

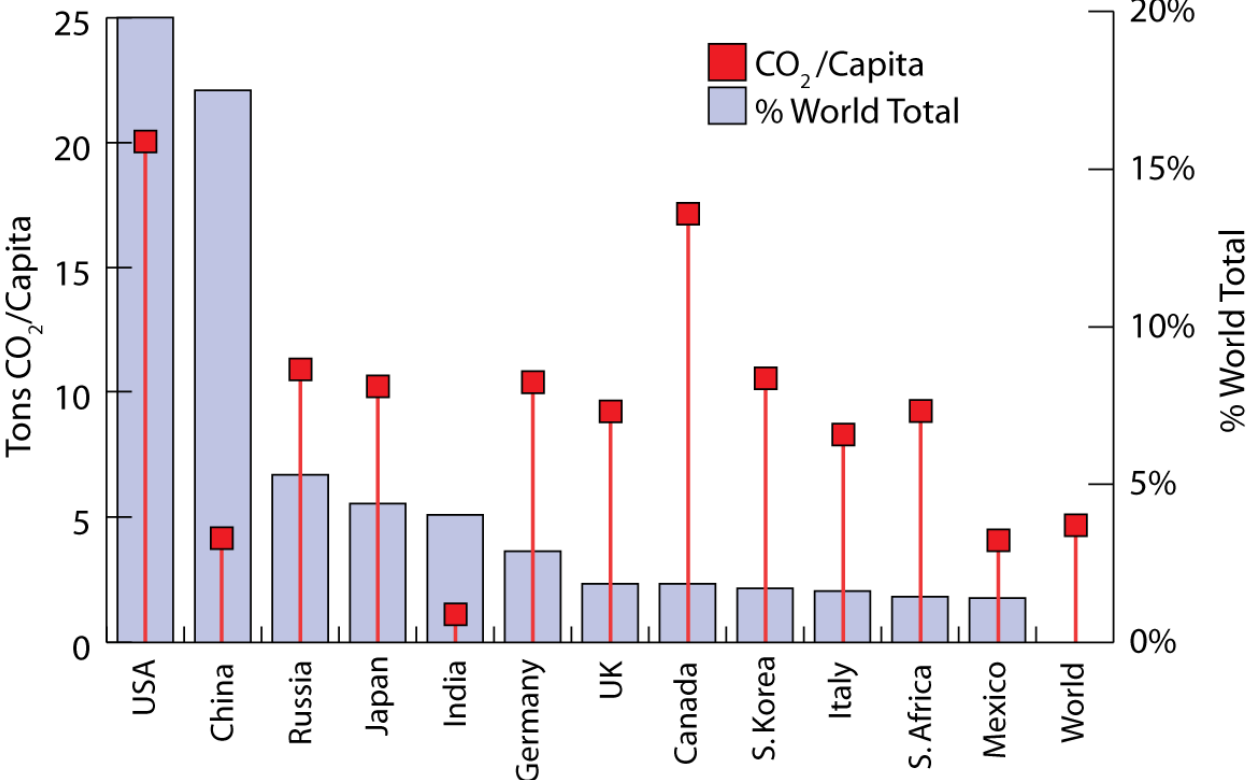
# Reducing Greenhouse Gas Production by 80% by 2050 How can we do it?

