

› Home

› Commit now

› Why commit

› Who's committed

› Spread the word

# I commit

Want to do something about climate change? Want to help preserve the places that matter to you? Then join the energy saving movement and make a personal commitment to save 20% of the energy you use. Together our actions will have a real impact by helping to fight climate change.

You can also create your own "commitment widget" to add to your webpage or network site and tell all your friends about your commitment.

#### Latest commitment:

Gloria Burke committed to help preserve sherwood forest



photographer: zoreil

› Commit now

**SAVE  
YOUR  
20%**

Too busy to commit now? You can still join the energy saving movement by leaving your email address below.

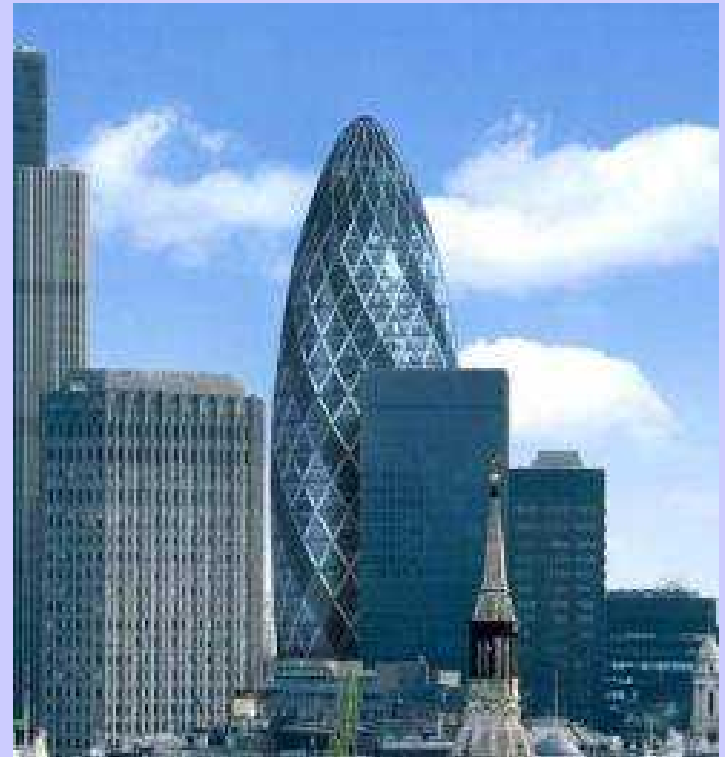
## Strategies for Saving Energy in the Home

Trying to save my 20%  
Julian Paren

- Nearly 50% of the UK's CO<sub>2</sub> emissions are caused by building, maintaining and occupying buildings
- A third of all the buildings around in 2050 have yet to be built
- Over 90% of the buildings standing today in Scotland will be standing in 2050
- Building Regulations get progressively tougher
- Only Zero carbon homes to be built after 2016
- Electrical appliances becoming rapidly more efficient

# Energy in the home

with 2050 and Climate Act in view



Total homes in location: 21,696,796 Total homes in HEED for location: 2,201,813 Data Density: 10.1%

Property Type		
Flat	192,853	9.2%
Mid Terraced House	470,969	22.4%
End Terraced House	200,671	9.6%
Semi Detached Bungalow	16,467	0.8%
Detached Bungalow	20,570	1.0%
Semi Detached House	774,361	36.9%
Detached House	417,761	19.9%
Other	7,126	0.3%
Unknown	0	0.0%
<b>Total :</b>	<b>2,100,780</b>	<b>100%</b>

Tenure		
Owner Occupier	1,215,831	74.2%
Privately Rented	91,822	5.6%
Rented from Local Authority	238,419	14.5%
Rented from Housing Association	78,617	4.8%
Other	14,825	0.9%
Unknown	0	0.0%
<b>Total :</b>	<b>1,639,514</b>	<b>100%</b>

Loft Insulation		
Properties with no loft insulation	168,043	9.1%
- less than 25mm	22,376	1.2%
- with 25 - 49mm	99,643	5.4%
- with 50 - 74mm	248,904	13.5%
- with 75 - 99mm	224,477	12.2%
- with 100 - 149mm	354,953	19.3%
- with 150 - 199mm	222,081	12.1%
- with 200mm - 249mm	119,947	6.5%
- with 250mm and Over	21,053	1.1%
Unknown	357,255	19.4%
<b>Total :</b>	<b>1,838,534</b>	<b>100%</b>

Property Age		
Properties built before 1900	202,565	9.7%
Properties built between 1900 - 1929	303,860	14.5%
Properties built between 1930 - 1949	459,340	22.0%
Properties built between 1950 - 1965	459,140	22.0%
Properties built between 1966 - 1976	267,141	12.8%
Properties built between 1977 - 1981	163,502	7.8%
Properties built between 1982 - 1990	120,594	5.8%
Properties built between 1991 - 1995	56,015	2.7%
Properties built after 1995	51,825	2.5%
Unknown	5,216	0.2%
<b>Total :</b>	<b>2,083,218</b>	<b>100%</b>

