

# Carbon Reduction Plan – Stage 1: “Preliminary Carbon Reduction Options”

Wenhaston Energy Support Group AGM  
Wenhaston, May 26th 2011

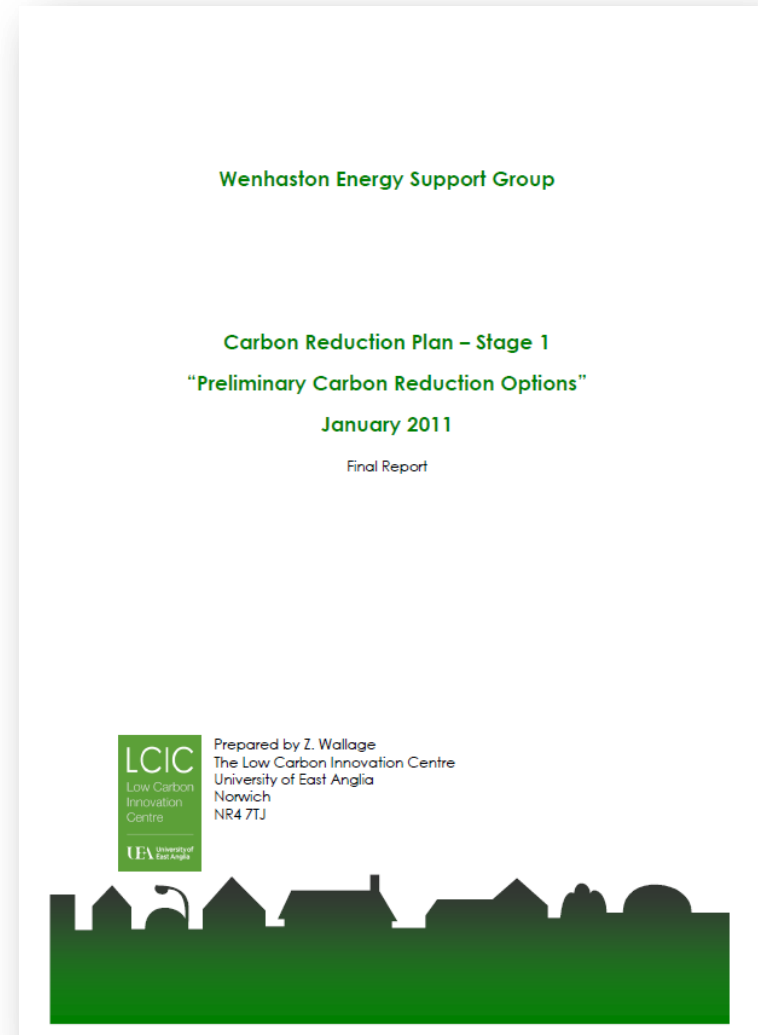
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University of East Anglia



