







Retrofit quick start guide

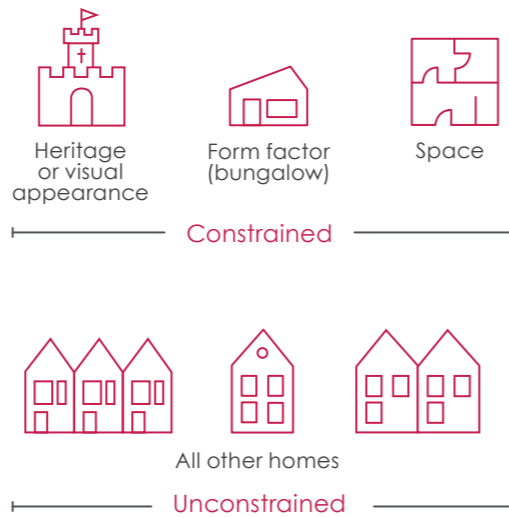
1 Use the six key principles for best practice retrofit

-  **Principle 1:** Reduce energy consumption
-  **Principle 2:** Prioritise occupant and building health
-  **Principle 3:** Have a whole building Retrofit Plan
-  **Principle 4:** Measure the performance
-  **Principle 5:** Think big!
-  **Principle 6:** Consider impact on embodied carbon

 **SIGNPOST** Chapter 2 - What is retrofit?

2 Tailor the retrofit to the property type

Determine whether the home is constrained or unconstrained:

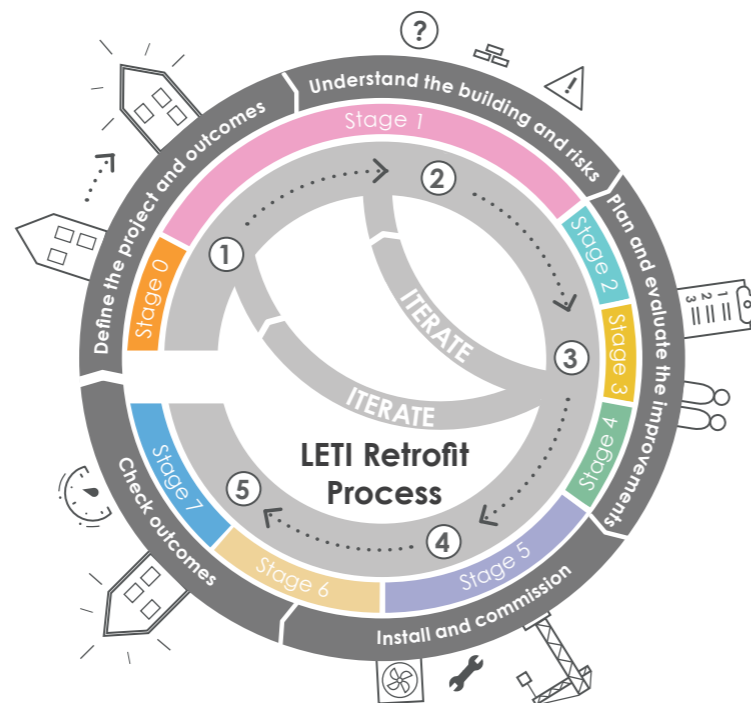


3 Make a whole house Retrofit Plan and follow the LETI Retrofit Process

The whole house Retrofit Plan must:

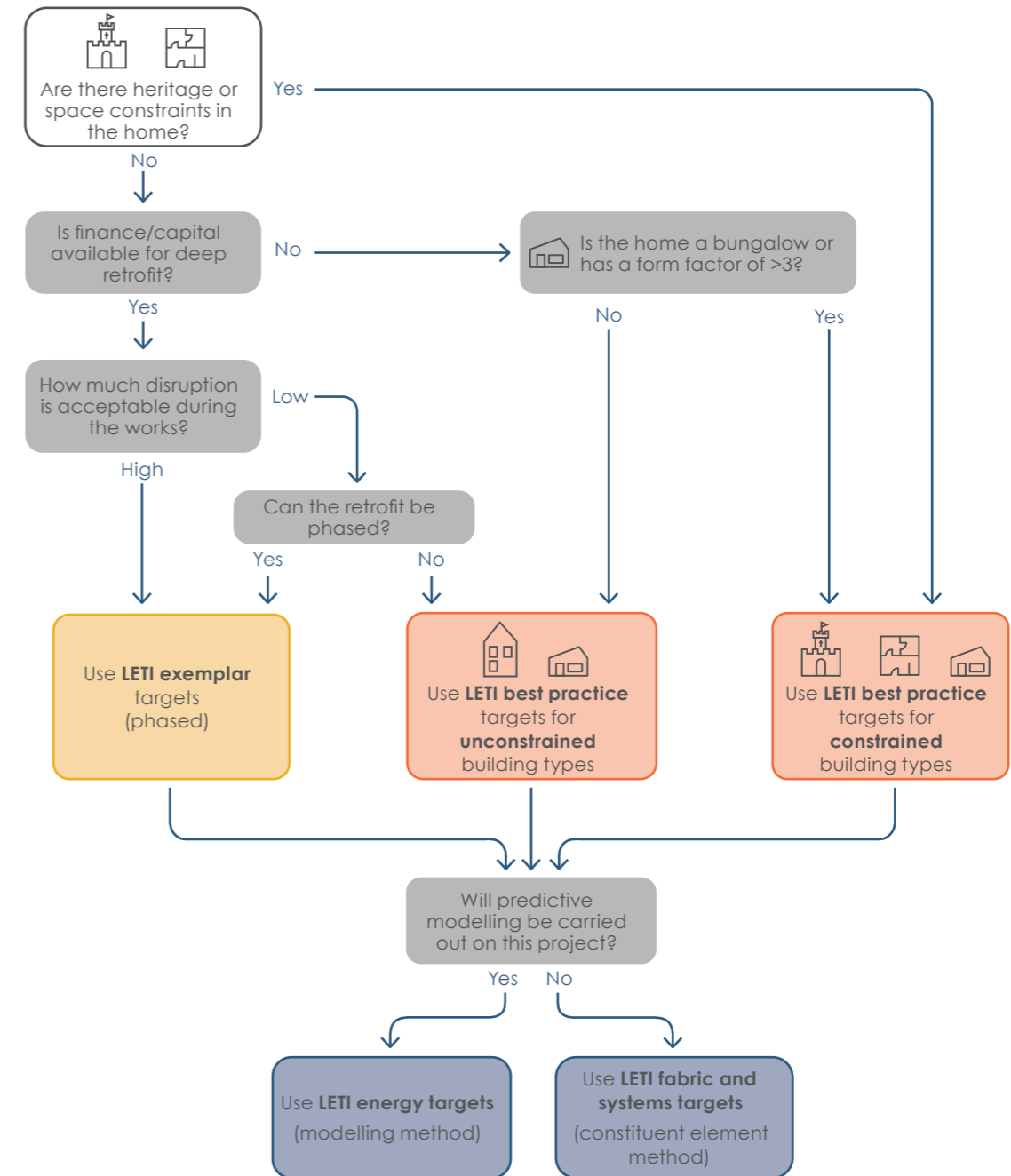
- Set out key building information, constraints, risks, and opportunities.
- Set out the key works proposed along with related strategies and details.
- Set out the sequence of work.
- Be appropriate in its level of detail and intervention for the project.
- Include a plan for monitoring and reporting energy consumption.
- Stay with the building.

 **SIGNPOST** Chapter 5 - How do we do it?



4 Use the flow chart to determine the appropriate LETI target and approach

The following flowchart sets out how to decide on the appropriate retrofit target for the project:



Notes:

- If there are heritage or significant space constraints in the home, still try to reduce the space heating demand, hot water demand and Energy Use Intensity (EUI) as much as possible. Use the U-values recommended for the unconstrained retrofit wherever possible.
- For any retrofit - independent quality assurance (QA) process is recommended for example for LETI exemplar use EnerPHit. Requirements for EnerPHit depend on the UK region, if following EnerPHit check the full requirements at the start of the project.

 **SIGNPOST** Chapter 4 - LETI home retrofit targets - 4.4 Using retrofit standards and guidance

 **SIGNPOST** Chapter 3 - Where are we now and what can we achieve? - 3.2 Form factor

5a LETI retrofit energy targets (modelling method)