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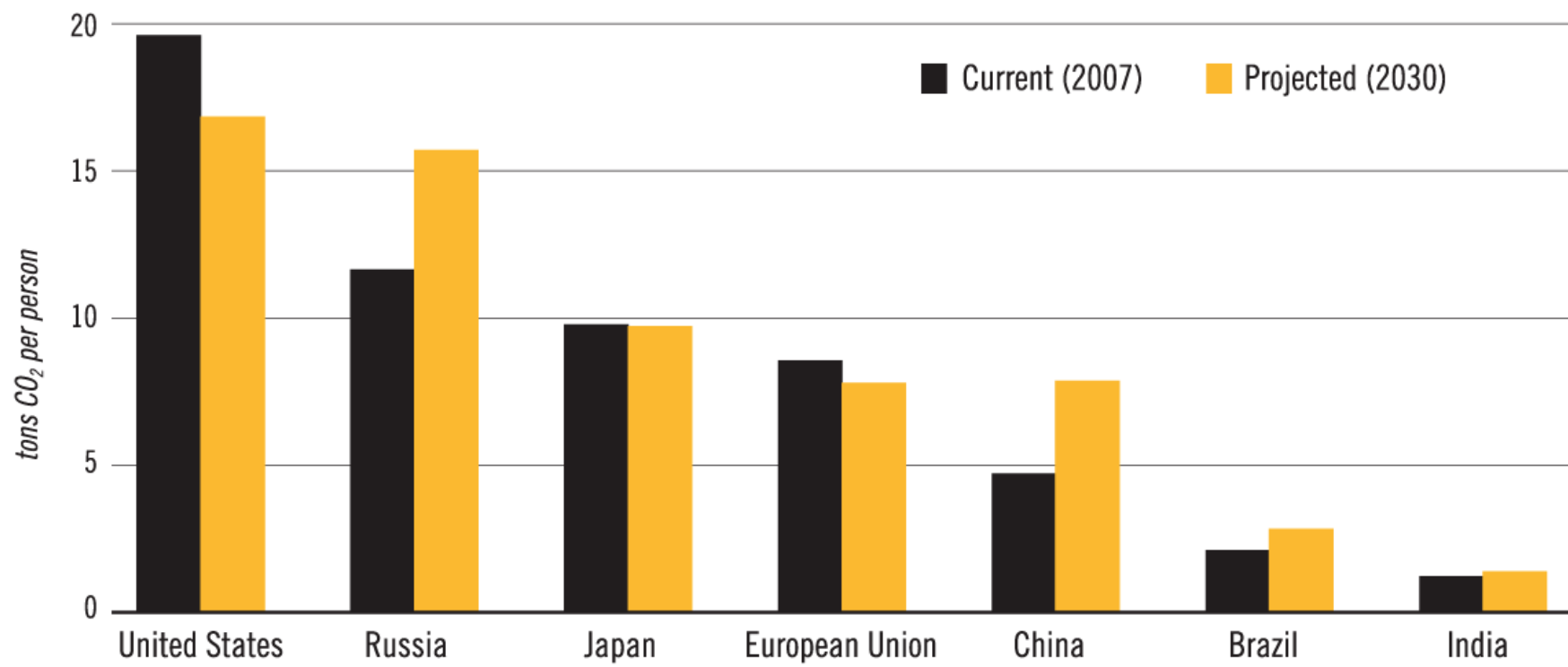
# Looking at

- What does an 80% reduction mean
- What are the tools open to us
- What are others doing
- Where do we find the political will/acceptance to do this

## Top 12 CO<sub>2</sub>-Emitting Countries & Their Per-Capita Emissions (2004)



Climate Analysis Indicators Tool: <http://cait.wri.org>



# 80% reduction by 2050

- Global population will increase by 50% from 6 to 9 billion
- Need to reduce emissions from both developed and developing countries
- Aiming for 2 tonnes CO<sub>2</sub>e per person per year
- Will mean decarbonise electricity generation and transport globally

## Tools available – carrots and sticks

- Carbon taxes
- Carbon markets
- Regulations
  - Building regulations
  - Transport regulations – vehicle emissions standards and low carbon fuels
- Energy efficiency
- Renewables and nuclear generation
- New technologies – eg CCS

# UK low carbon transition plan

- [http://www.decc.gov.uk/en/content/cms/publications/lc\\_trans\\_plan/lc\\_trans\\_plan.aspx](http://www.decc.gov.uk/en/content/cms/publications/lc_trans_plan/lc_trans_plan.aspx)
- 30% electricity from renewables by 2020
- Fund 4 commercial scale demonstrations of CCS for coal power stations
- US\$5 billion for household energy efficiency
- Smart meters to every home by 2020
- Feed in tariffs
- 15 village/town/city test beds for piloting initiatives
- Cutting average CO<sub>2</sub> from new cars by 40% on 2007 levels