External Wall Type		
Solid Walls	661,968	32.3%
Stone Walls	92,348	4.5%
Timber Framed	30,131	1.5%
Cavity Walls with No Filled Cavity	619,414	30.2%
Cavity Walls with Filled Cavity	422,934	20.6%
Other Construction	77,611	3.8%
Unknown	144,803	7.1%
<b>Total :</b>	<b>2,049,209</b>	<b>100%</b>

Glazing Type		
Single Glazing	429,438	21.7%
1 - 50% Double Glazing (Some)	155,217	7.8%
51 - 99% Double Glazing (Part)	166,314	8.4%
Double Glazing (Full)	974,333	49.2%
Unknown	256,255	12.9%
<b>Total :</b>	<b>1,981,557</b>	<b>100%</b>

Main Heating Fuel		
Gas Heating	1,481,659	85.6%
Oil Heating	48,359	2.8%
Paraffin Heating	0	0.0%
Electric Heating	133,278	7.7%
Solid Fuel	37,144	2.2%
LPG	17,173	1.0%
Unknown	8,809	0.5%
<b>Total :</b>	<b>1,726,422</b>	<b>100%</b>

Main Heating System		
Condensing Boiler with radiators	242,677	13.2%
Boiler with radiators	943,449	51.2%
Combi Boiler with radiators	146,015	7.9%
Back Boiler with radiators	97,011	5.3%
Electric Storage Heaters	111,332	6.0%
Warm Air	48,325	2.6%
Room Heaters	203,757	11.1%
Open/Flame Effect Fires	20,899	1.1%
Unknown	28,402	1.5%
<b>Total :</b>	<b>1,841,866</b>	<b>100%</b>

Electricity Consumption in 2004:	<input type="text" value="n/a"/>	per household:	<input type="text" value="n/a"/>
Gas Consumption in 2004: (DTI Estimates)	<input type="text" value="n/a"/>	per household:	<input type="text" value="n/a"/>
Estimated CO2 Emissions: (Defra Estimates)	<input type="text" value="n/a"/>	per household:	<input type="text" value="n/a"/>

# UK housing stock

- Average house
  - Floor area 80 m<sup>2</sup>
  - Semi-detached
  - 65 years old
- 11% homes built since 1982
- 20% of homes detached
- 8% with Combi boiler and radiators
- 1% with loft insulation thicker than 250 mm
- 50% full double glazing
- 90% heated by mains gas

# Scotland Housing Expo - 52 homes



- Predicted annual running cost for heating - Average £210
- House size - Average 125 m<sup>2</sup>
- Energy usage (heating only) - Average 100 kWh m<sup>-2</sup>



# Heat gained

Four components

- Electricity used in house for appliances and cooking
- Solar radiation heating house (passive solar gain)
- House occupants
- Central heating and domestic hot water boiler
  - Programmed on a thermostat to provide the heat necessary to balance the fabric and ventilation losses to maintain a steady house temperature during the winter

# The conservatory paradox



- Conservatories have increased heating bills in the majority of homes because the owners heat them
- A double glazed conservatory loses heat ten times faster than a conventional room



# Heat loss in houses

Two components  
Notoriously difficult to distinguish

- Fabric heat loss
  - Conduction through house envelope
  - roof, floor, walls, windows etc
- Ventilation heat loss
  - Air movement through structural envelope
  - draughts, air extractor fans, open windows and doors etc

