

# The State of the Estate

Hampshire County Council's Journey to Net Zero

SPACES Study Day 22 June 2023

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Mike Chater



Hampshire  
County Council

# The State of the Estate

Hampshire County Council's Journey to Net Zero

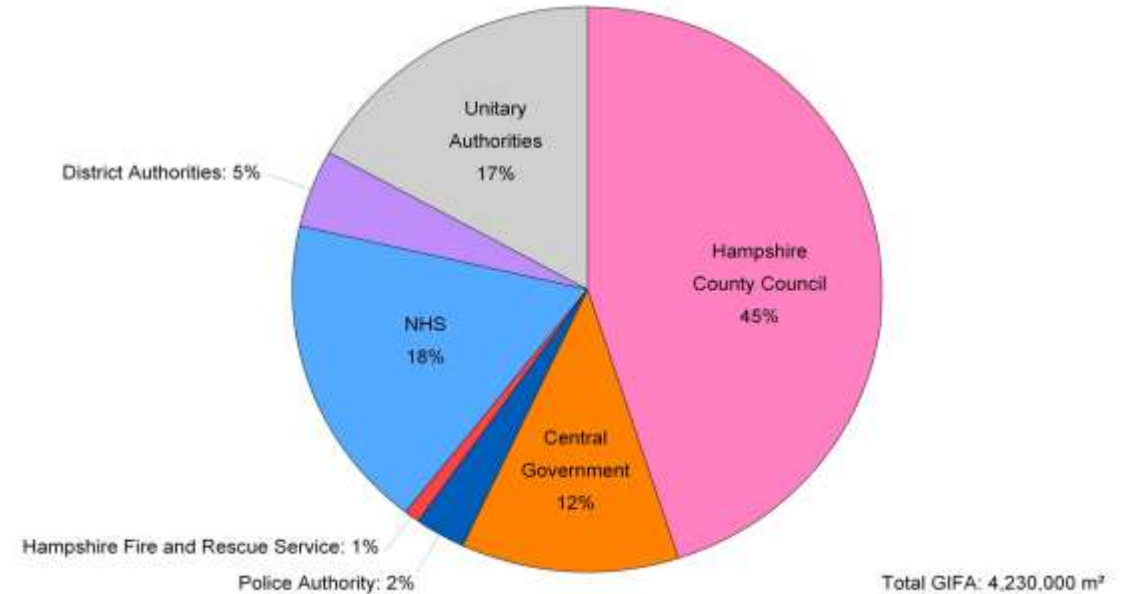
- Hampshire County Council
- Our decarbonisation challenge
- Trajectory to net-zero
- Energy league tables
- Low-carbon construction pilot
- SCOLA re-clad case study



Hampshire  
County Council

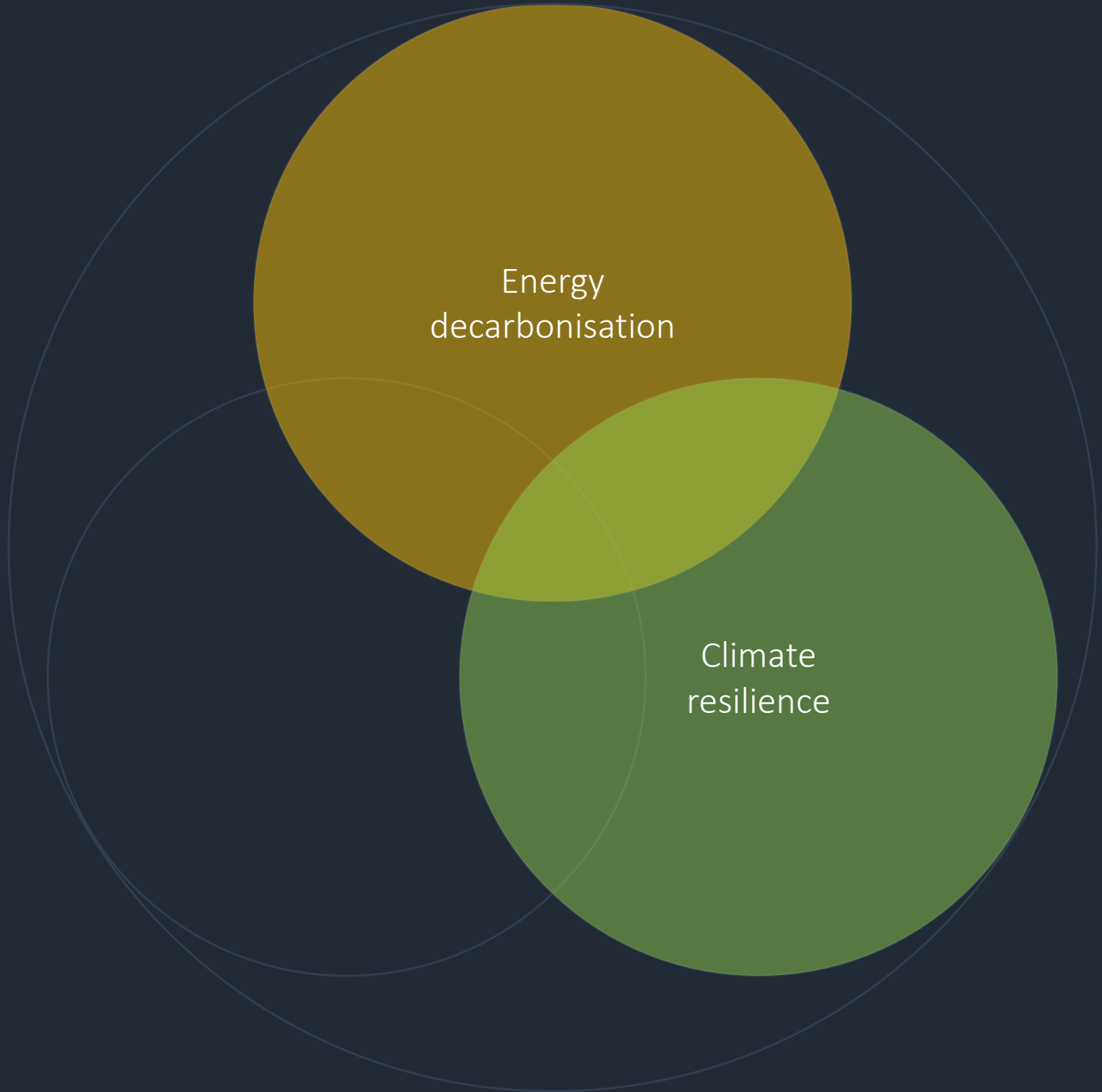
# Hampshire County Council context

- Tier-1 local authority, serving 1.3m residents, annual revenue budget of £2.4bn
- Education, children’s and adult’s social care, public health, culture and communities, highways, waste and economic development
- 9000 buildings across 900 sites
- 45% of public estate in Hampshire economic area - 1.9 million m<sup>2</sup> gross internal floor area
- Property Services – in-house multi-disciplinary team of over 400 staff



