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Decarbonising Blocks of Flats

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APSE Energy Associates & Employees of Salvis

Agenda

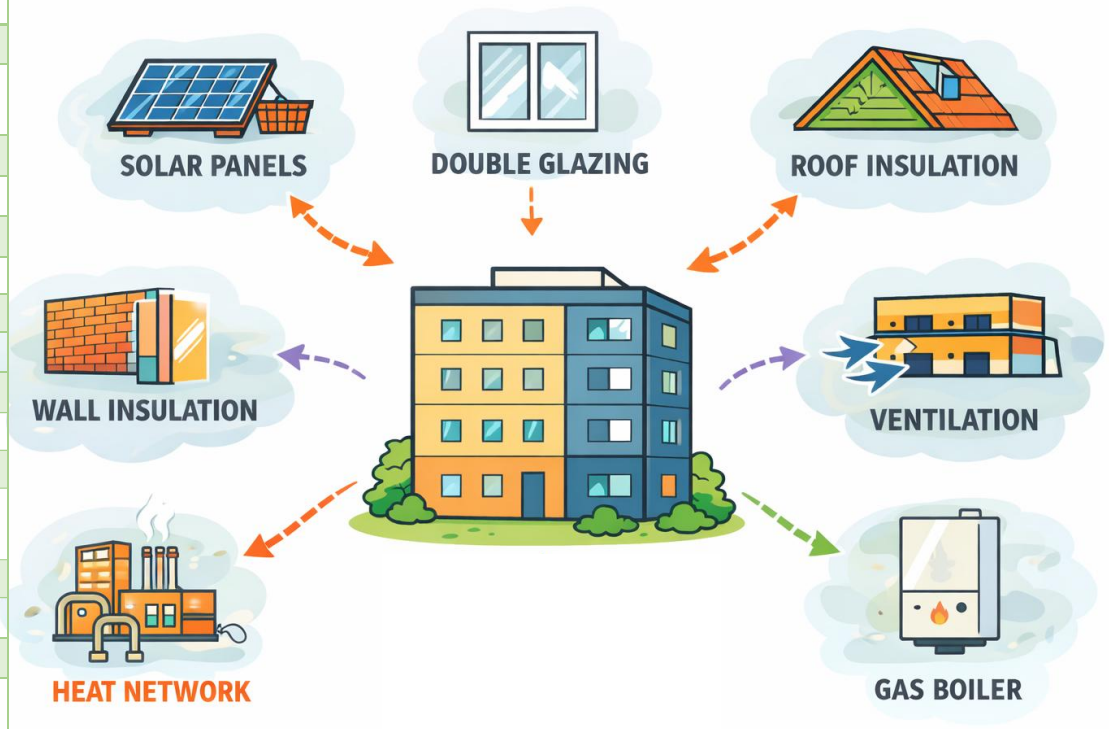
- Introduction
- Fabric considerations
- District heating through centralised energy centre with air source heat pumps
- Shared rooftop PV
- Expansion for wider district heating

Introduction & Project Scope

- Net Zero Target
- Minimum Energy Efficiency Standards (EPC C or better)
- Alleviate fuel poverty
- Value for money
- Carbon emissions reduction
- Future proofing

Retrofit Options

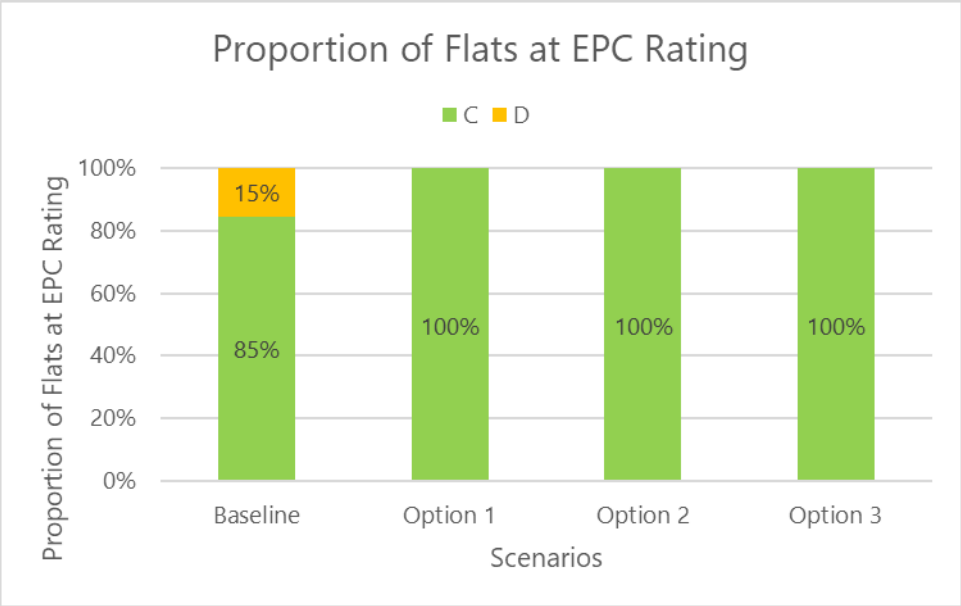
Retrofit Measures	Option 1	Option 2	Option 3	Life Expectancy of Measure (Years)
Fabric Efficiency				
Undercroft (Under floor insulation – UFI)	✓	✗	✓	42
Window	✓	✓	✓	20
Solid Door	✓	✓	✓	30
Glazed Door	✓	✓	✓	20
Heating System				
New Gas-fired boilers	✗	✗	✓	16
Heat network (Heat Generator: ASHP)	✓	✓	✗	40
Renewable Power Generation				
Solar Photovoltaics (PV) with SolShare	✓	✓	✓	25
Discounted Measures				
Roof	✗	✗	✗	20
Wall (External or Internal insulation incl. party wall)	✗	✗	✗	36 - 42
Ground floor (Solid floor insulation – SFI)	✗	✗	✗	42



Retrofit Cost for One Block

	Retrofit Option 1	Retrofit Option 2	Retrofit Option 3
Capital Cost	£2,910,000	£2,900,000	£900,000