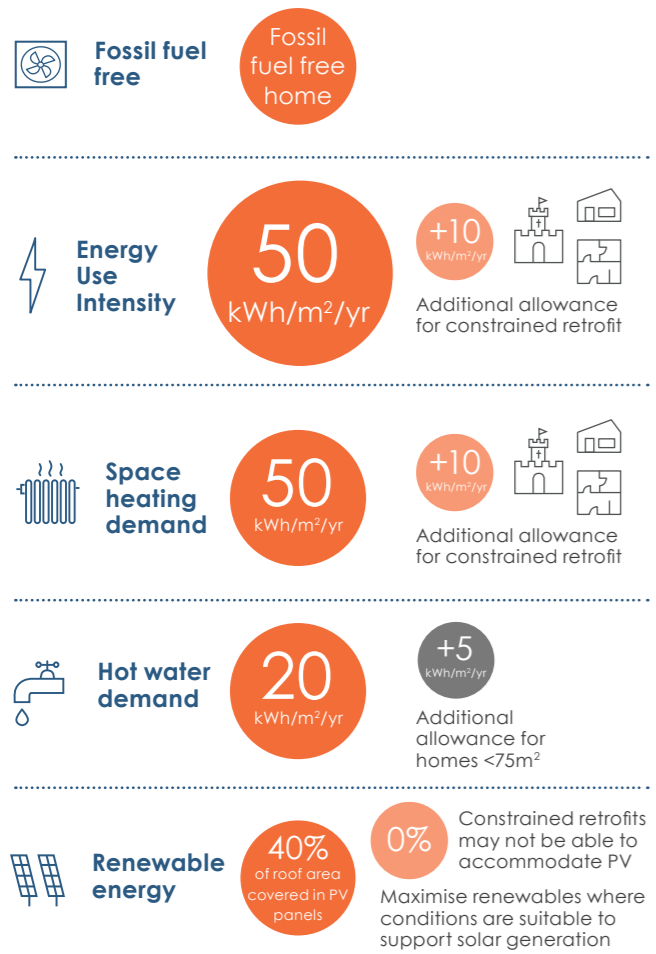
Our analysis demonstrated that what LETI considers to be a pragmatic, affordable and realistic level of retrofit matches closely with the AECB Retrofit standard in terms of both space heating demand and final EUI. LETI considers this to be a **best practice** retrofit.

► **SIGNPOST** Chapter 4 - LETI home retrofit targets - 4.2 Modelling method

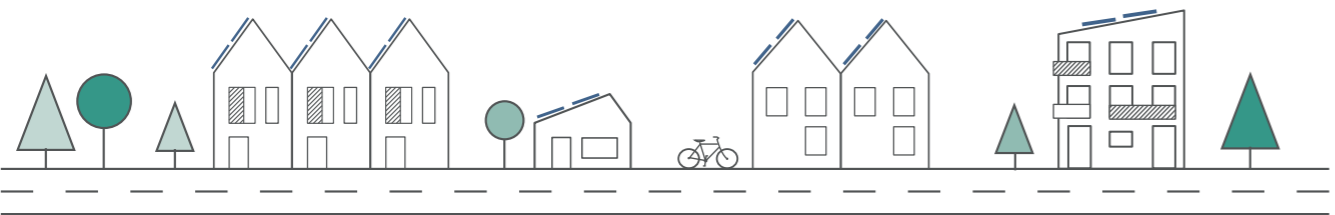
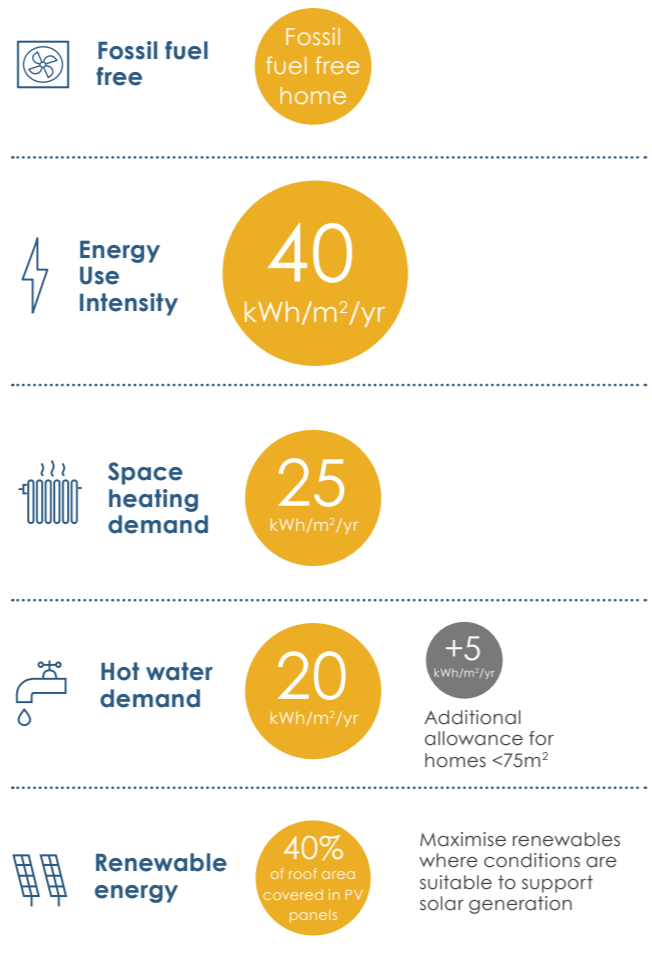
The more demanding Passivhaus EnerPhit retrofit standard achieves further reductions and is aligned with LETI's **exemplar** targets in terms of retrofit ambition.

