

Choosing the RETROFIT measures



Choosing the RETROFIT measures

Energy Performance Certificate

3, David Street, Cwmdare, ABERDARE, CF44 8UE

Dwelling type: Mid-terrace house Reference number: 8684-7022-0470-8046-9922
 Date of assessment: 26 February 2014 Type of assessment: RdSAP, existing dwelling
 Date of certificate: 03 March 2014 Total floor area: 55 m²

Use this document to:

- Compare current ratings of properties to see which properties are more energy efficient
- Find out how you can save energy and money by installing improvement measures

Estimated energy costs of dwelling for 3 years:	£ 5,454
Over 3 years you could save	£ 4,299

Estimated energy costs of this home

	Current costs	Potential costs	Potential future savings
Lighting	£ 213 over 3 years	£ 105 over 3 years	
Heating	£ 3,906 over 3 years	£ 735 over 3 years	
Hot Water	£ 1,335 over 3 years	£ 315 over 3 years	
Totals	£ 5,454	£ 1,155	

These figures show how much the average household would spend in this property for heating, lighting and hot water. This excludes energy use for running appliances like TVs, computers and cookers and any electricity generated by microgeneration.

Energy Efficiency Rating

	Current	Potential
(92 plus) A		
(81-91) B		
(69-80) C		
(55-68) D		
(39-54) E		
(21-38) F		
(1-20) G		

The graph shows the current energy efficiency of your home.

The higher the rating the lower your fuel bills are likely to be.

The potential rating shows the effect of undertaking the recommendations on page 3.

The average energy efficiency rating for a dwelling in England and Wales is band D (rating 60).

Top actions you can take to save money and make your home more efficient

Recommended measures	Indicative cost	Typical savings over 3 years	Available with Green Deal
1 Increase loft insulation to 270 mm	£100 - £350	£ 1,002	✔
2 Internal or external wall insulation	£4,000 - £14,000	£ 980	✔
3 Floor insulation	£800 - £1,200	£ 186	✔

See page 3 for a full list of recommendations for this property.

To find out more about the recommended measures and other actions you could take today to save money, visit www.direct.gov.uk/leavingenergy or call 0300 123 1234 (standard national rate). The Green Deal may allow you to make your home warmer and cheaper to run at no up-front cost.

Page 1 of 5

Energy Efficiency Rating

	Current	Potential
(92 plus) A		
(81-91) B		
(69-80) C		
(55-68) D		
(39-54) E		
(21-38) F		
(1-20) G		

Very energy efficient • lower running costs

Not energy efficient • higher running costs

EPC based on RdSAP software with assumed U-Values provides a SAP rating of 13 points – within band ‘G’

Choosing the RETROFIT measures

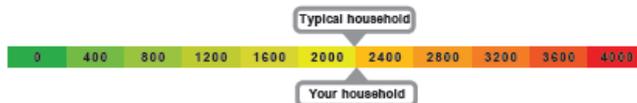
GREEN DEAL Advice Report Occupancy Assessment

3, David Street, Cwmdare, ABERDARE, CF44 8UE

Date of assessment: 26 February 2014 Reference number: 0808-5806-7427-9024-7935
Date of report: 03 March 2014 UPRN: 8874900078

This report was prepared when the property was not occupied. Consequently the data for 'your household' are based on standard assumptions.

Current energy bill for your household in £/year



'Typical household' shows energy usage for a typical property of this size and type. Your household's energy usage is ABOUT THE SAME as typical. See page 3 for how we have worked this out.

Green Deal improvements recommended by your assessor

For the list of recommendations on your Energy Performance Certificate, turn to the last page.

Improvements	Estimated costs*	Your household's estimated annual savings	Typical annual savings - maximum Green Deal repayment in year 1**
Increase loft insulation to 270 mm	£100 - £350	£213	£217
External wall insulation (100 mm) to 100% of stone wall	£4,000 - £14,000	£233	£238
Draught proofing	£80 - £120	£43	£43
Condensing gas boiler ⁽¹⁾	£3,000 - £7,000	£454	£461
Replace single glazed windows with low-E double glazing	£3,300 - £6,500	£47	£47
High performance external doors	£1,000	£9	£9
Total	£11,480 - £28,370	£1,000	£1,016
Electricity/gas/other fuel savings			£426 / £-248 / £837

* Discounts available for qualifying homes - see page 4.

** Repayments capped at this level - providers could charge less.

⁽¹⁾ Assumes that mains gas can be made available to the property. The cost of providing the gas supply needs to be ascertained.

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Energy Performance Certificate



3, David Street, Cwmdare, ABERDARE, CF44 8UE

Dwelling type: Mid-terrace house Reference number: 8684-7022-0470-8046-9922
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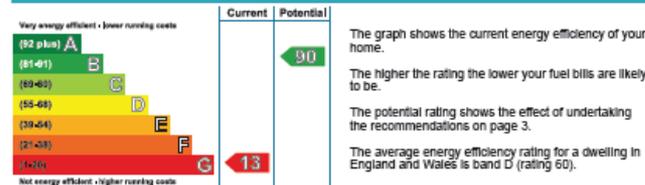
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Totals	£ 5,454	£ 1,155	

These figures show how much the average household would spend in this property for heating, lighting and hot water. This excludes energy use for running appliances like TVs, computers and cookers, and any electricity generated by microgeneration.

Energy Efficiency Rating



Top actions you can take to save money and make your home more efficient

Recommended measures	Indicative cost	Typical savings over 3 years	Available with Green Deal
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2 Internal or external wall insulation	£4,000 - £14,000	£ 980	✓
3 Floor insulation	£800 - £1,200	£ 186	✓

See page 3 for a full list of recommendations for this property.

To find out more about the recommended measures and other actions you could take today to save money, visit www.direct.gov.uk/savingenergy or call 0300 123 1234 (standard national rate). The Green Deal may allow you to make your home warmer and cheaper to run at no up-front cost.

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Green Deal Assessment & EPC

Choosing the RETROFIT measures

Energy Performance Certificate



3, David Street, Cwmdare, ABERDARE, CF44 8UE

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Date of assessment: 26 February 2014	Type of assessment: RdSAP, existing dwelling
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Energy Efficiency Rating

Very energy efficient - lower running costs

(92 plus) **A**

(81-91) **B**

(69-80) **C**

(55-68) **D**

(39-54) **E**

(21-38) **F**

(1-20) **G**

Not energy efficient - higher running costs

Current	Potential
	90
13	

The graph shows the current energy efficiency of your home.

The higher the rating the lower your fuel bills are likely to be.

The potential rating shows the effect of undertaking the recommendations on page 3.

The average energy efficiency rating for a dwelling in England and Wales is band D (rating 60).

Top actions you can take to save money and make your home more efficient

Recommended measures	Indicative cost	Typical savings over 3 years	Available with Green Deal
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See page 3 for a full list of recommendations for this property.

To find out more about the recommended measures and other actions you could take today to save money, visit www.direct.gov.uk/savingenergy or call 0300 123 1234 (standard national rate). The Green Deal may allow you to make your home warmer and cheaper to run at no up-front cost.

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1. Lowest Band at G but could achieve Band B, but:
2. Are all recommended 'measures' suitable or achievable?
3. Doesn't take into account condition of the building and the impact of maintenance.
4. Base line data on performance is inaccurate so percentage of real improvement is impossible to ascertain.

Choosing the RETROFIT measures

GREEN DEAL Occupancy Assessment
Advice Report

3, David Street, Cwmdare, ABERDARE, CF44 8UE
 Date of assessment: 26 February 2014 Reference number: 0808-5806-7427-9024-7935
 Date of report: 03 March 2014 UPRN: 8874900078

This report was prepared when the property was not occupied. Consequently the data for 'your household' are based on standard assumptions.

Current energy bill for your household in £/year

0 400 800 1200 1600 2000 2400 2800 3200 3600 4000

Typical household: 2000
Your household: 2400

Typical household shows energy usage for a typical property of this size and type. Your household's energy usage is ABOUT THE SAME as typical. See page 3 for how we have worked this out.

Green Deal improvements recommended by your assessor
 For the list of recommendations on your Energy Performance Certificate, turn to the last page.

Improvements	Estimated costs*	Your household's estimated annual savings	Typical annual savings - maximum Green Deal repayment in year 1**
Increase loft insulation to 270 mm	£100 - £350	£213	£217
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High performance external doors	£1,000	£9	£9
Total	£11,480 - £28,570	£1,000	£1,016
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Page 1 of 5

1. Based on inaccurate EPC with potentially inaccurate predictions on improved energy performance.
2. Unreliable payback periods.
3. Unreliable £ savings.
4. Doesn't pick up other measures / works which would save energy and '£'s.

