

# Energy efficiency in the digital home

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## Company credentials

- **We specialize in the installation and integration of**
  - ▶ Heating, ventilation and air-conditioning controls
  - ▶ Lighting controls and automatic blinds/windows
  - ▶ Security systems
  - ▶ Smart appliance switching
  - ▶ Audio-visual systems



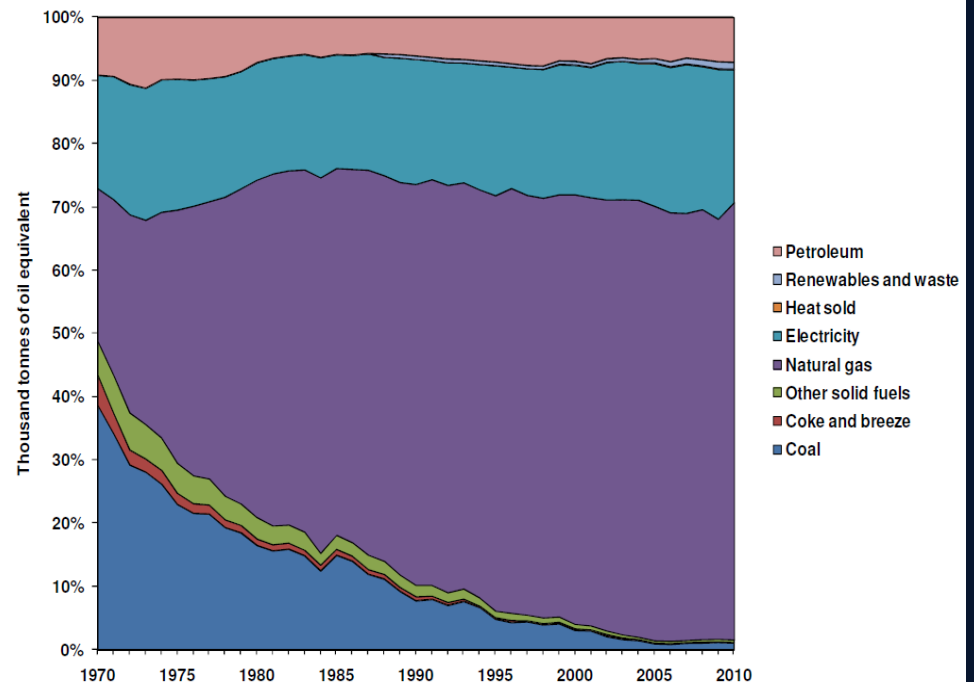
# Energy consumption, the facts...