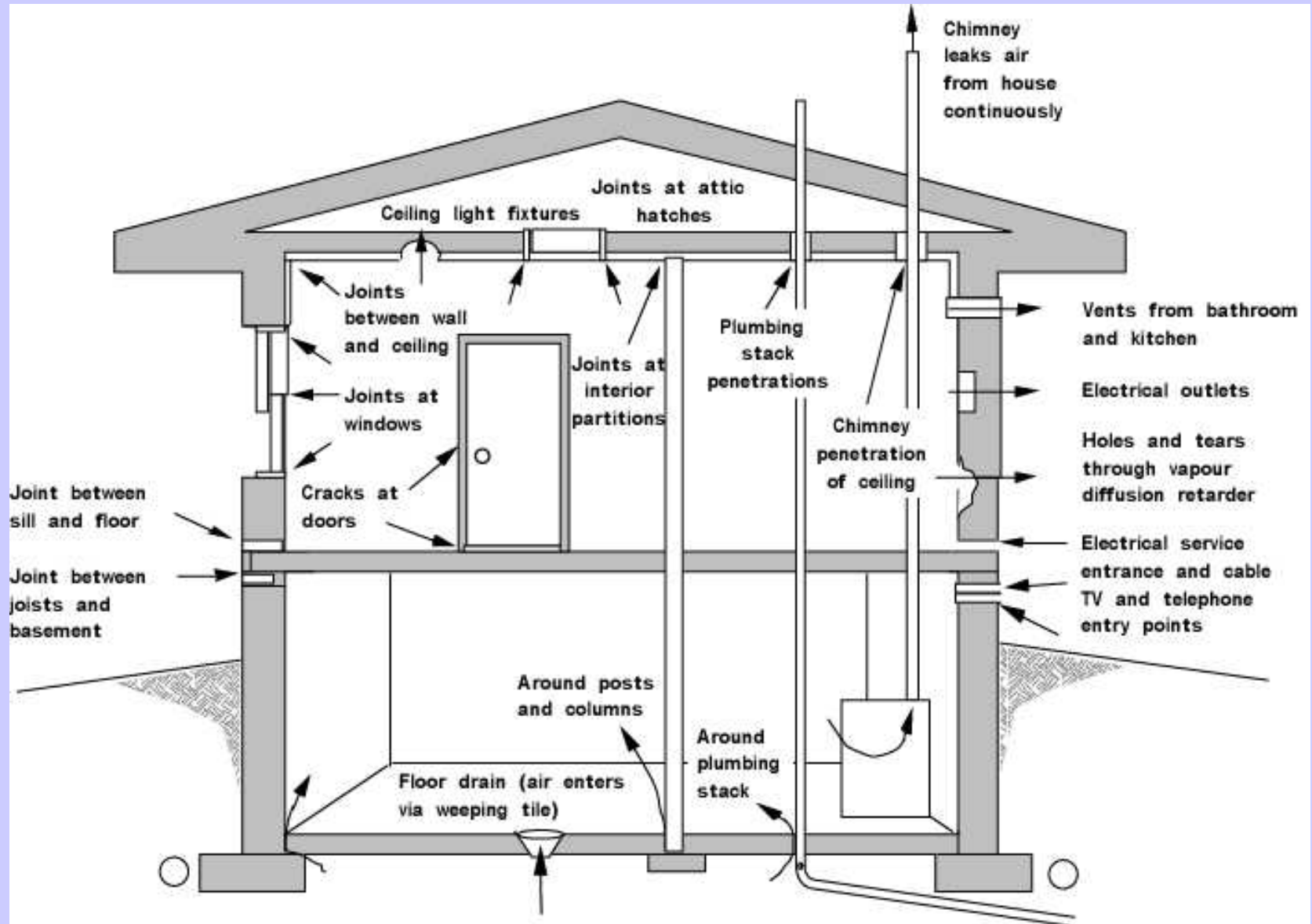


Heat loss in  
houses  
**Both are  
significant  
In the hands of the  
builder**

- Fabric heat loss
  - Conduction through house envelope
  - roof, floor, walls, windows etc
  - May be **estimated** from **U values** of structural components
- Ventilation heat loss
  - Air movement through structural envelope
  - draughts, air extractor fans, open windows and doors etc
  - May be **estimated if number of air changes per hour is known**