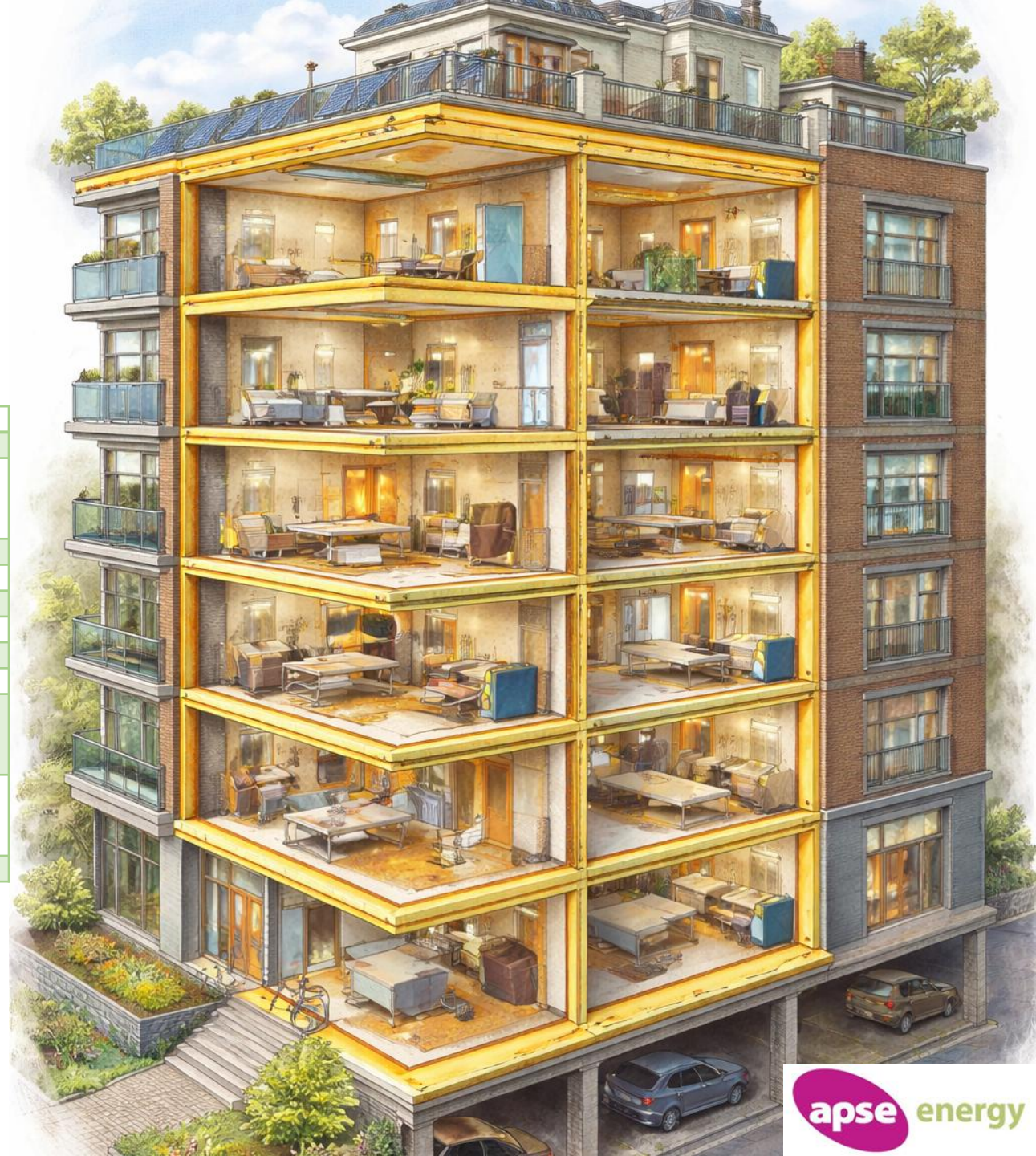
EPC Rating



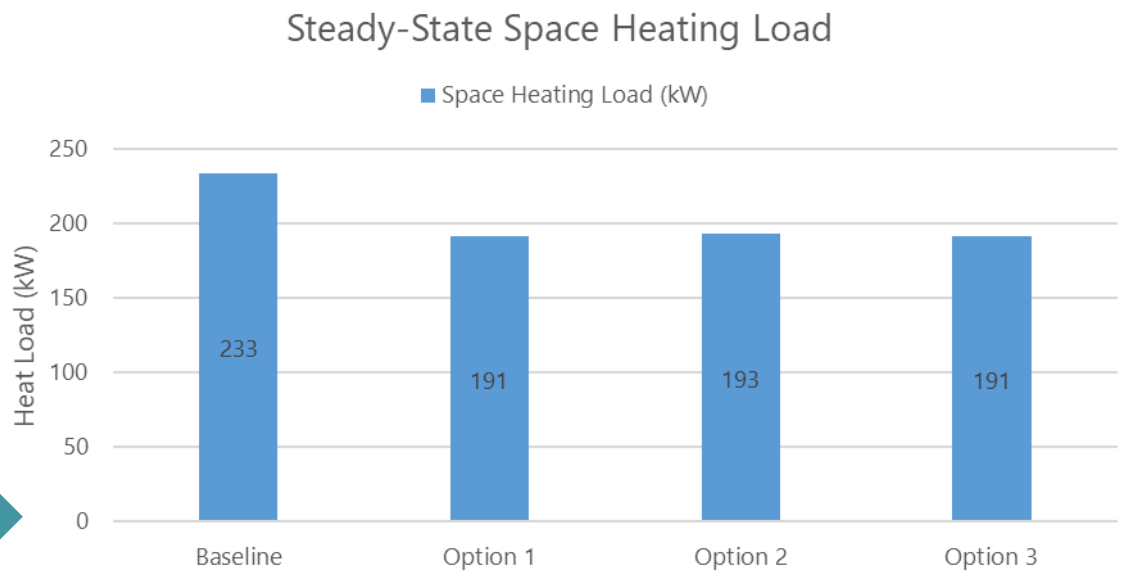
Score	Energy rating
92+	A
81-91	B
69-80	C
55-68	D
39-54	E
21-38	F
1-20	G