## Some key facts (National Statistics 2010)

### What types of energy do we consume in the home?

- Natural gas & oil 76%
- Electricity 21%
- Everything else 3%

Domestic consumption by fuel, UK, 1970 to 2010



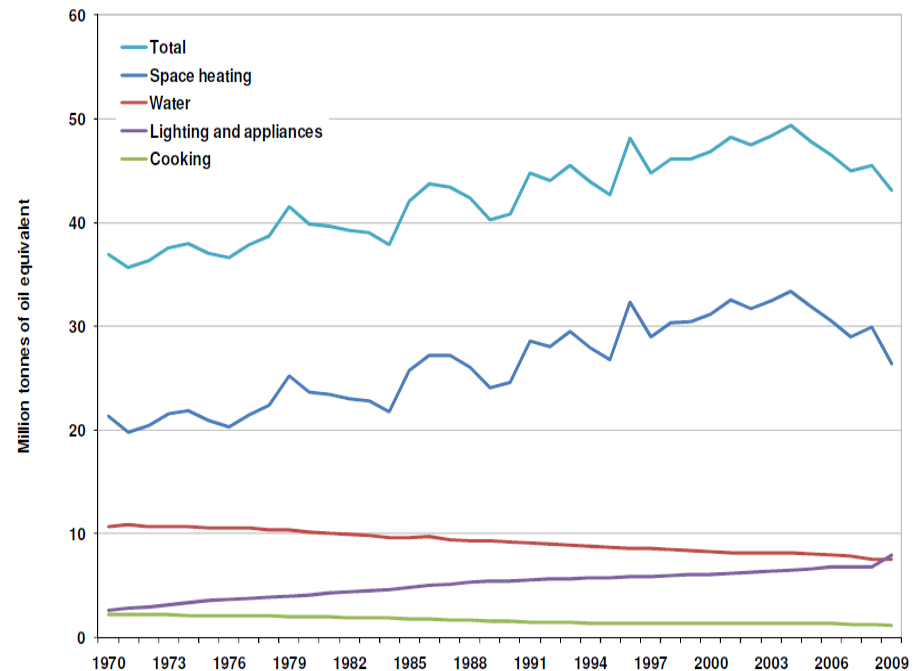
Source: DECC, ECUK Table 3.1

## Some key facts (National Statistics 2009)

### What do we use this energy for?

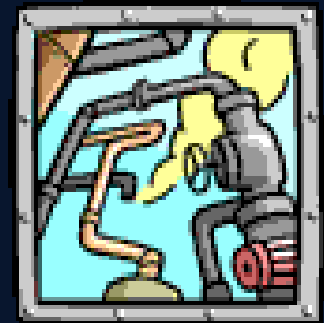
- Space heating 61%
- Hot water 18%
- Lighting and appliances 18%
- Cooking/Other 3%

Domestic final energy consumption by end use, UK, 1970 to 2009



## Intelligent homes, where are we now?

- Most homes have little or no intelligent heating or lighting control
  - ▶ 80% of homes in the UK don't have basic heating controls at all\*
  - ▶ 47% of householders don't know how to program their current heating system\*
- There are huge savings to be made just by adding intelligence



## A typical family home

- **Always has**
  - ▶ People
  - ▶ Heating (maybe gas/oil & electricity)
  - ▶ Lighting
  - ▶ Appliances
  - ▶ Doors, windows, curtains, blinds
- **Sometimes has**
  - ▶ Ventilation and cooling systems
  - ▶ Security systems
  - ▶ Energy production (solar, ground source etc.)

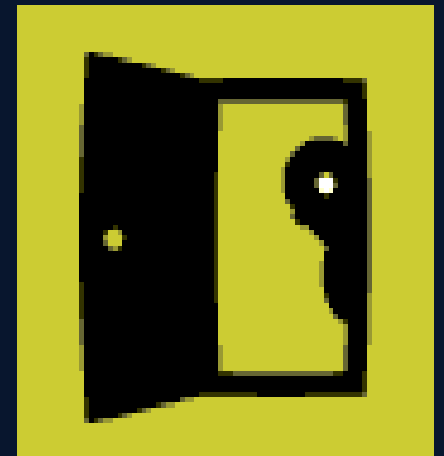
## How can we save energy in the home?

- **Energy saving requires**
  - ▶ Everyone in the house to be energy efficient at all times and be provided with the means to do this (local control everywhere)
- **And/or**
  - ▶ The house to be made smarter so that it starts to make energy-saving decisions



## When you walk out the door in the morning...

- **Your family probably know..**
  - ▶ That you going to work for the day or on holiday for a week
  - ▶ What time you will be expected back home
- **Your heating, lighting, appliances know..**
  - ▶ Usually, nothing!