# Carbon Reduction Plan – Stage 1: Preliminary Carbon Reduction Options

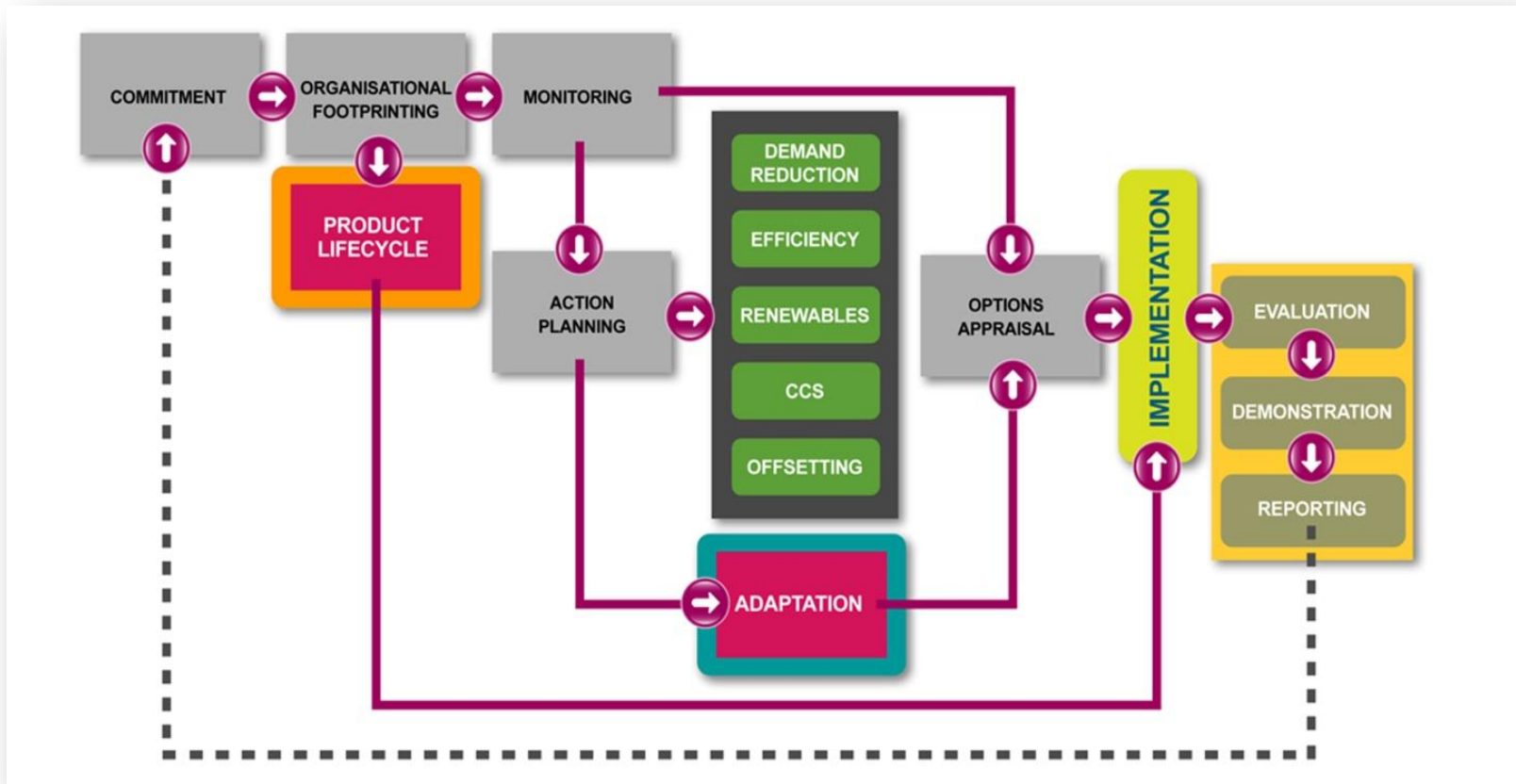
## Outline:

- ✦ Background to Study;
- ✦ Carbon Baseline;
- ✦ Strategies & Options Appraisal;
- ✦ Example Technologies;
- ✦ Overview & Next Steps



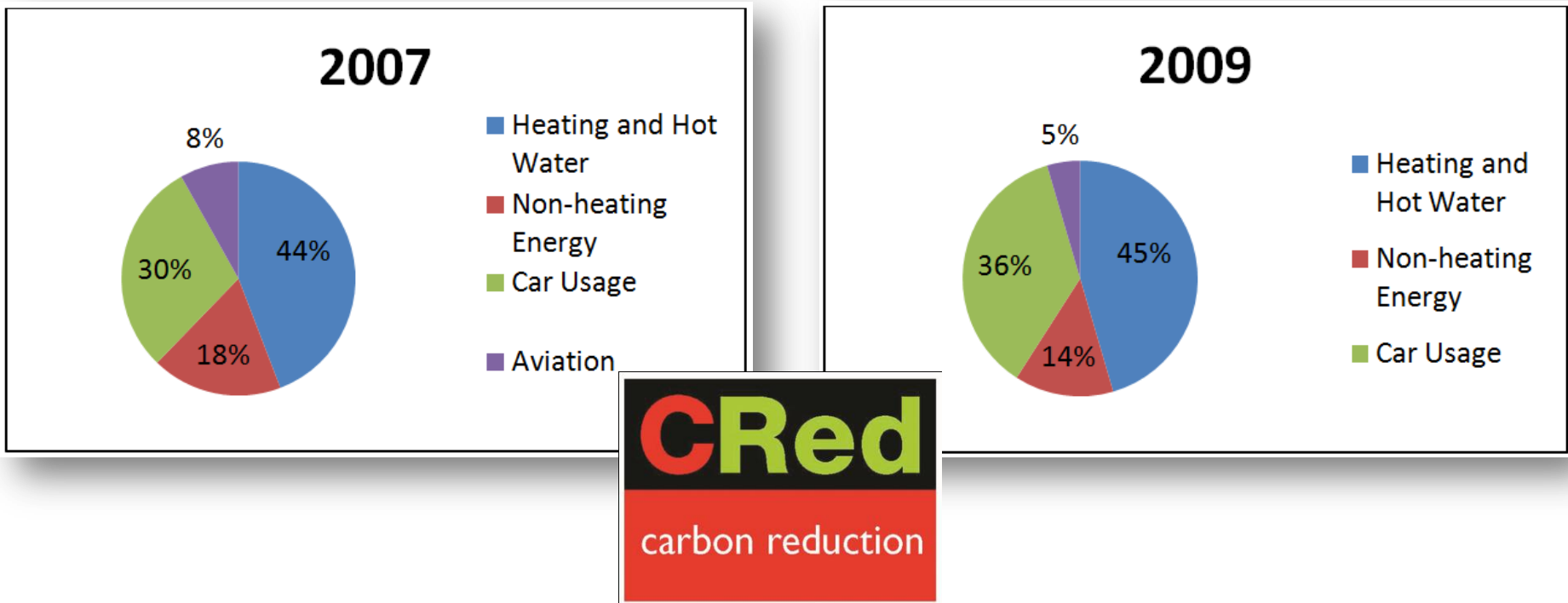
## Project Remit:

*“Identify a preliminary set of carbon reduction options for the community, including renewable energy technologies, suitable for the context of the local parish”*



## Background to Study:

In 2007 & 2009 WESG commissioned LCIC (formerly known as CRed) to undertake two complimentary studies to estimate the carbon footprint of the local community. This data provided a baseline upon which a future *Carbon Reduction Strategy* could be developed:



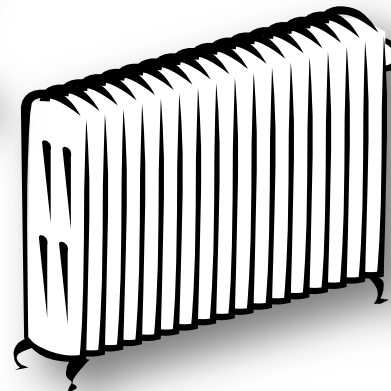
## Carbon Baseline:

The Wenhaston community carbon footprint was estimated to be ~ 4,180 tonnes CO<sub>2</sub> per annum (2009).

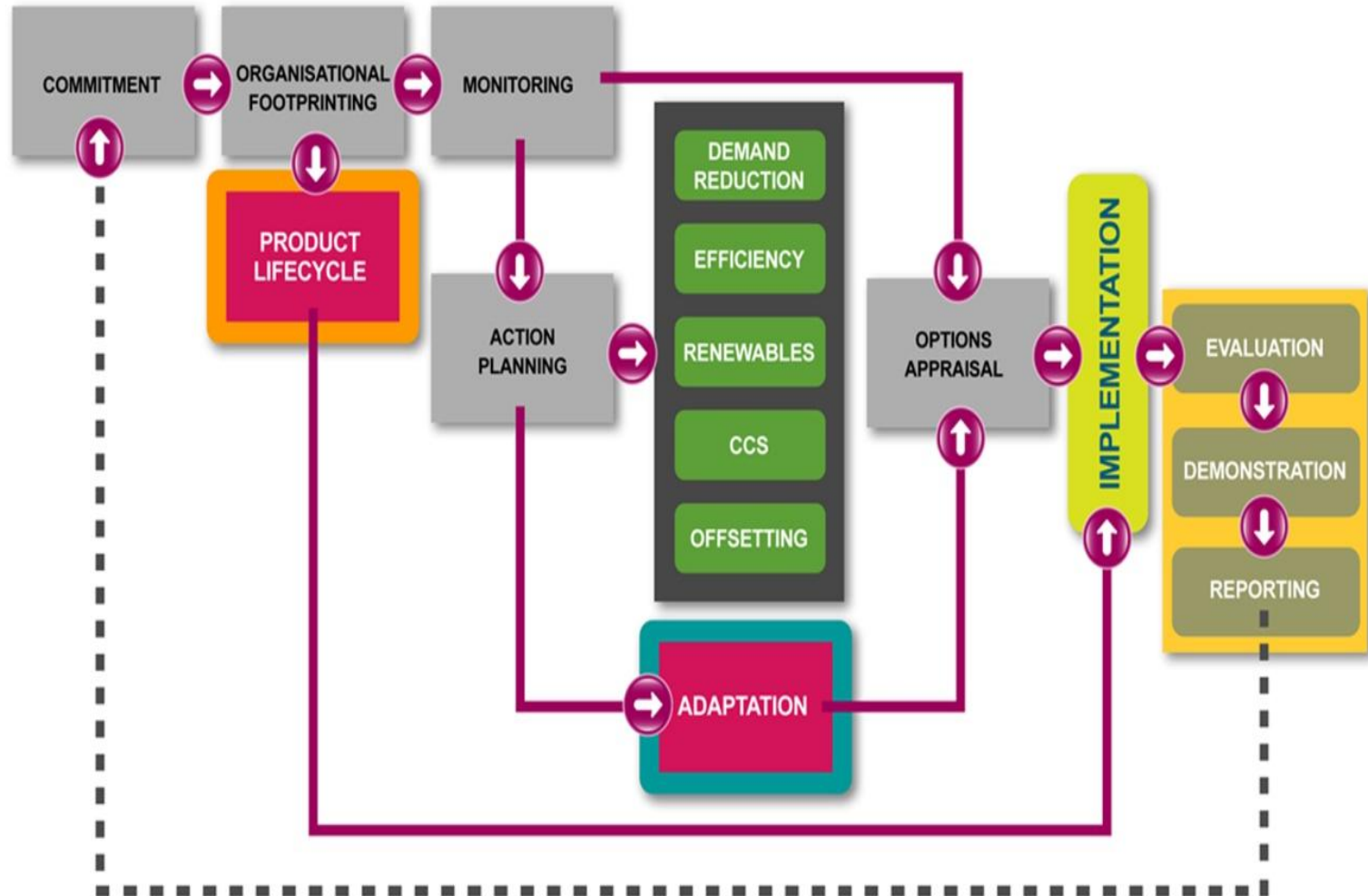
Per household, this equates to ~ 11 tonnes CO<sub>2</sub> per annum (2009).