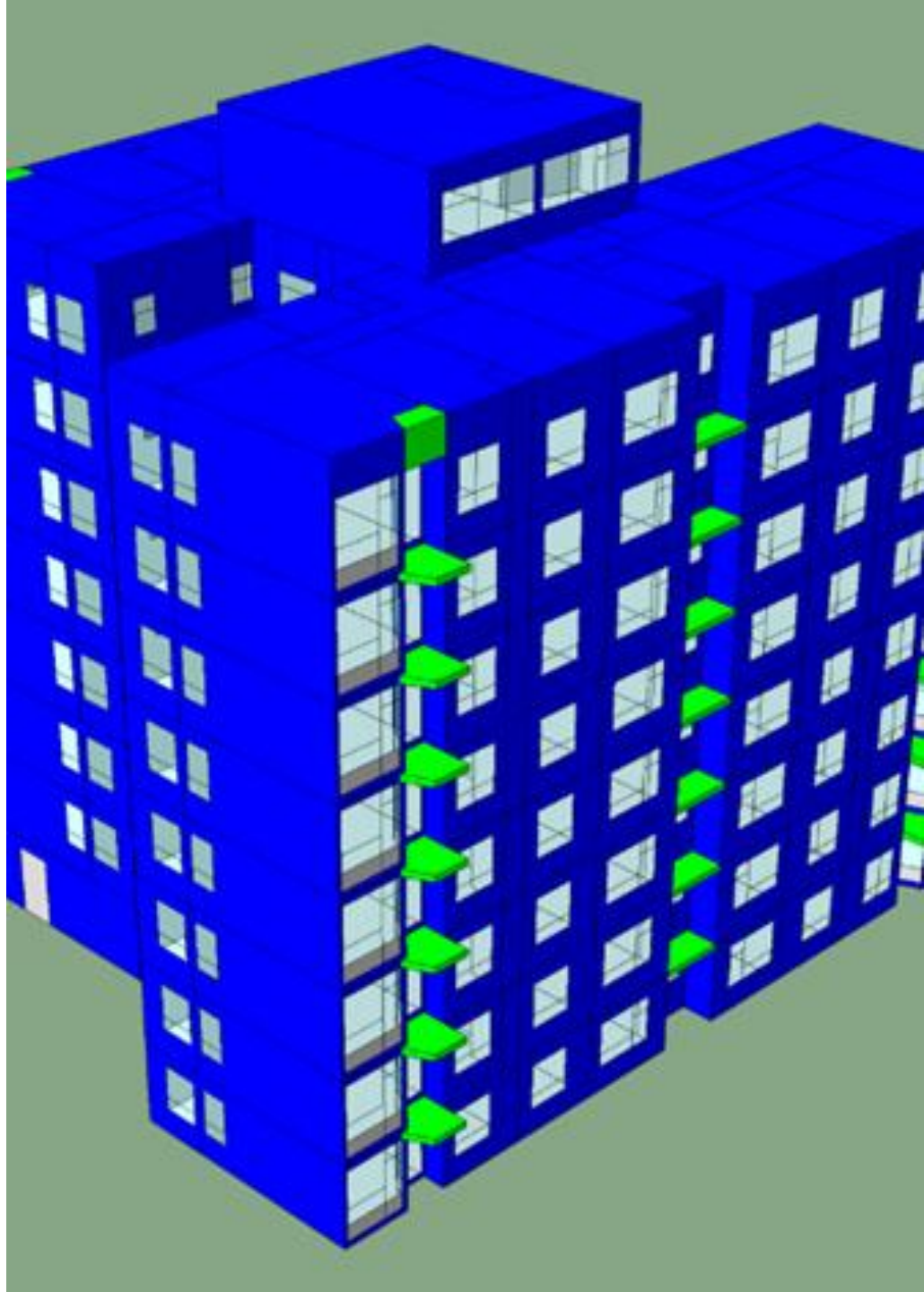
Fabric Considerations

Retrofit Measures	Option 1	Option 2	Option 3
Fabric Efficiency			
Undercroft (Under floor insulation – UFI)	✓	✗	✓
Window	✓	✓	✓
Solid Door	✓	✓	✓
Glazed Door	✓	✓	✓
Discounted Measures			
Roof	✗	✗	✗
Wall (External or Internal insulation incl. party wall)	✗	✗	✗
Ground floor (Solid floor insulation – SFI)	✗	✗	✗