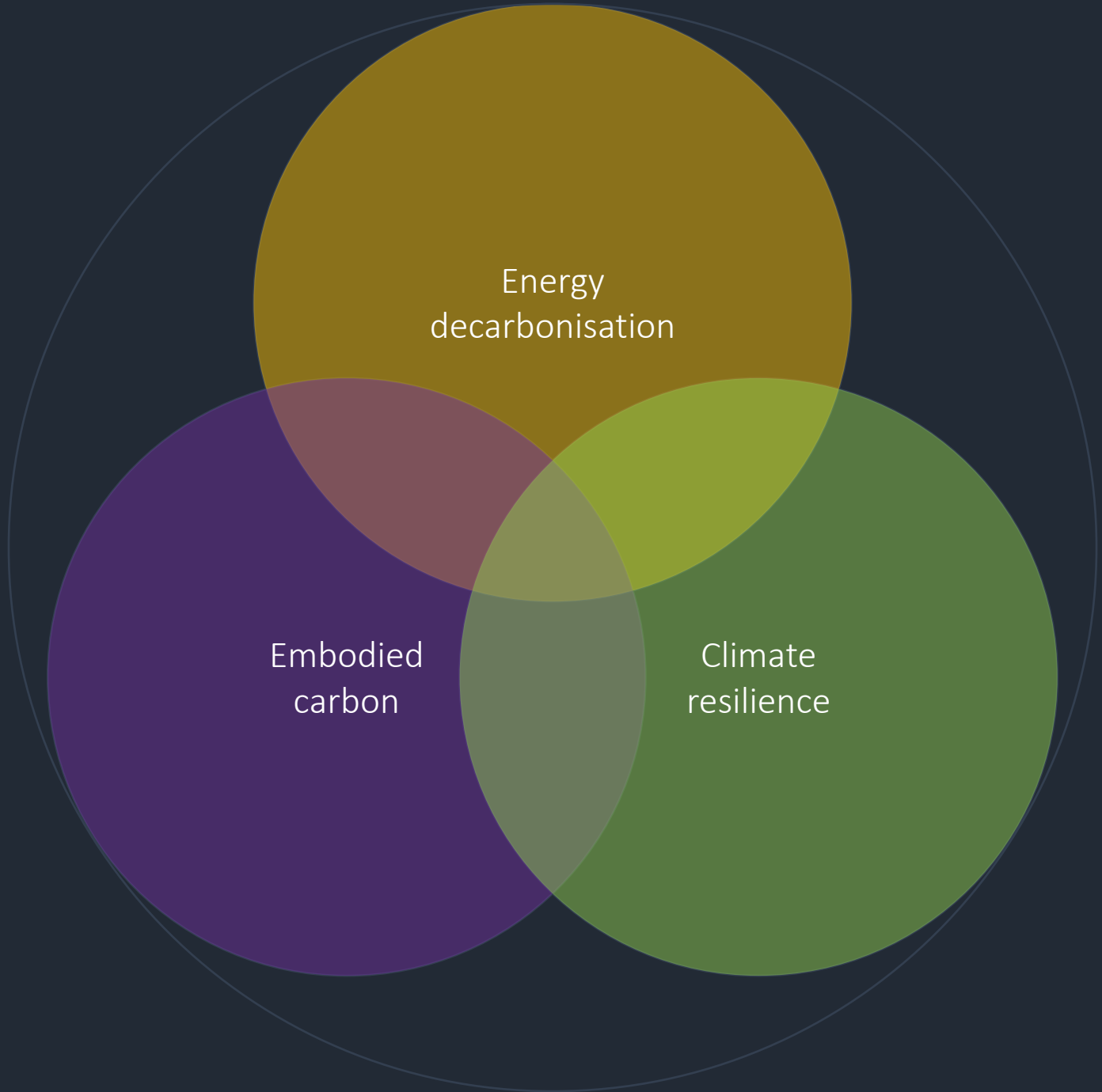


Energy  
decarbonisation



Energy  
decarbonisation

Climate  
resilience



Energy  
decarbonisation

Embodied  
carbon

Climate  
resilience

HCC emissions – initial findings

**200,000** tCO<sub>2</sub>e/yr

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# Buildings workstream

76,000 tCO<sub>2</sub>e/y

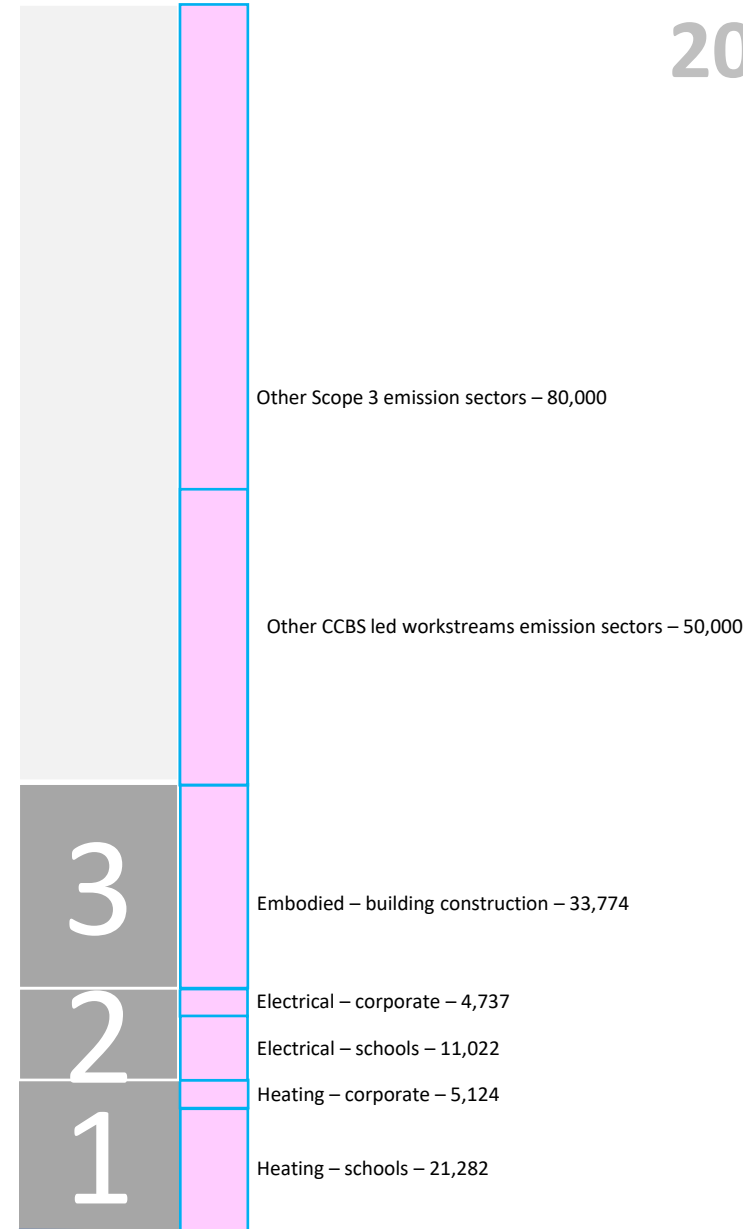
200,000 tCO<sub>2</sub>e/y

Other workstreams

63%

Buildings workstream

37%





# HCC's Heat Decarbonisation Challenge

- **26,500** tCO<sub>2</sub>e/y heating emissions (20/21)
- 2200 boilers across 600 sites
- 1/3<sup>rd</sup> boilers over 20 years old (of known age)
- 40% of 'known unknown' age
- Dispersed challenge, few single large sites
- 10 planned replacements per year, like-for-like fossil fuel
- Children's Services 80% of the 'heat estate'
- 500 schools, including a large 1960's SCOLA system-built estate



# Phase 1 PSDS Decarbonisation Programme

- £29m PSDS grant
- £3.2m HCC funding
- 5 workstreams

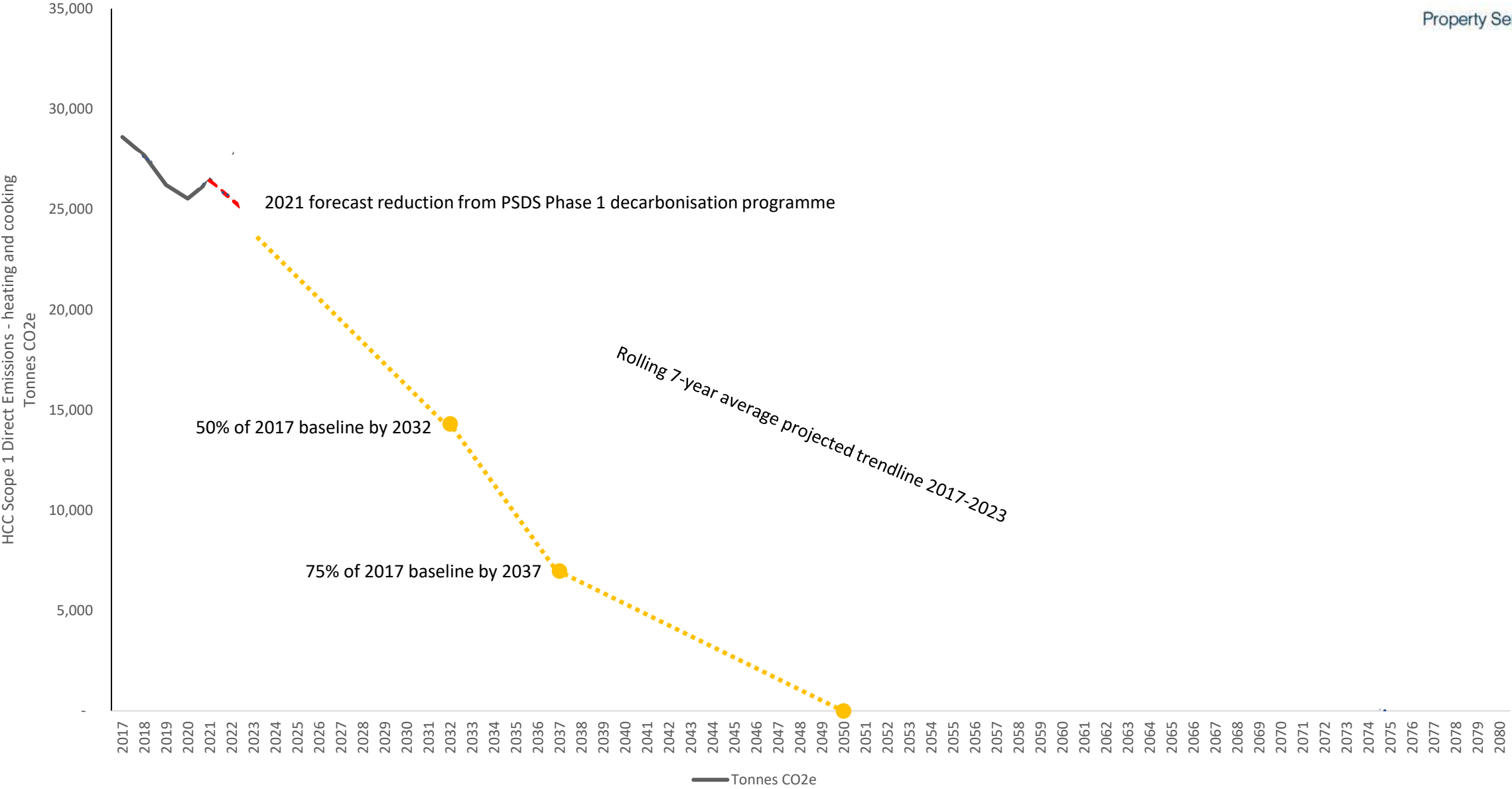
# Phase 1 PSDS Decarbonisation Programme

Workstream	No of projects	No of contracts	Value £m	£/tCO <sub>2</sub> lifetime	tCO <sub>2</sub> /y saved
[Redacted content]					

- £29m PSDS grant
- £3.2m HCC funding
- 5 workstreams

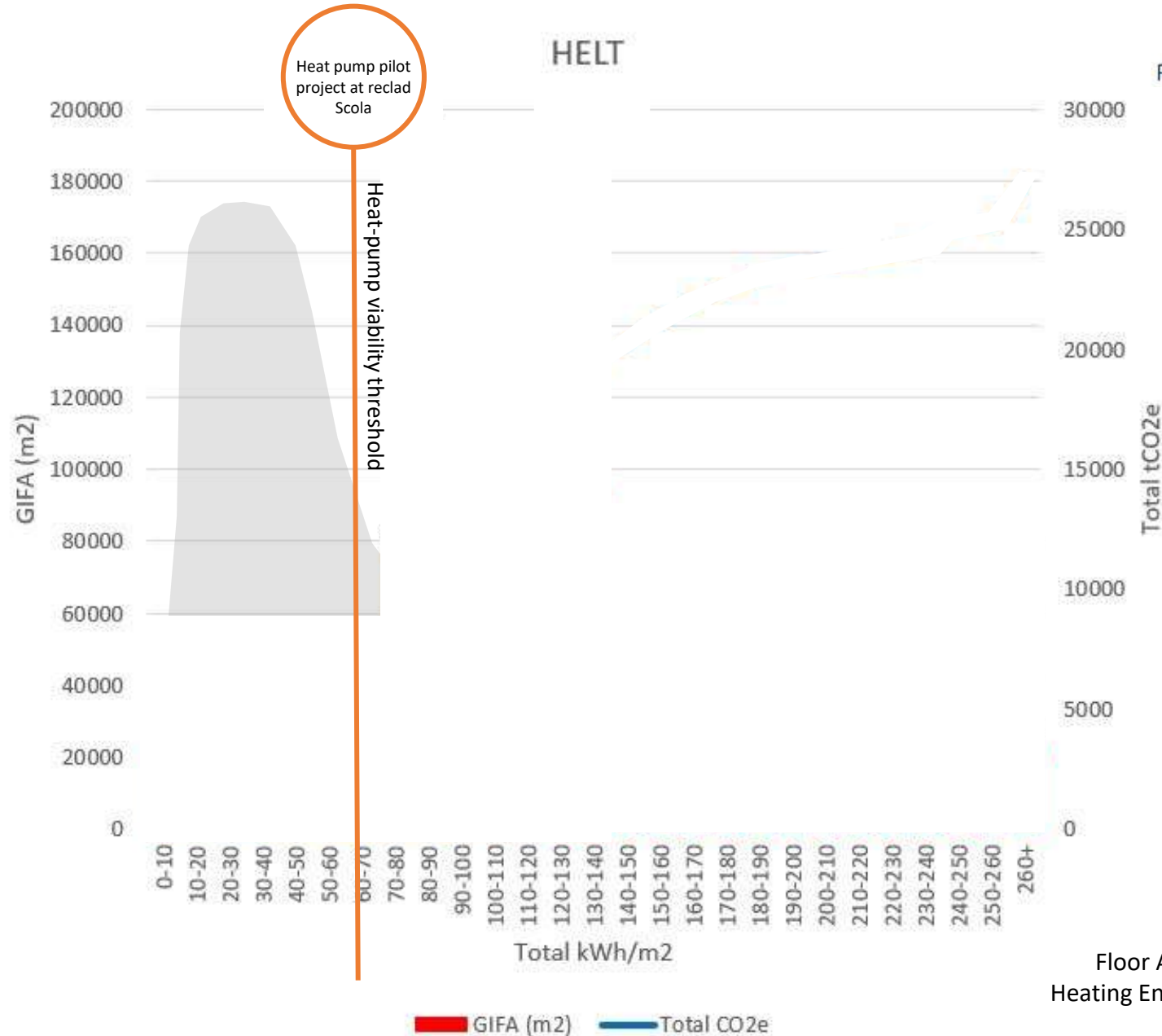


### HCC Scope 1 Building Emissions- Natural Gas, LPG and Oil



# The funding challenge

- Need to invest 82% gas-to-heat pump projects every year to achieve targets by 2032
- Average £2 energy including essential efficiency upgrade
- £50m per year every year
- £0.5bn to 2032, 250 sites
- Say 500 pump of 600 sites
- **£1bn** technology to be viable ...moving the shape of the estate to 'the left'