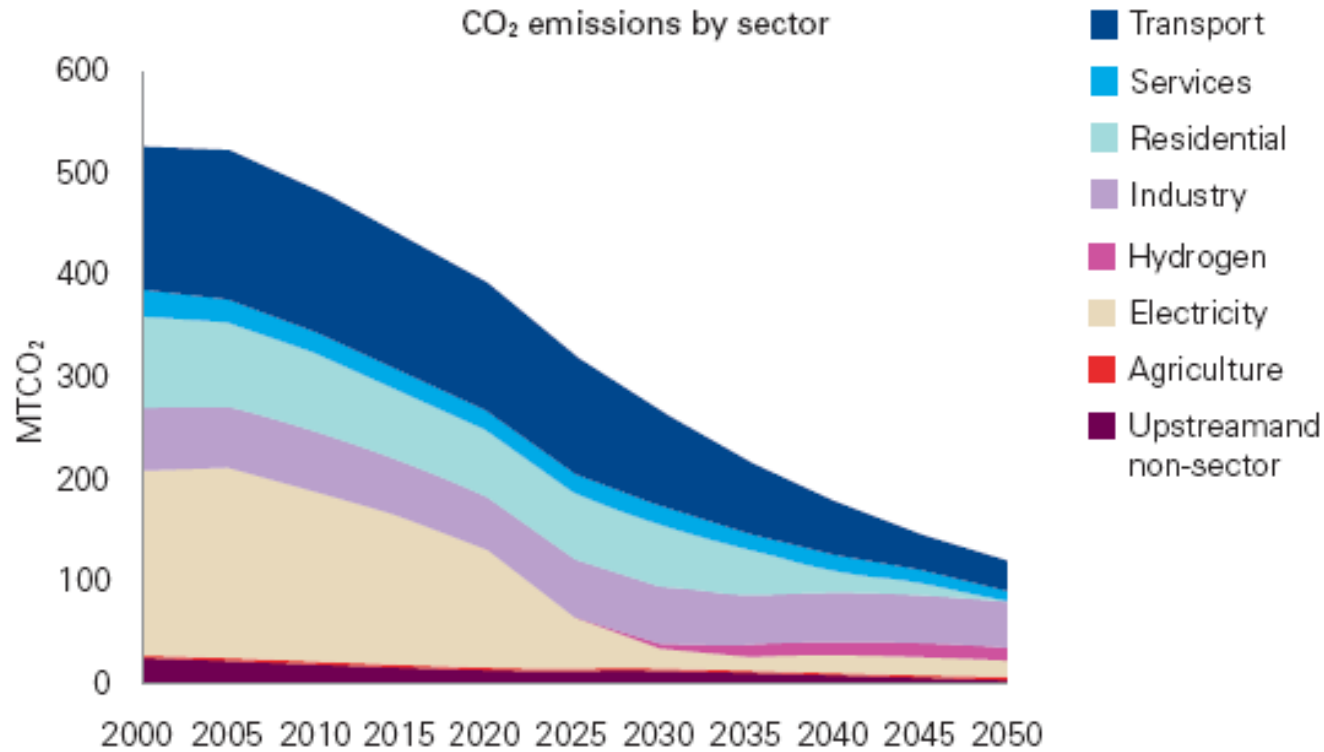
# UK Electricity generation current energy source

Energy source	%
Coal	32.9
Natural Gas	43.3
Nuclear	15.3
Renewables	5.9
Other	2.5

# What 80% reduction might look like for the UK

Chart 4

One scenario for UK sectoral CO<sub>2</sub> emissions to 2050 on an 80% CO<sub>2</sub> emissions reduction path

