

# Energy Efficiency and Demand Reduction

The UK Government's approach

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# The challenge



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- The challenge facing the world is to **avoid dangerous climate change** by drastically reducing our dependence on fossil fuels and **make the transition to a low carbon society**. In the UK we want to achieve:
    - **80% reduction in emissions by 2050**
    - **Keep our energy supplies secure**
    - **Protect the vulnerable**

## Outline of talk



1. Why energy efficiency and demand reduction are so important for meeting our targets, both medium and long term
2. Current estimates of the scope for improvement, focussing on housing as an example
3. Broad brush view of key measures likely to be required

# Why energy efficiency and demand reduction is so important -1

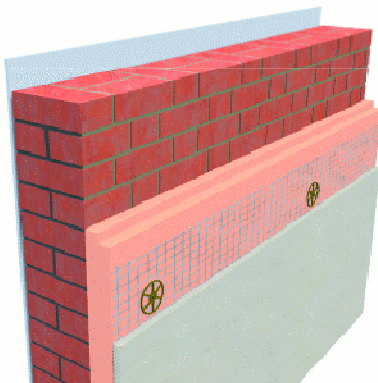
- Concept of ‘Service Demand’, which is the demand for services supplied by energy, e.g. Thermal comfort, hot water, IT
- In homes, there is rising pressure on service demand:
  - Higher indoor temperatures during heating season
  - More households
  - More elderly people, who need winter warmth
  - More electrical equipment



- In shops, offices, need more air-conditioning to deal with heat from electrical equipment – not just for hot summer days!

# Why energy efficiency and demand reduction is so important - 2

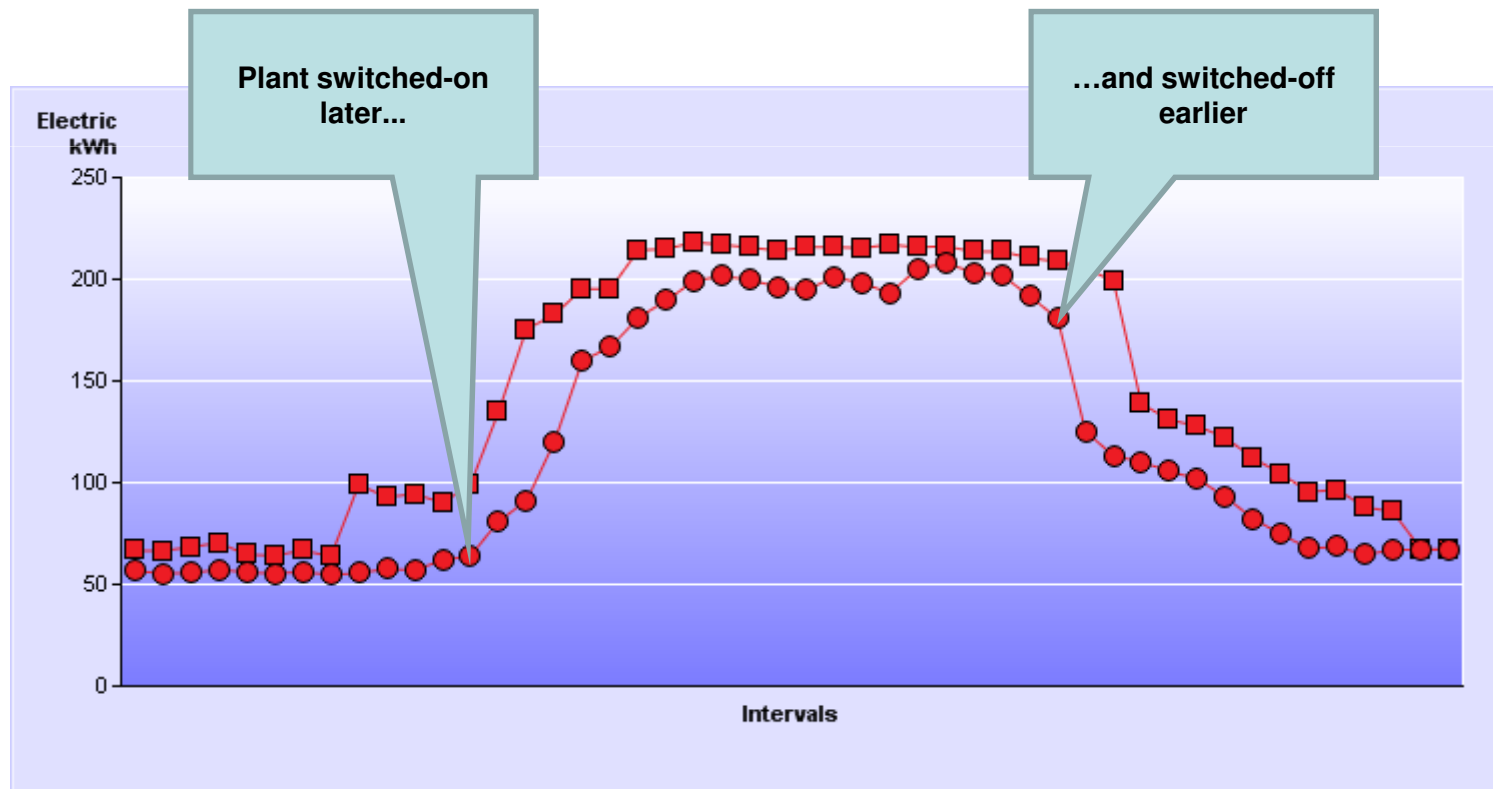
- Energy Efficiency Improvements (use less energy for same service demand):
- Insulation to reduce heat losses
- More efficient equipment (boilers, pumps, lights)