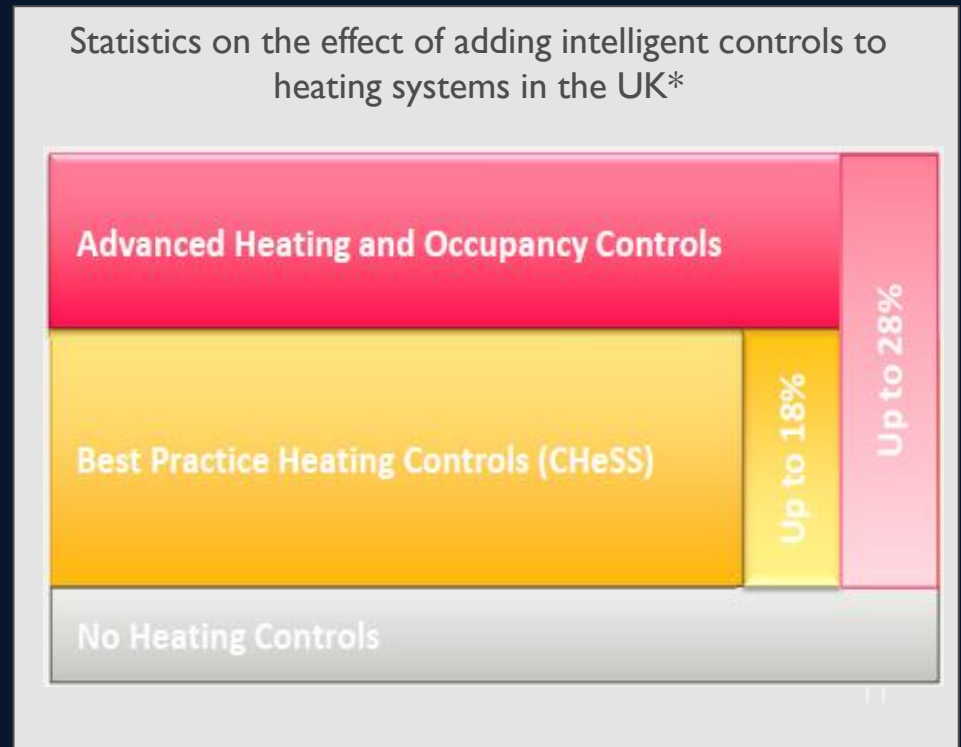


**Look Familiar!!**



## Advantages of intelligent heating

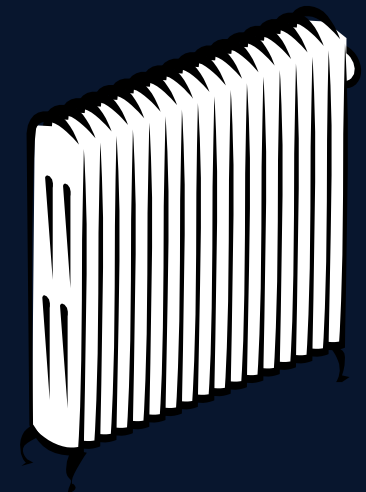
- Over 90% of heating and cooling systems installed are operated with timer/thermostat control only
- Virtually no systems take the weather into account!
- Up to 28% of energy consumed can be saved just by adding advanced controls



## Tactics to add intelligence

### ■ Heating

- ▶ Intelligent temperature feedback from each room, e.g. top floor or insulated rooms need much less heat
- ▶ Remote access and control (on your way home)
- ▶ Is the house empty (alarm?)
- ▶ Forecasting – weather pattern for next 3 days
- ▶ Cause and effect linkage (e.g. bathroom under-floor, towel rails, mirrors and lighting linked to time of night/day)
- ▶ Universal control – no separate timers/switches



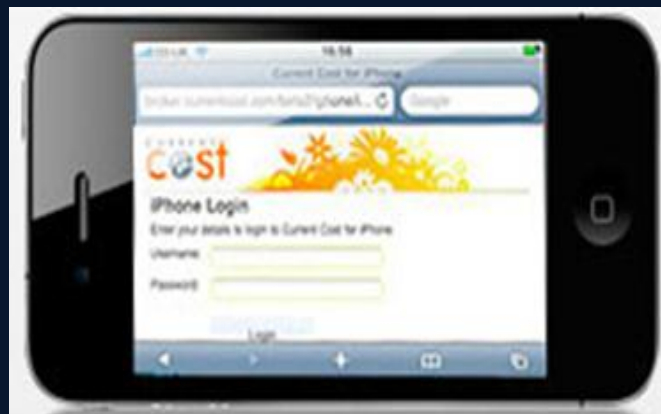
## Tactics to add intelligence

- **Lighting**
  - ▶ Dimming/comfort control, can save up to 15%
  - ▶ Occupancy sensors, can save up to 20%
  - ▶ Day/night settings, automatic timers, a further 15%
  - ▶ Graded lighting and sensor control, total of up to 60% saving\*
  - ▶ Major improvements in low energy/LED lighting