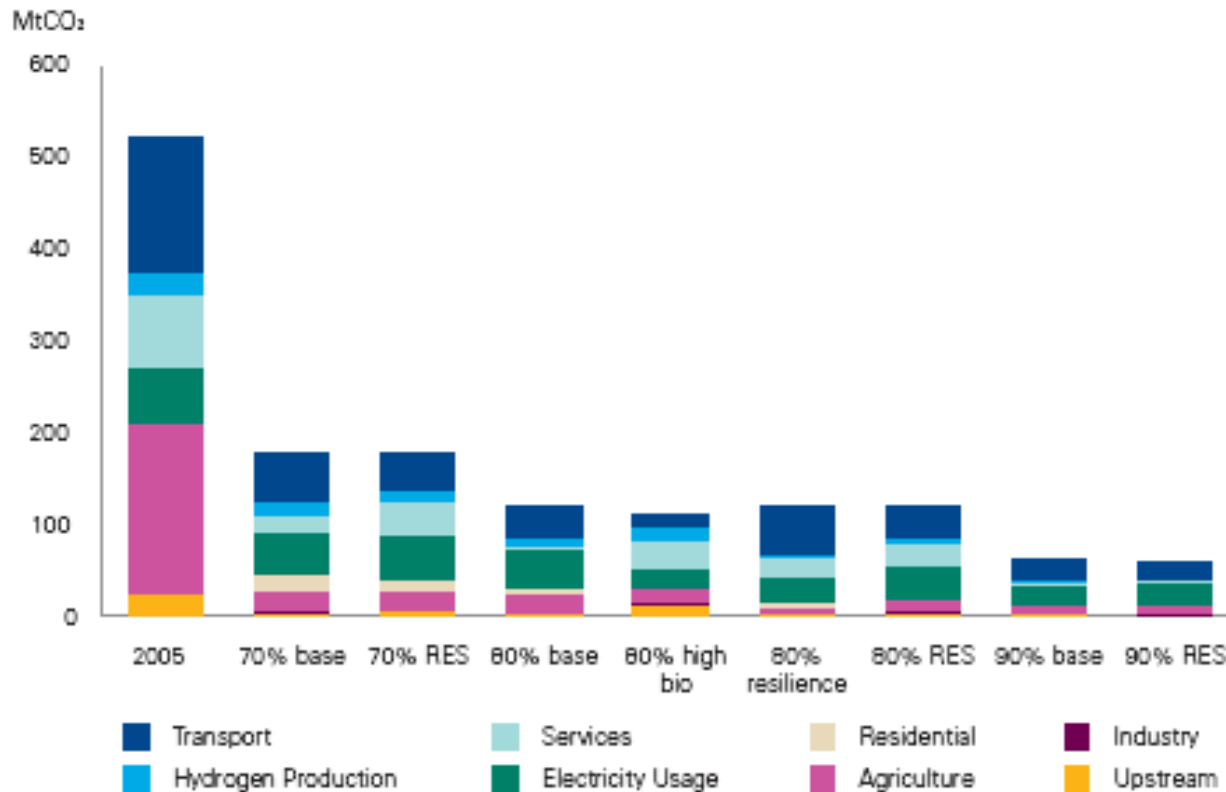


Source: MARKAL (2008)

# What might this look like for sectors

Chart 5

Sectoral CO<sub>2</sub> emissions in 2050 under MARKAL scenarios, compared to 2005 emissions

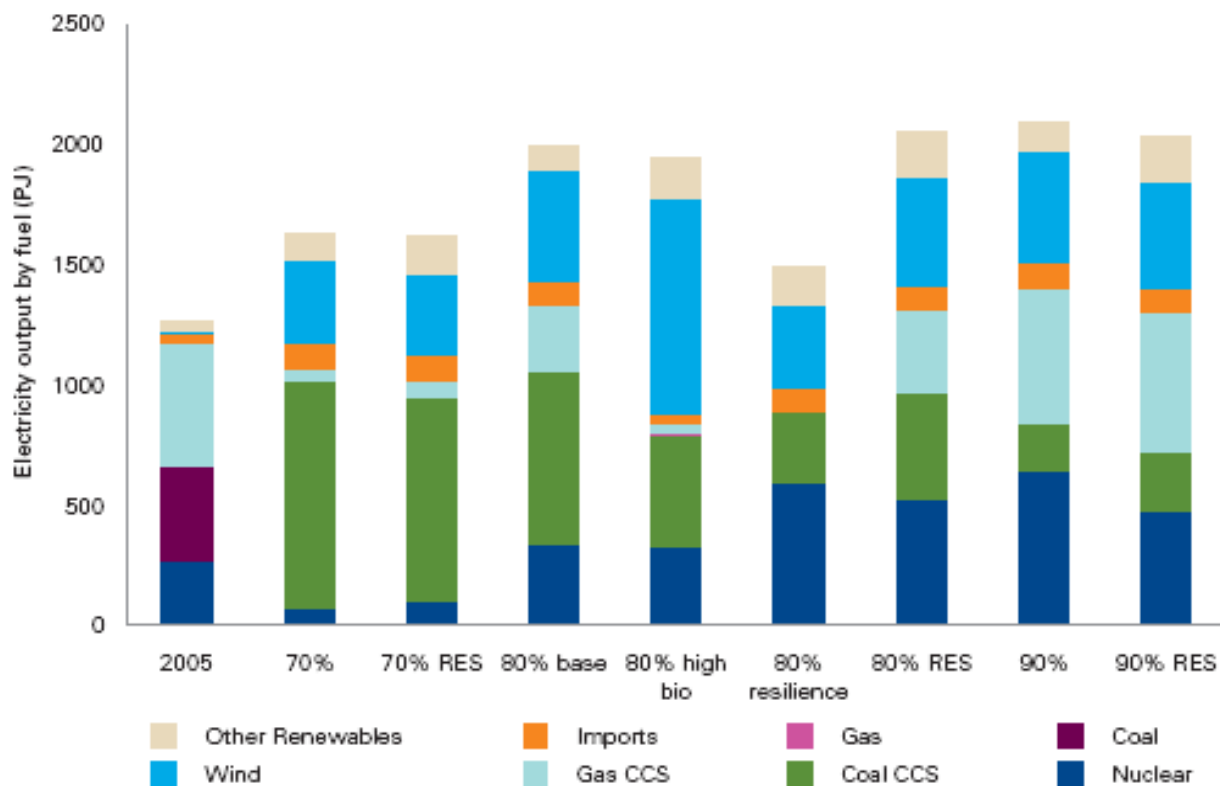


Source: Department of Energy and Climate Change analysis based on MARKAL (2009)

# What does this look like for the electricity sector

Chart 6

Variation in electricity demand and generation technologies in 2050 under MARKAL scenarios, compared to 2005 emissions

