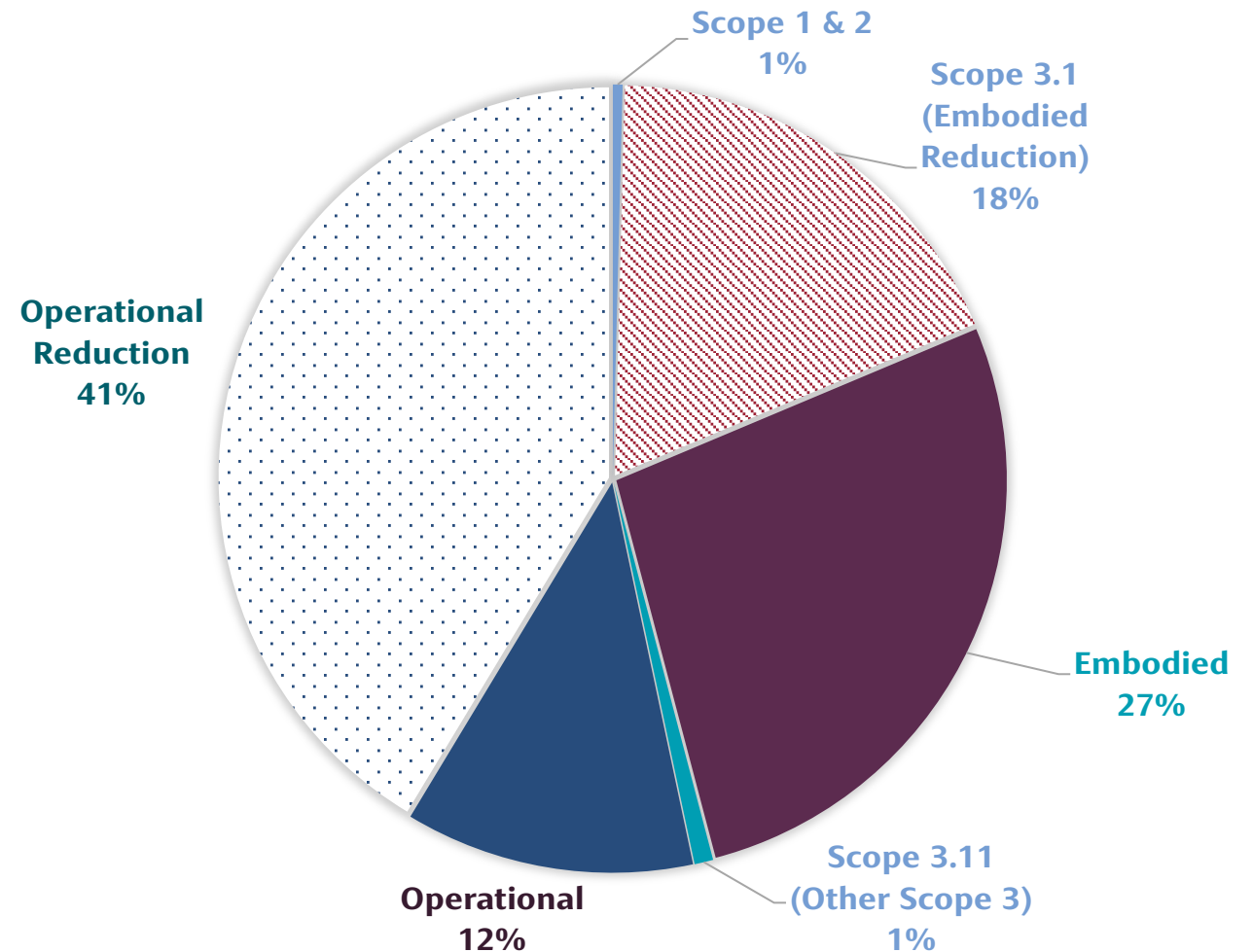
Scope 1 Direct Emissions → HVO's, EV's etc.

Scope 2 Purchased Power → Renewable Electricity

Scope 3.1 Purchased Goods & Services
(*'Embodied Carbon'*) → Reductions here will include Lean Design, Low Carbon Concrete, increased use of Timber etc.