Choosing the RETROFIT measures

GREEN DEAL Occupancy Assessment

Improvements recommended on the EPC

Improvements	Estimated costs	Your household's estimated annual savings	Expected Green Deal repayment in year 1	Green Deal finance
Increase loft insulation to 270 mm	£100 - £350	£213	£217	✓
Solar photovoltaic panels, 2.5 kWp	£9,000 - £14,000	£258	£258	✓
Wind turbine	£1,500 - £4,000	£20	£20	✓
Internal or external wall insulation	£4,000 - £14,000	£240	£245	✓
Floor insulation	£800 - £1,200	£52	£53	✓
Draught proofing	£80 - £120	£43	£44	✓
Low energy lighting for all fixed outlets	£40	£24	£22	
Wood pellet stove with boiler and radiators	£7,000 - £13,000	£195	£184	✓
Solar water heating	£4,000 - £6,000	£93	£90	✓
Replace single glazed windows with low-E double glazing	£3,300 - £6,500	£95	£103	✓
High performance external doors	£1,000	£17	£18	✓
Total	£30,820 - £60,210	£1,250	£1,254	

Choosing the RETROFIT measures

Measure	Lowest cost	Highest cost	Estimated savings	Payback on lowest cost	Payback on highest cost
IWI/ EWI	£4,000	£14,000	£240	16.7 years	58.3 years
Draught proofing	£80	£120	£43	1.9 years	2.8 years
Double glazing	£3,300	£6,500	£103	32 years	63.1 years

Choosing the RETROFIT measures

Measure	Lowest cost	Highest cost	Estimated savings	Payback on lowest cost	Payback on highest cost
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Double glazing	£3,300	£6,500	£103	32 years	63.1 years

1. EWI / IWI – could be beneficial, if aesthetics are understood and there is sufficient understanding about technicalities and work is properly undertaken.

Choosing the RETROFIT measures

Measure	Lowest cost	Highest cost	Estimated savings	Payback on lowest cost	Payback on highest cost
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Double glazing	£3,300	£6,500	£103	32 years	63.1 years

1. EWI / IWI – could be beneficial, if aesthetics are understood and there is sufficient understanding about technicalities and work is properly undertaken.
2. Draught proofing - very beneficial.

Choosing the RETROFIT measures

Measure	Lowest cost	Highest cost	Estimated savings	Payback on lowest cost	Payback on highest cost
IWI/ EWI	£4,000	£14,000	£240	16.7 years	58.3 years
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Double glazing	£3,300	£6,500	£103	32 years	63.1 years

1. EWI / IWI – could be beneficial, if aesthetics are understood and there is sufficient understanding about technicalities and work is properly undertaken.
2. Draught proofing - very beneficial.
3. New double glazed windows – consider alternatives.

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Measures

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GETTING STARTED ABOUT GLOSSARY REPORT

Colour key

Building context

Wall

External Wall Insulation

Application of an insulation material and a weather-protective finish to the outside of the wall

ADD TO LIST CLOSE MEASURE

Advantages

7 Technical Concerns

- Trapped/accumulated moisture (major)
- Thermal Bridges (high)
- Draughting (high)
- Rain and Drains (liquid moisture penetration) (high)
- Building Control/Warrant (medium)
- Monitoring and feedback required (medium)
- Personal capacity/Right opportunity (medium)

3 Heritage Concerns

3 Energy Concerns

Related measures

Reset wheel

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The Sustainable Traditional Buildings Alliance (STBA) is a collaboration of not for profit organisations that aims to promote and deliver a more sustainable traditional built environment in the UK.

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Responsible Retrofit Guidance Wheel Report

Print report Back to wheel

Update report name

Colour key

Concerns

- Minor concern
- Medium concern
- High concern
- Major concern

Measure to measure linkages

- Measure options
- Thermal coherence
- Airtightness
- Human Health/Fabric Health
- Heating issues
- People issues
- Monitoring and maintenance
- Hidden services
- Electricity issues

STBA Retrofit Guidance Tool

Choosing the RETROFIT measures

STBA Retrofit Guidance Tool

An aid to decision making and a way of learning about traditional building retrofit

- Single interface
- Explain technical issues to a wider public
- Highlight the risks of individual measures
- Show the links to other aspects of buildings
- Signpost relevant expert research

<http://responsible-retrofit.org/wheel/> (freely available)

Choosing the RETROFIT measures

STBA Retrofit Guidance Tool

An aid to decision making and a way of learning about traditional building retrofit

- Single interface
- Explain technical issues to a wider public
- Highlight the risks of individual measures
- Show the links to other aspects of buildings
- Signpost relevant expert research

<http://responsible-retrofit.org/wheel/> (freely available)

BUT no mention of BS 7913 and 'significance'

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RESPONSIBLE RETROFIT GUIDANCE WHEEL

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GETTING STARTED

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Getting started

The wheel depicts more than 50 measures that can be used for the retrofitting or refurbishing of traditional buildings. It encourages exploration of the measures' advantages, concerns about their performance and possible interactions between them.

Each measure has a number of advantages and concerns (categorised into technical, heritage and energy). The concerns are colour coded and their summary is shown in the wheel 'rings' for technical, heritage and energy concerns.

- Minor concern
- Medium concern
- High concern
- Major concern

To get started you can:

1. **Choose** your Building Context in the side-bar - some concerns depend on the building context.

▼ Building context

Please select the context of your building here:

Heritage

Colour key

Building context

Heritage

Condition/State of repair

What is the condition/state of repair of the building?
Fair (Acceptable condition, likely to need some

Exposure

What is the exposure of the building to wind driven rain? (see B Regs AD C diagram 12 shows map for UK zones). Apply correction factors if known and as described in BS 8104:1992

Moderate (Wind driven rain (in l/m² per spell) 3: ▼

Energy User Type

How does the energy user compare with others in terms to energy use as assessed in the Green Deal Occupancy assessment?

Medium (Typical) Energy Use (Within 10% either ▼

User interest and involvement in Operations

What is the user's level of motivation/knowledge when

Stage 1 - Context setting

Choosing the RETROFIT measures

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RESPONSIBLE RETROFIT GUIDANCE WHEEL

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Colour key

Building context

Please select the context of your building here:

Heritage
What is the heritage value of the building?

Condition/State of repair
What is the condition/state of repair of the building?

Exposure
What is the exposure of the building to wind driven rain? (see B.Reg.s AD C diagram 12 shows map for UK zones). Apply correction factors if known and as described in BS 8104:1992

Energy User Type
How does the energy user compares with others in terms to energy use as assessed in the Green Deal Occupancy assessment?

User interest and involvement In Operation
What is the user's level of motivation and knowledge when

Stage 1 - Context setting

Choosing the RETROFIT measures

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Colour key

Building context

Please select the context of your building here:

Heritage
What is the heritage value of the building?
Conservation area (Building in conservation area ▼)

- Listed - Exceptional (Listed building - Grade 1 and 2* in E&W, Category A in Scotland and NI)
- Listed - Important (Listed - Grade 2 in E&W, Category B and C(S) in Scotland and B and B+ in NI)
- Conservation area (Building in conservation area)
- Character building (Building with some character but not in a conservation area)
- Non character building (Building heritage character not significant)

Exposure
What is the exposure of the building to wind driven rain? (see B.Reg AD C diagram 12 shows map for UK zones). Apply correction factors if known and as described in BS 8104:1992
Moderate (Wind driven rain (in l/m2 per spell) 3: ▼)

Energy User Type
How does the energy user compares with others in terms to energy use as assessed in the Green Deal Occupancy assessment?
Medium (Typical) Energy Use (Within 20% eith ▼)

User interest and involvement In Operation
What is the user's level of motivation and knowledge when

Stage 1 - Context setting

Choosing the RETROFIT measures

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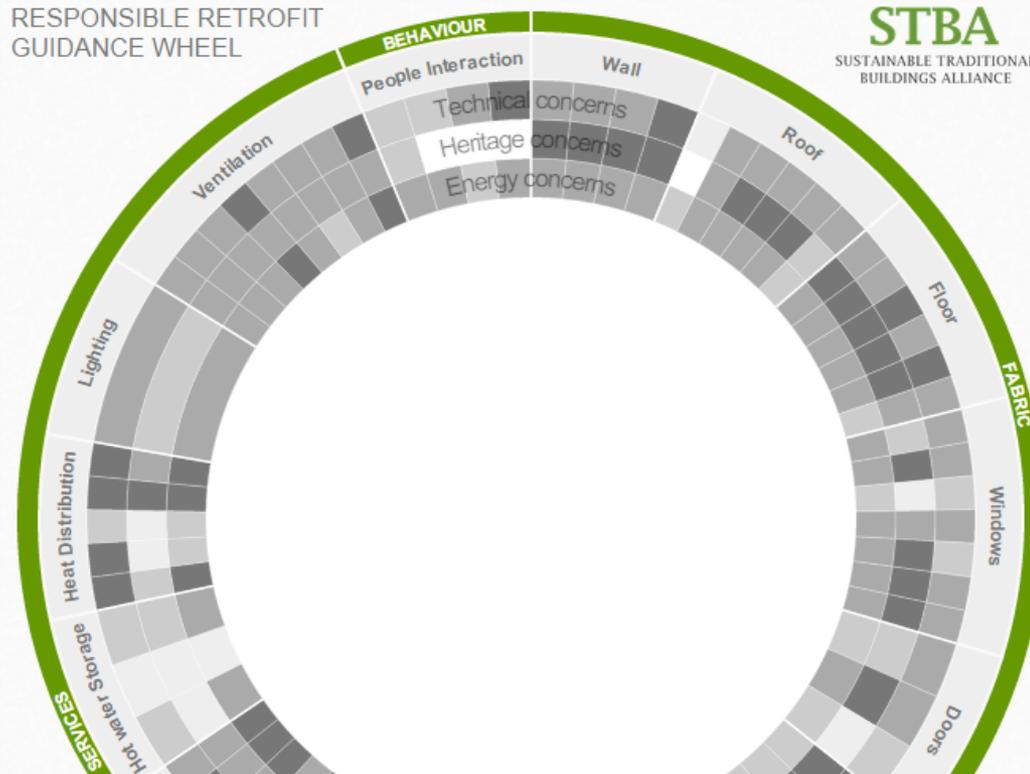
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Colour key

Building context

Please select the context of your building here:

Heritage

What is the heritage value of the building?