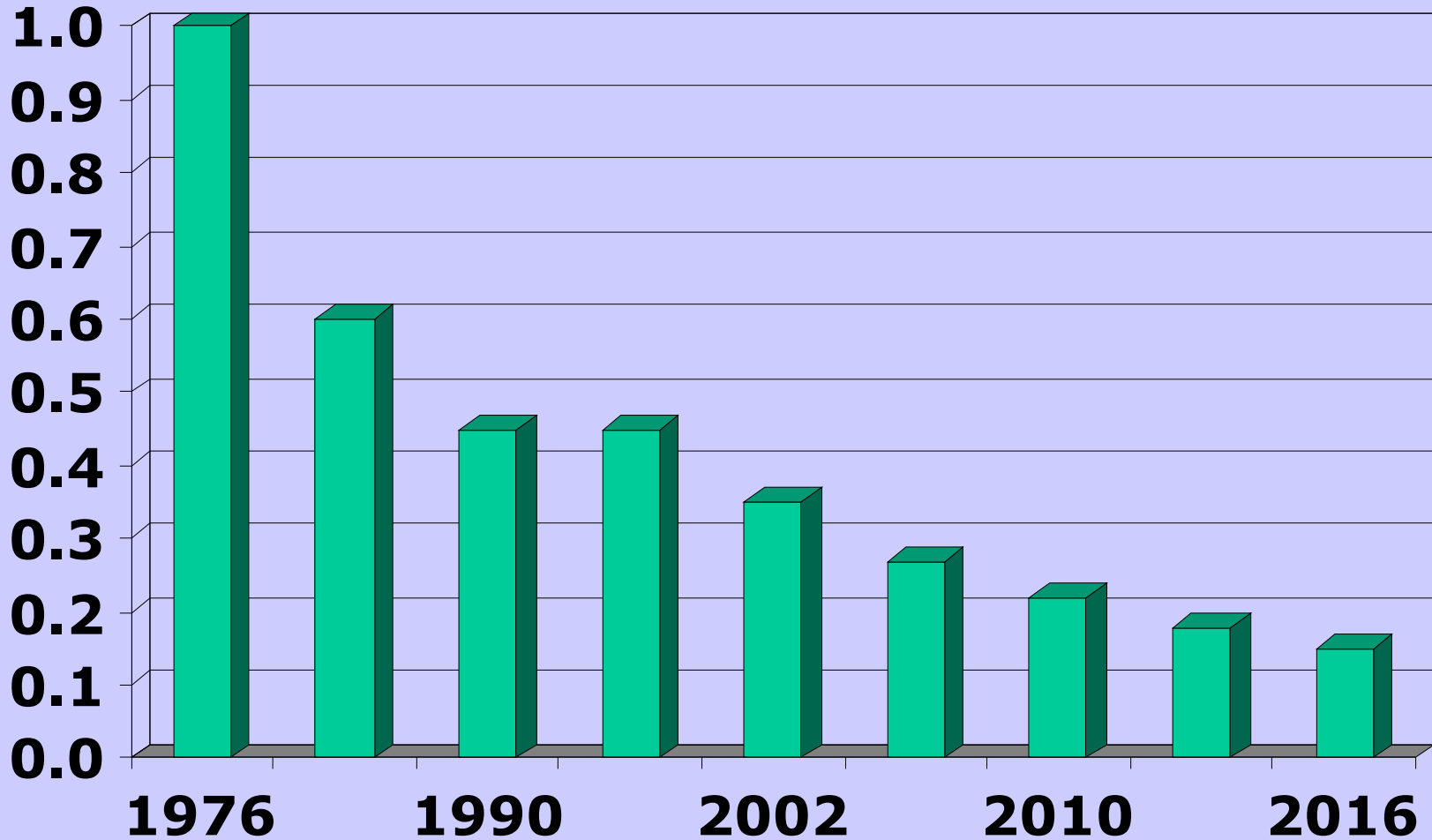
# Ventilation paths

## Intentional and unintentional

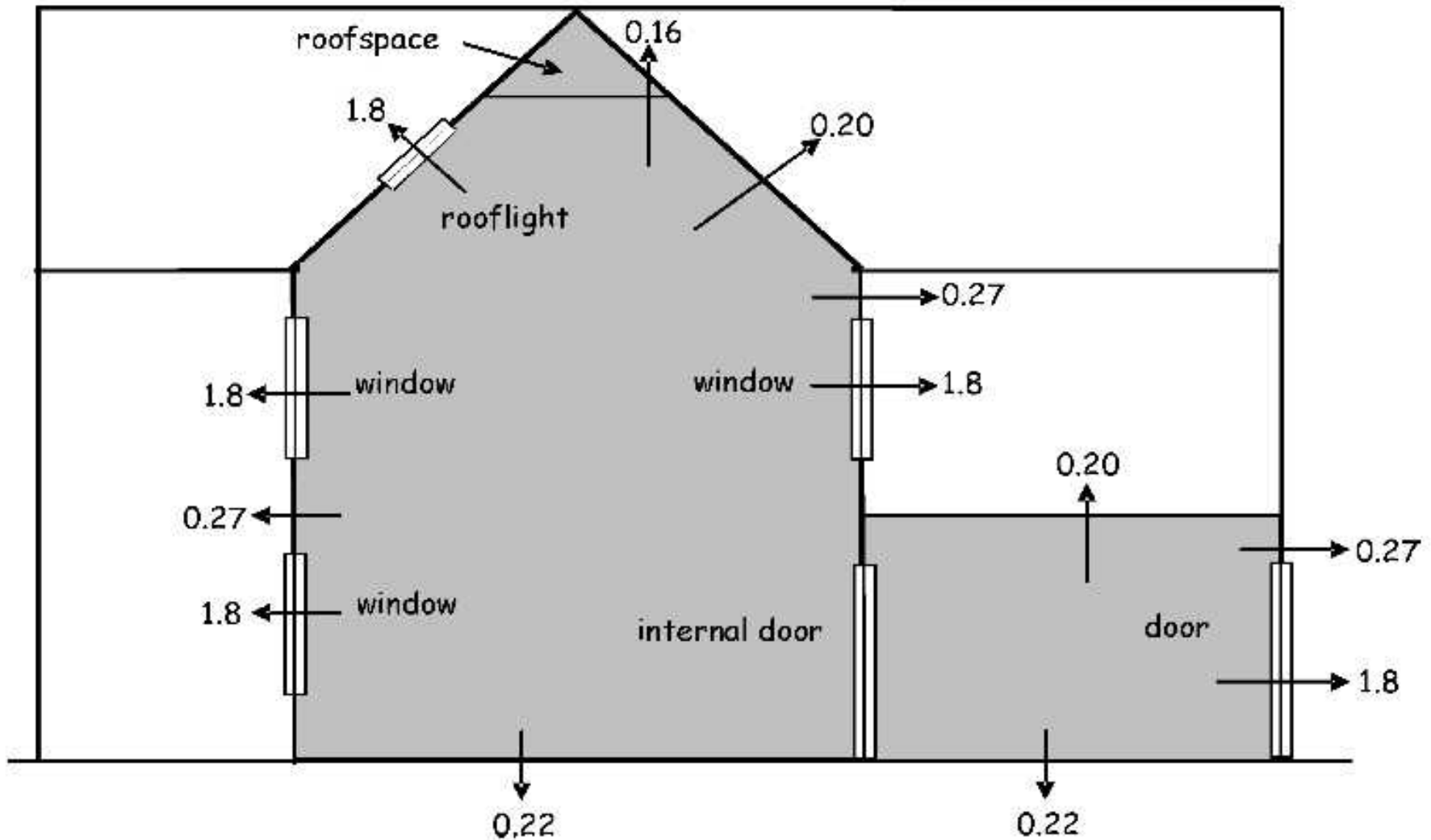


# Fabric heat loss

## U values for outside walls

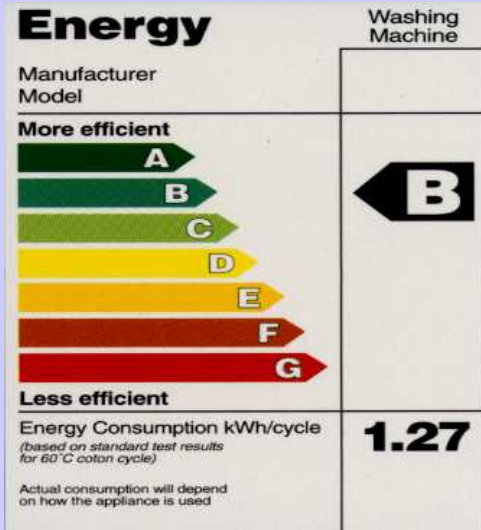
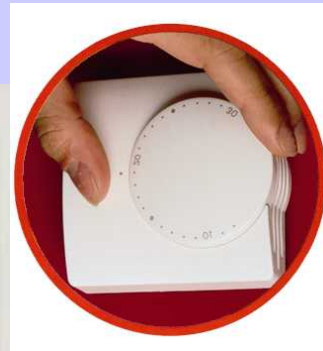


# Fabric Heat loss U- 2006



- Ideals missed by builders “cutting corners”

# What you can do



## **I commit to save my 20% and will do the following things to help me do this:**

Please cross all the applicable boxes:

When making hot drinks only boil as much water as I need.

Replace 3 lightbulbs with Energy Saving Recommended ones.

Turn down my thermostat by 1°C.

Install a condensing boiler.

Turn appliances off standby.

Buy Energy Saving Recommended appliances.

Install cavity wall insulation.

Wash my laundry at 30°C.

Top up my loft insulation to 270mm (10.5 inches).

Not use the car for short journeys.

# Monitor your home



- Electricity
  - Read your meter regularly and make sense of the figures
  - Use a TBI Smart Meter and see the power required to power appliances and lighting.
- Heating fuel
  - Monitor your consumption at different times of the year.
- Do you know how much energy you use for
  - Central Heating
  - Domestic Hot Water
- Monitor room temperatures
  - Do you keep your bedrooms cooler than other rooms?



## Different reasons for wishing to save energy in the home

- To save money in the long term
  - Capital investment then reduced heating bills for 10, 15, 20 years
  - Choose option with a fast payback time that you can afford today
- To reduce your personal carbon footprint
  - Consider the options and make the best choice for you
- To reduce Man's impact on the Planet
  - Invest in Practical Action schemes in Developing Countries
- To anticipate Peak Oil and its implications

