

# STBA

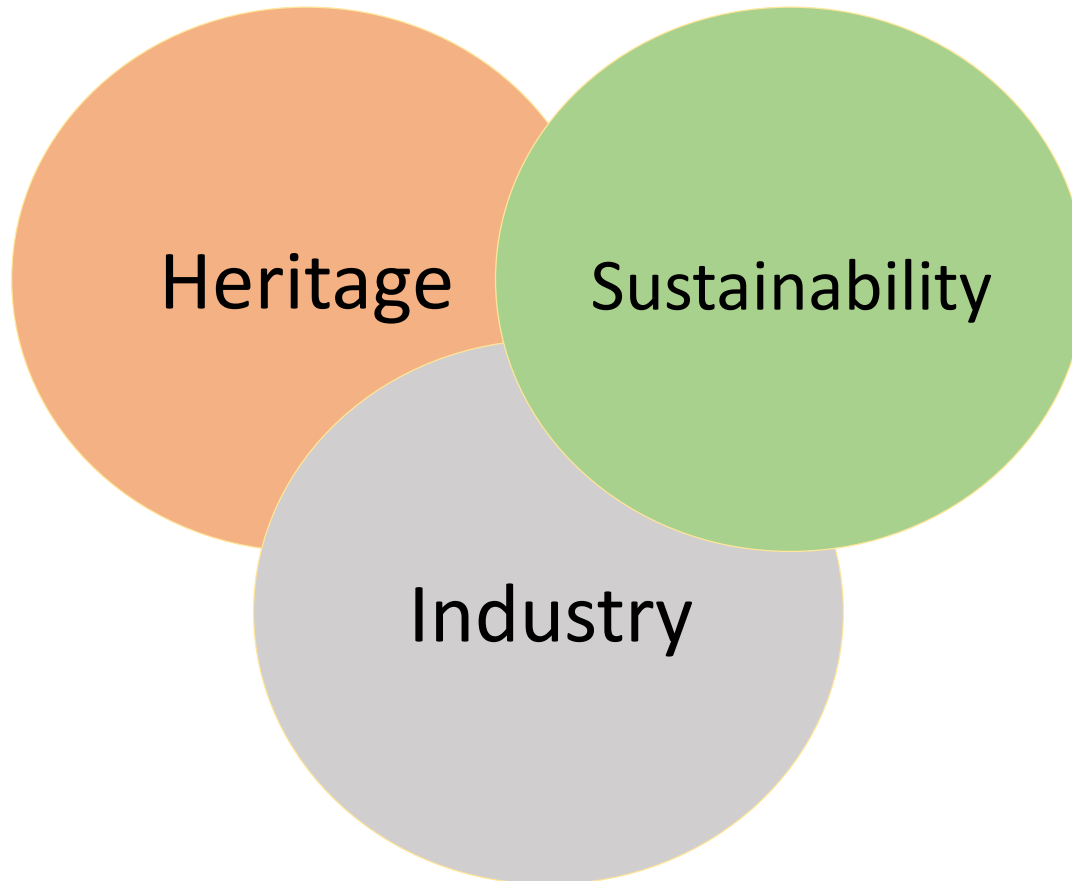
SUSTAINABLE TRADITIONAL  
BUILDINGS ALLIANCE

## **National and International targets on Sustainability and Decarbonisation**

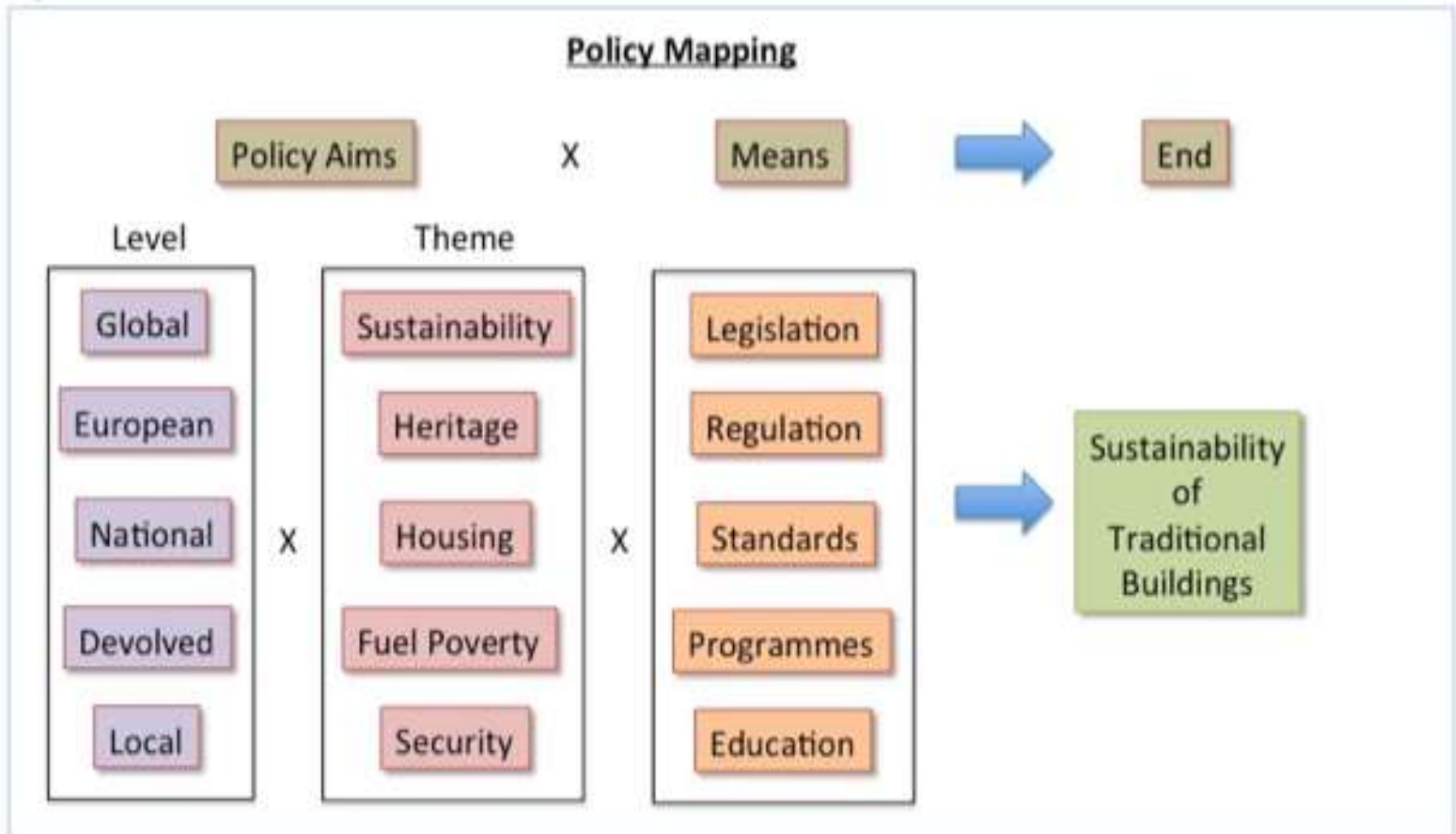
*Nigel Griffiths, Director, STBA*

*Caerphilly Castle 23<sup>rd</sup> October 2019*

**Three pillars of the  
Alliance**



## National and International targets on Sustainability and Decarbonisation



## Global Sustainability and Climate Change Policy

Sustainability is an emerging discipline; its definition and focus have shifted markedly over the last few decades.

The Brundtland definition of sustainable development (1987) is as follows:

- “Sustainable development is the kind of development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

The Earth Summit (Rio, 1992) adopted three major agreements:

- Agenda 21 – an action plan for all areas of sustainable development
- Rio Declaration on Environment and Development
- Statement of Forest Principles

Since Rio, policy has segmented between sustainability and climate change, and the climate change agenda has emerged strongly.

## Global Sustainability and Climate Change Policy (ctd)

1997 – Kyoto Protocol – First international commitment to emissions reductions

2015 – Paris Agreement – Limit increase in global average temperature to “well below 2°C” and ideally 1.5°C.