Scope 3.11 Use of Sold Products
(*'Operational Carbon'*) → Reductions here will include PV, Grid Decarbonisation, Passive House etc.

Other Scope 3 Capital Goods → e.g. IT equipment
Employee Commuting, Waste



2.

What if?

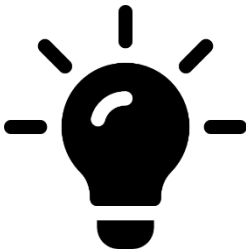
What if we could solve several problems at once?



What if there was a build methodology that provided...



Greater comfort for residents



Reduced Energy bills for life



Carbon savings



Increased resilience to a warming world



Superior build quality



No performance gap

Thermal Comfort / Increased Resilience

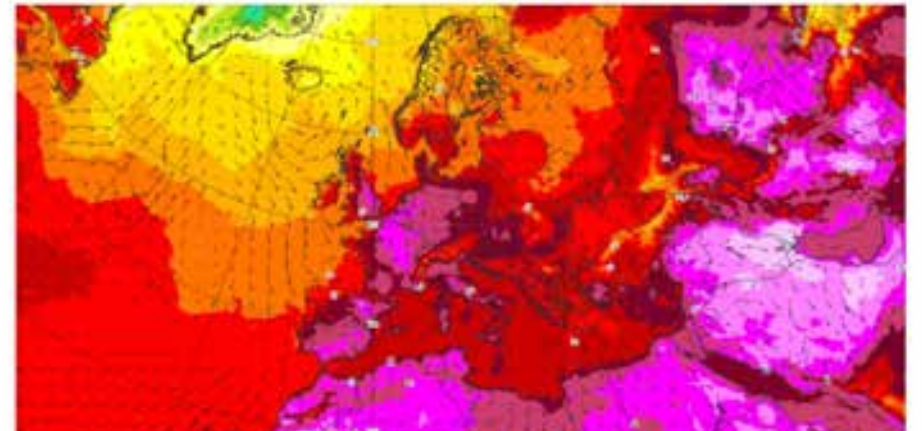
- **PH provides thermal comfort in both winter and summer.**
- Physics-based approach which takes both gains (solar gains & internal gains due to people and plant) and losses into account
- **Solar gains can be controlled with shading, orientation & g-value**
- Insulation of DHW circulation systems will limit uncontrolled internal gains
- Homes (inc. Apartments) can and should be designed to limit overheating (>25°C) to between 2% and 3% of the year.

Climate Crisis

Europe's current disturbing pattern of overheating is worse than in many parts of the world

Having experienced its hottest day in 135 years on Monday, Ireland's lack of preparedness for rising temperatures is a growing concern