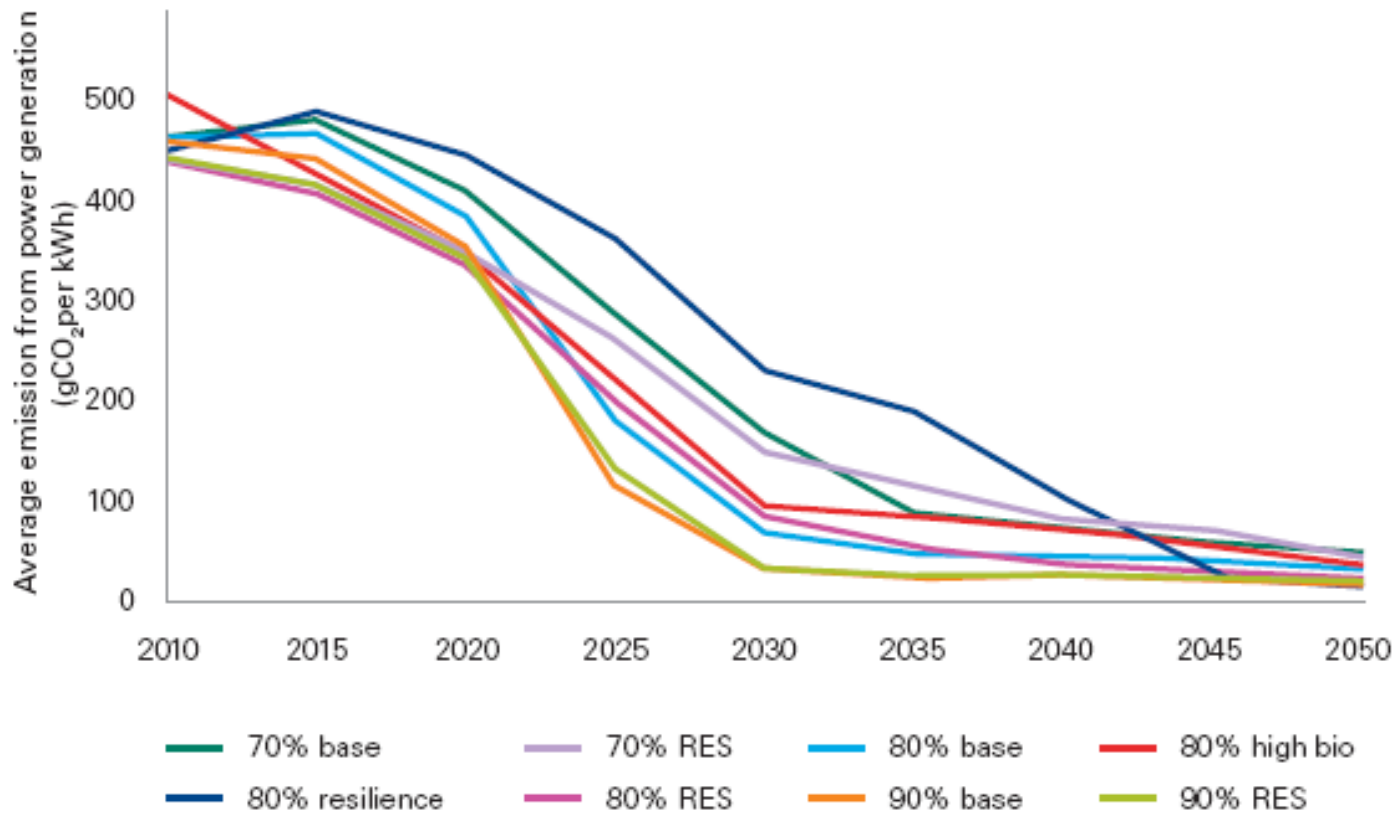


Source: Department of Energy and Climate Change chart based on MARKAL (2009)