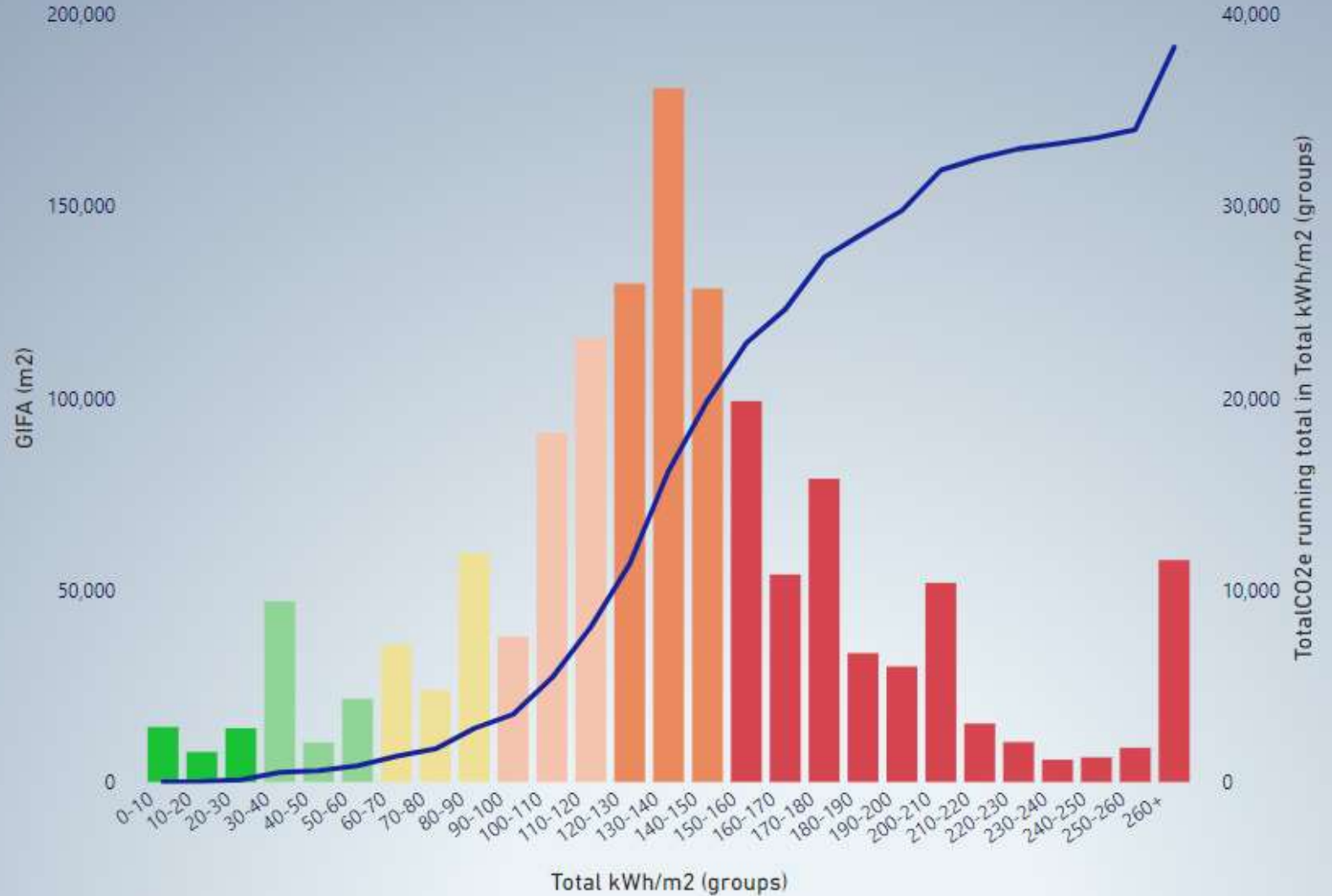


Floor Area distribution of Heating Energy Efficiencies of HCC Built Estate

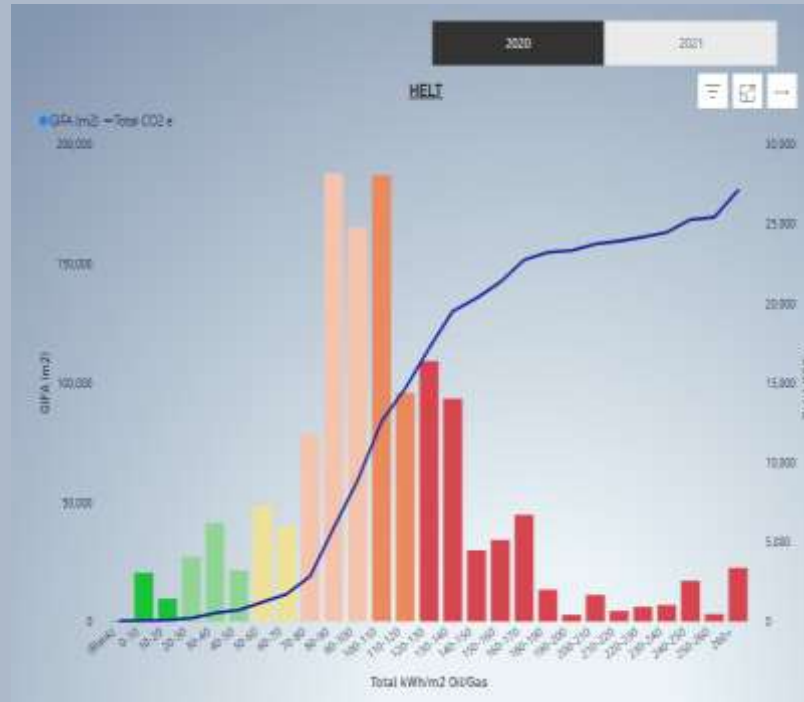
**Cumulative Carbon**

Total kWh/m2 (groups)	GIFA (m2)	TotalCO2e	Total CO2
0-10	14,326	13.86	13.86
10-20	7,822	23.56	37.42
20-30	14,007	78.40	115.81
30-40	47,059	382.64	498.45
40-50	10,263	95.81	594.26
50-60	21,654	263.11	857.37
60-70	35,678	492.27	1,349.64
70-80	23,955	371.34	1,720.98
80-90	59,691	1,073.00	2,793.99
90-100	37,921	735.52	3,529.51
100-110	91,023	1,905.34	5,434.85
110-120	115,652	2,655.73	8,090.58
120-130	129,891	3,281.80	11,372.39
130-140	180,729	4,854.60	16,226.99
140-150	128,593	3,653.72	19,880.70
150-160	99,243	3,003.78	22,884.48
160-170	54,080	1,752.54	24,637.03
170-180	79,034	2,714.77	27,351.80
180-190	33,583	1,234.15	28,585.94
190-200	30,100	1,195.93	29,781.87
200-210	51,888	2,104.75	31,886.62
210-220	15,230	628.78	32,515.40
220-230	10,401	481.08	32,996.48
230-240	5,824	266.82	33,263.30
240-250	6,432	301.03	33,564.33
250-260	8,935	440.98	34,005.31
260+	57,831	4,291.91	38,297.22
<b>Total</b>	<b>1,370,845</b>	<b>38,297.22</b>	<b>38,297.22</b>

● GIFA (m2) — TotalCO2e running total in Total kWh/m2 (groups)



*Current data limited to those sites that Property Services are responsible for, i.e. hold billing and metering data.*



### Cumulative Carbon

Total kWh/m2 (groups)	GIFA (m2)	TotalCO2e	Total CO2
60-70	5,803	77.76	77.76
120-130	5,702	141.29	219.04
130-140	6,054	160.46	379.50
140-150	6,801	192.98	572.48
150-160	12,285	372.05	944.53
160-170	2,464	82.09	1,026.62
170-180	1,398	48.75	1,075.37
180-190	4,742	167.80	1,243.17
200-210	2,877	113.49	1,356.66
210-220	5,640	232.67	1,589.32
230-240	3,520	162.82	1,752.14
240-250	2,934	135.88	1,888.03
<b>Total</b>	<b>60,220</b>	<b>1,888.03</b>	<b>1,888.03</b>



*Current data limited to those sites that Property Services are responsible for, i.e. hold billing and metering data.*

### Filters

Search

Filters on this visual

**FY**  
is 2020 or 2021

Filters on this page

**Client**  
is (All)

**Site Use**  
is School - Special

Search

- 3
- Activity Centre 14
- Adults With Learning ... 12
- Adults With Learning ... 26
- Adults With Physical Dis... 4
- Arts/Drama Centre 6



## Boorley Park

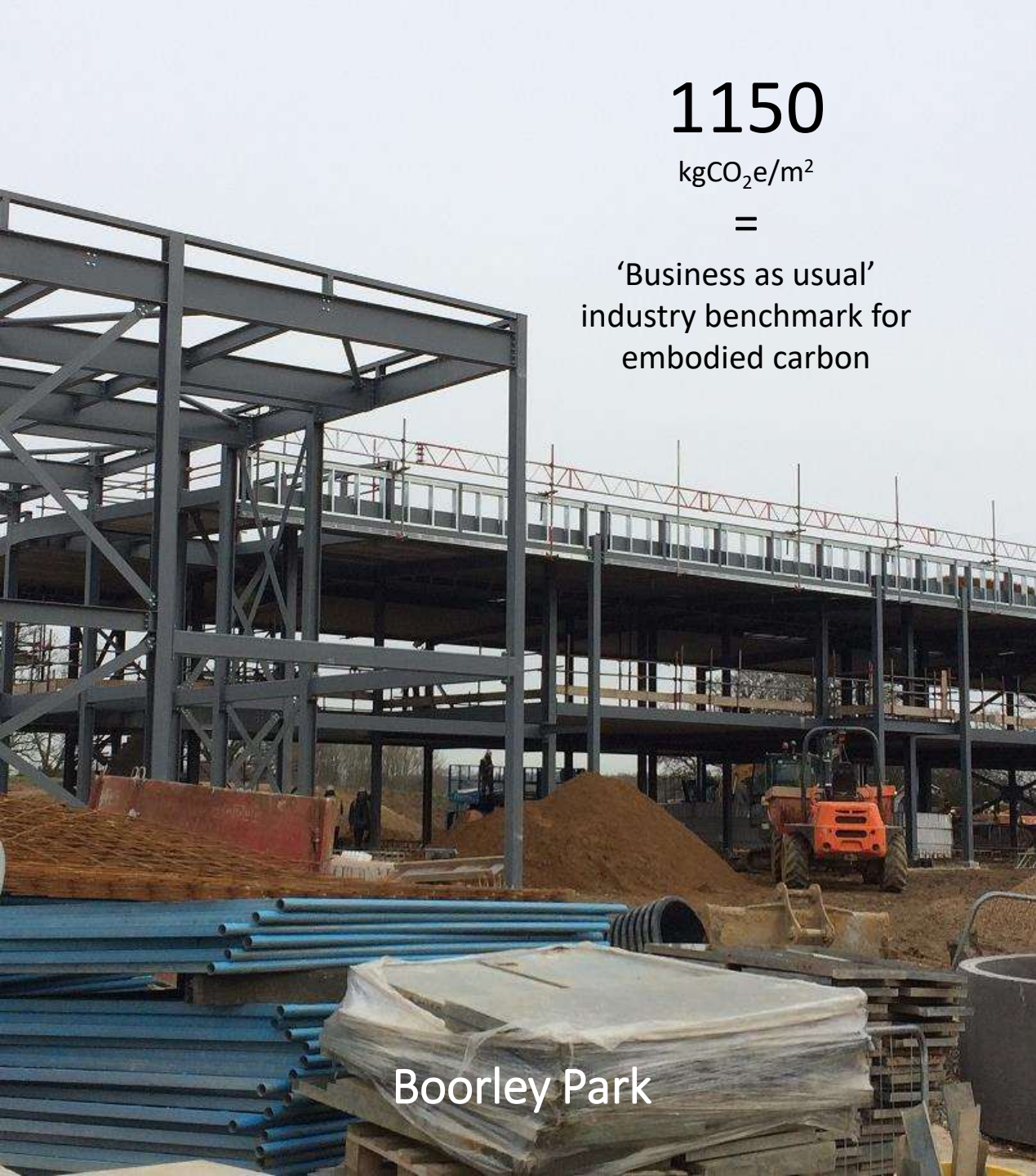
- Steel frame and pre-cast concrete floors
- Carbon intensive supply chain from raw materials to construction



## Stoneham Park

- Timber-frame panelised system
- Lower carbon supply chain from raw materials to construction