Expand

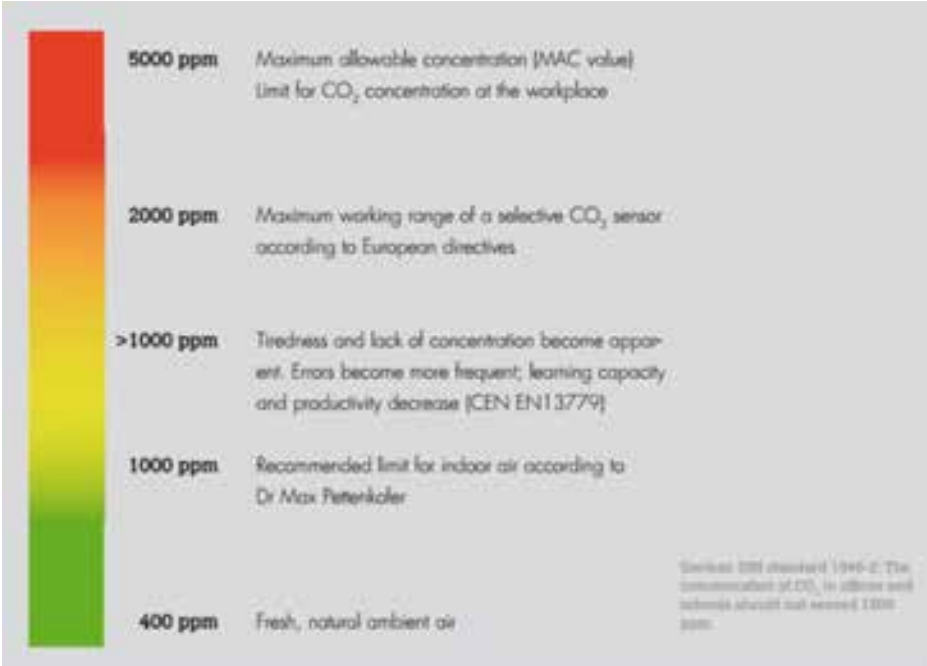


Reduced Energy Bills

| LCCA Study: Comparative Life Cycle Costs for 2 Alternatives | | | | | | |
|---|----------------------------|-------------------------------|-----------------|--------------|-----------------|----------------------|
| | Avg Apt Area <i>sqm</i> | Energy Usage <i>kWh/yr</i> | Length of study | Initial Cost | Total LCC (NPV) | Net Savings per unit |
| nZEB | 70 | 4,934 | 60 years | - | €102,796 | - |
| Passivhaus | 70 | 2,778 | 60 years | €6,000 | €86,956 | €15,839.85 |

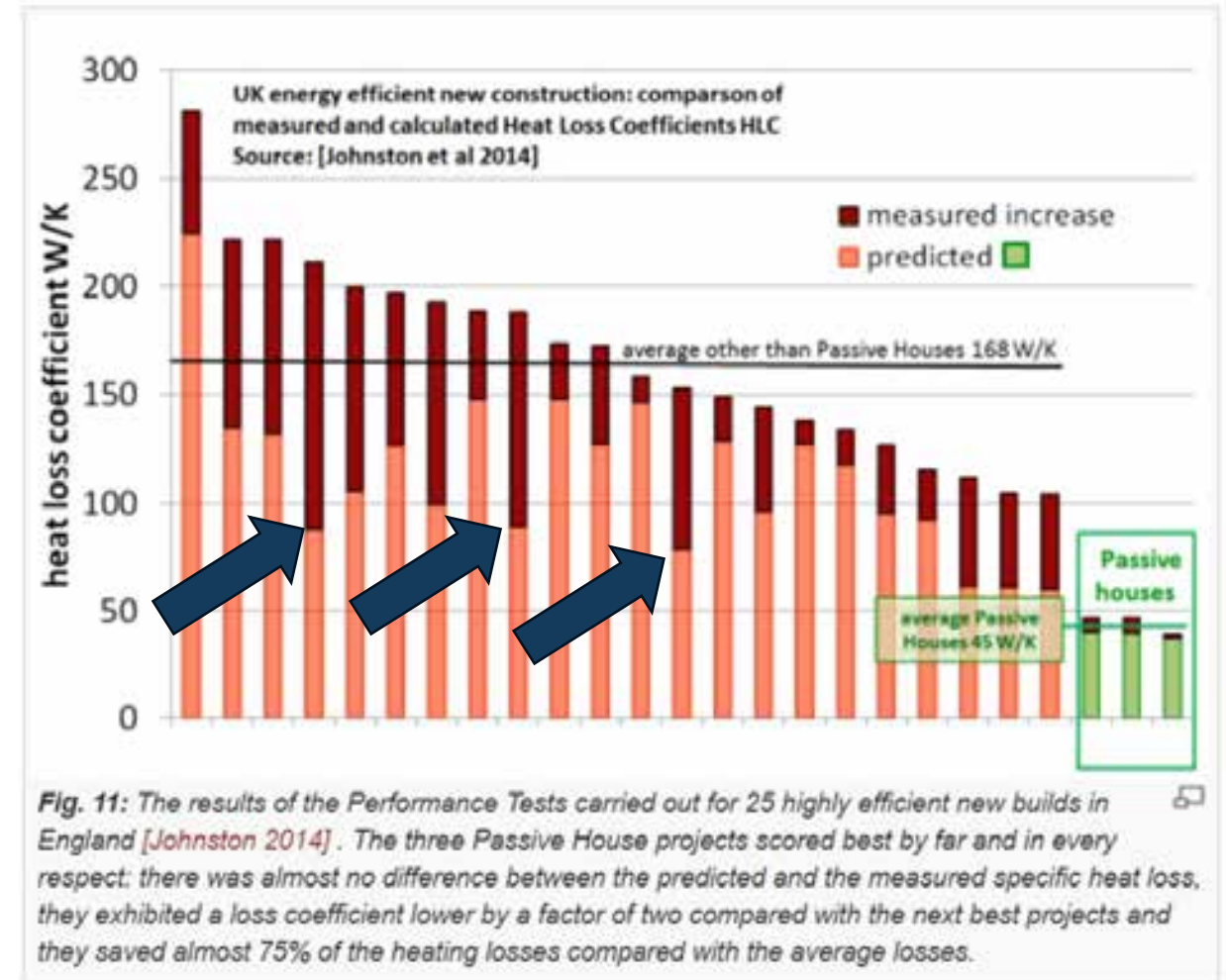
| Project Savings |
|----------------------|
| Pipers Square |
| €12.25m |