# And put another way..

Chart 7

Rate of decarbonisation of the electricity sector under MARKAL scenarios

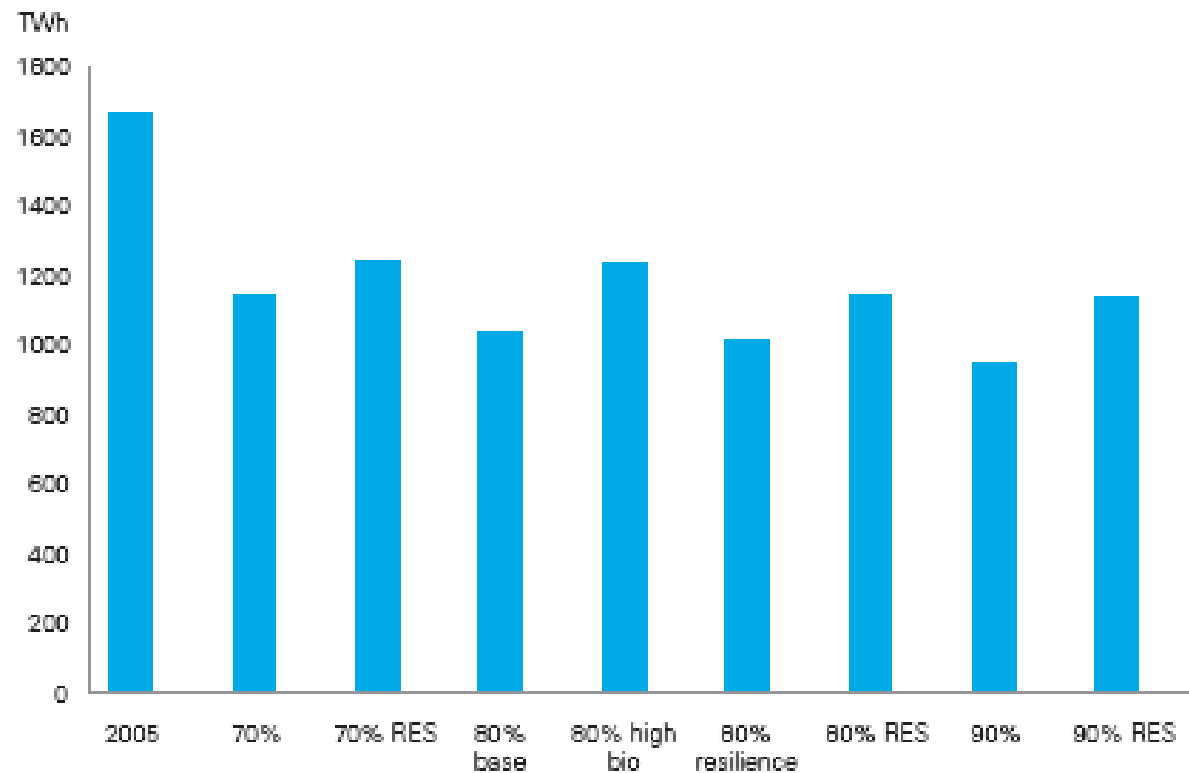


Source: Department of Energy and Climate Change chart based on MARKAL (2009)

# And what does that mean for demand?

Chart 8

Energy consumption across scenarios



Source: Department of Energy and Climate Change chart based on MARKAL (2009)

Note: This chart compares energy consumption in 2005 with energy consumption scenarios in 2050.

# Which policies will deliver which reductions?

**Table 4**

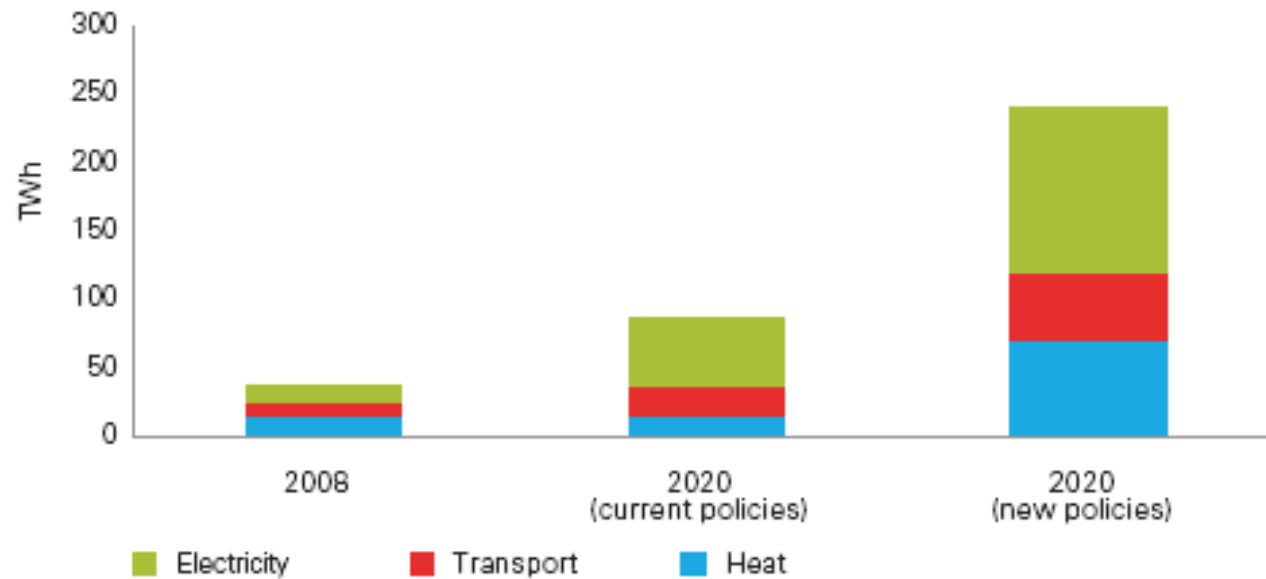
Detailed breakdown of savings delivered by Transition Plan policies by budget period (MtCO<sub>2</sub>e)