# From Local Government handbook in 2005

## costs and savings for existing dwellings

### ***Box 1: Domestic Efficiency Measures – estimated costs & savings***

<b><i>Measures</i></b>	<b>Average cost (£)</b>	<b>Cost saved (£/yr)</b>	<b>Carbon saved (kgC/yr)</b>	<b>Pay-back (yrs)</b>	<b>Potential homes ('000) †</b>	<b>Potential total carbon saving (MtC/yr)</b>
Hot water cylinder insulation	14	29	53	0.5	1,137	0.1
Cavity wall insulation	342	133	242	2.6	8,500	2.1
Loft insulation (full and top-up)	284	104	190	2.7	6,186	1.2
Improved heating controls	147	43	77	3.4	2,102	0.2
Draught proofing	100	23	43	4.3	9,793	0.4
Micro CHP	1,571	230	508	6.8	12,000 <sup>4</sup>	6.1
Solid wall insulation	3150	380	694	7.5	7,479	5.2
A-rated boiler	1,500 <sup>1</sup>	168	177	8.9	17,128	3.0
Micro wind	2,363	224	263	10.5	- <sup>2</sup>	-
Ground source heat pump <sup>3</sup>	4,725	368	990	12.8	17,000	16.8
Photovoltaic (PV) electricity	9,844	212	249	46.4	9,892	2.5
Solar water heating	2,625	48	88	54.7	19,330	1.7
Windows (Single to Double Glazing)	4,000 <sup>1</sup>	41	26	97.6	10,746	1.7



# Costs/benefits

Dr Brenda Boardman

Lower Carbon futures, Environmental Change Inst  
University of Oxford

	<u>Approx. Cost</u>	<u>Approx. Annual Savings</u>	<u>Payback</u>
Double Glazing	£5000	£40	125+ years
Secondary Glazing	£3000	£30	100+ years
Draughtproofing (DIY)	£40	£10-15	3-4 years
Cavity Wall Insulation	£125-140	£70-100	2-3 years
Hot Water Tank Jacket (DIY)	£10	£20	6 months
Thermostatic Radiator Valves	£75-100	£10-15	5-10 years
Room Thermostat	£110-140	£20-25	4-7 years
Full heating controls	£125-250	£50-60	2-5 years

*All figures are averages based on a 3-bedroom 1930s semi.*



# Heat requirement of our last house compared to other figures

- Average UK Dwelling Stock 239 kWh/m<sup>2</sup>
- UK Building Regulations ADL1 2006 146 kWh/m<sup>2</sup>
- **Our Cambridge house built 1988 100 kWh/m<sup>2</sup>**
- **Average for Scotland's Housing EXPO 87 kWh/m<sup>2</sup>**
- AECB Silver Standard 58 kWh/m<sup>2</sup>
- AECB Gold (Passiv House Standard) 23 kWh/m<sup>2</sup>