## UK Climate Change Policy

2008 – Climate Change Act – Reduce emissions by 80% compared to 1990 levels

2019 – Commitment to Net Zero emissions by 2050, repeated in Wales.

## EU Sustainability and Climate Change Policy

### 1997: Treaty of Amsterdam

- Includes sustainable development as an overarching objective

### 2001: EU Sustainable Development Strategy. The core objectives are:

- Climate change and clean energy
- Sustainable transport
- Sustainable consumption & production
- Conservation and management of natural resources
- Public Health
- Social inclusion, demography and migration
- Global poverty and sustainable development challenges

2009 – 2020 target – 20% emissions reduction (20/20/20)

2014 – 2030 target – 40% emissions reduction

2018 – 2050 target – Climate neutral economy

EPBD

2002 – EPBD introduced

2010 – EPBD “recast”

## Policy in Wales

### 2015: Wellbeing of Future Generations Act

In this Act “sustainable development” means the process of improving the economic, social, environmental and cultural well-being of Wales



## Nothing is without impact (Retrofit)



Large embodied energy and resource use

Substantial impact on Heritage



## Nothing is without impact (Grid)



Concerns about impact of renewables on the landscape  
Embodied energy (and pollution) of new plant

## Key Question for Today

The key question is what changes we should make to our building stock, in the light of the fact that all buildings could soon be entirely supplied by decarbonised electricity and would thus meet the far-reaching main target required of them?

### Comparing Costs

- New sources of low carbon electricity cost money.
- Retrofit costs money.

### Comparing impacts

- New renewable plant has significant environmental impact
- Making changes to our building stock consumes resources and . . .

	Financial Costs & Benefits	Environmental Costs & Benefits
Retrofit		
Grid Decarbonisation		

## Key Question for Today

The key question is what changes we should make to our building stock, in the light of the fact that all buildings could soon be entirely supplied by decarbonised electricity and would thus meet the far-reaching main target required of them?

### **What are we trying to achieve anyway?**

Who is the target audience?

- Residents: improving their health & wellbeing, reducing their energy costs
- Community: local regeneration and employment
- Planet: reducing pollution, carbon emissions, avoiding resource depletion.

A plural agenda, embracing multiple objectives, is therefore needed.