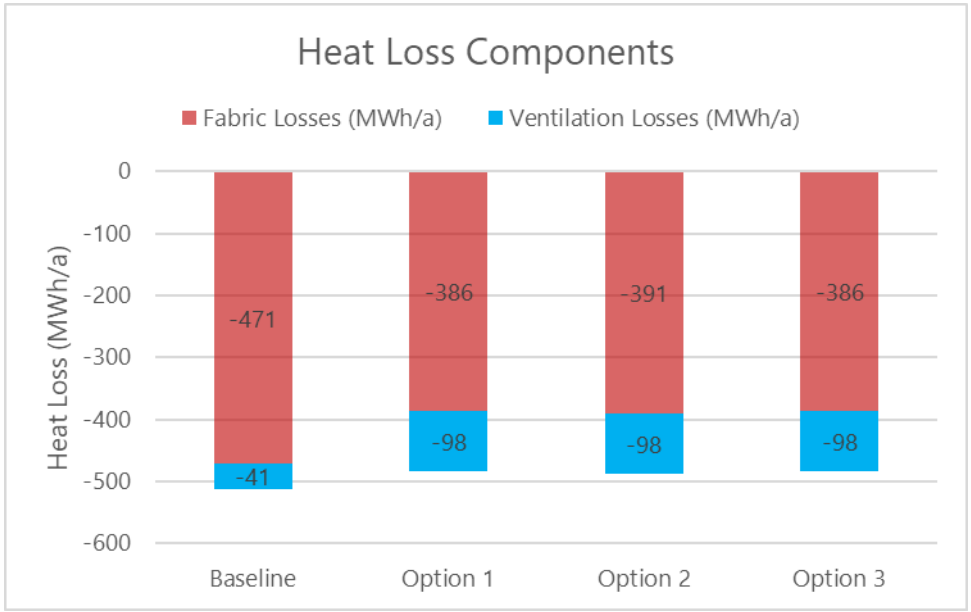


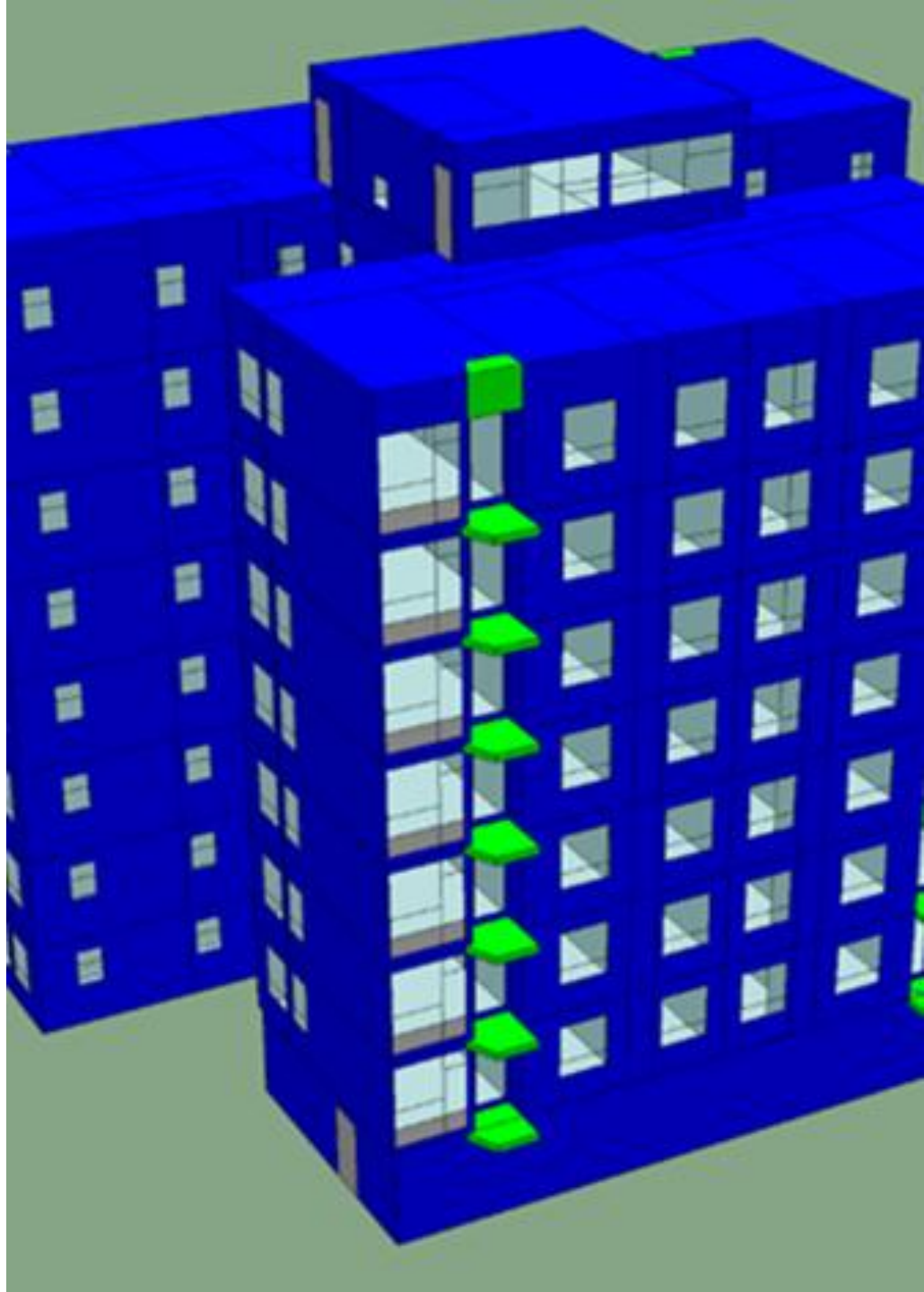
Thermal Modelling





Ventilation Upgrades





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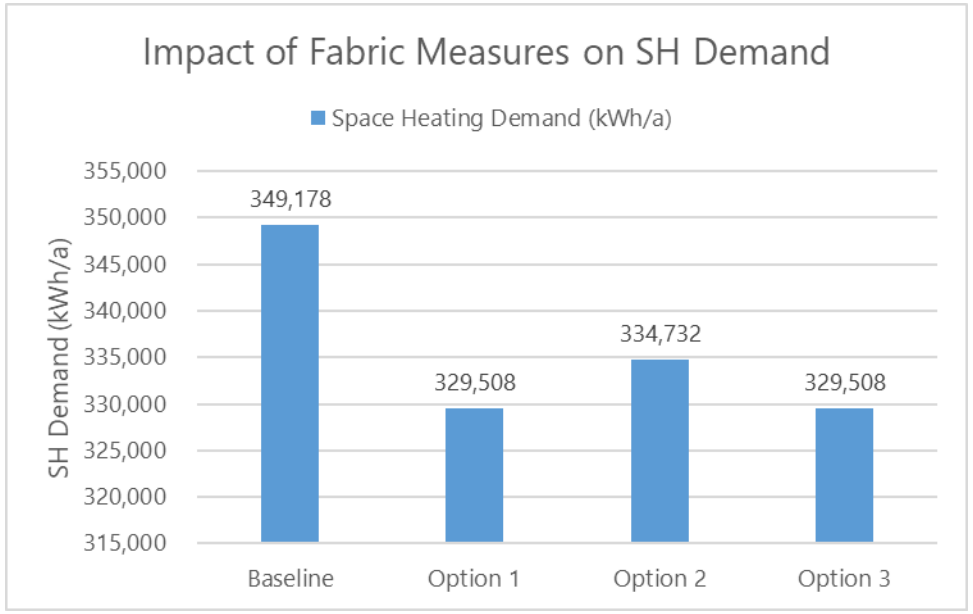
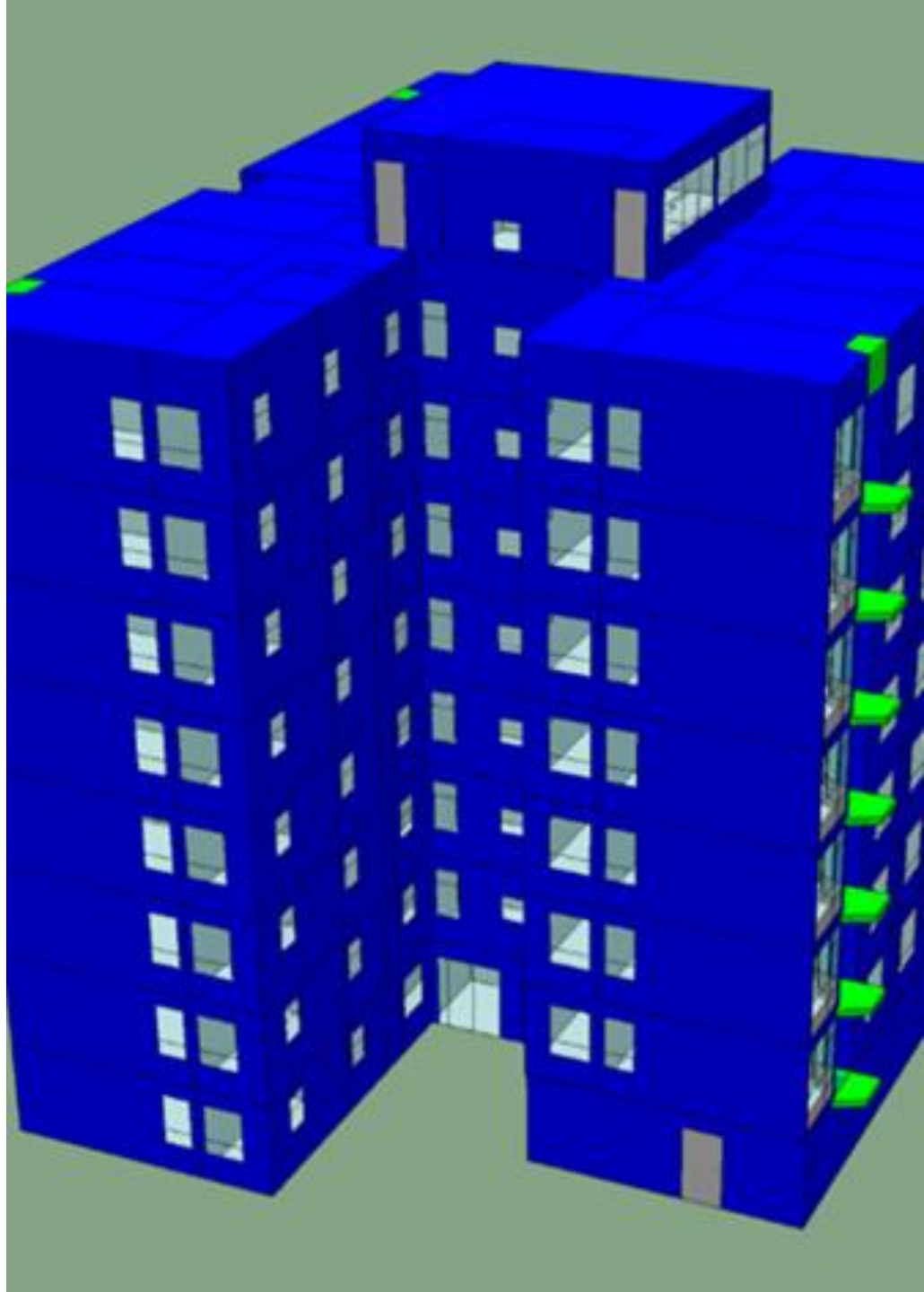