## How we could reduce our fuel usage by 26%

- 2.4% Increased loft insulation from 100 mm to 270 mm
- 0.5% Replaced leaking Velux windows
- 16% Replaced 1980s boiler with A\* rated
- 7% Reduce thermostat by 1°C

# Temperature in the home

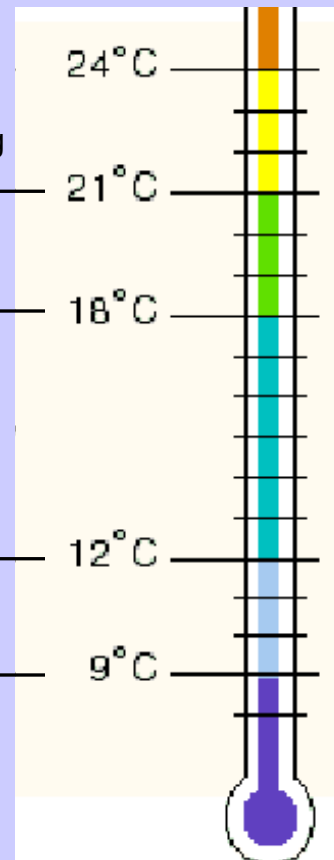
21-24°C: The recommended temperature for a home where older people or children are living

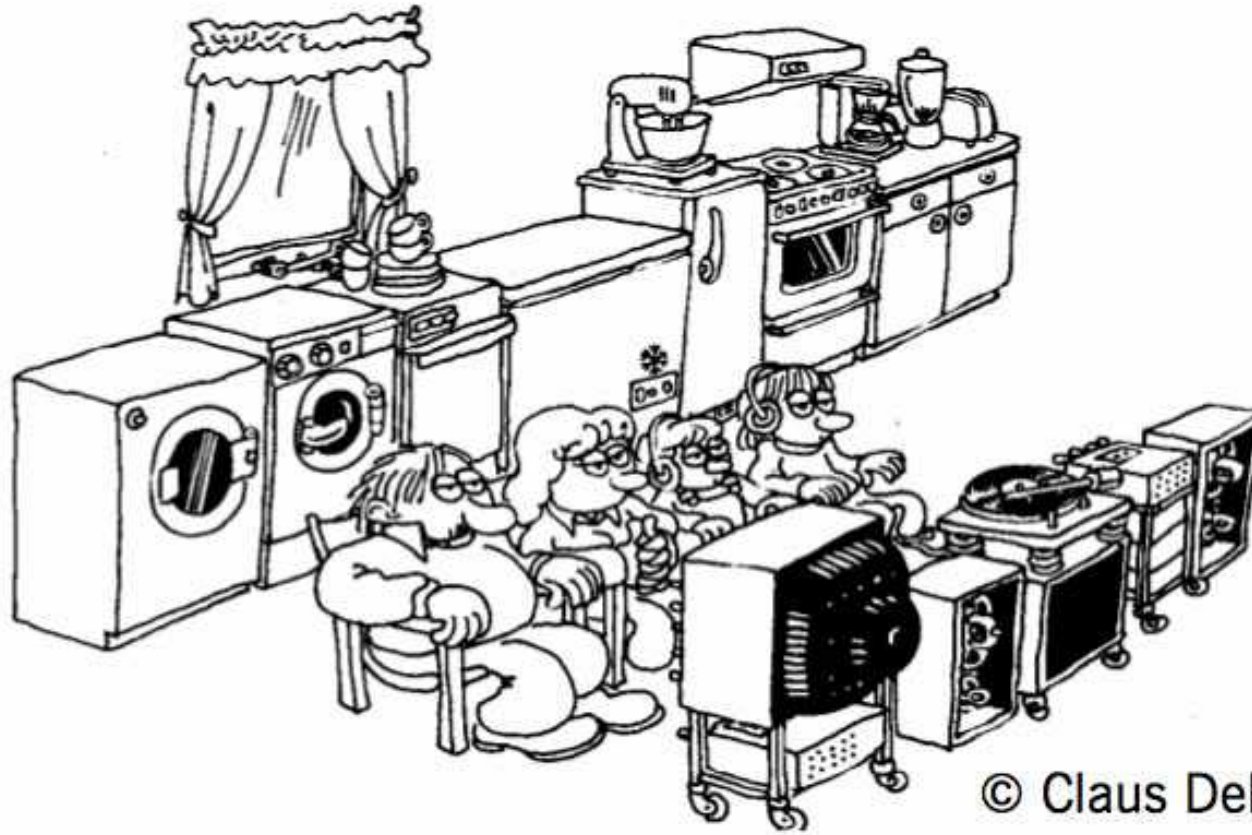
18-21°C: No risk to healthy adults. Below this temperature range risk of ill health increases.

Below 18°C: Diminished resistance to respiratory infections and increased risk of falls.

Below 12°C: Increased blood pressure and viscosity.

Below 9°C: After two or more hours deep body temperature falls.