MtCO <sub>2</sub> e	Budget 1 (2008-12)	Budget 2 (2013-17)	Budget 3 (2018-22)
<b>Policies (firm and funded) EU ETS</b>			
Reduction in UK share of EU ETS cap <sup>36</sup>	0	155	248
<b>Transport</b>			
New Car CO <sub>2</sub> standards to 2015	0	5.1	20.1
Additional Renewable Transport fuels, 10% by energy by 2020	0	9.1	30.1
Low Carbon Buses	0	0.2	0.9
SAFED training for bus drivers	0.4	1.0	1.0
<b>Households</b>			
Domestic energy efficiency package <sup>39</sup>	9.3	30.4	45.8
Product Policy (additional to the domestic energy efficiency package) <sup>40</sup>	-0.8	-2.4	-4.5
Zero Carbon Homes	0.1	0.6	2.2
Smart-metering and better billing (lifestyle changes)	0.9	2.1	1.8
Community Energy Saving Programme	0.2	0.1	0.1

# Renewables..

Chart 13

Increase in renewables brought on in 2020 by this package, compared to current policies and 2005 levels

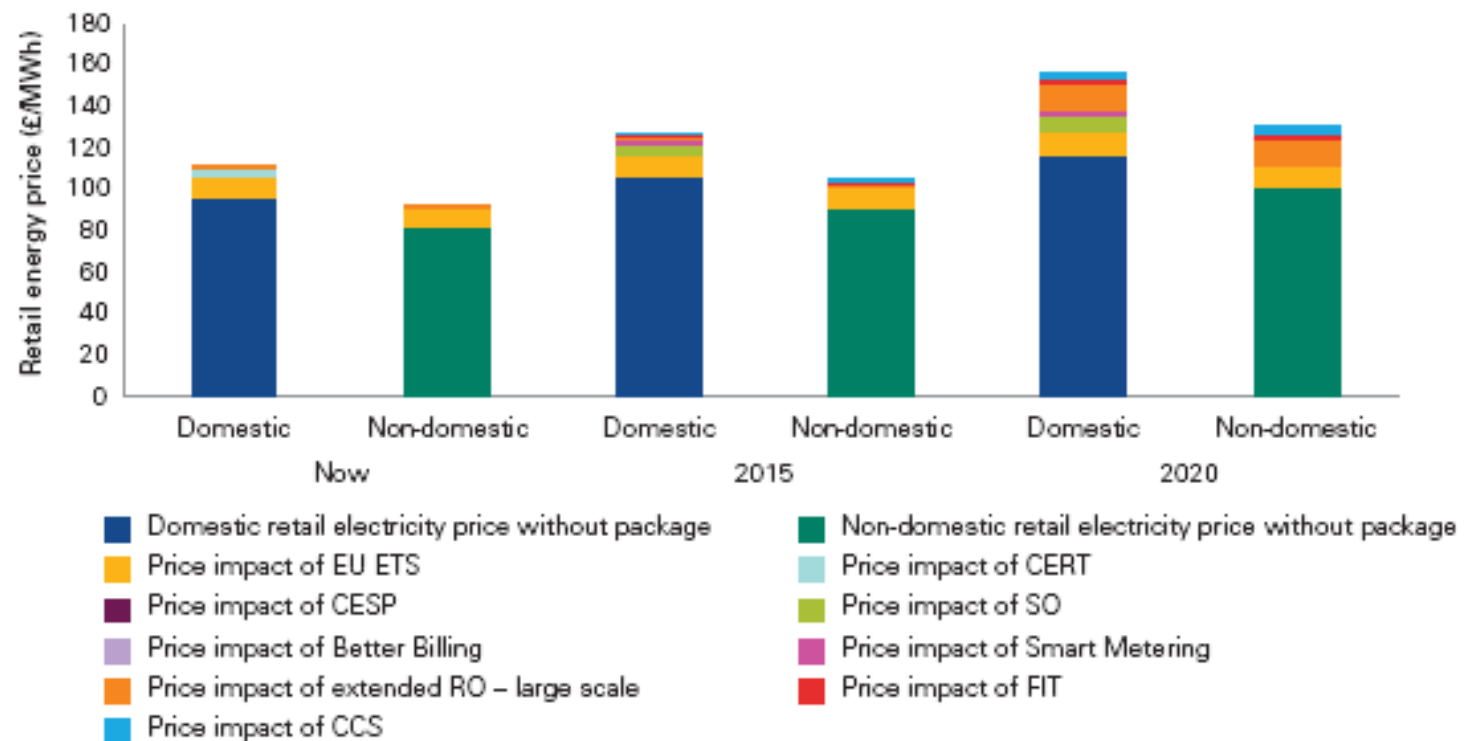


Source: Department of Energy and Climate Change (2009)