1150

kgCO<sub>2</sub>e/m<sup>2</sup>

=

'Business as usual'  
industry benchmark for  
embodied carbon

Boorley Park



670

kgCO<sub>2</sub>e/m<sup>2</sup>

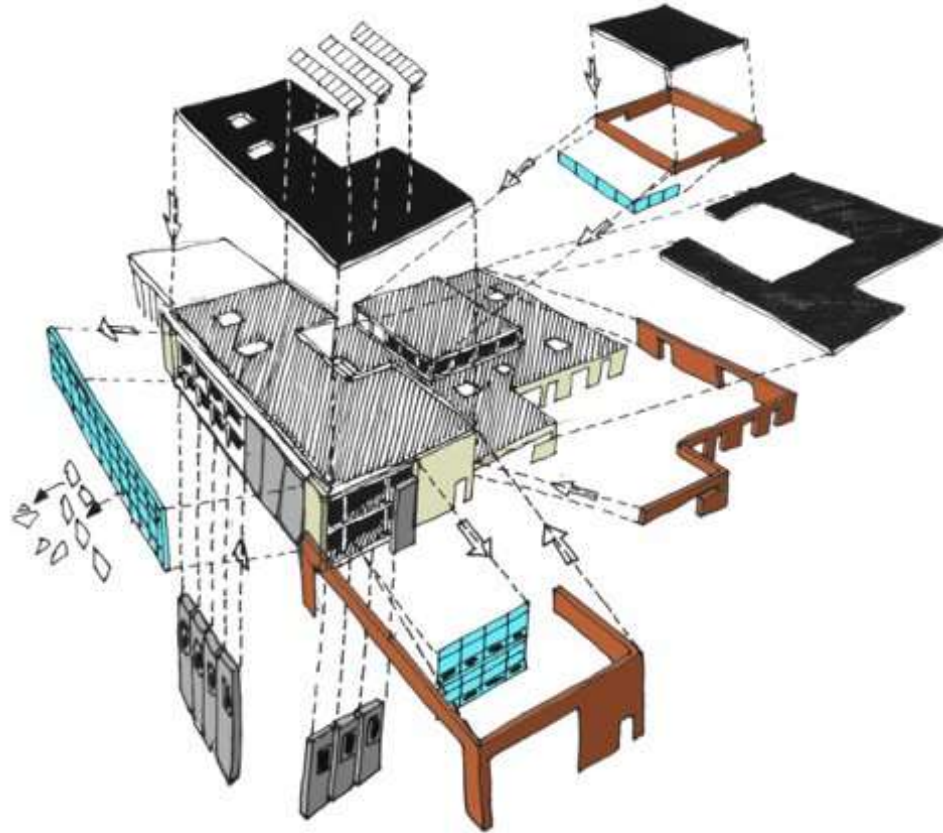
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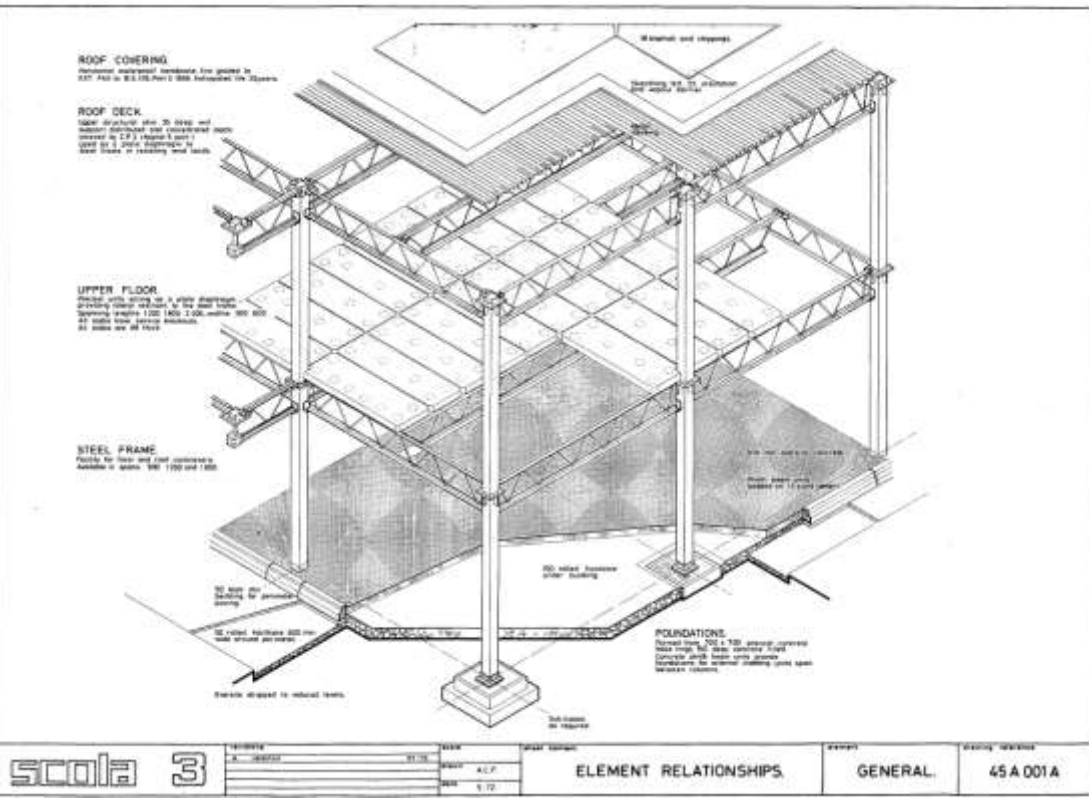
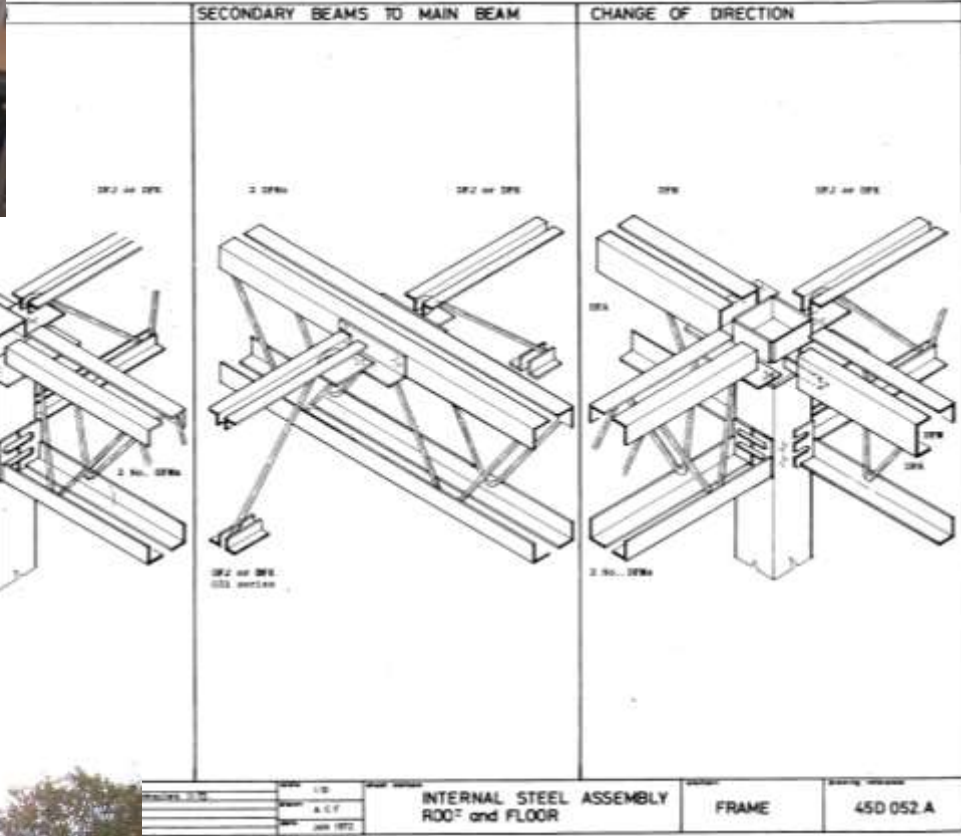
RIBA target for 2025  
for embodied carbon in  
new schools

Stoneham Park

Hiltingbury Junior School

# *TOWARDS NET ZERO SCOLA PILOT*

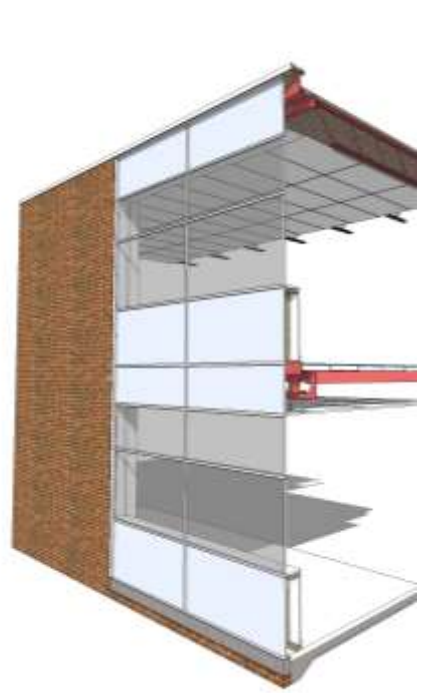




- Mass produced building programme 1970's.
- 4 revisions to SCOLA Manual.
- Frames were engineered with tolerance.
- Very poorly insulated.
- Single glazed Crittal windows.
- Lots of asbestos.



- HCC has just over 450 SCOLA buildings.
- Recladding programme started in early 2000's
- Replacing and reducing glazing
- Re roofing
- Improving insulation and air tightness to current regulations.



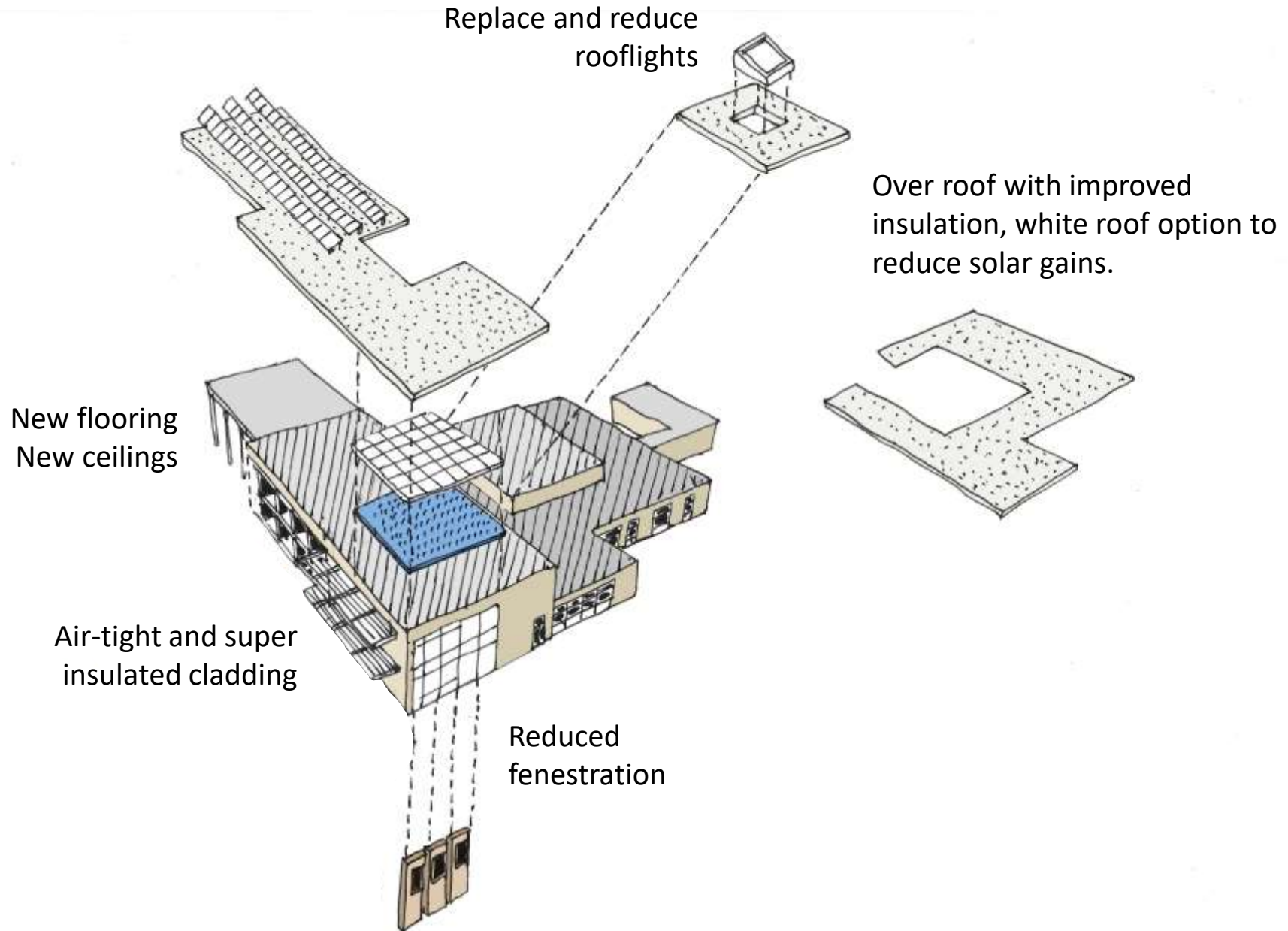


Energy  
decarbonisation



Energy  
decarbonisation  
OPERATIONAL  
ENERGY TARGET  
**< 70 kWh/m<sup>2</sup>/year**