Comfort – Indoor Air Quality



No Performance Gap

- When reporting on our Carbon Output and Reductions targets we cannot ignore the Performance Gap – it is well understood and we are expected to account for it.
- The perils of houses not performing to their assessed performance are well known to Cairn
- Ironically, the higher the designed efficiency level of a building, the greater the percentage performance gap is likely to be
- **Dunboyne Road: 48%** greater than predicted by DEAP
- **PHPP** proven to be accurate: < 10%



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3.

Why Passive House?



Operational Carbon reduction strategies

- Predictable
- Scalable
- Replicable
- Can be applied to every Building and Site
- Accurately forecast building performance
- **Utilise existing supply chain**



Strategy: Decarbonisation using Passive House



Reducing Scope 3.11 (Carbon In-use): Passive Apartment Schemes

Robust and cost-effective route to help us achieve
our **scope 3 carbon reduction targets**

Current schemes will save **27,000 tonnes of carbon**
(equivalent to **13%** of our entire 2019 baseline footprint)

Meeting and **exceeding our current high
standards** (Citywest airtightness = 0.8ach)

Third-party Certification by Passivhaus Institute

Significant energy cost savings for the occupiers

Same ingredients, new recipe

- 1 Insulation – NO CHANGE
- 2 Triple-glazed windows
- 3 Efficient junctions – NO CHANGE
- 4 Airtightness – 0.6ach
- 5 Heat Recovery Ventilation



72 sqm Apartment

Heat Energy
Demand (kWh/yr)

nZEB compliant

2,400

Passivhaus standard

1,080

Reduction per apartment

55%

Our Passivhaus
standard apartments
will reduce heat
demand by **55%**

4.

What are we doing?



Piper's Square, Charlestown – 590 Apartments

Development Overview

590
Passivhaus
Standard
Apartments

4 blocks of apartments (3 with basements) delivering one of the most sustainable scaled apartment development in the Irish market with significant energy cost savings for the occupiers

Unlocking Delivery

Respond
Housing
Assoc.

Cairn Homes with the support and partnership of **Respond** Housing and **Fingal County Council** will see the delivery of our first passive apartment scheme

Accelerated Build Programme

33
Month Build
Programme

Start on site, **November 2023** with completion **October 2026** (144 weeks).
First Unit Handover – February 2026 Block 1



Seven Mills T2 – 607 Apartments

Development Overview

607
Passivhaus
Standard
Apartments

4 blocks of apartments (3 with basements) delivering one of the most sustainable scaled apartment development in the Irish market with significant energy cost savings for the occupiers

Unlocking Delivery

LDA

Cairn Homes with the support and partnership of **Respond** Housing and **Fingal County Council** will see the delivery of our first passive apartment scheme

Accelerated Build Programme

33
Month Build
Programme

Start on site, **November 2023** with completion **October 2026** (144 weeks).
First Unit Handover – February 2026 Block 1



Santry – 558 Apartments

Development Overview

558
Passivhaus
Standard
Apartments

On two sister sites delivering sustainable scaled apartments with significant energy cost savings for the occupiers

Unlocking Delivery

**Tuath
Housing
Assoc.**

Cairn Homes with the support and partnership of **Tuath** Housing and **Fingal County Council** will see the delivery of these passive apartment schemes

Accelerated Build Programme

33
Month Build
Programme

Start on site, **March 2024** with completion **January 2026**.



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Q&A