Distributed across the four emission sources it equates to:

- ✦ Heating and hot water energy – (45%);
- ✦ Non-heating energy – (14%);
- ✦ Car usage – (36%);
- ✦ Aviation – (5%);



# Strategies & Options Appraisal:

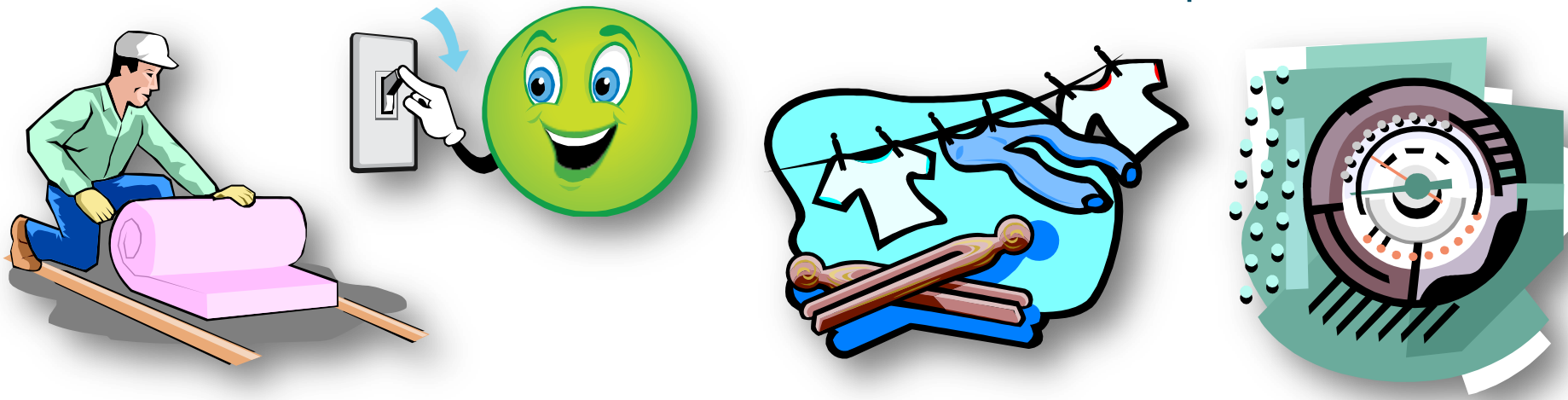


## Step One: Demand Reduction

Reduce CO<sub>2</sub> emissions through relatively “low-tech” modifications and behavioural change, e.g. switching off unused appliances and installing cavity wall insulation.