Listed - Important (Listed - Grade 2 in E&W, C: ▾)

Condition/State of repair

What is the condition/state of repair of the building?

Fair (Acceptable condition, likely to need some ▾)

Exposure

What is the exposure of the building to wind driven rain? (see B.Reg AD C diagram 12 shows map for UK zones). Apply correction factors if known and as described in BS 8104:1992

Moderate (Wind driven rain (in l/m2 per spell) 3: ▾)

Energy User Type

How does the energy user compares with others in terms to energy use as assessed in the Green Deal Occupancy assessment?

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What is the user's level of motivation and knowledge when

Stage 1 - Context setting

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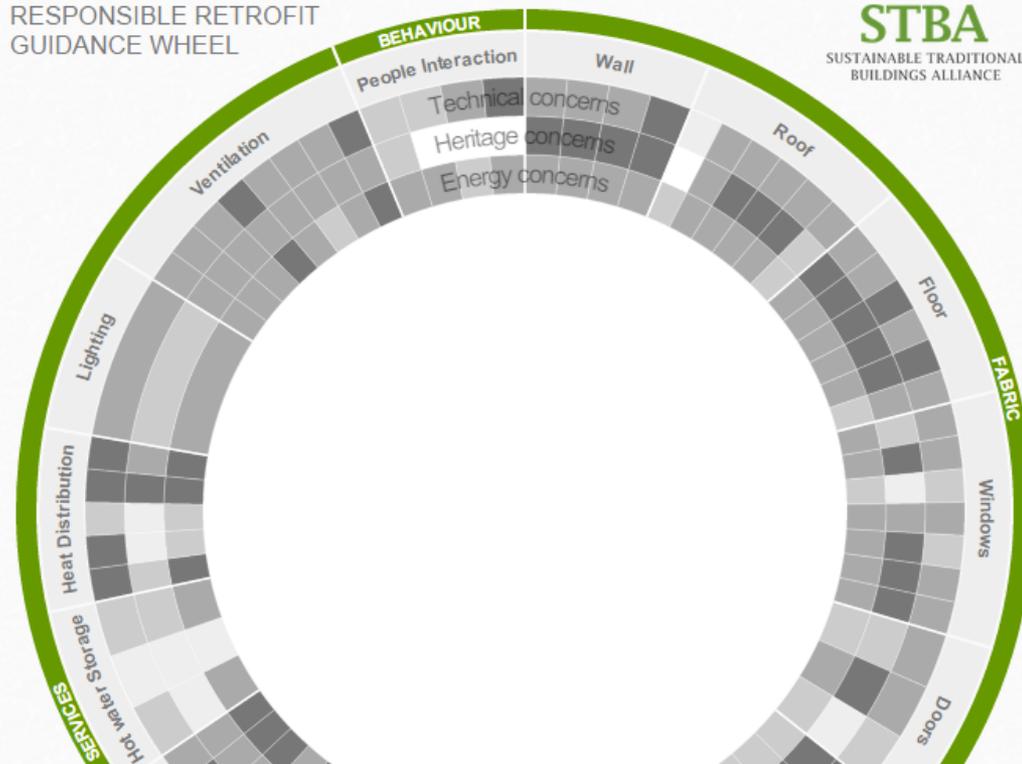
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RESPONSIBLE RETROFIT GUIDANCE WHEEL



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► Colour key

► Building context

Please select the context of your building here:

Heritage

What is the heritage value of the building?

Listed - Important (Listed - Grade 2 in E&W, C: ▼

Condition/State of repair

What is the condition/state of repair of the building?

Fair (Acceptable condition, likely to need some ▼

Excellent (Very good condition, very unlikely to need repairs)

Good (Good condition, unlikely to need immediate repairs)

Fair (Acceptable condition, likely to need some small repairs)

Poor (Poor condition, needs immediate repairs)

Very Poor (Very poor conditions, needs immediate and intensive repairs)

Moderate (Wind driven rain (in l/m2 per spell) 3: ▼

Energy User Type

How does the energy user compares with others in terms of energy use as assessed in the Green Deal Occupancy assessment?

Medium (Typical) Energy Use (Within 20% eith ▼

User interest and involvement In Operation

What is the user's level of motivation and knowledge when

Stage 1 - Context setting

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GETTING STARTED ABOUT GLOSSARY REPORT

► **Colour key**

▼ **Building context**

Please select the context of your building here:

Heritage
What is the heritage value of the building?

Condition/State of repair
What is the condition/state of repair of the building?

Exposure
What is the exposure of the building to wind driven rain?
(see B.Regis AD C diagram 12 shows map for UK zones).
Apply correction factors if known and as described in BS 8104:1992

Very Severe (Wind driven rain (in l/m2 per spell) 100 or more)
Severe (Wind driven rain (in l/m2 per spell) 56.5 to less than 100)
Moderate (Wind driven rain (in l/m2 per spell) 33 to less than 56.5)
Sheltered (Wind driven rain (in l/m2 per spell) less than 33)
Severe localised conditions (Local conditions warrant a more careful treatment to a specific medium (typical) Energy Use (within 20% etc))

User interest and involvement In Operation
What is the user's level of motivation and knowledge when

Stage 1 - Context setting

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► Colour key

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(see B.Regs AD C diagram 12 shows map for UK zones).
Apply correction factors if known and as described in BS 8104:1992

User interest and involvement In Operation
What is the user's level of motivation and knowledge when

Stage 1 - Context setting

Choosing the RETROFIT measures

GUIDANCE WHEEL

SUSTAINABLE TRADITIONAL BUILDINGS ALLIANCE

Colour key

Building context

Please select the context of your building here:

Heritage
What is the heritage value of the building?
Listed - Important (Listed - Grade 2 in E&W, C:)

Condition/State of repair
What is the condition/state of repair of the building?
Fair (Acceptable condition, likely to need some)

Exposure
What is the exposure of the building to wind driven rain? (see B.Reg.s AD C diagram 12 shows map for UK zones). Apply correction factors if known and as described in BS 8425:1992
Very Severe (Wind driven rain (in l/m2 per spell)

Energy User Type
How does the energy user compares with others in terms to energy use as assessed in the Green Deal Occupancy assessment?
Medium (Typical) Energy Use (Within 20% eith)

User interest and involvement in Operation
What is the user's level of motivation and knowledge when operating the building?
User with some motivation but less understand)

Number of exposed sides
How many sides of the building are exposed to wind for ventilation?
Double or multiple (Dwelling has two or more e.)
Single (Dwelling has a single exposed side)
Double or multiple (Dwelling has two or more exposed sides)

Reset wheel

Stage 1 - Context setting

Choosing the RETROFIT measures

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SUSTAINABLE TRADITIONAL BUILDINGS ALLIANCE

Colour key

Building context

Please select the context of your building here:

Heritage
What is the heritage value of the building?
Listed - Important (Listed - Grade 2 in E&W, C:)

Condition/State of repair
What is the condition/state of repair of the building?
Fair (Acceptable condition, likely to need some)

Exposure
What is the exposure of the building to wind driven rain? (see B.Reg.s AD C diagram 12 shows map for UK zones). Apply correction factors if known and as described in BS 8475:1992
Very Severe (Wind driven rain (in l/m2 per spell)

Energy User Type
How does the energy user compares with others in terms of energy use as assessed in the Green Deal Occupancy assessment?
Medium (Typical) Energy Use (Within 20% eith)

User interest and involvement in Operation
What is the user's level of motivation and knowledge when operating the building?
User with some motivation but less understand)

Number of exposed sides
How many sides of the building are exposed to wind for insulation?
Double or multiple (Dwelling has two or more e.)
Single (Dwelling has a single exposed side)
Double or multiple (Dwelling has two or more exposed sides)

Reset wheel

Stage 1 - Context setting

Choosing the RETROFIT measures

STBA
SUSTAINABLE TRADITIONAL BUILDINGS ALLIANCE

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RESPONSIBLE RETROFIT GUIDANCE WHEEL

BEHAVIOUR
People Interaction

FABRIC
Roof
Floor
Windows
Doors

Lighting
Ventilation
Heat Distribution
Storage

STBA
SUSTAINABLE TRADITIONAL BUILDINGS ALLIANCE

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Wall

Wall measures look at the introduction of insulation in traditional wall construction. The options look at alternative positions of the insulation layer within the wall: within an existing cavity, external or internal to a solid wall construction or within a framed wall construction. Depending on context different solutions may be considered for different building elevations.