Use of either energy target requires detailed energy modelling to be carried out.

LETI best practice retrofit



LETI exemplar retrofit



► **SIGNPOST** Chapter 4 - LETI home retrofit targets - 4.5 LETI typical house archetype examples

5b LETI retrofit fabric and system targets (constituent element method)

This constituent method can be used where detailed energy modelling is not possible or financially feasible on a small project.

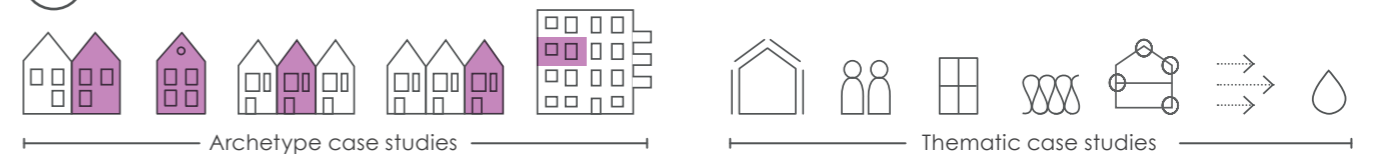
The fabric and system components of the retrofit works should achieve the target parameters set out below.

► **SIGNPOST** Chapter 4 - LETI home retrofit targets - 4.3 Constituent element method

Building element	Retrofit actions	LETI best practice		LETI exemplar
		Constrained retrofit	Unconstrained retrofit (cool temperate climate)	All retrofit types
Walls	Cavity	0.24 W/m ² .K	0.18 W/m ² .K	0.15 W/m ² .K
	Solid uninsulated	0.32 W/m ² .K	0.18 W/m ² .K	0.15 W/m ² .K
	Timber frame	0.21 W/m ² .K	0.18 W/m ² .K	0.15 W/m ² .K
Roofs	Cold	0.12 W/m ² .K	0.12 W/m ² .K	0.12 W/m ² .K
	Warm/flat	0.22 W/m ² .K	0.12 W/m ² .K	0.12 W/m ² .K
Floors	Suspended timber	0.20 W/m ² .K	0.18 W/m ² .K	0.15 W/m ² .K
	Solid uninsulated	0.80 W/m ² .K	0.15 W/m ² .K	0.15 W/m ² .K
Windows and doors	Windows	1.30 W/m ² .K	1.00 W/m ² .K	0.80 W/m ² .K
	Doors	1.00 W/m ² .K	0.80 W/m ² .K	0.80 W/m ² .K
General envelope	Thermal bridging	0.10 W/m.K	0.10 W/m.K	0.08 W/m.K
	Airtightness	3.0 ach@50Pa	2.0 ach@50Pa	1.0 ach@50Pa
Systems	Systems and appliances	Fossil fuel free	Fossil fuel free	Fossil fuel free
	Ventilation type	Install and remove extract fans	MVHR*	MVHR
	Lighting power	Replace lamps and fittings	50 lm/W	100 lm/W
Hot water	Hot water tank	Increase insulation or replace	1.5 W/K	1.5 W/K
	Primary pipework	Insulate all pipework	90% of pipework insulated	90% of pipework insulated
	Shower demands	Low flow fittings	16 litres/pers.day	16 litres/pers.day
	Other demands	Low flow fittings	9 litres/pers.day	9 litres/pers.day
Renewables	Photovoltaic generation	Rooftop installation	0% of roof area covered in PV panels	40% of roof area covered in PV panels

* If not possible use demand control dMEV or demand control cMEV

6 Case studies



► **SIGNPOST** Chapter 6 - Case studies