- ✦ Fourteen relatively simple measures identified;
- ✦ If just one action implemented, emissions could be reduced by ~15%;
- ✦ If all actions implemented, emissions could reduce by ~25%

Thus, although often seen as rudimentary measures, demand reduction is an effective and, in most cases, low-cost option.



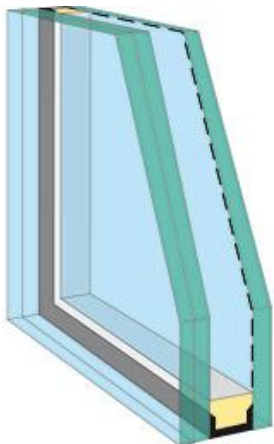
## Step Two: Energy Efficiency

Installing new energy efficient technologies and appliances to optimise the remaining energy demand.

- ✦ Four principal energy efficiency options identified;
- ✦ Optimise heat – install energy efficient condensing boilers & glazing;
- ✦ Optimise power – install low-energy lighting & ≥A+ rated appliances;

A combination of measures equates to a 15% reduction.

Thus, a 40% reduction achievable through Steps 1 & 2.



<b>Energy</b>		Fridge-Freezer
Manufacturer Model		
<b>More efficient</b>		
A		
B		
C		
D		
E		
F		
G		
<b>Less efficient</b>		
Energy consumption kWh/year <small>(Based on standard test results for 24h)</small>		<b>325</b>
<small>Actual consumption will depend on how the appliance is used and where it is located</small>		
Fresh food volume l		190
Frozen food volume l		126
<b>Noise</b> <small>(dB(A) re 1 pW)</small>		
<small>Further information is contained in product brochures</small>		
<small>Norm EN 153 May 1990 Refrigerator Label Directive 94/2/EC</small>		

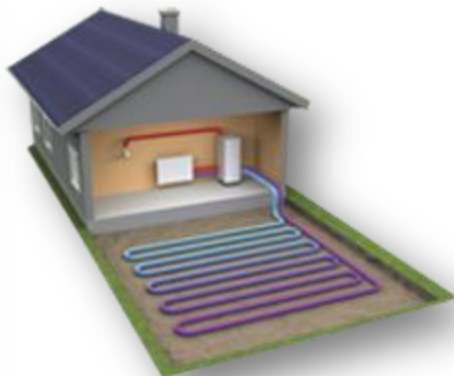
## Step Three: Renewable Energy

De-carbonise the energy supply by installing renewable heat and power technologies.

- ✦ Nine renewable technologies reviewed in detail, inc carbon, financial, environmental, technical, planning & social aspects;
- ✦ Ground source heat pumps and biomass boilers are attractive heat-based options in a rural “off-grid” community;
- ✦ Solar PV panels are reliable & readily available options for electricity production;

If a householder uses a MCS accredited installer, they’re eligible for financial support from government schemes that provide a 6-8% return on investment:

- ✦ **“Feed in Tariff (FiT)”**
- ✦ **“Renewable Heat Incentive (RHI)”**

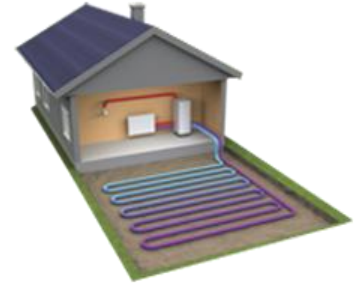


# Example Technologies: Production of Renewable Heat and the “RHI”

## Phase 1 – “RHI Premium Payment” (From July 2011)

One-off payments *expected* to be between £300 and £1,250/unit:

- ✦ Ground-source heat pumps ~ £1,250/unit
- ✦ Biomass Boilers ~ £950/unit



**But**, it's thought recipients will need to ensure that they:

- ✦ Have a well-insulated home, based on its energy performance certificate (EPC);
- ✦ Agree to give feedback on how the equipment performs.

## Phase 2 – “RHI Tariffs” (From October 2012)

Those in receipt of the “RHI Premium Payments” will be able to receive long-term financial support once RHI tariffs are introduced (as will anyone else who installed an eligible technology since 15<sup>th</sup> July 2009).



### Ground Source: Heat Pump Example

Installation Cost: ~£8,000 - £12,000

Receipt of RHI Premium Payment: ~£950??