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SUSTAINABLE TRADITIONAL  
BUILDINGS ALLIANCE

**The evidence so far**

*Peter Draper, Sustainability Co-Chair, STBA*

*Caerphilly Castle 23<sup>rd</sup> October 2019*

*Background Information from*

*Cardiff Uni commissioned research*

*&*

*BEIS projections*

*Cardiff University*  
*Homes of today for tomorrow*

*Decarbonising Welsh Housing between 2020 and 2050*

*Ed Green, Simon Lannon, Jo Patterson, Heledd Iorwerth*

WSA

18<sup>th</sup> July 2019

&

*BEIS: Updated energy and emissions projections:  
2018*

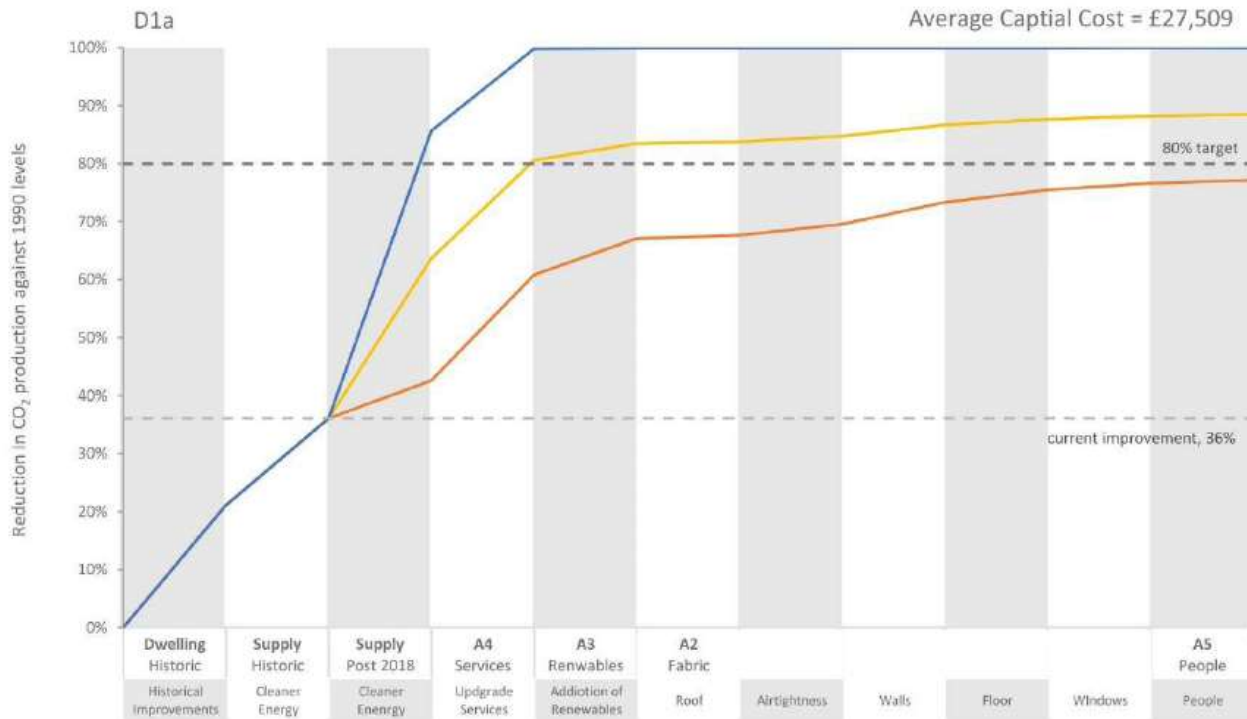
<https://www.gov.uk/government/publications/updated-energy-and-emissions-projections-2018>

16<sup>th</sup> May 2019

Blue scenario – transformative further improvement (80% clean energy from grid)  
 Yellow scenario – significant further improvement (60% clean energy from grid)  
 Red scenario – minor further improvement (40% clean energy from grid)

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SUSTAINABLE TRADITIONAL BUILDINGS ALLIANCE



Note that report initially had 80% reduction target, since replaced with 100% target. But that scenario 2 (yellow line) gives between 90-95% reduction across most archetypes.

**BEIS projection 2018 from Annexe I (Existing policies section)**

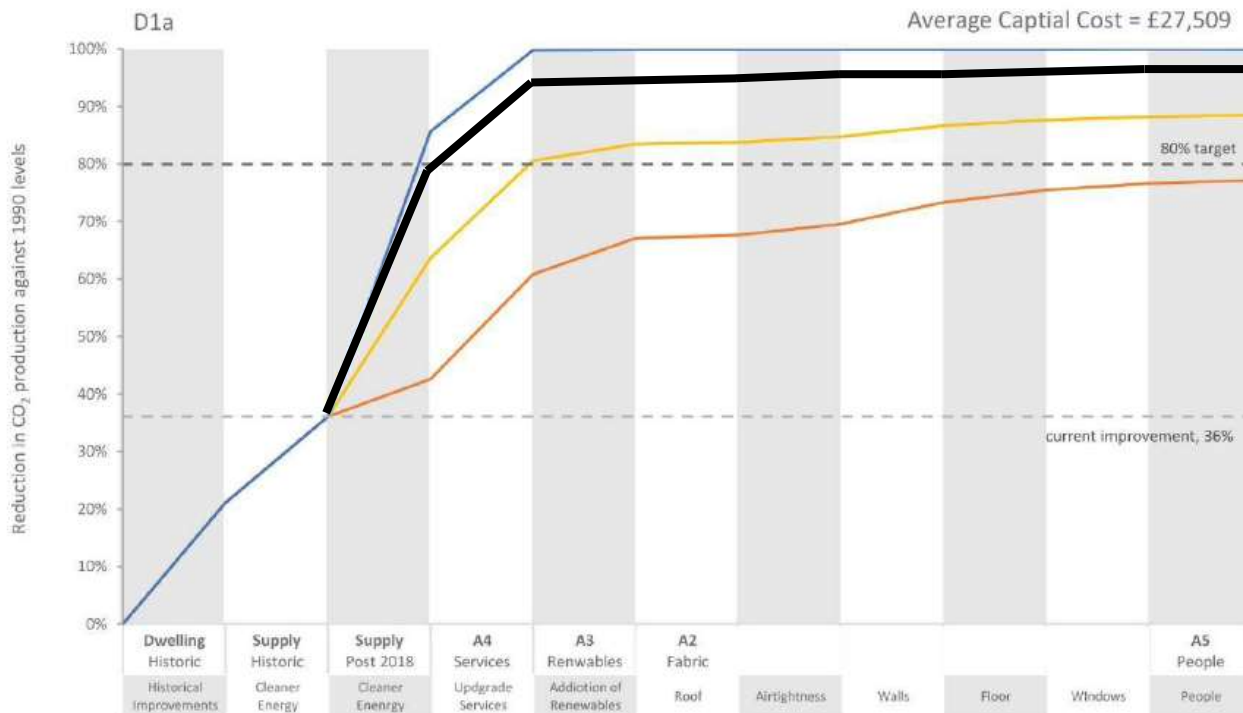
Energy	2019	2035
Total capacity GW	107	145
Sum of low carbon sources: Renewables / storage / nuclear / interconnectors (assume 50% renewable)	57	104
	<b>53%</b>	<b>72%</b>
Note if interconnectors are 90% then		<b>77%</b>