# Improving Building Fabric

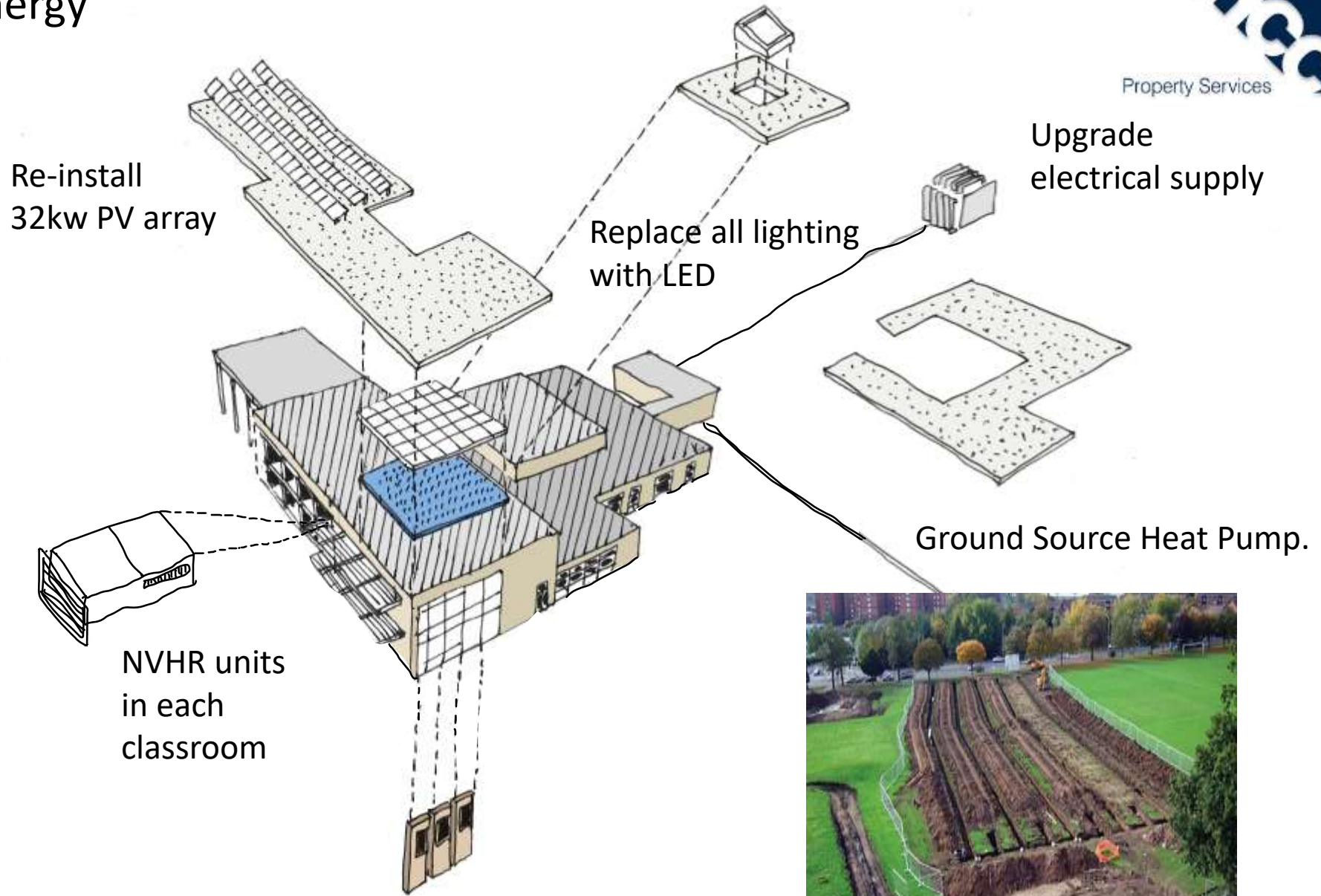


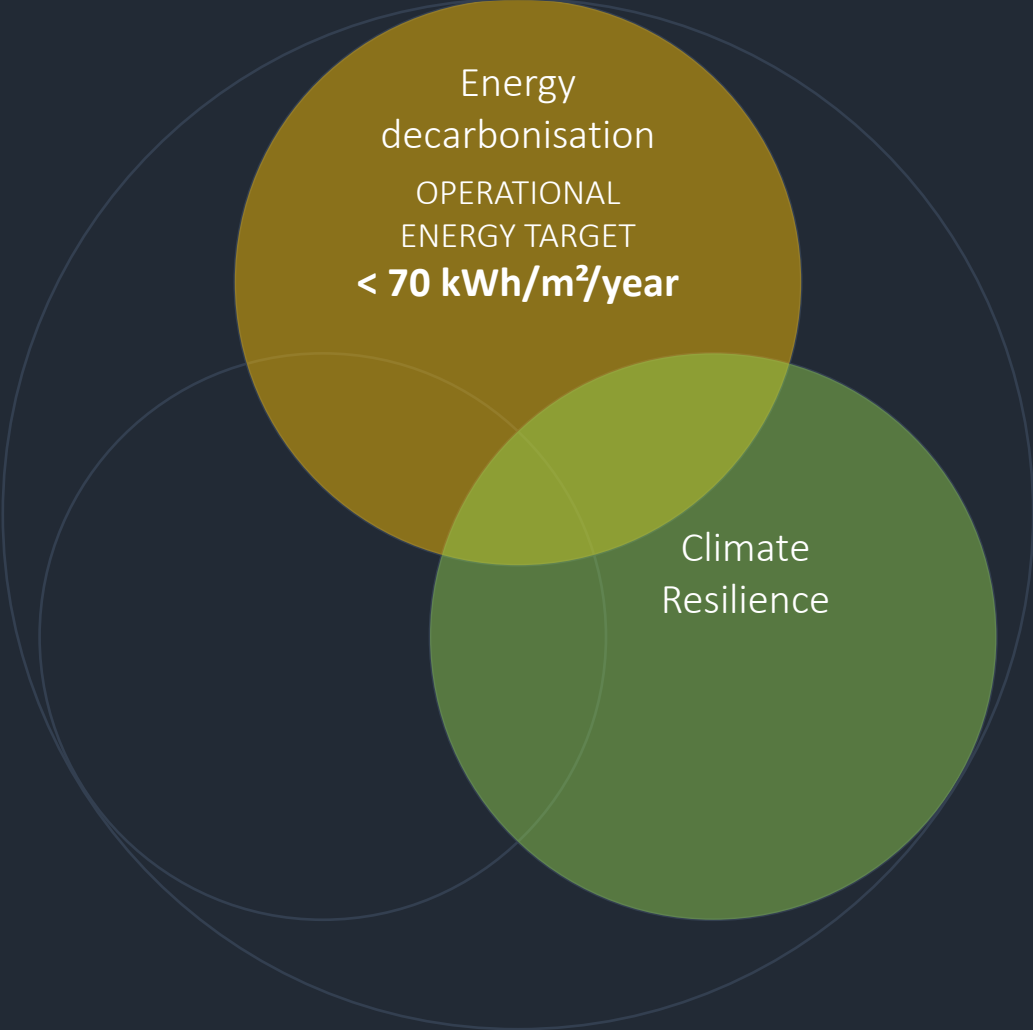


# Operational Energy



Property Services





Energy  
decarbonisation  
OPERATIONAL  
ENERGY TARGET  
< 70 kWh/m<sup>2</sup>/year

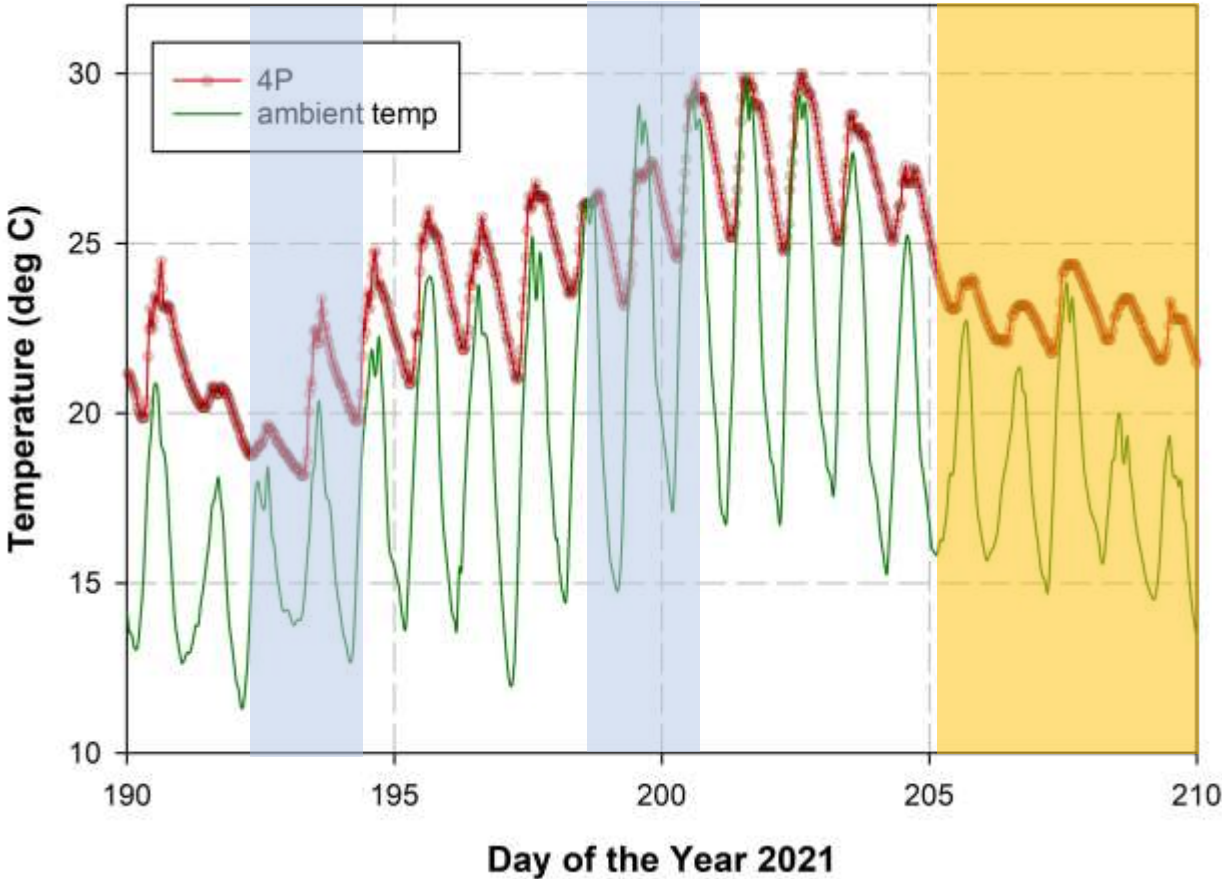
Climate  
Resilience

Energy  
decarbonisation  
OPERATIONAL  
ENERGY TARGET  
**< 70 kWh/m<sup>2</sup>/year**