Heating System Efficiency

Heating System	Existing Gas-fired Boilers	Heat Network (ASHP)	New Gas-fired Boilers
	Baseline	**Retrofit Opt. 1 & 2**	**Retrofit Opt. 3**
Space Heating ŋ	89%	320%	89%
Water (DHW) Heating ŋ	89%	253%	89%

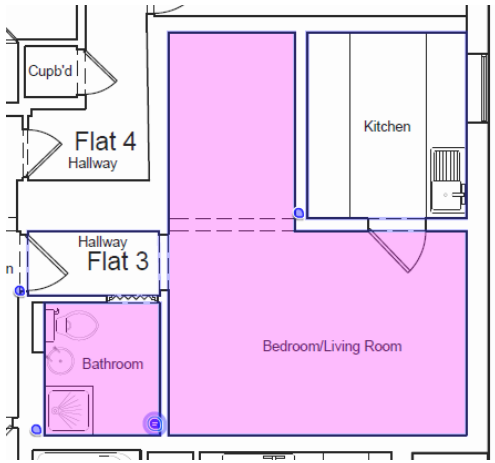
Radiator Capacity Check

	Gas-fired Boilers	Heat Network (ASHPs)
Flow temperature (°C)	80	55
Return temperature (°C)	60	35
Room design temperature (°C)	20	20
Mean water-to-air temperature Δt (°C)	50	25
Heat Emitter	Radiators	Radiators

Radiator Capacity Check

Bedsit

Heating System	Existing Gas Boiler (80/60°C)	Heat Network (55/35°C)	Heat Network (55/35°C)	New Gas Boiler (80/60°C)
Room	**Baseline**	**Retrofit Opt. 1**	**Retrofit Opt. 2**	**Retrofit Opt. 3**
Bathroom	TRUE	FALSE	FALSE	FALSE
Circulation				
Kitchen				
Studio	FALSE	FALSE	FALSE	TRUE



2-Bed

Heating System	Existing Gas Boiler (80/60°C)	Heat Network (55/35°C)	Heat Network (55/35°C)	New Gas Boiler (80/60°C)
Room	**Baseline**	**Retrofit Opt. 1**	**Retrofit Opt. 2**	**Retrofit Opt. 3**
Bathroom	TRUE	FALSE	FALSE	TRUE
Bedroom 1	TRUE	FALSE	FALSE	TRUE
Bedroom 2	TRUE	FALSE	FALSE	TRUE
Circulation	TRUE	TRUE	FALSE	TRUE
Cupboard 1				
Cupboard 2				
Cupboard				
Boiler				
Kitchen	FALSE	FALSE	FALSE	FALSE
Living	TRUE	FALSE	FALSE	TRUE

Shared Rooftop PV

Facts and Figures

5-15

Typical SAP score increase

£1,500-3,500

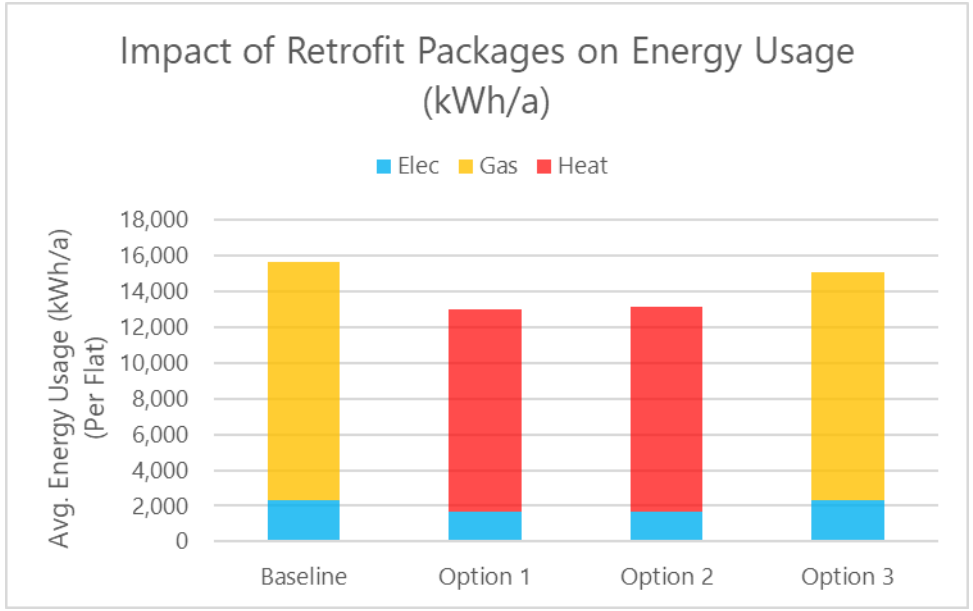
Typical fully installed costs per apartment