# Costs...

Chart 17

Estimated impact of the package of climate change policies on domestic and non-domestic retail electricity prices



Source: Department of Energy and Climate Change (2009)

# And for householders...

**Table 8**

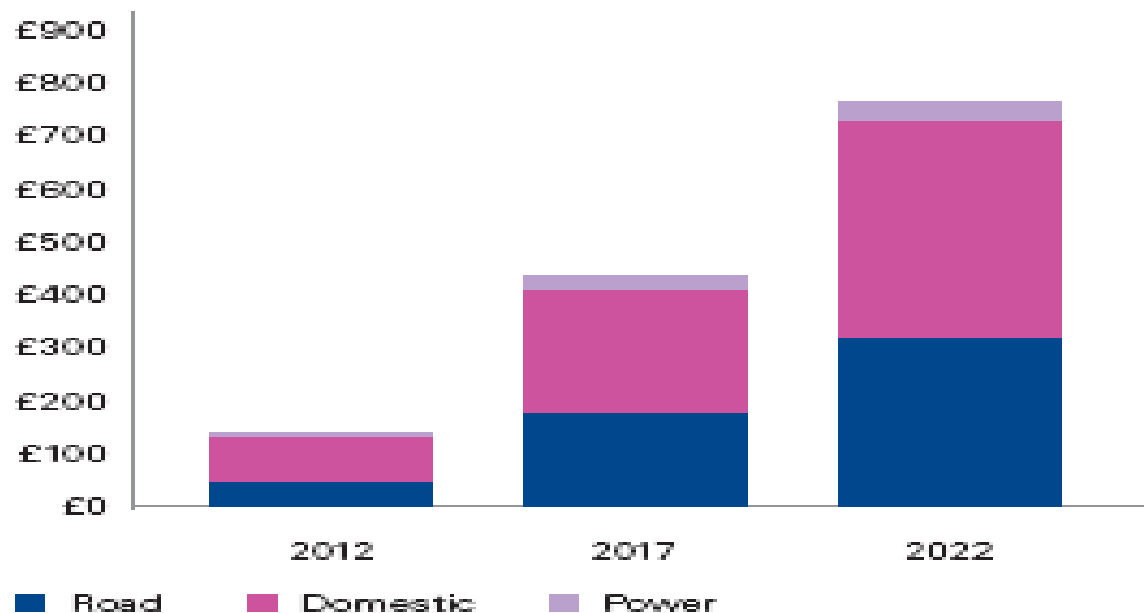
**Estimated impact of the package on average domestic energy bills<sup>78</sup>**

<b>£ (real 2009 prices)</b>	<b>Current<sup>79</sup></b>	<b>2015</b>	<b>2020</b>
Estimated average bill without any policies set out in this plan	1,135	1,244	1,348
Estimated average bill with policies	1,184	1,258	1,473
Impact of policies ( % impact)	49 (4%)	14 (1%)	125 (9%)

# Some co-benefits....

**Chart 29**

**The net air quality benefit associated with Climate Change measures**



Source: the Department for Environment, Food and Rural Affairs Analysis (2009)

55% – 60% from the power sector,  
35% – 40% from the domestic sector and  
5% from road transport.

# So how did UK get to a position where it can do this

- Started 10 years ago
  - with Climate change Levy – tax on carbon
  - UK Emissions Trading System
  - Climate Change Agreements and other measures as part of the
  - Climate Change Review

# Has learned lessons along the way

- Cheaper and easier to act (at least in the first years) than initially estimated
- Savings and opportunities by acting early – energy efficiency and horizon scanning - make for efficient robust industries
- Cap and trade central – but **not** the only tool employed
- Use of offsets must be very limited if to gain benefits of domestic low carbon economy
- Competitiveness impacts of carbon pricing are small for most sectors

Important to move key decisions away from politicians and lobbying

- Climate Change Act
  - Climate Change Committee – scientists and economists – recommends targets and division between sectors
  - Government legally bound
  - Carbon Budgets

# Carbon Budgets

- April 2009 the UK Chancellor of the Exchequer announced.
- Legally binding carbon budgets for the first three five-year periods 2008-2012, 2013-2017 and 2018-2022.
- A revised target to reduce emissions to at least 34% below 1990 emissions by 2018-22.
- Aim to meet the carbon budgets announced today through domestic action alone, and consistent with this, setting a zero limit in the non-traded sector on offsetting through international credits for the first budget period.

# Some conclusions

- Fear of action dissipates once you start
- The costs have been lower than anticipated
- The benefits and opportunities are immense
- Co benefits significant – though not all quantifiable
- Domestic action will bring the greatest benefits
- And there are important rewards for early adopters