Climate  
Resilience  
**to 2°C rise global  
temp**

# Climate Resilience

## When is Hot Too Hot?

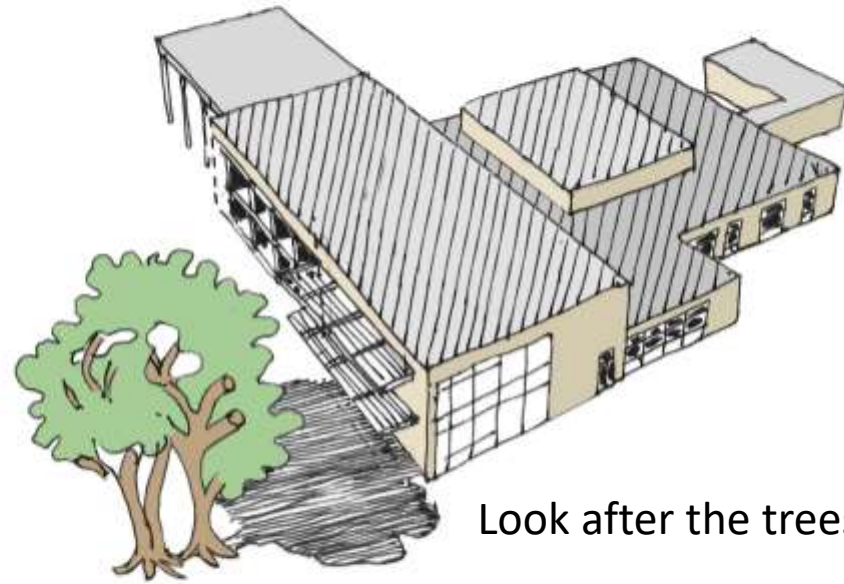


### HILTINGBURY 2<sup>ND</sup> FLOOR

4P – dual aspect classroom  
Cross flow ventilation potential



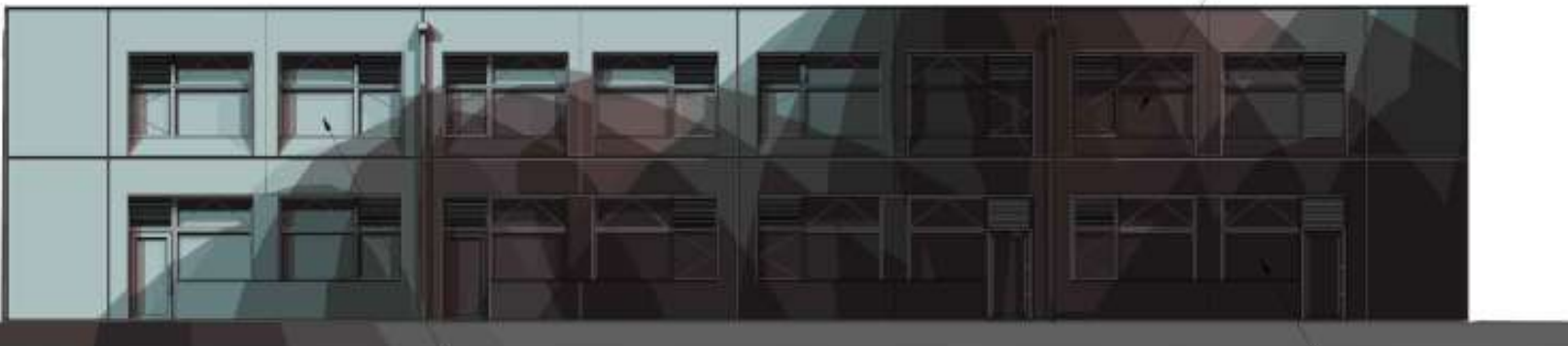
# Climate Resilience



Look after the trees!

- Morning Shadow
- Midday/ All Day Shadow
- Afternoon Shadow
- Well-Shaded

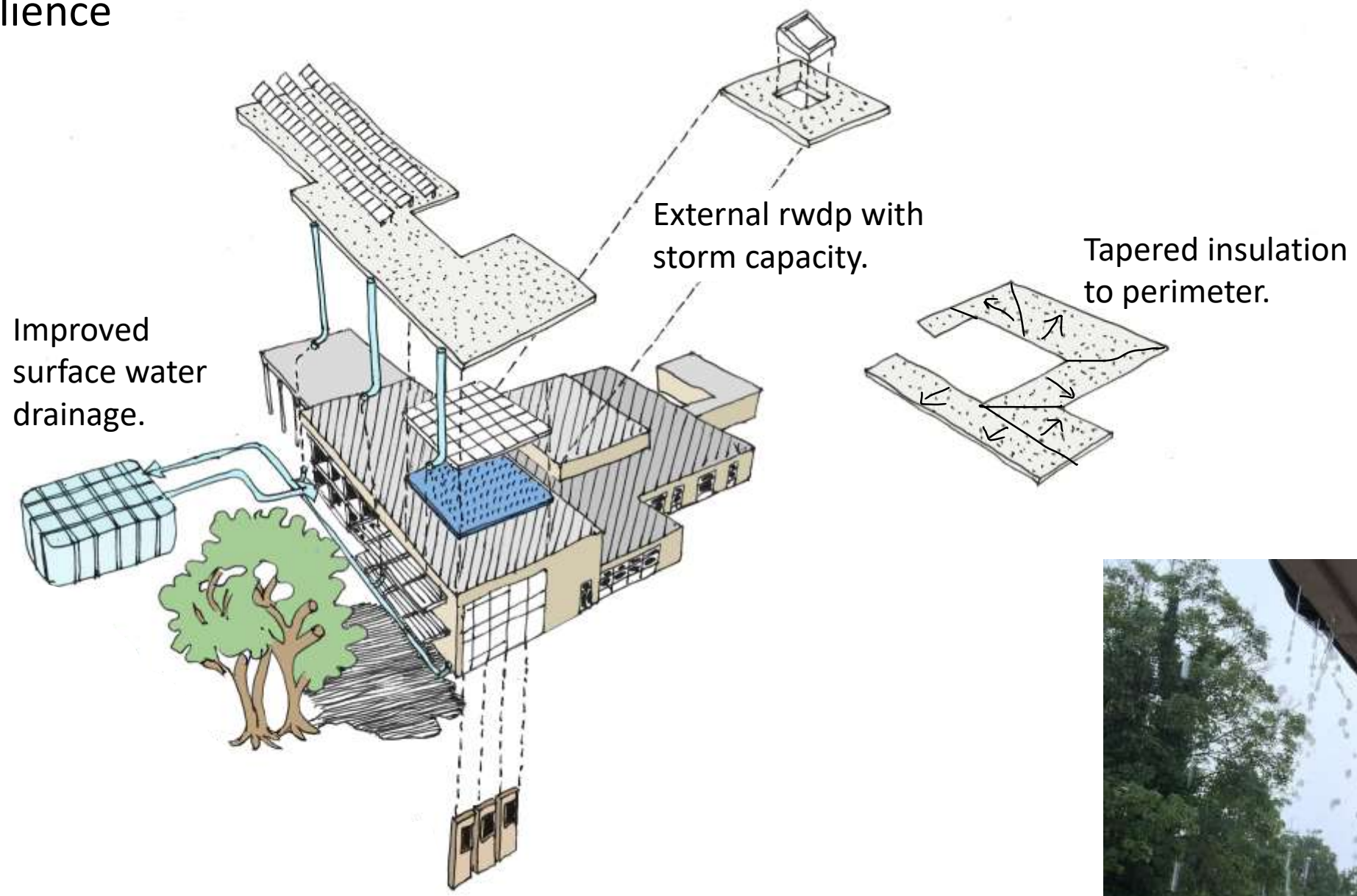
4 Hours Shading After 13:00

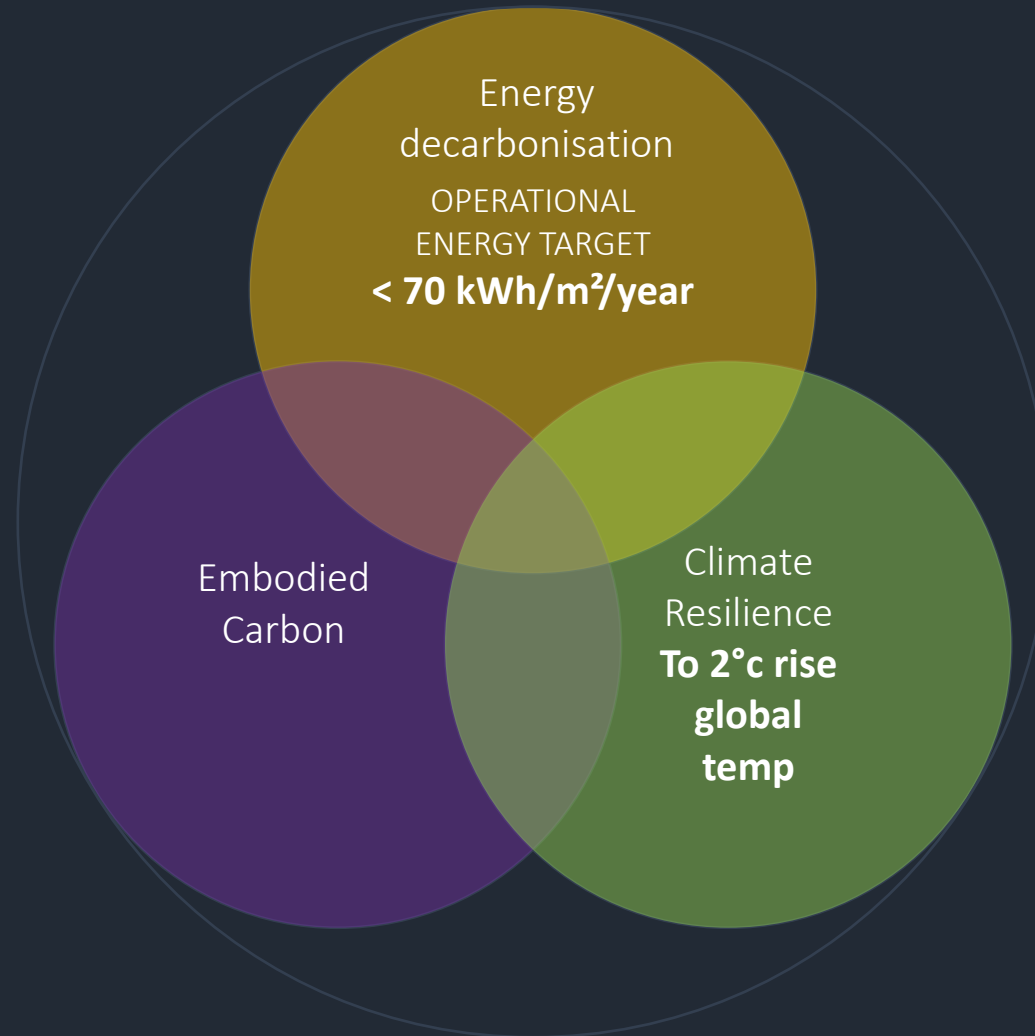


Add Brises Soleil only where needed.