40 %

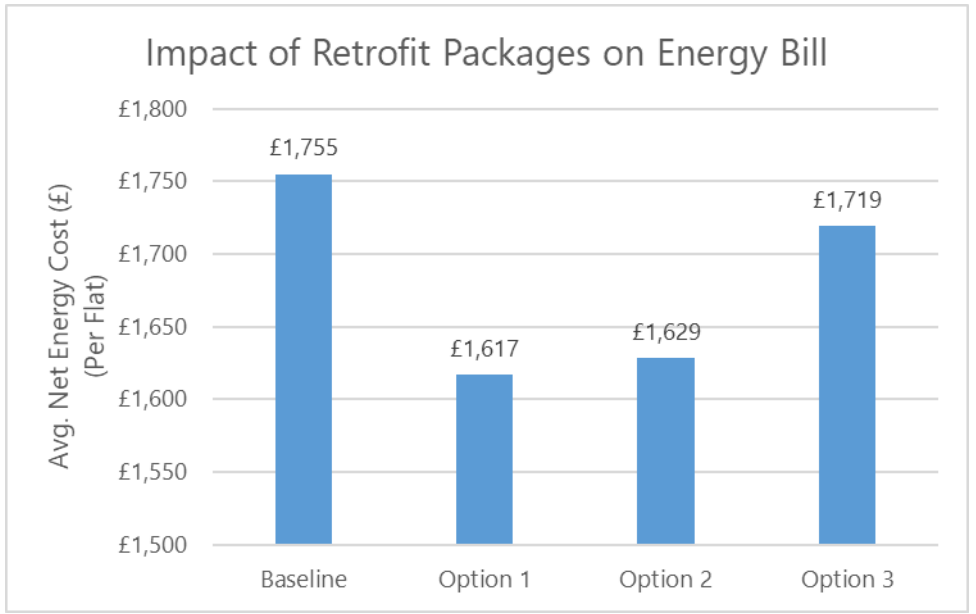
Typical bill savings

Source: UKGBC, 2021
Sharing rooftop solar to apartments | UKGBC

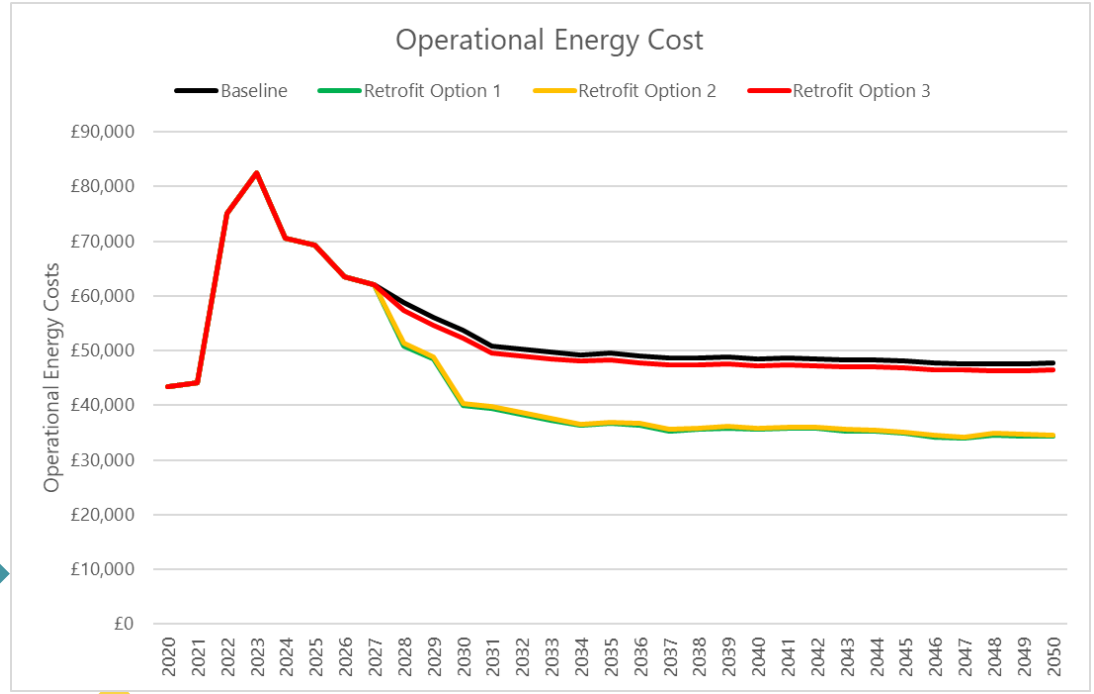
Tenant Energy Use (per Flat)

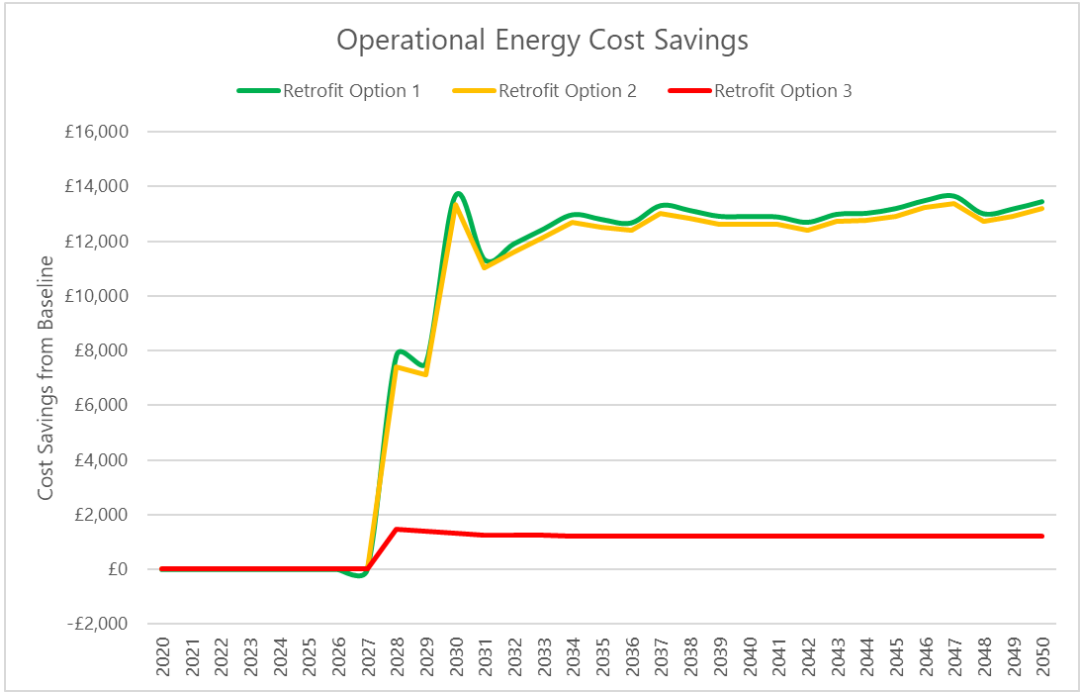


Tenant Energy Bill (per Flat)