Cavity Wall Insulation

External Wall insulation

Internal Wall insulation ← Choosing a measure

Frame infill insulation

CLOSE CATEGORY

Stage 2 – Explore and Select Measures

Choosing the RETROFIT measures

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SUSTAINABLE TRADITIONAL BUILDINGS ALLIANCE

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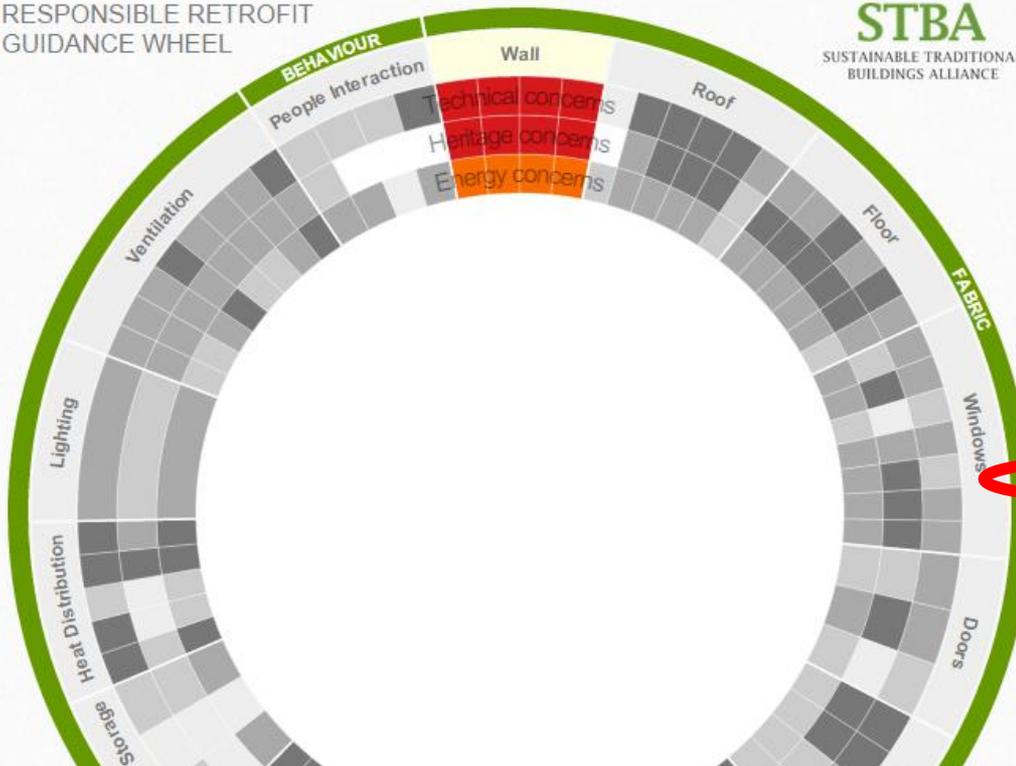
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RESPONSIBLE RETROFIT GUIDANCE WHEEL



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Wall

Wall measures look at the introduction of insulation in traditional wall construction. The options look at alternative positions of the insulation layer within the wall: within an existing cavity, external or internal to a solid wall construction or within a framed wall construction. Depending on context different solutions may be considered for different building elevations.

Cavity Wall Insulation

External Wall insulation

Internal Wall insulation

Frame infill insulation

CLOSE CATEGORY

Choosing the RETROFIT measures

STBA

SUSTAINABLE TRADITIONAL BUILDINGS ALLIANCE

WELCOME TO THE RESPONSIBLE RETROFIT KNOWLEDGE CENTRE

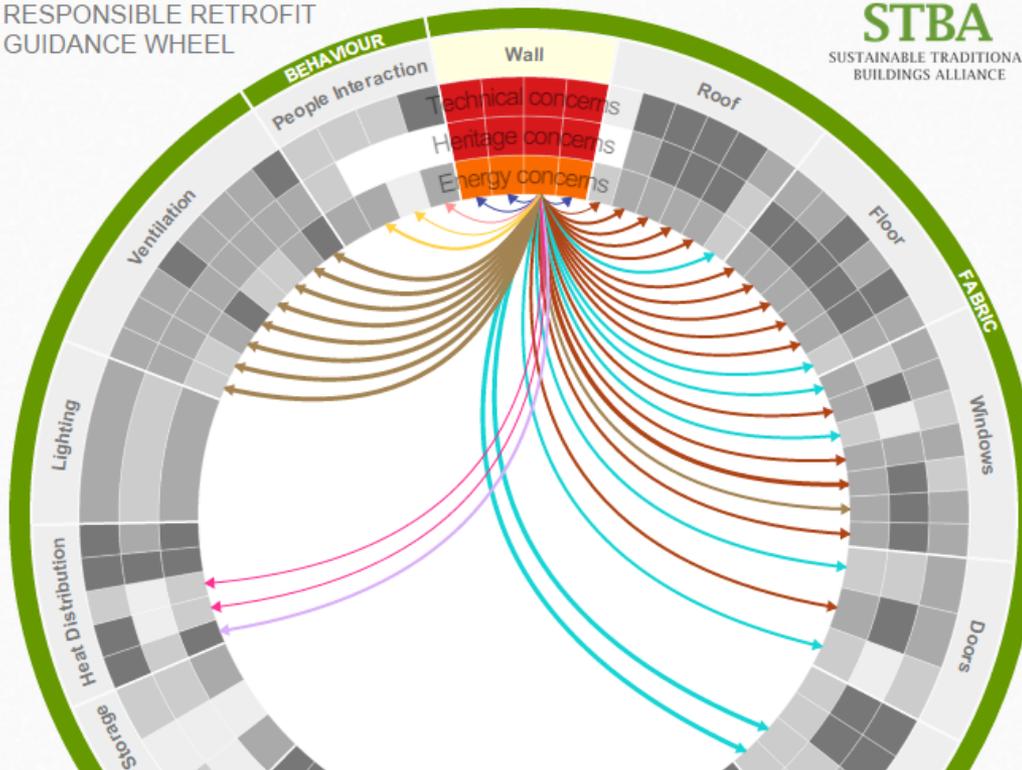
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RESPONSIBLE RETROFIT GUIDANCE WHEEL



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Wall

Internal Wall insulation

Insulation material is fixed to the inside surface of external walls and new internal finishes applied or insulation is blown behind existing linings

ADD TO LIST

CLOSE MEASURE

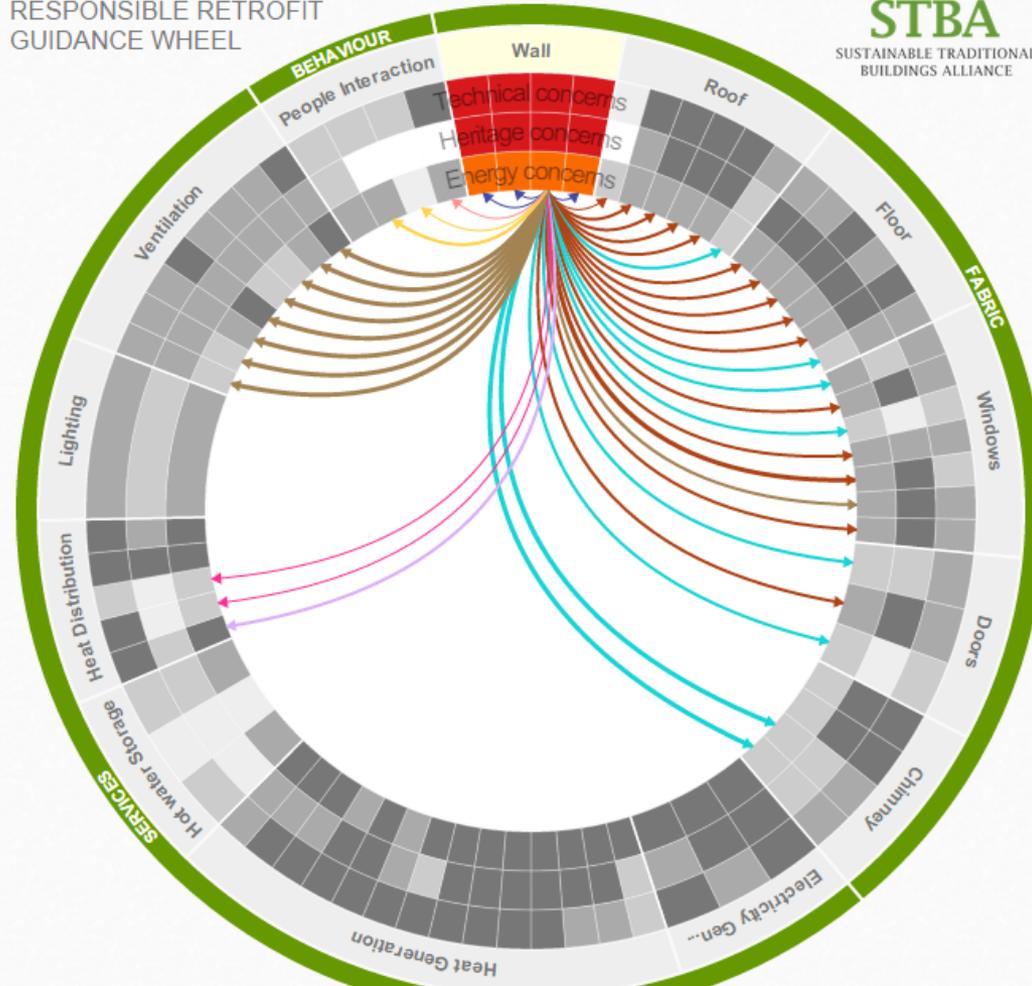
- Advantages
- 8 Technical Concerns
- 3 Heritage Concerns
- 3 Energy Concerns
- Related measures

Choosing the RETROFIT measures

RESPONSIBLE RETROFIT
GUIDANCE WHEEL

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Colour key

Building context

Wall

Internal Wall insulation

Insulation material is fixed to the inside surface of external walls and new internal finishes applied or insulation is blown behind existing linings

ADD TO LIST

CLOSE MEASURE

Advantages

Reduce heat loss - improve comfort. Potential associated benefits of reduced energy cost and lower CO2 and depending on material and finishes improved internal moisture buffering