# Climate Resilience

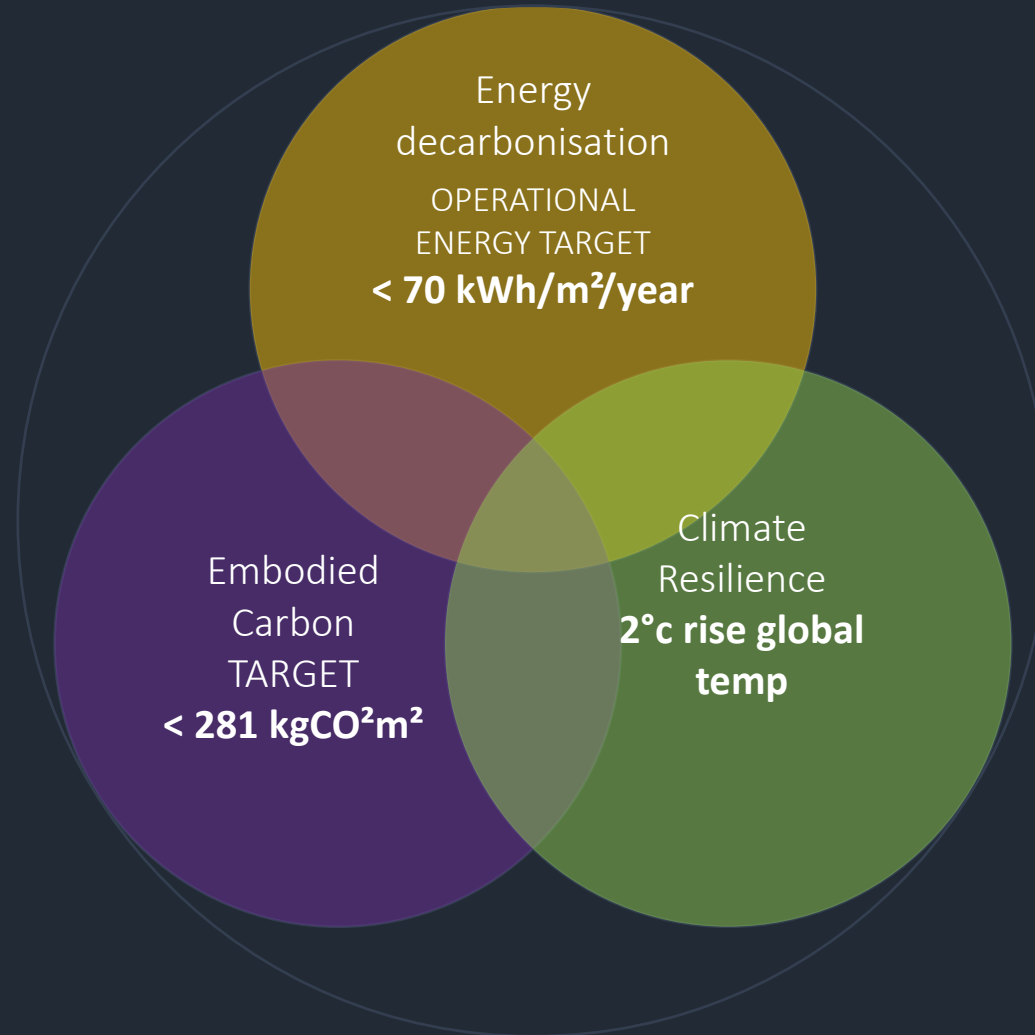




Energy  
decarbonisation  
OPERATIONAL  
ENERGY TARGET  
**< 70 kWh/m<sup>2</sup>/year**

Embodied  
Carbon

Climate  
Resilience  
**To 2°C rise  
global  
temp**



Energy  
decarbonisation  
OPERATIONAL  
ENERGY TARGET  
**< 70 kWh/m²/year**

Embodied  
Carbon  
TARGET  
**< 281 kgCO²m²**

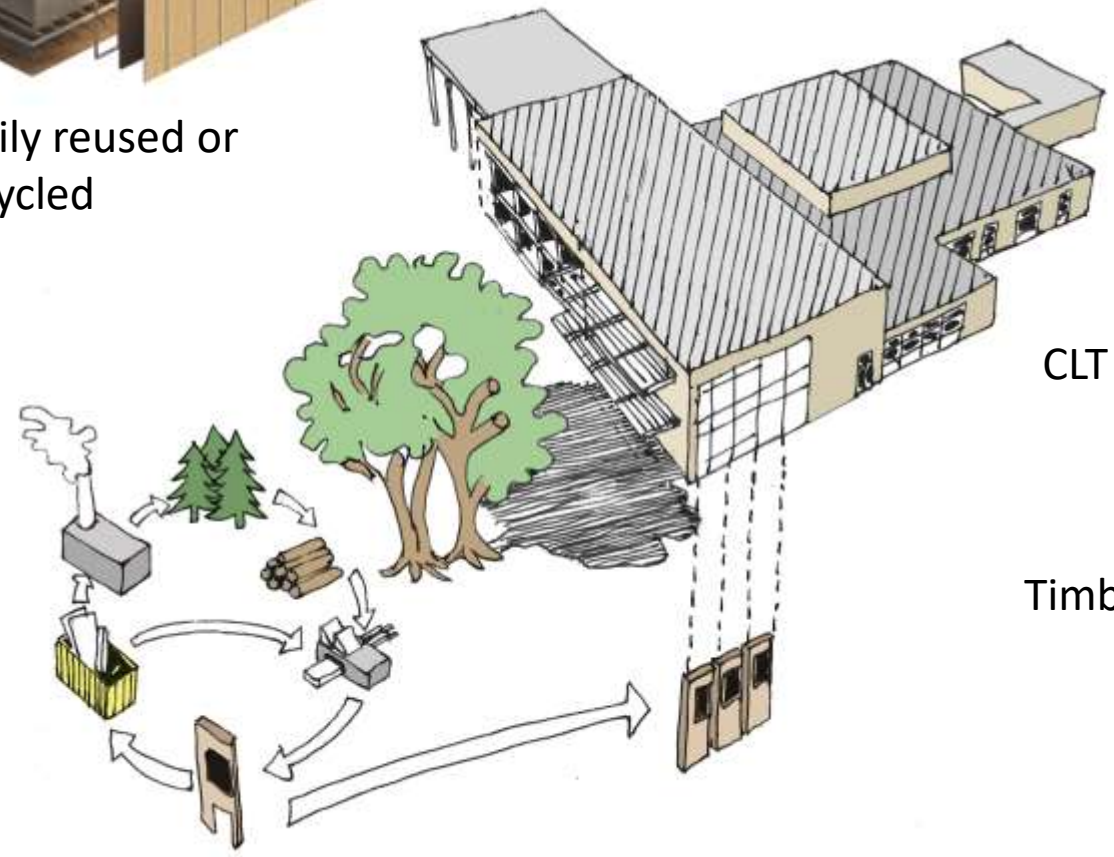
Climate  
Resilience  
**2°c rise global  
temp**



# Embodied Carbon.....*wood is good.*



Easily reused or recycled



- CLT and Larsen Truss panels
- Natural fibre insulation
- Timber cladding to first floor



Composite timber windows







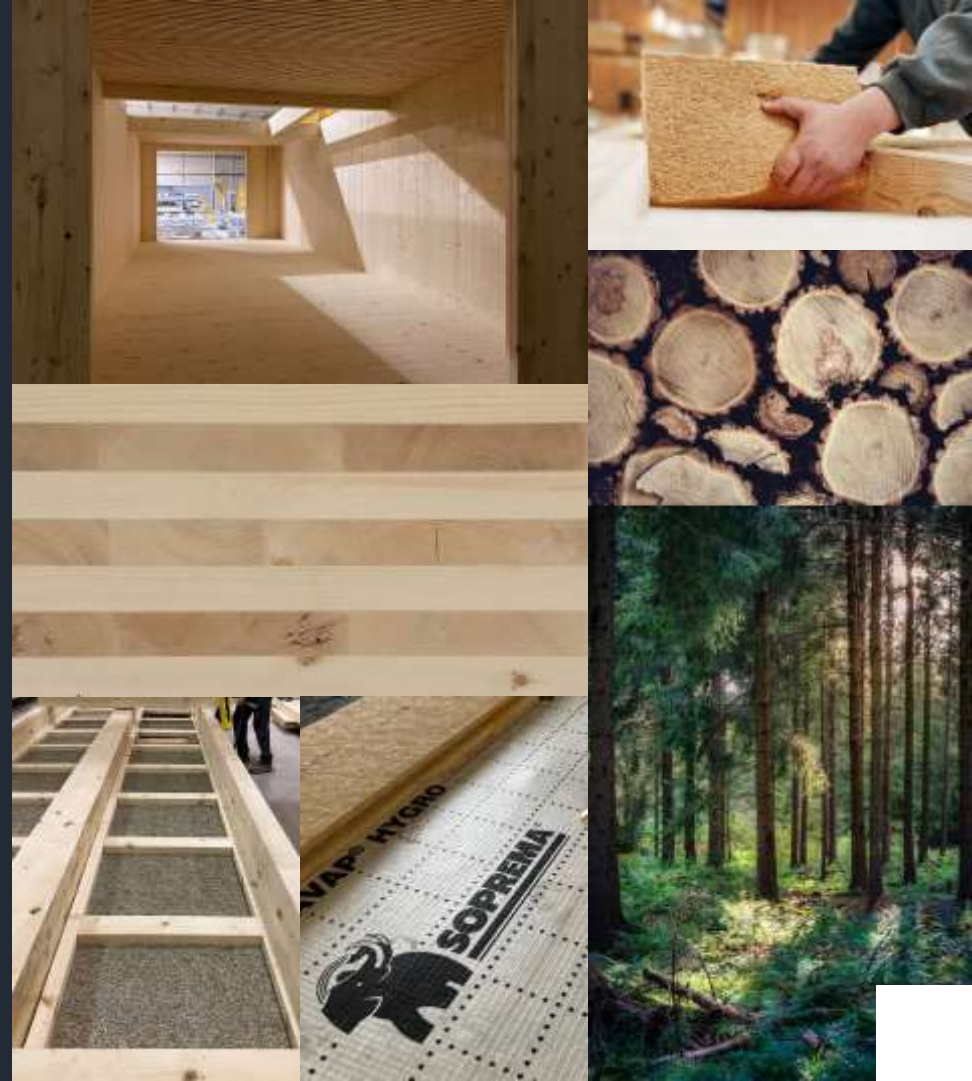
# ECOSYSTEMS

1

## TECHNOLOGIES Our Materials

We source our timber direct from the forest floor in the North East of Scotland. We use predominantly Sitka Spruce and Scots Pine, both of which are readily available and highly sustainable.

Our strategic alliances with local sawmills, local businesses and leading roofing and insulation specialists, are key to our success as we build local and highly sustainable supply chains.



### FAST TRACK PROGRAMME USING OFFSITE

Undertaken in 2 phases ( 4 classes in each phase)

34 week programme instead of normal 54 weeks.

Prelim savings offset additional cost of timber.

Less waste, less disruption, better quality control

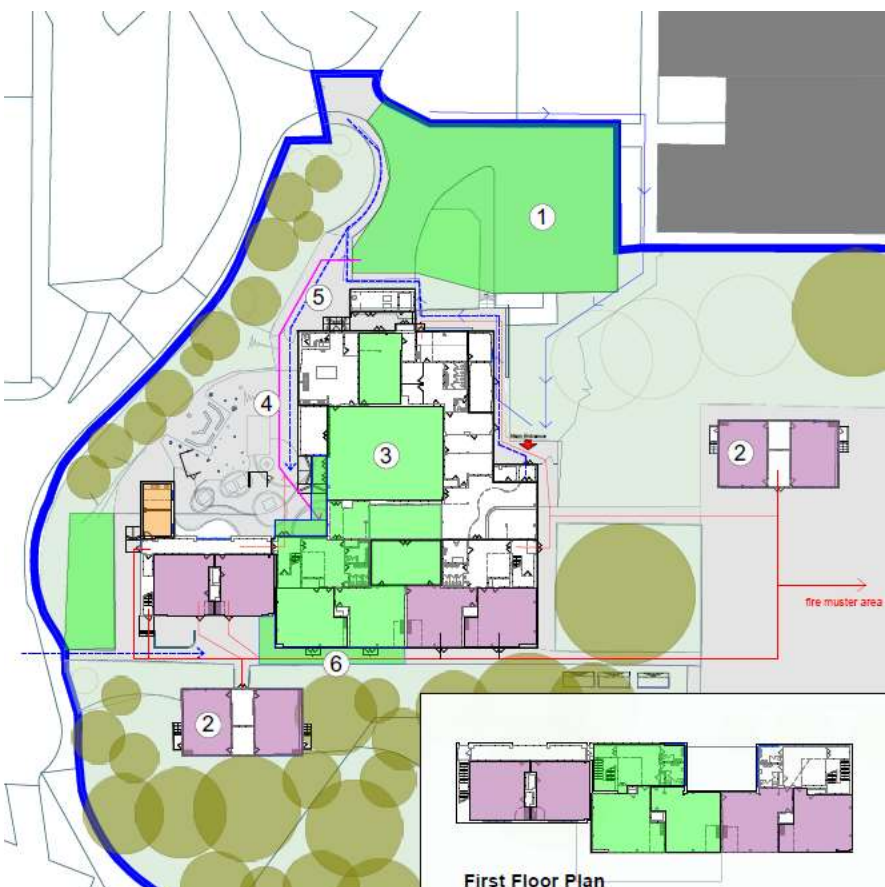
Modular offsite temporary classroom for duration of contract also using same timber specification.