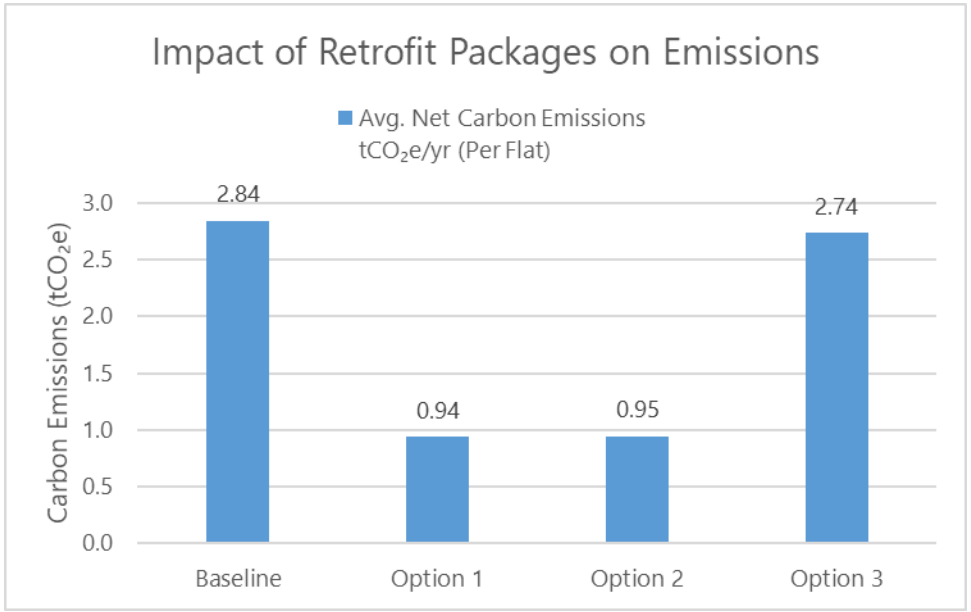


Operating Cost of One Block

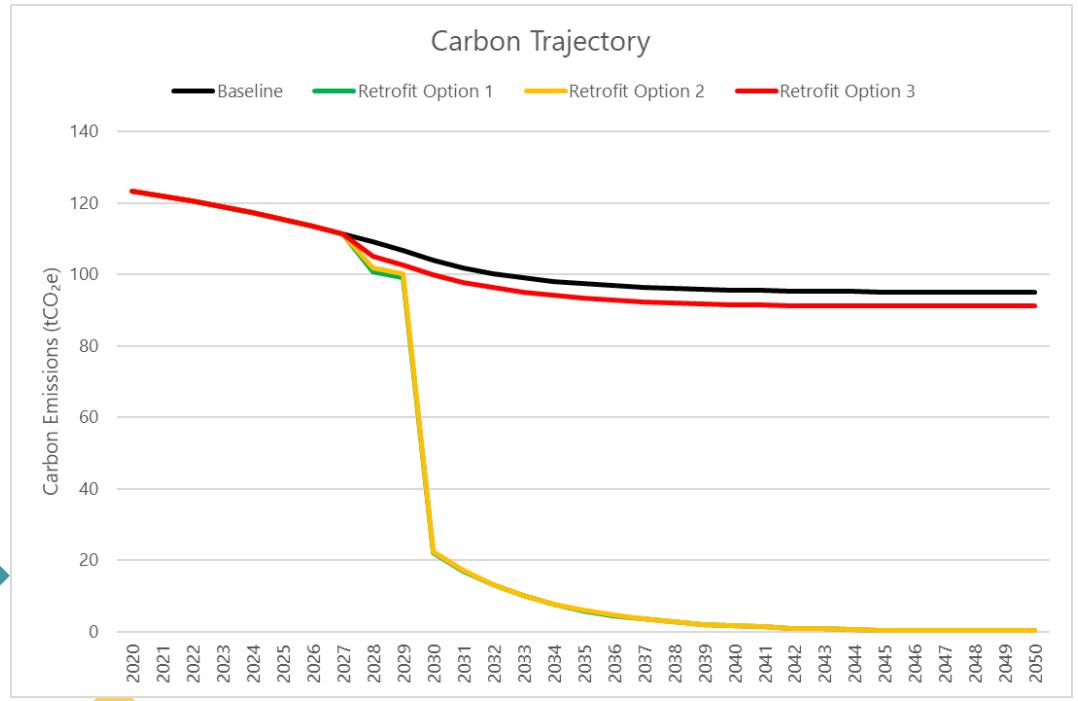


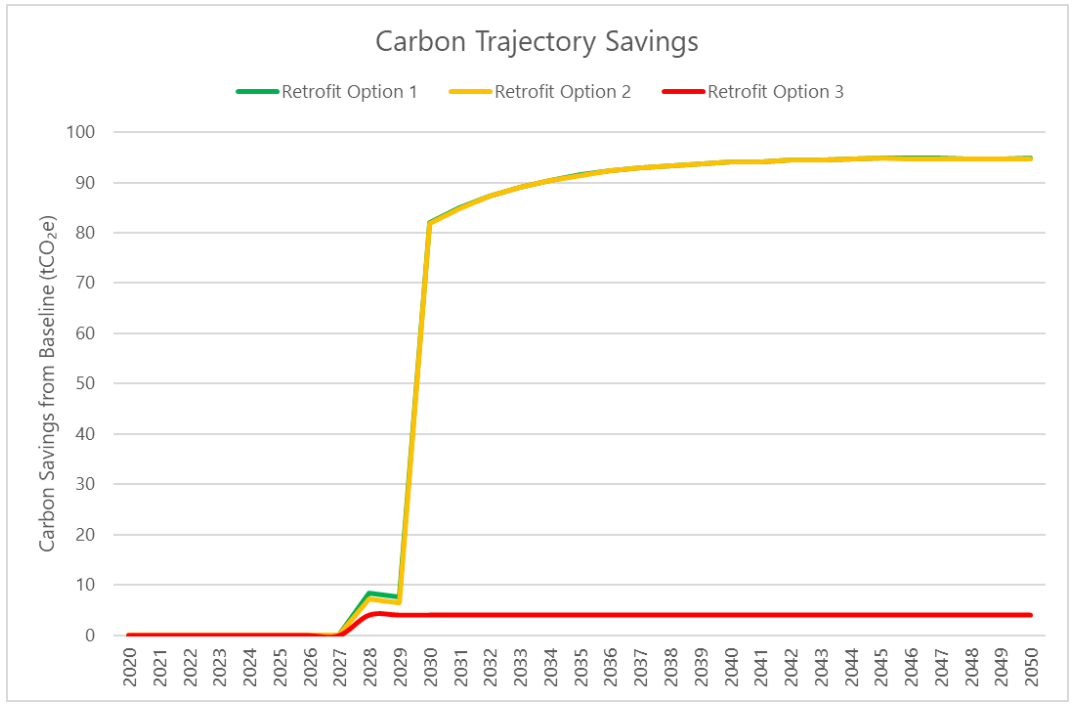


Tenant Carbon Emissions (per Flat)