- Demand Reduction (lower service demand):
- Less waste
- Decrease service demand e.g. Allow lower indoor temperatures in winter, higher temperatures in summer


# Energy efficiency in offices saves money and CO<sub>2</sub>

DECC has improved operation of building management system since last winter at 3 Whitehall Place



Half-hourly meter data from midnight

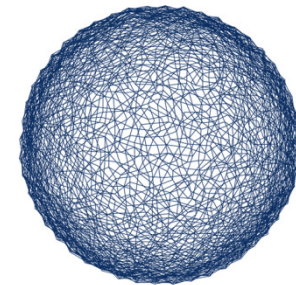
## Energy efficiency in homes saves money and CO<sub>2</sub>

- Installing cavity wall insulation in a typical home saves £115 and 630 kg CO<sub>2</sub> per year
  - In the first year of CERT, 545 000 homes have received cavity wall insulation
  - UK saving of 400 000 tonnes of CO<sub>2</sub> per year, and bill savings of £60 million
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- Plus: many other measures can save energy: e.g. loft insulation, and the Building Regulations now require replacement boilers to be A- or B-rated

## Demand reduction will help us meet CO<sub>2</sub> targets for 2020



1. Compared with 1990, UK greenhouse gas emissions over the 2018-2022 period must be 34% lower
2. Effort is required from all sectors:
  - e.g. For household sector 28% reduction of direct emissions relative to 2008 emissions is needed
3. Strong deal at Copenhagen makes target tougher: 42% reduction relative to 1990 levels for UK



COP15  
COPENHAGEN  
UN CLIMATE CHANGE CONFERENCE 2009



# Demand reduction will help us meet the targets in the Renewable Energy Strategy

1. By 2020, 15% of UK energy must come from renewables
2. Lead scenario suggests renewables will provide:
  - 30% of electricity (5.5% today)
  - 12% heat
  - 10% transport energy



3. The less energy the UK uses, the less difficult these targets are
4. Demand reduction helps with security of supply

## Demand reduction will help us meet 2050 emissions target

1. The less energy that is needed in 2050, the less low-carbon energy will need to be provided
2. Some electrification will also decrease final demand for energy:
  - Heat pumps can 3 or 4 units of heat for each unit of electricity: much better than a condensing boiler
  - Electric cars bypass the inherent inefficiencies of internal combustion engines: 4-fold improvement possible



# Current estimates of scope for improvement

- CaRB research consortium estimated 40% reduction in energy use for space and water heating from the existing housing stock is possible
- New build will be “zero-carbon” by 2016, with underpinning energy efficiency improvement
- Smart meters by 2020 will give householders direct feedback on electricity use



## Broad brush view of key measures likely to be required



- 40% reduction in heating energy use in the housing stock requires using all opportunities between now and 2050:
- As well as remaining cavities and lofts, rates of installation of solid wall insulation will need to increase >10-fold
- Much more efficient heating systems
- Skills base for installation and maintenance
- Smart meters for all households