8 Technical Concerns

3 Heritage Concerns

3 Energy Concerns

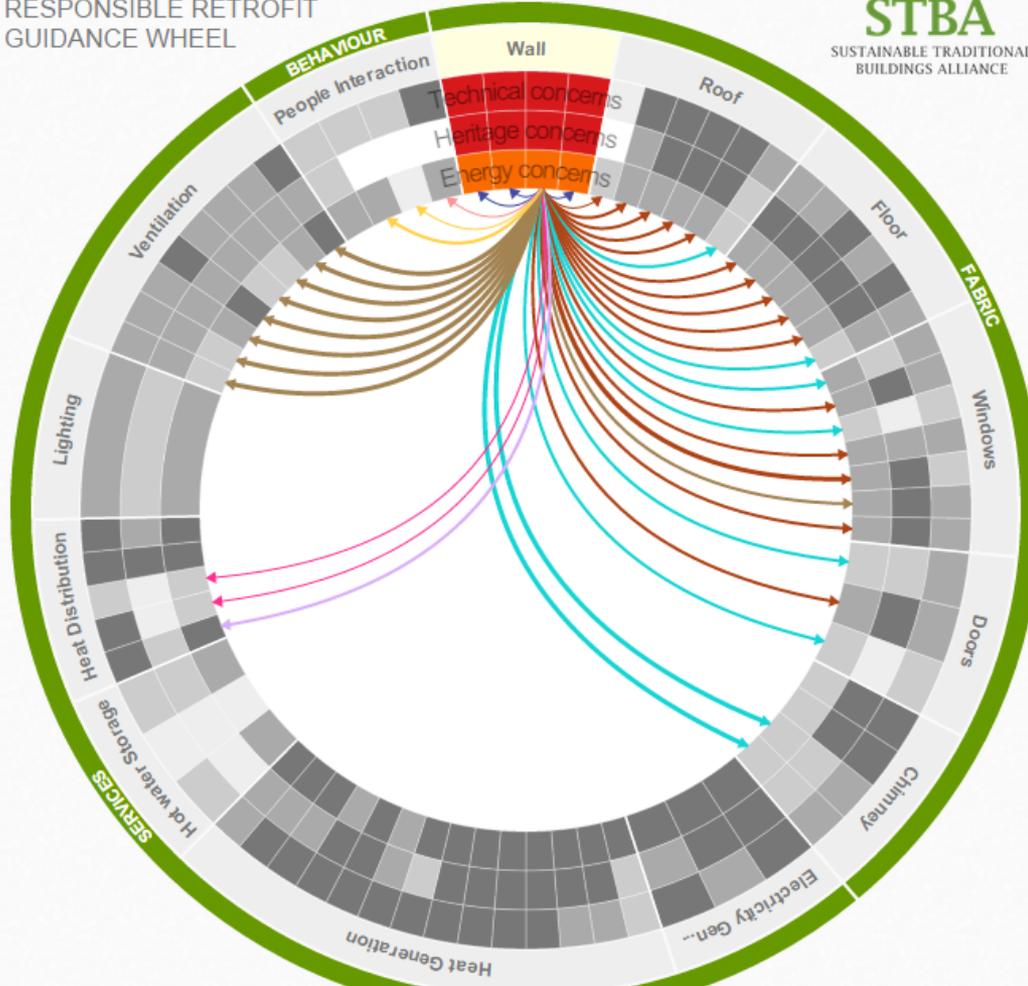
Related measures

Choosing the RETROFIT measures

RESPONSIBLE RETROFIT
GUIDANCE WHEEL

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Wall

Internal Wall insulation

Insulation material is fixed to the inside surface of external walls and new internal finishes applied or insulation is blown behind existing linings

ADD TO LIST

CLOSE MEASURE

► Advantages

Reduce heat loss - improve comfort. Potential associated benefits of reduced energy cost and lower CO2 and depending on material and finishes improved internal moisture buffering

► 8 Technical Concerns

- Rain and Drains (liquid moisture penetration) (major)
- Interstitial/surface Condensation (high)
- Trapped/accumulated moisture (high)
- Thermal Bridges (high)
- Personal capacity/Right opportunity (high)
- Overheating (medium)
- Building Control/Warrant (medium)
- Monitoring and feedback required (medium)

► 3 Heritage Concerns

► 3 Energy Concerns

Choosing the RETROFIT measures

GUIDANCE WHEEL

BEHAVIOUR

People Interaction

Technical concerns

Heritage concerns

Energy concerns

Wall

Roof

Floor

FABRIC

Windows

Doors

Chimney

Electricity Gen...

Heat Generation

SERVICES

Hot water Storage

Heat Distribution

Lighting

Ventilation

Reset wheel

SUSTAINABLE TRADITIONAL BUILDINGS ALLIANCE

► Colour key

► Building context

Wall

Internal Wall insulation

Insulation material is fixed to the inside surface of external walls and new internal finishes applied or insulation is blown behind existing linings

ADD TO LIST CLOSE MEASURE

► Advantages

Reduce heat loss - improve comfort. Potential associated benefits of reduced energy cost and lower CO2 and depending on material and finishes improved internal moisture buffering

► 8 Technical Concerns

- Rain and Drains (liquid moisture penetration) (major)

Excess liquid moisture in fabric caused by rain and poor fabric condition (e.g. poor pointing, porous masonry, cracks), defective rain water goods, high ground levels, high water table, poor detailing (e.g. around windows, external wall insulation) or reduced ability of the fabric element to drain (due to reduced vapour openness or reduction of heat reaching the fabric).

Suggested actions (before)

Ensure property is in good state of repair prior to refurbishment. Commission a professional building surveyor (RICS) to investigate condition of fabric. If necessary repair any features that may reduce effectiveness of measure e.g. re-point wall, mend/replace downpipes, reduce ground levels and add drainage to ground around property. Careful surveying and detailing required at design stage to provide clear information with full installation details (e.g. of VCL layer if applicable).

Choosing the RETROFIT measures

GUIDANCE WHEEL

SUSTAINABLE TRADITIONAL BUILDINGS ALLIANCE

► Colour key

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Wall

Internal Wall insulation

Insulation material is fixed to the inside surface of external walls and new internal finishes applied or insulation is blown behind existing linings

ADD TO LIST CLOSE MEASURE

► Advantages

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► 8 Technical Concerns

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Choosing the RETROFIT measures

Reset wheel

Colour key

- Building context

Wall

Internal Wall insulation

Insulation material is fixed to the inside surface of external walls and new internal finishes applied or insulation is blown behind existing linings

ADD TO LIST CLOSE MEASURE

- Advantages

Reduce heat loss - improve comfort. Potential associated benefits of reduced energy cost and lower CO2 and depending on material and finishes improved internal moisture buffering

- 8 Technical Concerns

- Rain and Drains (liquid moisture penetration) (major)
- Interstitial/surface Condensation (high)

The presence of liquid water within or on a building element due to condensing water vapour. This can lead to fabric decay and/or mould growth that are hidden. It can occur through vapour diffusion or air leakage into structure where warm moisture meets colder areas/surfaces. It can occur in walls, roofs or floors through incorrect installation of insulation systems, air leakage, thermal bridging and reduced ventilation.

Suggested actions (before)

Carry out a thorough assessment of context, moisture loads fabric types and condition of building. Understand the restrictions imposed by the exposure for the different orientations of the building (e.g. internal insulation is not suitable in some orientations in certain locations). Consider that different solutions might apply for different orientations (i.e. a combination of insulation measures may need to be

Choosing the RETROFIT measures

Reset wheel

JOSEPH WADDELL TRADITIONAL BUILDINGS ALLIANCE

► Colour key

► Building context

Wall

Internal Wall insulation

Insulation material is fixed to the inside surface of external walls and new internal finishes applied or insulation is blown behind existing linings

ADD TO LIST CLOSE MEASURE

► Advantages

Reduce heat loss - improve comfort. Potential associated benefits of reduced energy cost and lower CO2 and depending on material and finishes improved internal moisture buffering

► 8 Technical Concerns

- Rain and Drains (liquid moisture penetration) (major)
- Interstitial/surface Condensation (high)
- Trapped/accumulated moisture (high)

Moisture, both as a liquid and a vapour, becoming trapped and possibly accumulating within building fabric as a result of changing either fabric or ventilation conditions. For instance, where there is rising damp in a wall or high levels of moisture within a solid floor, the application of vapour closed materials or reduced whole house ventilation could result in moisture related problems (e.g. timber decay, mould growth)

Suggested actions (before)

Prior to refurbishment install moisture monitoring (e.g. through wall or other fabric element) to establish moisture profile of structure and cause of any existing problems. Check fabric for any water leaks. Ensure any existing dampness is resolved before proceeding with measure.