Carbon saved:  $\geq 1.3$  tonnes CO<sub>2</sub> per year

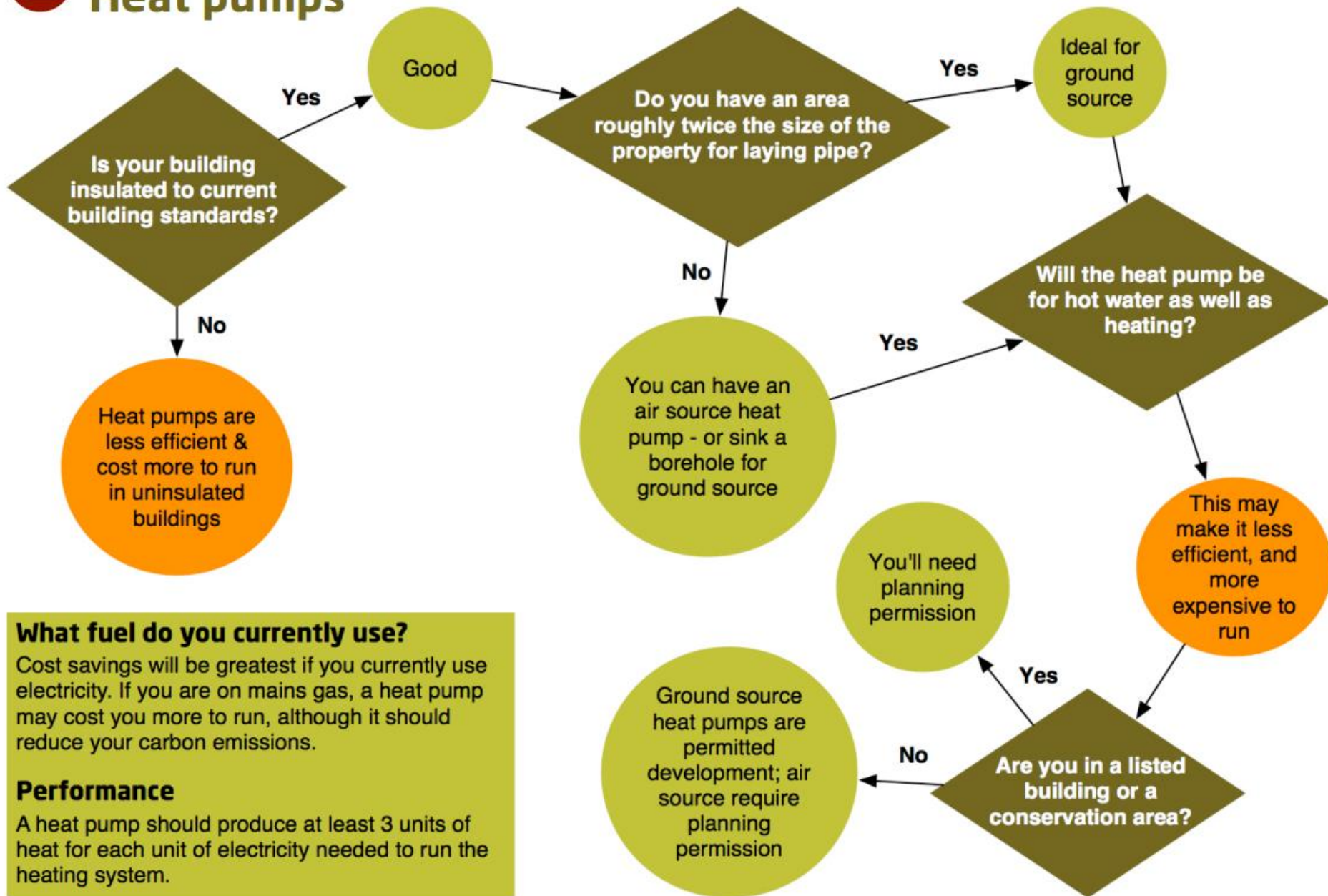
Utility bills reduced: No more heating oil!

Payback/Income generation: ~£750 per year??