“Energy supply **scenario 3 (80% clean energy from grid)** was not modelled in detail because this level of improvement in clean energy supply would obviate the need for physical retrofit to decarbonise the housing stock.” *Ed Green, Simon Lannon, Jo Patterson, Heledd Iorwerth*



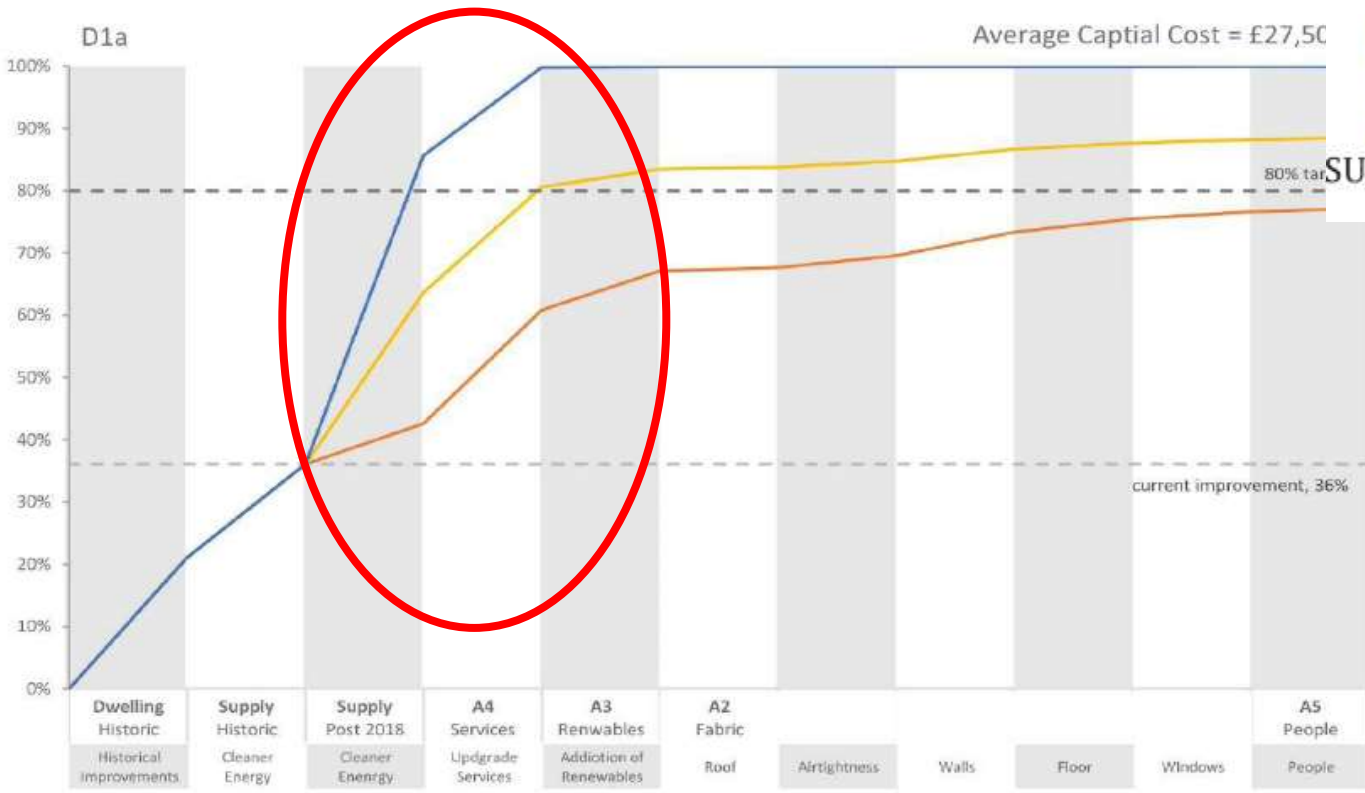
**Figure 5.1 and 5.2: The impact of three energy supply scenarios on decarbonisation**