Choosing the RETROFIT measures

BUILDINGS ALLIANCE

▼ Colour key

▼ Building context

Wall

Internal Wall insulation

Insulation material is fixed to the inside surface of external walls and new internal finishes applied or insulation is blown behind existing linings

ADD TO LIST CLOSE MEASURE

▼ Advantages

Reduce heat loss - improve comfort. Potential associated benefits of reduced energy cost and lower CO2 and depending on material and finishes improved internal moisture buffering

▼ 8 Technical Concerns

▼ 3 Heritage Concerns

▼ 3 Energy Concerns

▼ Installation quality (high)

Product/material requires a standard of quality installation in order to operate as intended

Suggested actions (before)

Define installation quality requirements e.g : use only system trained and approved installers for measure and put in place on site quality checking procedures, monitoring and/or testing (e.g. thermographic survey of cavity wall infill). Ensure design and supply chain are aware of critical aspect of installation quality for success of measure. Provide information so that it can be understood by a range of people - from the well informed expert to the complete novice. Consider using a supply contract that guarantees quality and performance, which requires supplier to put risk

Choosing the RETROFIT measures

BUILDINGS ALLIANCE

▼ Colour key

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Wall

Internal Wall insulation

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ADD TO LIST CLOSE MEASURE

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▼ 8 Technical Concerns

▼ 3 Heritage Concerns

▼ 3 Energy Concerns

- ▶ Installation quality (high)
- ▶ Actual U-value? (medium)
- ▶ Rebound effects (medium)

▼ Related measures

Reset wheel

Choosing the RETROFIT measures

BUILDINGS ALLIANCE

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Building context

Wall

Internal Wall insulation

Insulation material is fixed to the inside surface of external walls and new internal finishes applied or insulation is blown behind existing linings

ADD TO LIST **CLOSE MEASURE**

Advantages

Reduce heat loss - improve comfort. Potential associated benefits of reduced energy cost and lower CO2 and depending on material and finishes improved internal moisture buffering

8 Technical Concerns

3 Heritage Concerns

3 Energy Concerns

Installation quality (high)

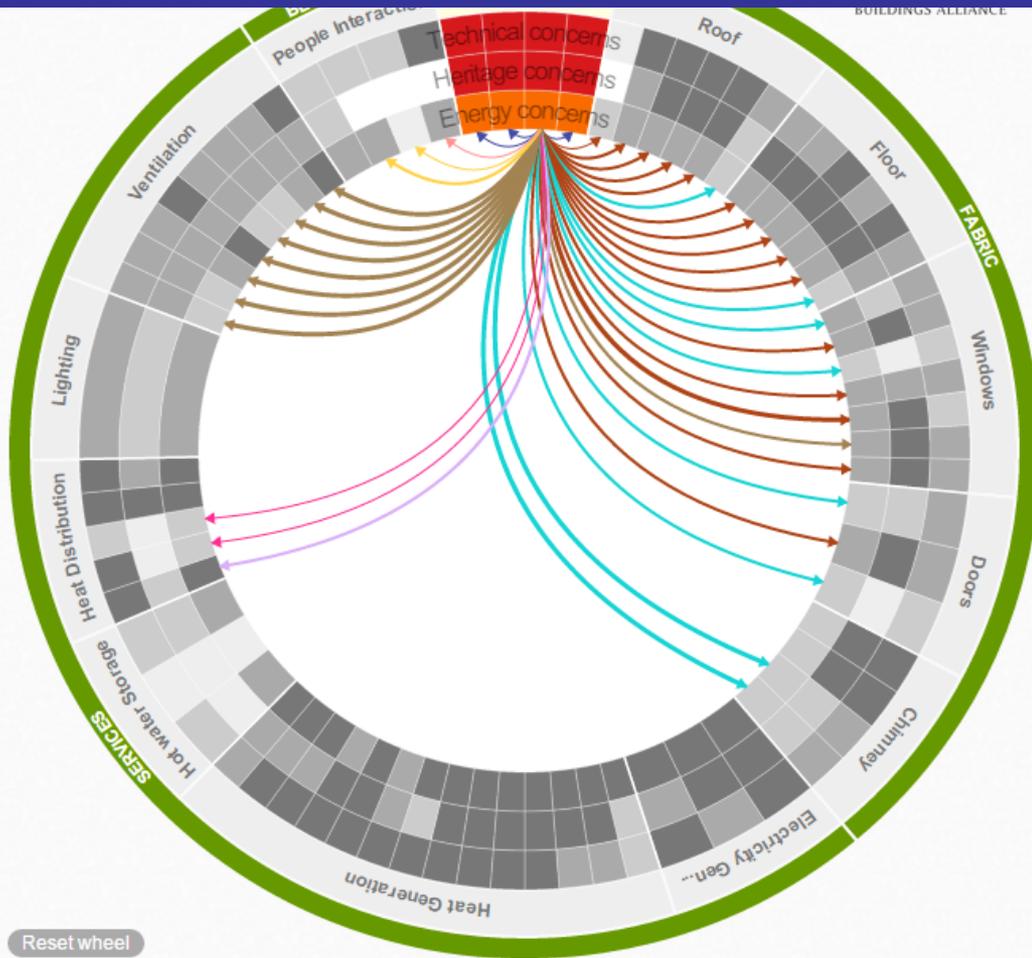
Actual U-value? (medium)

Performance gap between the modelled U value for any building element and its actual thermal performance can be considerable. Inaccurate modelling can lead to incorrect specification of measures and unexpected energy use outcomes.

Suggested actions (before)

Compare calculated U-value with measured data for similar fabric elements (e.g. walls, floors, roofs, windows, doors) . If possible carry out physical measurement of existing and feedback measured data to add to knowledge of buildings elements performance

Choosing the RETROFIT measures



► Colour key

► Building context

Wall

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ADD TO LIST

CLOSE MEASURE

► Advantages

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► 8 Technical Concerns

► 3 Heritage Concerns

► 3 Energy Concerns

► Installation quality (high)

► Actual U-value? (medium)

► Rebound effects (medium)

Rebound effects occur when the full energy saving of a measure is not achieved due a number of factors, including comfort take back, change in occupation or building use pattern, use of savings to fund our energy consuming activities.

Suggested actions (before)

Record actual energy use by users (from meter readings) before implementation of measures and compare (where possible) with national benchmarks. Record default settings

Choosing the RETROFIT measures

BUILDINGS ALLIANCE

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Wall

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ADD TO LIST CLOSE MEASURE

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► 3 Heritage Concerns

► 3 Energy Concerns

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Reset wheel

Choosing the RETROFIT measures

BUILDINGS ALLIANCE

▼ Colour key

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Wall

Internal Wall insulation

Insulation material is fixed to the inside surface of external walls and new internal finishes applied or insulation is blown behind existing linings

ADD TO LIST CLOSE MEASURE

▼ Advantages

Reduce heat loss - improve comfort. Potential associated benefits of reduced energy cost and lower CO2 and depending on material and finishes improved internal moisture buffering

▼ 8 Technical Concerns

▼ 3 Heritage Concerns

▼ 3 Energy Concerns

- ▶ Installation quality (high)
- ▶ Actual U-value? (medium)
- ▶ Rebound effects (medium)

▶ Related measures

Reset wheel

Choosing the RETROFIT measures

BUILDINGS ALLIANCE

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Wall

Internal Wall insulation

Insulation material is fixed to the inside surface of external walls and new internal finishes applied or insulation is blown behind existing linings

[ADD TO LIST](#) [CLOSE MEASURE](#)

► Advantages

Reduce heat loss - improve comfort. Potential associated benefits of reduced energy cost and lower CO2 and depending on material and finishes improved internal moisture buffering

► 8 Technical Concerns

► 3 Heritage Concerns

► 3 Energy Concerns

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- Actual U-value? (medium)
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Choosing the RETROFIT measures

BUILDINGS ALLIANCE

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Wall

Internal Wall insulation

Insulation material is fixed to the inside surface of external walls and new internal finishes applied or insulation is blown behind existing linings

ADD TO LIST **CLOSE MEASURE**

Advantages

Reduce heat loss - improve comfort. Potential associated benefits of reduced energy cost and lower CO2 and depending on material and finishes improved internal moisture buffering

8 Technical Concerns

3 Heritage Concerns

3 Energy Concerns

- Installation quality (high)
- Actual U-value? (medium)
- Rebound effects (medium)

Related measures

Measure options

- Cavity Wall Insulation
- External Wall insulation
- Frame infill insulation

Thermal coherence

- Window Shutters Refurbishment

Reset wheel

Choosing the RETROFIT measures

SUSTAINABLE TRADITIONAL BUILDINGS ALLIANCE

Type search here ... All Categories

GUIDANCE WHEEL

BEHAVIOUR: People Interaction

Wall: Technical concerns, Heritage concerns, Energy concerns

Roof

Loft insulation

Reason for connection: **Thermal coherence**
Thermal coherence: Improvement of level insulation to a similar sensible level - minimise thermal bridges (Moderate interaction)

Colour key

Building context

Wall

Internal Wall insulation

Installation material is fixed to the inside surface of external walls and new internal finishes applied or insulation is blown behind existing linings

ADD TO LIST CLOSE MEASURE

Advantages

Reduce heat loss - improve comfort. Potential associated benefits of reduced energy cost and lower CO2 and depending on material and finishes improved internal moisture buffering

8 Technical Concerns

3 Heritage Concerns

3 Energy Concerns

- Installation quality (high)
- Actual U-value? (medium)
- Rebound effects (medium)

Related measures

Stage 3 - Explore links

Choosing the RETROFIT measures

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GUIDANCE WHEEL

BEHAVIOUR: People Interaction

Wall: Technical concerns, Heritage concerns, Energy concerns

Roof

Floor

Windows

Doors

Chimney

Hot water storage

Heat D distribution

Lighting

Ventilation

SUSTAINABLE TRADITIONAL BUILDINGS ALLIANCE

Colour key

Building context

Wall

Internal Wall insulation

Material is fixed to the inside surface of external internal finishes applied or insulation is existing linings

Loft hatch and ceiling airtightness

Reason for connection: **Airtightness**

Improvement of airtightness - reduce infiltration - of whole building (Moderate interaction)

ADVANTAGES

CLOSE MEASURE

Advantages

Reduce heat loss - improve comfort. Potential associated benefits of reduced energy cost and lower CO2 and depending on material and finishes improved internal moisture buffering