[www.decc.gov.uk](http://www.decc.gov.uk)



# Heat pumps



## What fuel do you currently use?

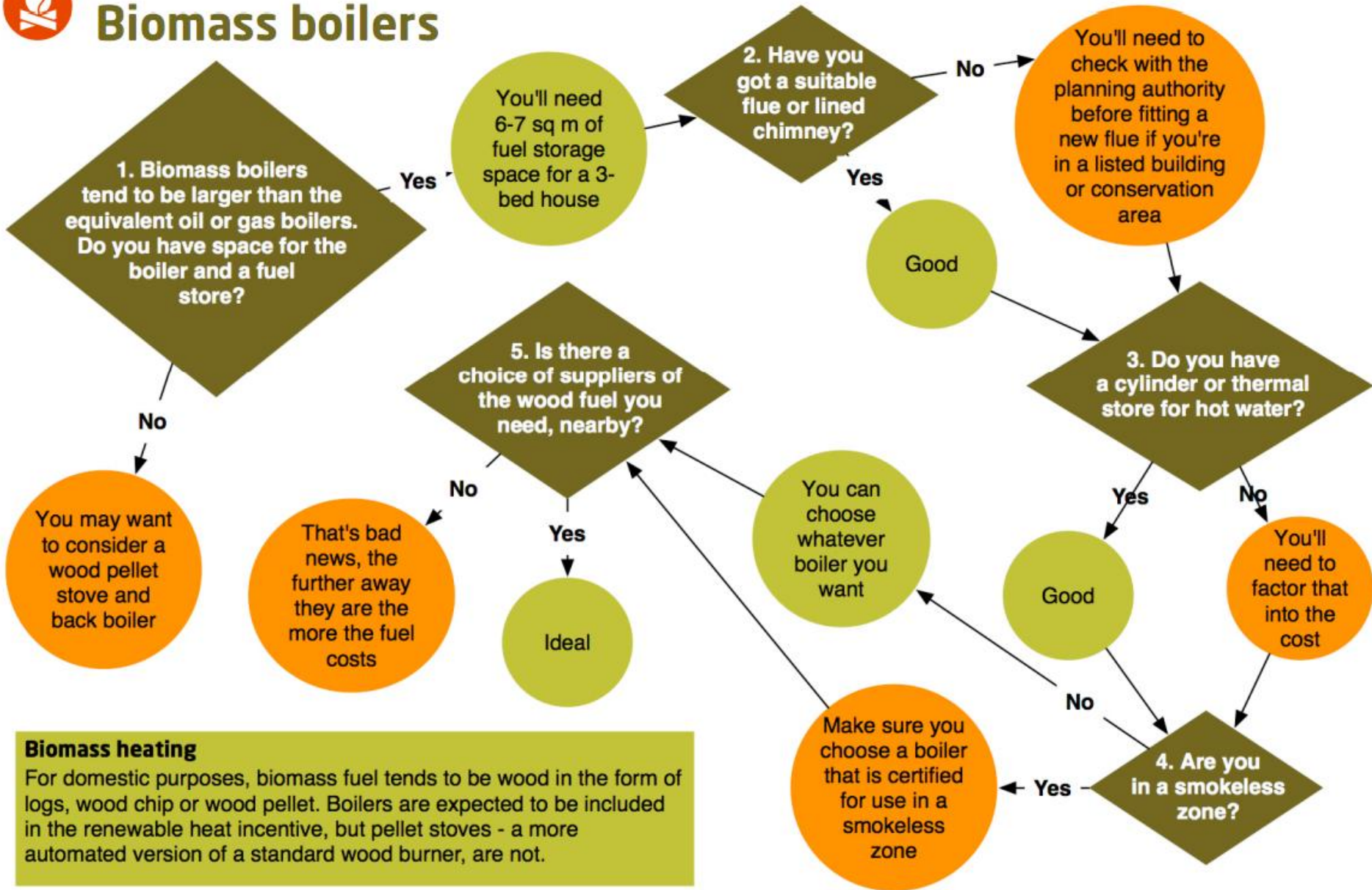
Cost savings will be greatest if you currently use electricity. If you are on mains gas, a heat pump may cost you more to run, although it should reduce your carbon emissions.

## Performance

A heat pump should produce at least 3 units of heat for each unit of electricity needed to run the heating system.