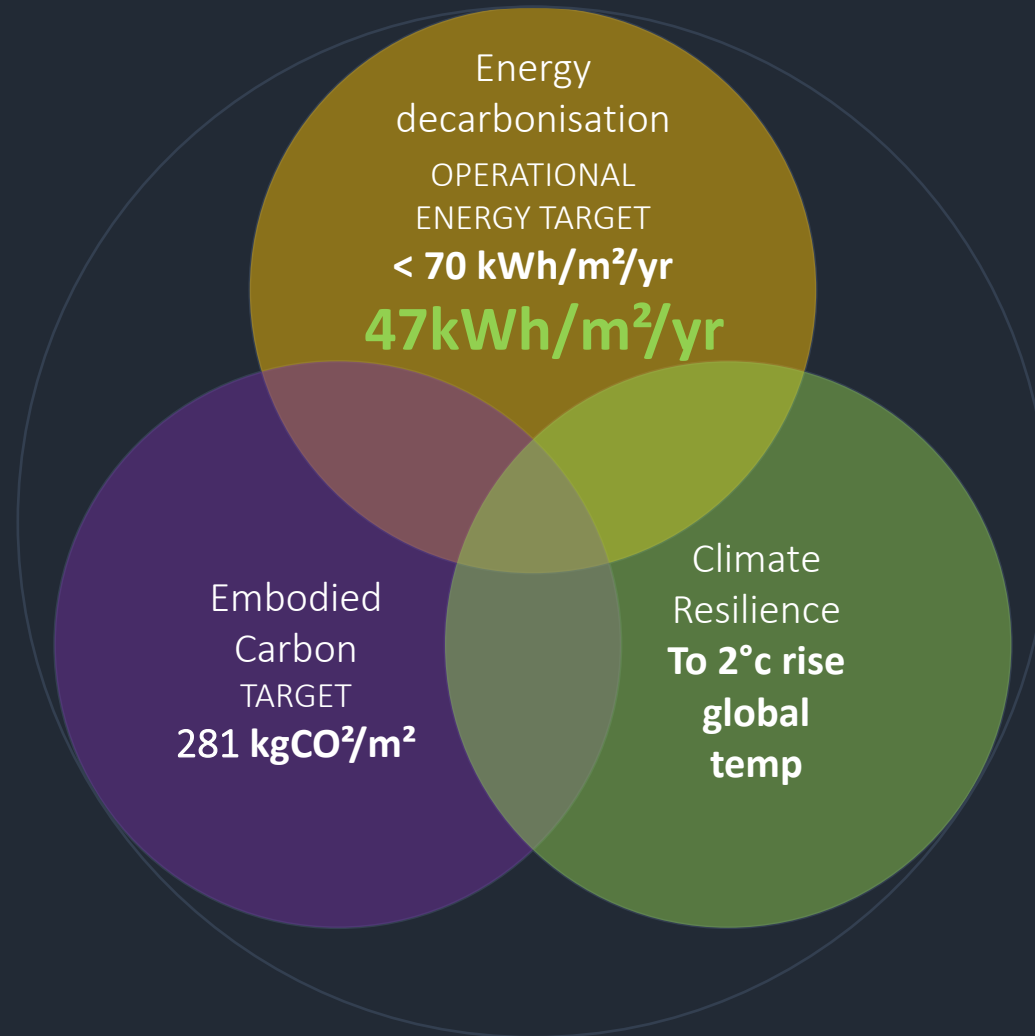


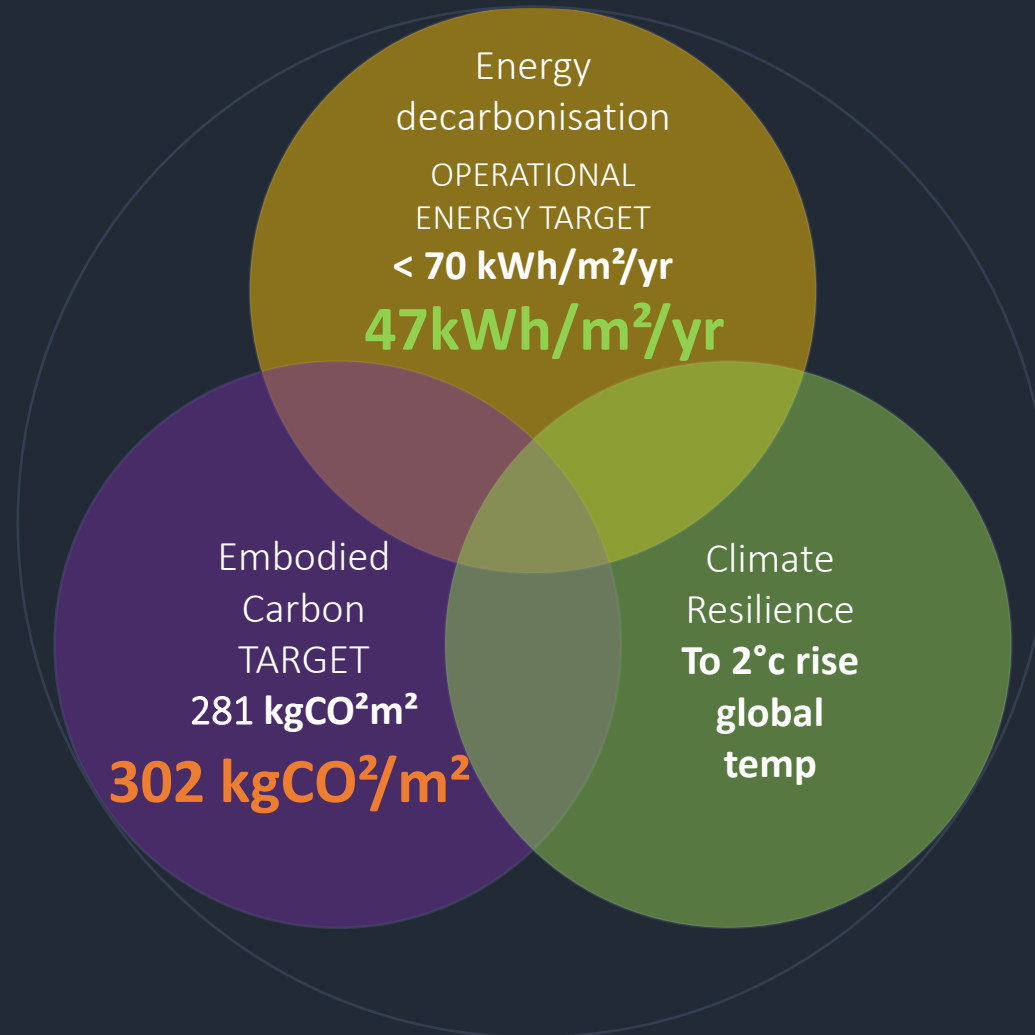
Demolition

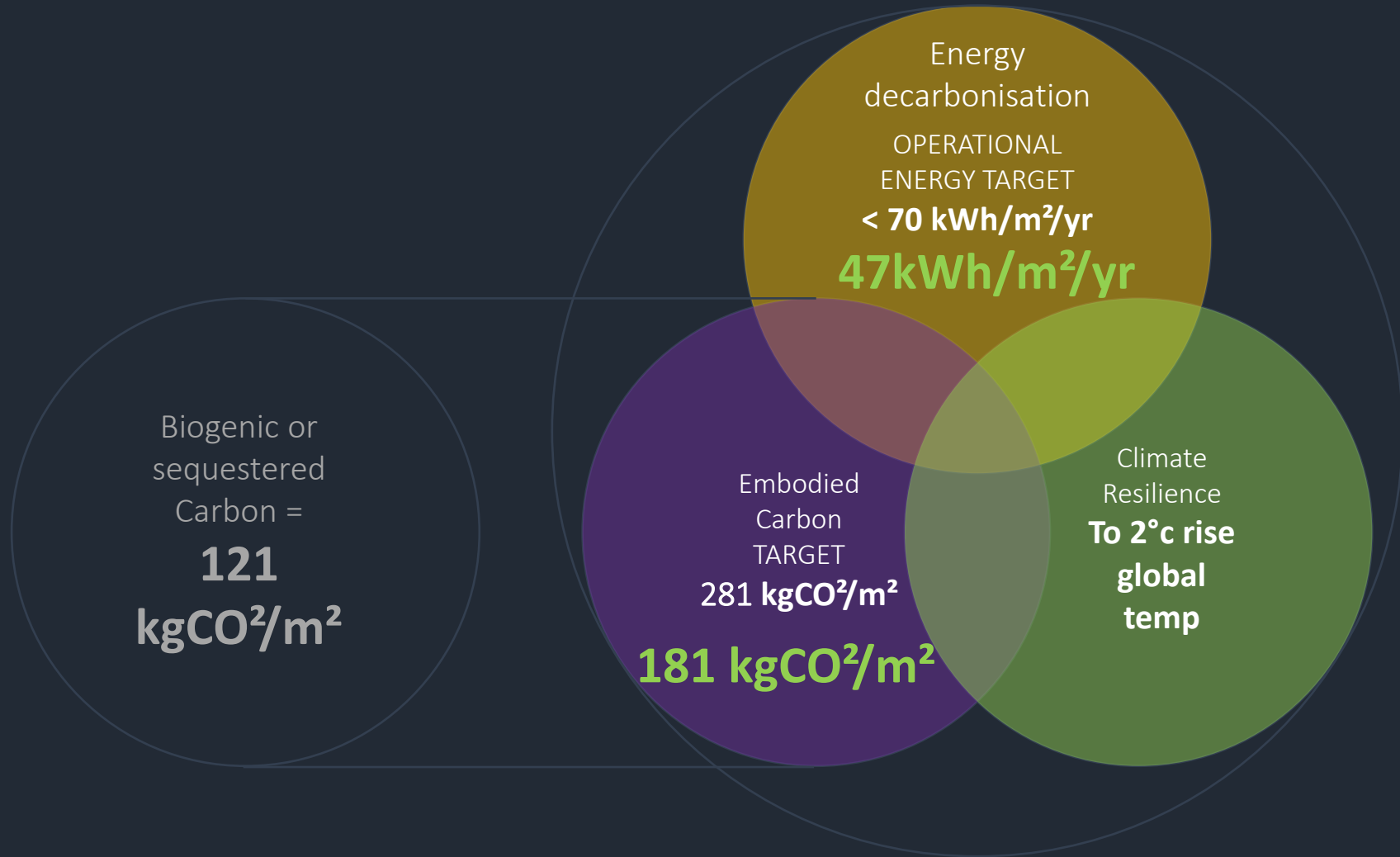


Installation of GF Panels with Spider Crane









Biogenic or  
sequestered  
Carbon =  
**121**  
**kgCO<sup>2</sup>/m<sup>2</sup>**

Energy  
decarbonisation  
OPERATIONAL  
ENERGY TARGET  
**< 70 kWh/m<sup>2</sup>/yr**  
**47kWh/m<sup>2</sup>/yr**

Embodied  
Carbon  
TARGET  
**281 kgCO<sup>2</sup>/m<sup>2</sup>**  
**181 kgCO<sup>2</sup>/m<sup>2</sup>**

Climate  
Resilience  
**To 2°c rise  
global  
temp**