8 Technical Concerns

3 Heritage Concerns

3 Energy Concerns

- Installation quality (high)
- Actual U-value? (medium)
- Rebound effects (medium)

Related measures

Stage 3 - Explore links

Choosing the RETROFIT measures

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Wall

Internal Wall insulation

Insulation material is fixed to the inside surface of external walls and new internal finishes applied or insulation is blown behind existing linings

ADD TO LIST CLOSE MEASURE

Window draughtproofing

Reason for connection: **Airtightness**

Improvement of airtightness - reduce infiltration - of whole building (Moderate interaction)

comfort. Potential associated cost and lower CO2 and finishes improved internal

moisture buffering

- 8 Technical Concerns
- 3 Heritage Concerns
- 3 Energy Concerns

- Installation quality (high)
- Actual U-value? (medium)
- Rebound effects (medium)

- Related measures

Stage 3 - Explore links

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Wall

Internal Wall insulation

Insulation material is fixed to the inside surface of external walls and new internal finishes applied or insulation is blown behind existing linings

ADD TO LIST CLOSE MEASURE

Energy efficient glazing

Reason for connection: **Thermal coherence**

Thermal coherence: Improvement of level insulation to a similar sensible level - minimise thermal bridges (Moderate interaction)

► 8 Technical Concerns

► 3 Heritage Concerns

► 3 Energy Concerns

- Installation quality (high)
- Actual U-value? (medium)
- Rebound effects (medium)

► Related measures

Stage 3 - Explore links

Choosing the RETROFIT measures

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Energy concerns

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Chimney

FABRIC

SERVICES
Ventilation
Lighting
Heat D distribution
Hot water Storage

SUSTAINABLE TRADITIONAL BUILDINGS ALLIANCE

► Colour key

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Wall

Internal Wall insulation

Insulation material is fixed to the inside surface of external walls and new internal finishes applied or insulation is blown behind existing linings

ADD TO LIST CLOSE MEASURE

Window refurbishment

Reason for connection: **Airtightness**

Improvement of airtightness - reduce infiltration - of whole building (Moderate interaction)

comfort. Potential associated it and lower CO2 and shes improved internal

► 8 Technical Concerns

► 3 Heritage Concerns

► 3 Energy Concerns

- Installation quality (high)
- Actual U-value? (medium)
- Rebound effects (medium)

► Related measures

Stage 3 - Explore links

Choosing the RETROFIT measures

SUSTAINABLE TRADITIONAL BUILDINGS ALLIANCE

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GUIDANCE WHEEL

SUSTAINABLE TRADITIONAL BUILDINGS ALLIANCE

- Colour key
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Wall

Internal Wall insulation

Insulation material is fixed to the inside surface of external walls and new internal finishes applied or insulation is blown behind existing linings

ADD TO LIST CLOSE MEASURE

- Advantages

Secondary glazing

Reason for connection: **Thermal coherence**

Thermal coherence: Improvement of level insulation to a similar sensible level - minimise thermal bridges (Moderate interaction)

Comfort. Potential associated and lower CO2 and has improved internal

- 3 Heritage Concerns
- 3 Energy Concerns

- Installation quality (high)
- Actual U-value? (medium)
- Rebound effects (medium)

- Related measures

Stage 3 - Explore links

Choosing the RETROFIT measures

SUSTAINABLE TRADITIONAL BUILDINGS ALLIANCE

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GUIDANCE WHEEL

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People Interaction

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Roof

Floor

FABRIC

Windows

Doors

Services

Hot Water Storage

Heat Distribution

Lighting

Ventilation

SUSTAINABLE TRADITIONAL BUILDINGS ALLIANCE

Colour key

Building context

Wall

Internal Wall insulation

Insulation material is fixed to the inside surface of external walls and new internal finishes applied or insulation is blown behind existing linings

ADD TO LIST CLOSE MEASURE

Advantages

Reduce heat loss - improve comfort. Potential associated and lower CO2 and has improved internal

Window Shutters Refurbishment

Reason for connection: Thermal coherence

Thermal coherence: Improvement of level insulation to a similar sensible level - minimise thermal bridges (Intense interaction)

3 Heritage Concerns

3 Energy Concerns

- Installation quality (high)
- Actual U-value? (medium)
- Rebound effects (medium)

Related measures

Stage 3 - Explore links

Choosing the RETROFIT measures

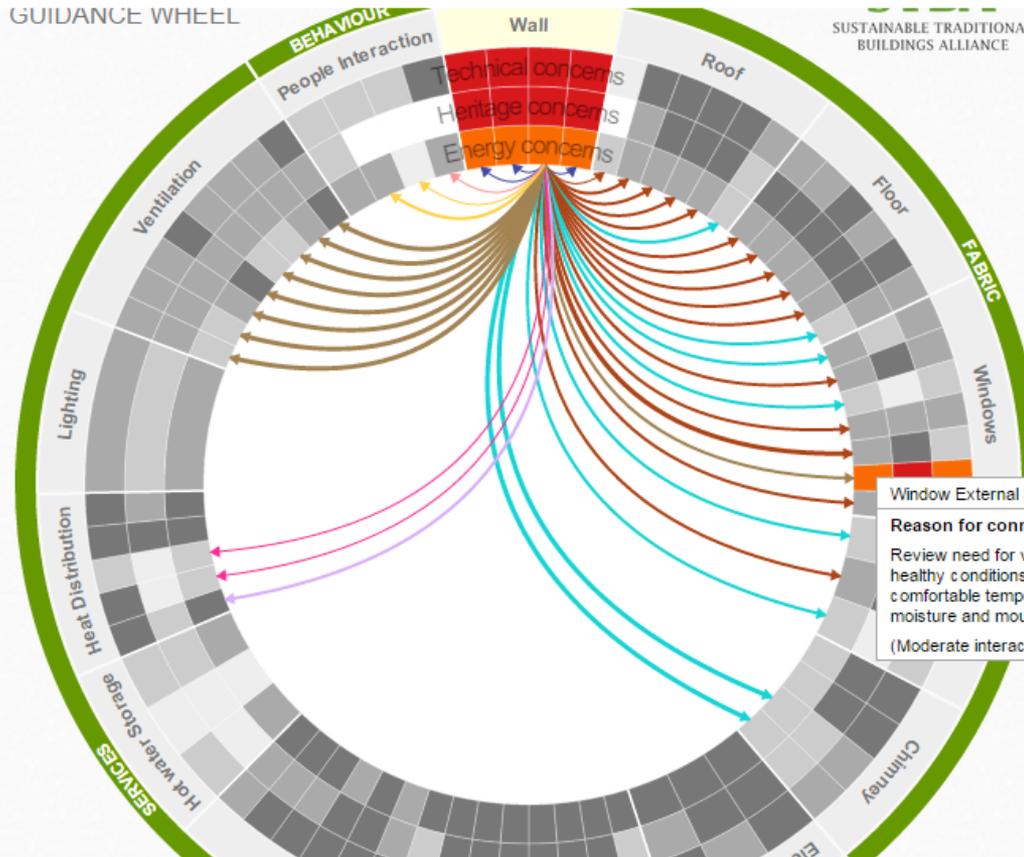
SUSTAINABLE TRADITIONAL BUILDINGS ALLIANCE

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All Categories



GUIDANCE WHEEL



SUSTAINABLE TRADITIONAL BUILDINGS ALLIANCE

Colour key

Building context

Wall

Internal Wall insulation

Insulation material is fixed to the inside surface of external walls and new internal finishes applied or insulation is blown behind existing linings

ADD TO LIST CLOSE MEASURE

Advantages

Reduce heat loss - improve comfort. Potential associated benefits of reduced energy cost and lower CO2 and improved internal

Window External Shading

Reason for connection: Human Health/Fabric Health

Review need for ventilation, daylight, shading to achieve healthy conditions for people (fresh air, daylight, comfortable temperatures) and for the fabric (avoiding moisture and mould growth)

(Moderate interaction)

3 Energy Concerns

- Installation quality (high)
- Actual U-value? (medium)
- Rebound effects (medium)

Related measures

Stage 3 - Explore links

Choosing the RETROFIT measures

SUSTAINABLE TRADITIONAL BUILDINGS ALLIANCE

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BEHAVIOUR

People Interaction

Technical concerns

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Wall

Roof

FLOOR

FABRIC

Windows

Chimney

SERVICES

Hot water Storage

Heat D distribution

Lighting

Ventilation

Colour key

Building context

Wall

Internal Wall insulation

Insulation material is fixed to the inside surface of external walls and new internal finishes applied or insulation is blown behind existing linings

ADD TO LIST CLOSE MEASURE

Advantages

Reduce heat loss - improve comfort. Potential associated benefits of reduced energy cost and lower CO2 and depending on material and finishes improved internal

Window Replacement

Reason for connection: **Thermal coherence**

Thermal coherence: Improvement of level insulation to a similar sensible level - minimise thermal bridges (Moderate interaction)