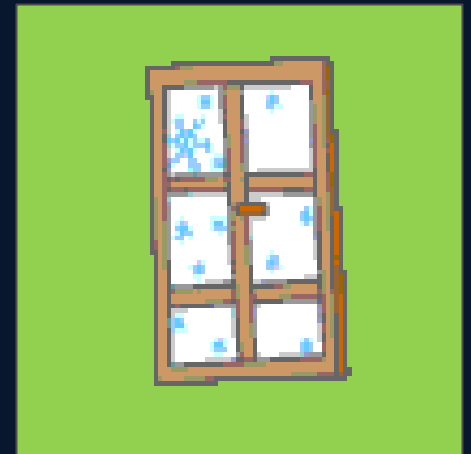
## Tactics to add intelligence

- **Appliances**
  - ▶ Control of rooms (particularly entertainment systems)
  - ▶ The intelligent power socket , every 4<sup>th</sup> or 5<sup>th</sup> socket
  - ▶ Switch on appliances when energy is cheapest
  - ▶ Intelligent Power Monitoring – online metering



## Tactics to add intelligence

- **Windows/blinds/curtains**
  - ▶ Automatic control on sunrise/sunset
  - ▶ Shading based on position of sun
  - ▶ Window contacts switch off heating/cooling



## Ideas on costs and payback

### ■ Honeywell Heating System

- ▶ Large domestic property, empty most of the week days
- ▶ Combination of under-floor heating and radiators
- ▶ Hot water not needed if occupants are working away
- ▶ Installation cost £7,000, payback period 3-4 years

### ■ Lutron Lighting System

- ▶ Combination of wall/ceiling lights in a property extension
- ▶ Graduated brightness in atrium areas
- ▶ Installation cost approx. £3,000, payback period 5-7 years



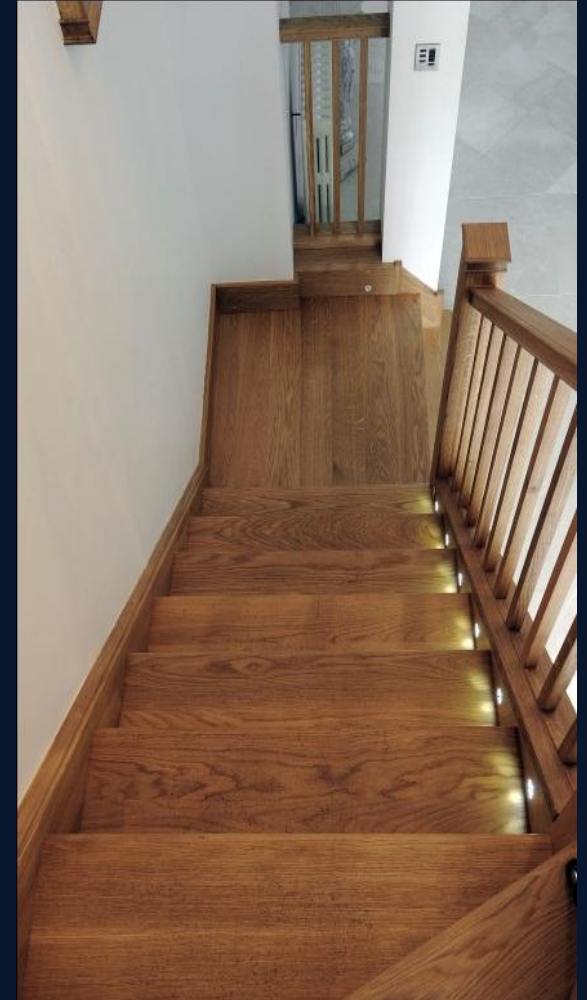


# Case Study - Integrated home in Oxford

## Energy saving in an integrated home – heating



## Energy saving in an integrated home – lighting



## Energy saving in an integrated home – ventilation





## Energy saving in an integrated home – blinds



## Energy saving in an integrated home – security



# Questions