© Claus Deleuran

*“Labour-saving and entertainment devices can increase energy demand, reduce personal interaction and can damage health.”<sup>10</sup>*

- Home insulation generally results in higher internal temperatures. Counteracting expected energy savings

# Our to do and done list



- Added loft insulation to 27 cm
- Installed wood burning stove in living room
- Replace laminate floor with wool carpet and underlay
- Replace LPG CH boiler with wood-fuelled alternative
- Install PV on south facing roof

# Price of fuels in S England May 2009

Thanks to John Willoughby

FUEL	PRICE		p/kWh	£/GJ	Quarterly Stand. Chg	Relative to Gas	Rank	kg CO2 / kWh
GAS	7.24 p/kWh \$		7.24	20.12				
	3.52 p/kWh \$\$		3.52	9.80	£ 24.88++	1.00	4	0.19
ELECTRICITY (on-peak)	14.68 p/kWh**		14.68	40.81		4.17		
	13.61 p/kWh***		13.61	37.83	£ 1.95++	3.86	11	0.42
ELECTRICITY (Economy 7) night rate	23.10 p/kWh**		23.10	64.22		6.56		
	16.11 p/kWh***		16.11	44.78	£ 12.73++	4.57	12	0.42
	4.57 p/kWh		4.57	12.70		1.30	7	0.42
OIL (35 sec)	40.11 p/litre*		3.81	10.59		1.08	5	0.27
OIL (28 sec)	32.31 p/litre*		3.36	9.34		0.95	3	0.27
COAL	£ 275.00 /tonne +		3.30	9.17		0.94	2	0.29
ANTHRACITE	£ 262.00 /tonne +		2.88	8.01		0.82	1	0.32
LPG	48.19 p/litre*		6.75	18.76	£ 17.62	1.91	10	0.23
Wood Pellets	£ 260.00 /tonne@		4.92	13.68		1.40	8	0.03
Wood Pellets	£ 222.00 /tonne		4.20	11.68		1.19	6	0.03
Logs (B'leaf)	£ 77.50 /load@@		5.16	14.35		1.46	9	0.03

# Black Isle choice



- Woodlogs are available at £70 a tonne locally. Coal costs £220 a tonne but has twice the heat value

# Cold loft insulation



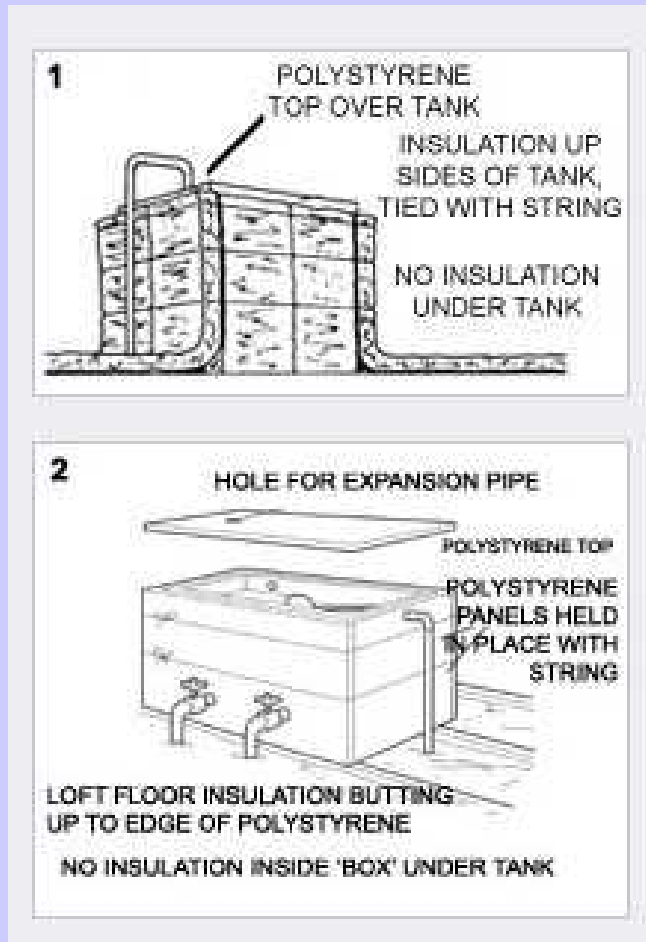
- Insulation between rafters and over them to 27 cm
- Easy fold up rolls best for walkways needed for access to tanks and electrical wiring

# Insulating pipes



- Buy insulation conforming to Building Regulations

# Cold water tank



- Keep warm by having no insulation underneath

# Recessed lighting



- Impermeable ceiling membrane cut for fitting
- Loftcaps needed to seal and insulate

# Personal Carbon Footprint



- Energy used in the home for our well being and personal satisfaction
- Energy used for the travel we choose to take
- Energy required for the “stuff” we choose to buy
- Energy required to provide food we choose to eat
  
- ONLY energy used in the home requires a capital investment to save energy, so saving energy outside the home is often the easiest option



# Carbon Footprint of average Brit

Energy in the home and personal travel only  
Footprint in tonnes of CO<sub>2</sub>

- Energy use in the home 2.35
- Energy use by car travel 1.05
- Energy use by train travel 0.90
- Energy use by bus travel 0.10
- Energy use by air travel 1.83
  
- Total for home and travel 5.42
  
- Where can the footprint best be reduced?