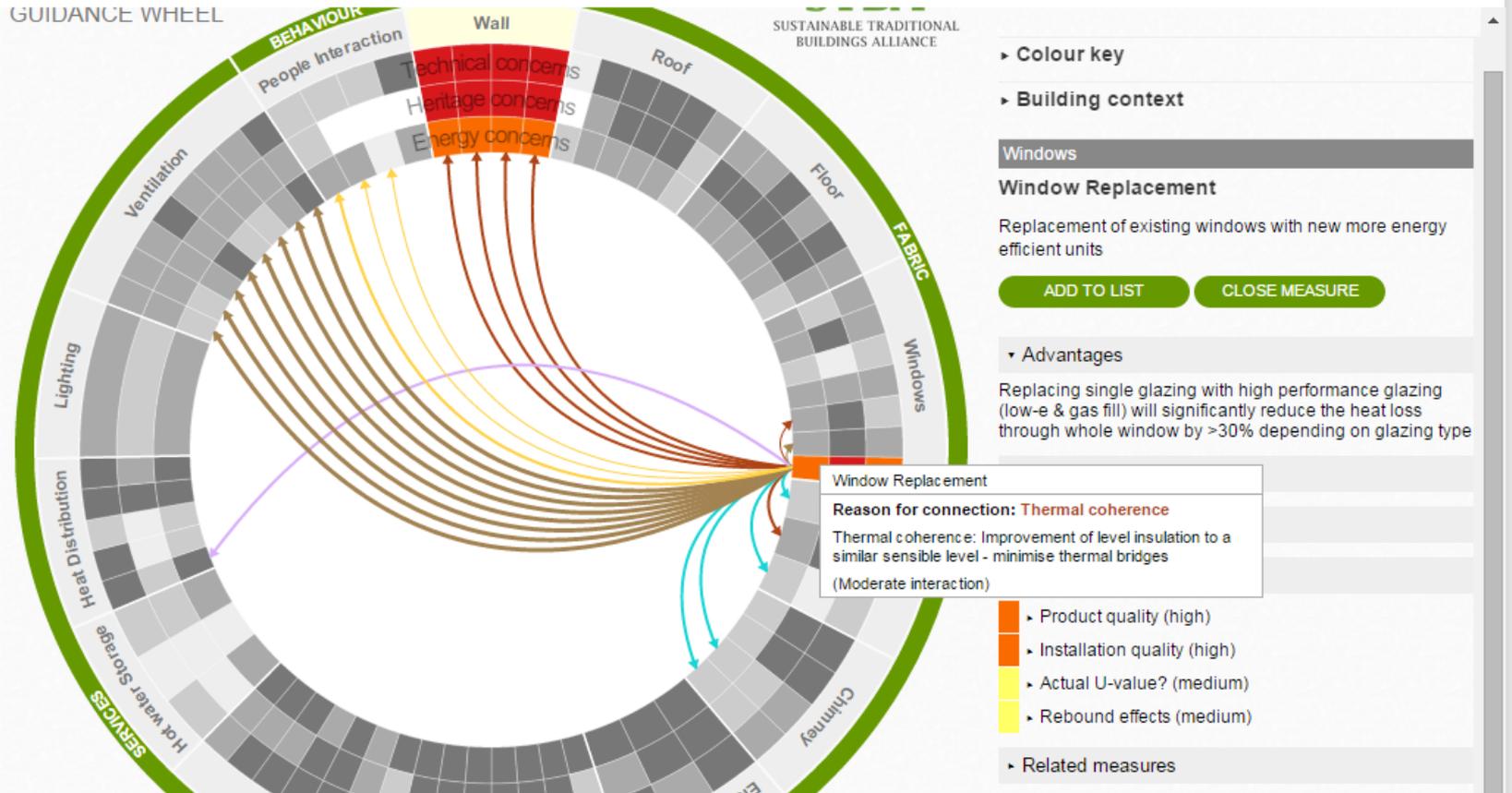
3 Energy Concerns

- Installation quality (high)
- Actual U-value? (medium)
- Rebound effects (medium)

Related measures

Stage 3 - Explore links

Choosing the RETROFIT measures



Stage 3 - Explore links

Choosing the RETROFIT measures

SUSTAINABLE TRADITIONAL BUILDINGS ALLIANCE

Type search here ... All Categories

GUIDANCE WHEEL

SUSTAINABLE TRADITIONAL BUILDINGS ALLIANCE

- Colour key
- Building context

Windows

Window Replacement

Replacement of existing windows with new more energy efficient units

[ADD TO LIST](#) [CLOSE MEASURE](#)

- Advantages

Replacing single glazing with high performance glazing (low-e & gas fill) will significantly reduce the heat loss through whole window by >30% depending on glazing type

- 4 Technical Concerns
- 3 Heritage Concerns
- 4 Energy Concerns

- Product quality (high)
- Installation quality (high)
- Actual U-value? (medium)
- Rebound effects (medium)

- Related measures

Stage 3 - Explore links

Choosing the RETROFIT measures

Stage 4 – Actions and References

RESPONSIBLE RETROFIT GUIDANCE WHEEL

STBA
SUSTAINABLE TRADITIONAL BUILDINGS ALLIANCE

GETTING STARTED ABOUT GLOSSARY REPORT

Advantages

5 Technical Concerns

- Sufficient ventilation? (high)
- Overheating (high)
- Personal preference (high)
- Monitoring and feedback required (medium)
- Personal capacity/Right opportunity (medium)

3 Heritage Concerns

- Original internal detail lost (medium)
- Detail retains character? (medium)

Where a particular feature is changed or covered (e.g. window, radiator type, ceiling), does the new detail preserve or enhance the original character of the building?

Suggested actions (before)

For any building elements that are new, specially if building is listed or in conservation area, design them to match the character of the original features (e.g. windows retaining original operation, frame design and glass pane division).

References

GUIDANCE [Warmer Bath: A guide to improving the energy efficiency of traditional homes in the city of Bath](#) (2011) Bath Preservation Trust & Centre for Sustainable Energy

GUIDANCE [Energy Efficiency In Historic Buildings - Draught-proofing windows and doors](#) (2010) English Heritage

GUIDANCE [Energy Efficiency And Historic Buildings - Application of Part L of the Building Regulations to historic and traditionally constructed buildings](#) (2011) English Heritage

GUIDANCE [Energy Efficiency In Historic Buildings - Secondary glazing for windows](#) (2010) English Heritage

CASE STUDY [GUIDANCE](#) [Energy Heritage: A guide to](#)

Find our more detail: open each concern tab to look up definition of concern, actions before, during and after retrofit to minimise risk.
Relevant references are listed

Choosing the RETROFIT measures

Stage 5 - Select measures

RESPONSIBLE RETROFIT GUIDANCE WHEEL

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GETTING STARTED ABOUT GLOSSARY REPORT

► Colour key

► Building context

Windows

Secondary glazing

Addition of a second pane of glass or double/triple glazed unit inside an existing window.

REMOVE FROM LIST CLOSE MEASURE

► Advantages

Can be as effective as/better than replacement energy efficient glazing in traditional windows in reducing heat loss with the advantage that the original window is retained

► 5 Technical Concerns

- Sufficient ventilation? (high)
- Overheating (high)
- Personal preference (high)
- Monitoring and feedback required (medium)
- Personal capacity/Right opportunity (medium)

► 3 Heritage Concerns

- Original internal detail lost (medium)
- Detail retains character? (medium)
- Planning consent outside conservation area (minor)

► 5 Energy Concerns

► Related measures

Reset wheel

Select measures: choose the measures you are interested in by clicking the add to list button

Choosing the RETROFIT measures

Stage 6 - Report

The screenshot shows a web interface for generating a report. At the top right, there are navigation tabs: GETTING STARTED, ABOUT, GLOSSARY, and REPORT. Below the tabs, the title 'Responsible Retrofit Guidance Wheel Report' is displayed. To the right of the title are two buttons: 'Print report' and 'Back to wheel'. Below the title is a text input field for 'Update report name' with a button next to it. The main content area is divided into several sections: 'Colour key' with color-coded boxes for concerns (Minor, Medium, High, Major) and measure linkages (Measure options, Thermal coherence, Airtightness, Human Health/Fabric Health, Heating issues, People issues, Monitoring and maintenance, Hidden services, Electricity issues); 'Context' with details like Heritage, Condition/State of repair, Exposure, Energy User Type, User interest and involvement, and Number of exposed sides; and 'Chosen measures' with a section for 'Frame infill insulation' including a description, advantages, and technical/heritage/energy concerns.

GETTING STARTED ABOUT GLOSSARY REPORT

Responsible Retrofit Guidance Wheel Report

Print report Back to wheel

Update report name

Colour key

Concerns
Minor concern Medium concern High concern Major concern

Measure to measure linkages
Measure options Thermal coherence Airtightness Human Health/Fabric Health Heating issues People issues Monitoring and maintenance
Hidden services Electricity issues

Context

Heritage: Character building
Condition/State of repair: Poor
Exposure: Severe
Energy User Type: Medium (Typical) Energy Use
User interest and involvement In Operation: Uninterested User
Number of exposed sides: Single

Chosen measures

Frame infill insulation

Addition of frame infill insulation material or replacement of existing frame infill material with more insulating material.

Advantages
Reduce heat loss - improve comfort. Potential associated benefits of reduced energy cost and lower CO2 and depending on material and finishes improved internal moisture buffering

Technical concerns:
Trapped/accumulated moisture (major) Thermal Bridges (major) Interstitial/surface Condensation (high) Rain and Drains (liquid moisture penetration) (high) Persona capacity/Right opportunity (high) Overheating (medium) Building Control/Warrant (medium) Monitoring and feedback required (medium)

Heritage concerns:
Original internal detail lost (medium) Original external detail lost (medium) Use of sympathetic materials (medium) Planning consent outside conservation area (minor)

Energy concerns:

Report: click the report tab to view a report of the chosen measures. Give a name to the report and print it out