- Blue scenario – transformative further improvement (80% clean energy from grid)
- Yellow scenario – significant further improvement (60% clean energy from grid)
- Red scenario – minor further improvement (40% clean energy from grid)



— Interpolation of 77% clean energy from grid

**Figure 5.1:** 10% of the housing stock is assumed to have limited retrofit. Social housing and PRS sectors are retrofitted beyond current Building Reg.s and transition to heat from electricity (not gas), along with 10% in fuel poverty. The remaining 30% (owner occupied) are retrofitted to current Building Reg.s only, and remain on mains gas.



**Fabric First?**

## Cost assumptions and Fuel Poverty in Home of today for tomorrow:

Scenario 3 80% reduction – Not modelled

Scenario 2 60% reduction – 50% increase in costs

Scenario 1 40% reduction – No change



## BEIS projection 2018 (Annexe M updated May 2019)

	2019	2035
Domestic electricity prices (kWh):	20.1p	21.4p
Domestic gas prices (kWh):	5p	5.1p

“In this context (**scenario 3**), the significance of retrofit of the existing housing stock relates less to decarbonisation targets and more to the need to avoid increases in fuel bills for occupants, and a consequent increase in fuel poverty.”

*Ed Green, Simon Lannon, Jo Patterson, Heledd Iorwerth 2019*

**Narratives:**

Good practice to SAP 88

Best practice to SAP 90

Rural to SAP 90

Heritage to SAP 71

Heritage narrative:

“Under this narrative, actions are constrained, e.g. Dwellings built before 1919 whose exterior appearance does not contribute to a locally distinctive character, listed building status or within a conservation area. Impact on exterior appearance is assumed to be problematic.” “To model the housing stock as a whole in 2050, it was assumed that 15% of homes must be retrofitted to the ‘heritage’ standard.”

## **Known consequences: Overheating**

“Following implementation of the four retrofit narratives, the majority of the housing stock (circa 86%) experience an acceptable risk of overheating (a slight to medium risk, during peak summer months only).” Mostly in:

1. mid terraced dwellings built 1965-1990 at SAP 90 – “elevated risk”
2. flats built post 1965 at SAP 90 – “untenable levels of overheating”

*Ed Green, Simon Lannon, Jo Patterson, Heledd Iorwerth 2019*

## Known consequences: Costs

		Payback (average)	Payback (assumed 30 yr maintenance)*
Good practice narrative	£17k to £32k	33	13
Best practice narrative	£33.5k to £63.3k	62	42
Heritage narrative	£10.8k to £25.5k	56	<b>6</b>
Rural narrative	£39.4k to £66.8k	39	28

\*Anticipated maintenance and repairs across 30 years fall in the range £11.1k to £19.8k.