# Saving carbon

	Tonnes saved	Comments
Upgrade gas 1980s boiler to a modern gas condensing boiler. Over 20 years save 15 tonnes - cost of £220 per tonne	0.75	Results from 1 Searles Meadow Costs £3300
Don't fly solo to New York and back each year	4.0*	Saves airfare *Includes indirect climatic effects
Reduce your car mileage by 3000 miles a year (average consumption for UK car fleet 2005)	1.0	Saves £400 or so a year
Drive 14,000 miles a year in a medium petrol hybrid car rather than a medium petrol car	2.0	Capital required for new car purchase

## Energy Performance Certificate

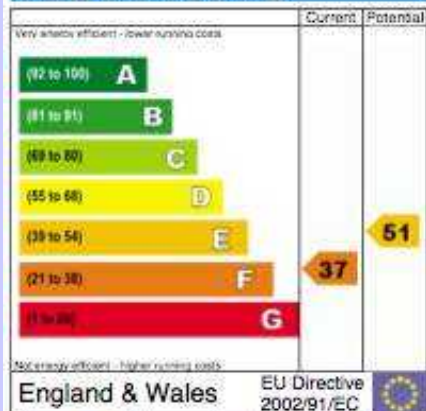


54, Blenheim Crescent  
SOUTH CROYDON  
CR2 6BP

Dwelling type: Semi-detached house  
Date of assessment: 3 August 2007  
Date of certificate: 7 August 2007  
Reference number: 8583-6128-4980-8297-2006  
Total floor area: 194 m<sup>2</sup>

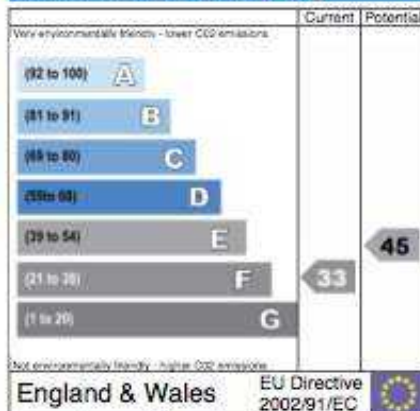
This home's performance is rated in terms of the energy use per square metre of floor area, energy efficiency based on fuel costs and environmental impact based on carbon dioxide (CO<sub>2</sub>) emissions.

### Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating, the more energy efficient the home is and the lower the fuel bills will be.

### Environmental Impact Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO<sub>2</sub>) emissions. The higher the rating, the less impact it has on the environment.

### Estimated energy use, carbon dioxide (CO<sub>2</sub>) emissions and fuel costs of this home

	Current	Potential
Energy use	425 kWh/m <sup>2</sup> per year	318 kWh/m <sup>2</sup> per year
Carbon dioxide emissions	14 tonnes per year	10 tonnes per year
Lighting	£148 per year	£89 per year
Heating	£1484 per year	£1129 per year
Hot water	£161 per year	£131 per year

Based on standardised assumptions about occupancy, heating patterns and geographical location, the above table provides an indication of how much it will cost to provide lighting, heating and hot water to this home. The fuel costs only take into account the cost of fuel and not any associated service, maintenance or safety inspection. This certificate has been provided for comparative purposes only and enables one home to be compared with another. Always check the date the certificate was issued, because fuel prices can increase over time and energy saving recommendations will evolve.

# Adding value to your home

- Energy Performance Certificate
- Who talks about a payback from a new kitchen or a make-over?
- What's the payback of flying to Prague?

# Reductions: home or away...



	<b>2 kWh solar system for UK home</b>	<b>Treadle pumps in North India</b>
Cost	£12,000 average cost (buy and install)	£12,000
	1 house	300 plus treadle pumps
CO2 saved per year	0.8 tonnes	230 tonnes
Comparison		200 times the CO2 per pound spent.
		300 Indian families helped out of poverty, nearly 2000 people.
Time taken for solar to get the same savings:		2000 years.

energy saving trust

Commitments so far  
**106,509**

Home Commit now Why commit Who's committed Spread the word

# I commit

Want to do something about climate change? Want to help preserve the places that matter to you? Then join the energy saving movement and make a personal commitment to save 20% of the energy you use. Together our actions will have a real impact by helping to fight climate change.

You can also create your own "commitment widget" to add to your webpage or network site and tell all your friends about your commitment.

Latest commitment:  
Gloria Burke committed to help preserve siberwood forest

photographer\_zorell

Commit now **SAVE YOUR 20%**

Too busy to commit now? You can still join the energy saving movement by leaving your email address below.



Transition  
**Black  
Isle**

Building strength in our communities to face the challenges of peak oil and climate change

## Take home messages

- There are many ways to reduce your carbon footprint
- The return of investment in energy saving in the home is higher than depositing the equivalent money in a bank
- The value of your home increases and fuel bills fall
- Lifestyle change could be a surer way to save 20%
- Investing in appropriate technology in the third world is very cost-effective
- Anticipating higher and higher fossil fuel prices by heating your home by renewables makes economic sense and is a good insurance policy