# Biomass boilers

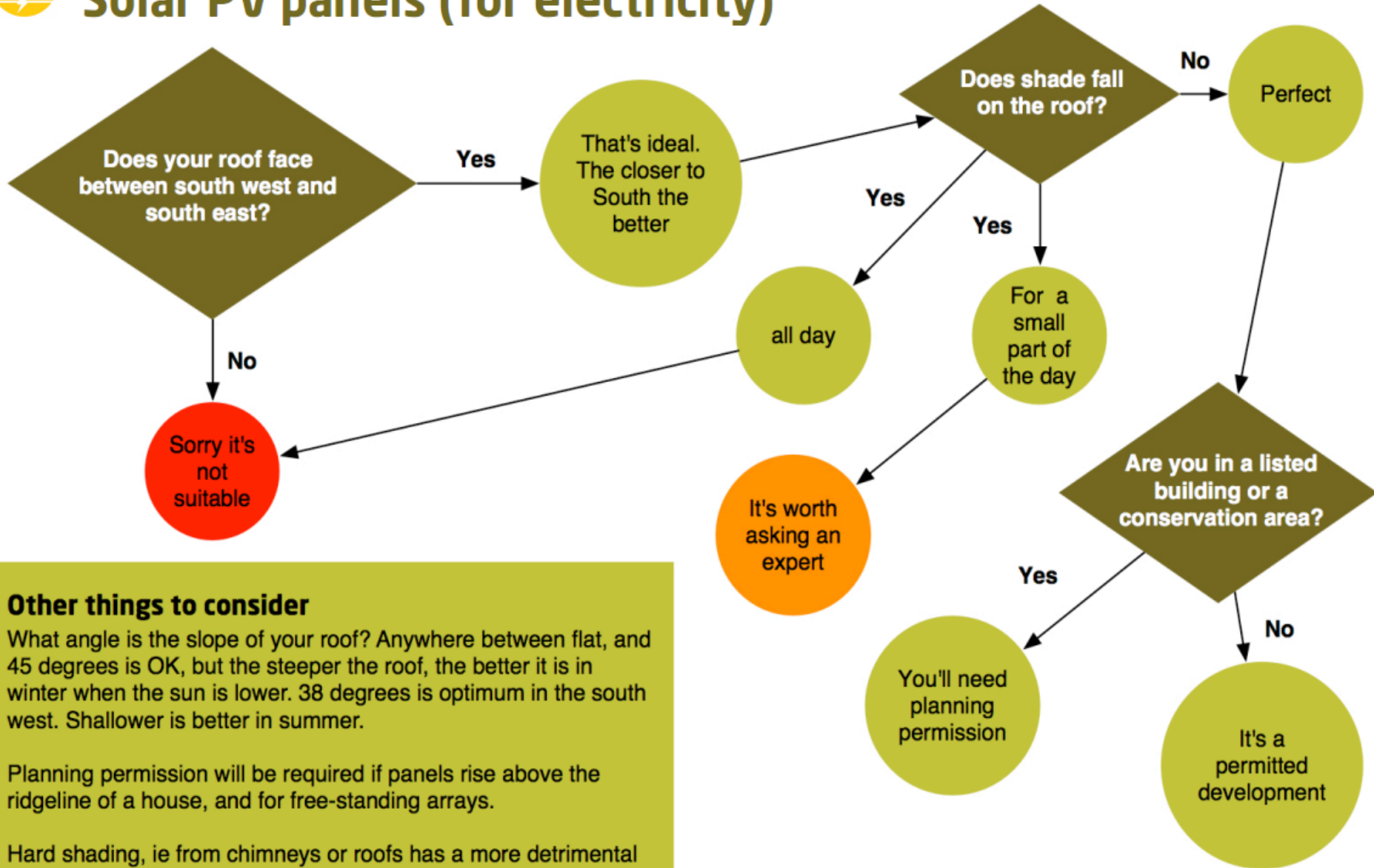


## Biomass heating

For domestic purposes, biomass fuel tends to be wood in the form of logs, wood chip or wood pellet. Boilers are expected to be included in the renewable heat incentive, but pellet stoves - a more automated version of a standard wood burner, are not.



# Solar PV panels (for electricity)



## Other things to consider

What angle is the slope of your roof? Anywhere between flat, and 45 degrees is OK, but the steeper the roof, the better it is in winter when the sun is lower. 38 degrees is optimum in the south west. Shallower is better in summer.

Planning permission will be required if panels rise above the ridgeline of a house, and for free-standing arrays.

Hard shading, ie from chimneys or roofs has a more detrimental impact than soft shading from trees

## Overview and Next Steps...

### Key Stages:

- ✦ 1) Demand Reduction
- ✦ 2) Energy Efficiency
- ✦ 3) Renewable Energy



Read and download the full report from: [www.wenhastongreen.org](http://www.wenhastongreen.org)

### Community Action:

A great deal of support and momentum for reducing emissions can be gained from acting collectively as a community group, and the most successful schemes benefit from the active engagement of all residents.

Check out: DECC's new community energy online: <http://ceo.decc.gov.uk>



**Thank you for your time:  
Any questions?**

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