Carbon Emissions of One Block

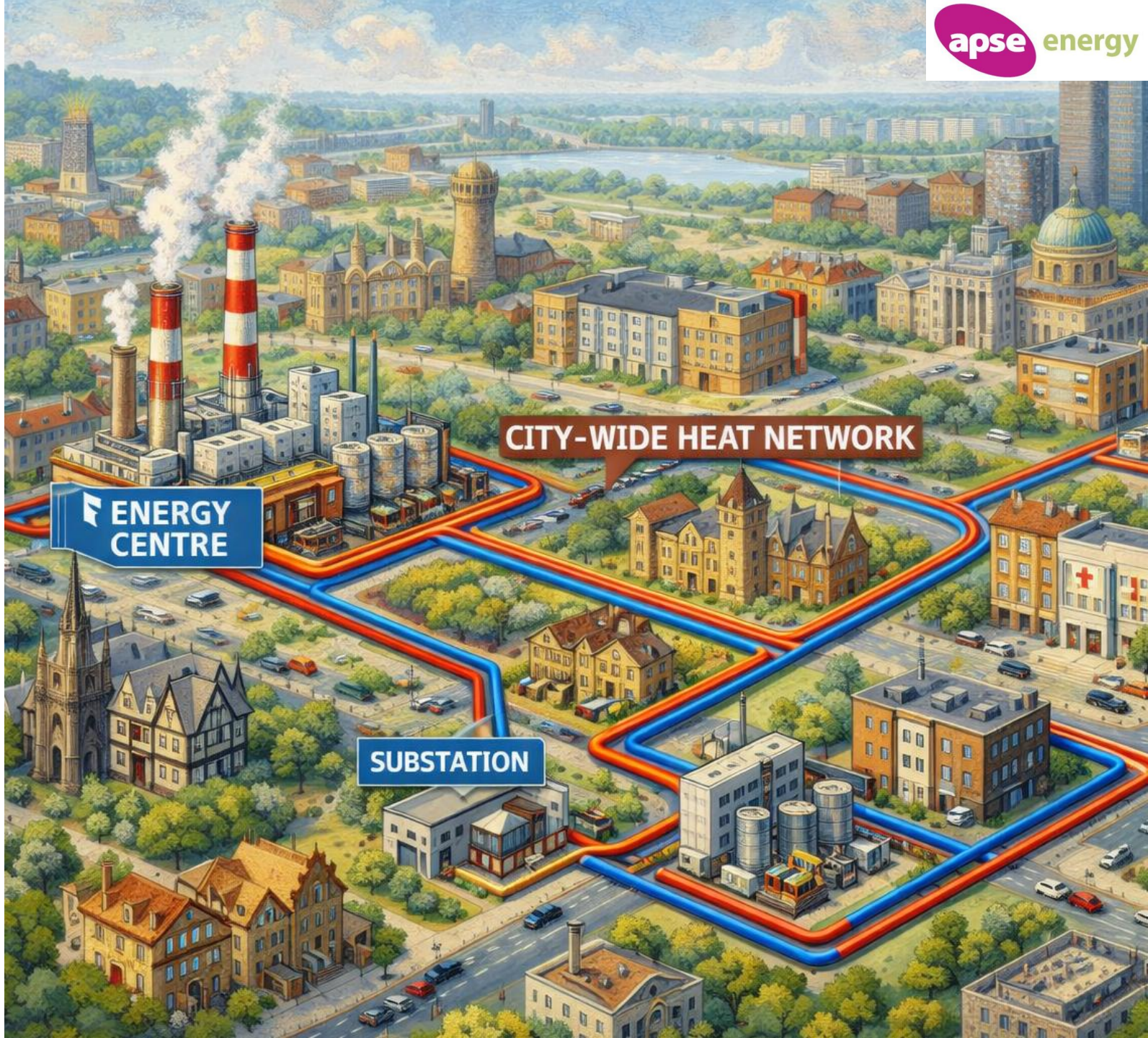




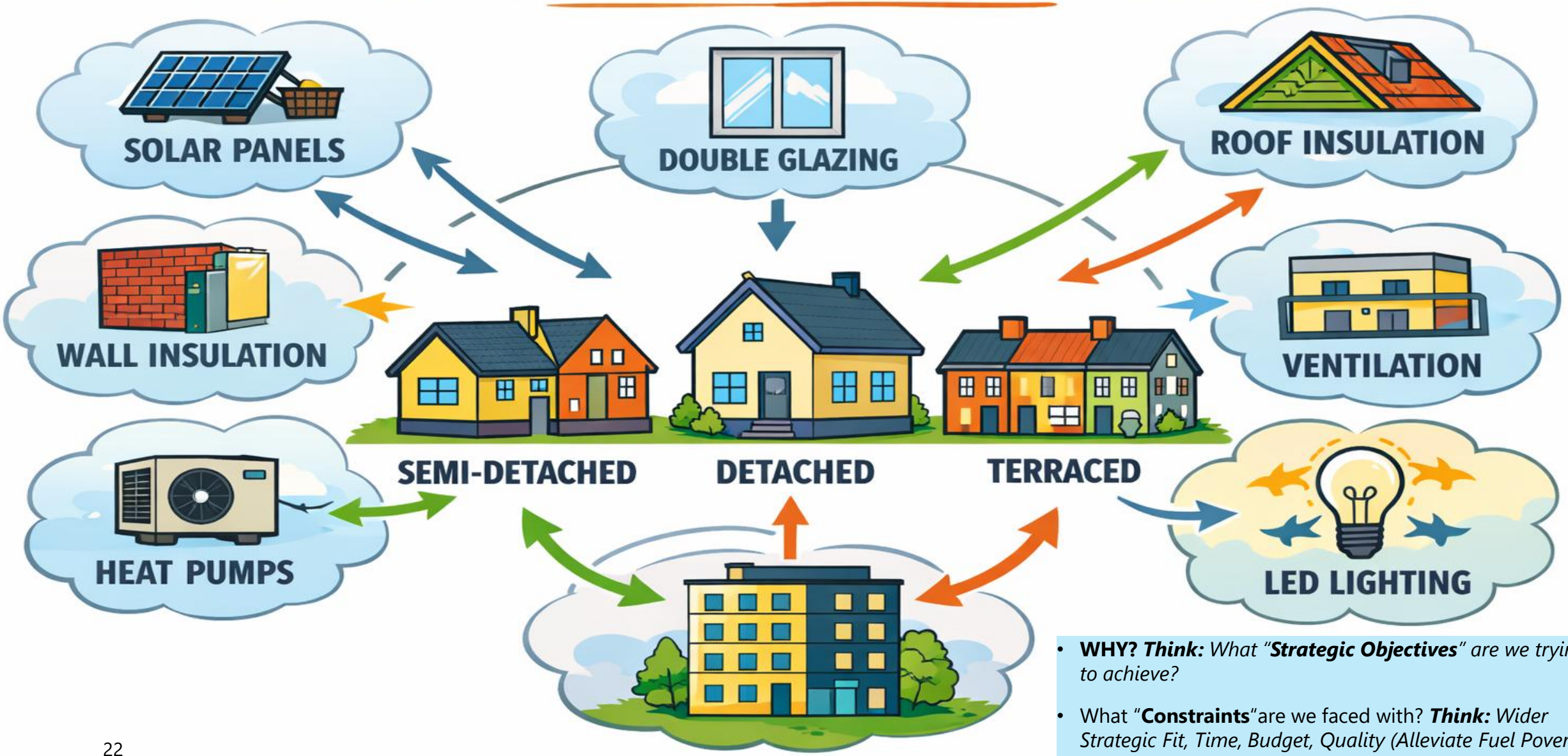
City Wide Heat Network

Funding Opportunities

- Heat Network Delivery Unit (HNDU)
- Green Heat Network Fund (GHNF)



ONE SIZE DOESN'T FIT ALL NEEDS



- **WHY? *Think:*** *What "**Strategic Objectives**" are we trying to achieve?*
- What "**Constraints**"are we faced with? ***Think:*** *Wider Strategic Fit, Time, Budget, Quality (Alleviate Fuel Poverty, Improve Health & Wellbeing), Risk (Legal & Regulatory Compliance)*

Contact Details

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Next Steps

Ready to take action?

Contact Phil Brennan for further details on delivery of projects

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