Royal Mail Group

Scotland's Hydrogen Future

Building a Sustainable Economy through Hydrogen and Renewable Energy

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Head of Sustainability

- Background on climate change
- Royal Mail Group context
- Hydrogen economy
- Summary

DAILY BUGLE

Tuesday/Partly Sunny /Weather: Page37 25Cents

IPCC results

Eleven of the last twelve years (1995-2006) rank among the twelve warmest years since 1850

Global atmospheric concentrations of CO_2 have increased markedly as a result of human activities since 1750

Global GHG emissions have grown by 70% between 1970 and 2004

Stern Review

The costs of reducing GHG emissions to avoid the worst impacts of climate change – can be limited to c. 1-2% of global GDP each year

Stern Review - projections

In contrast the costs of inaction would be equivalent to losing between 5% to 20% of global GDP every year.

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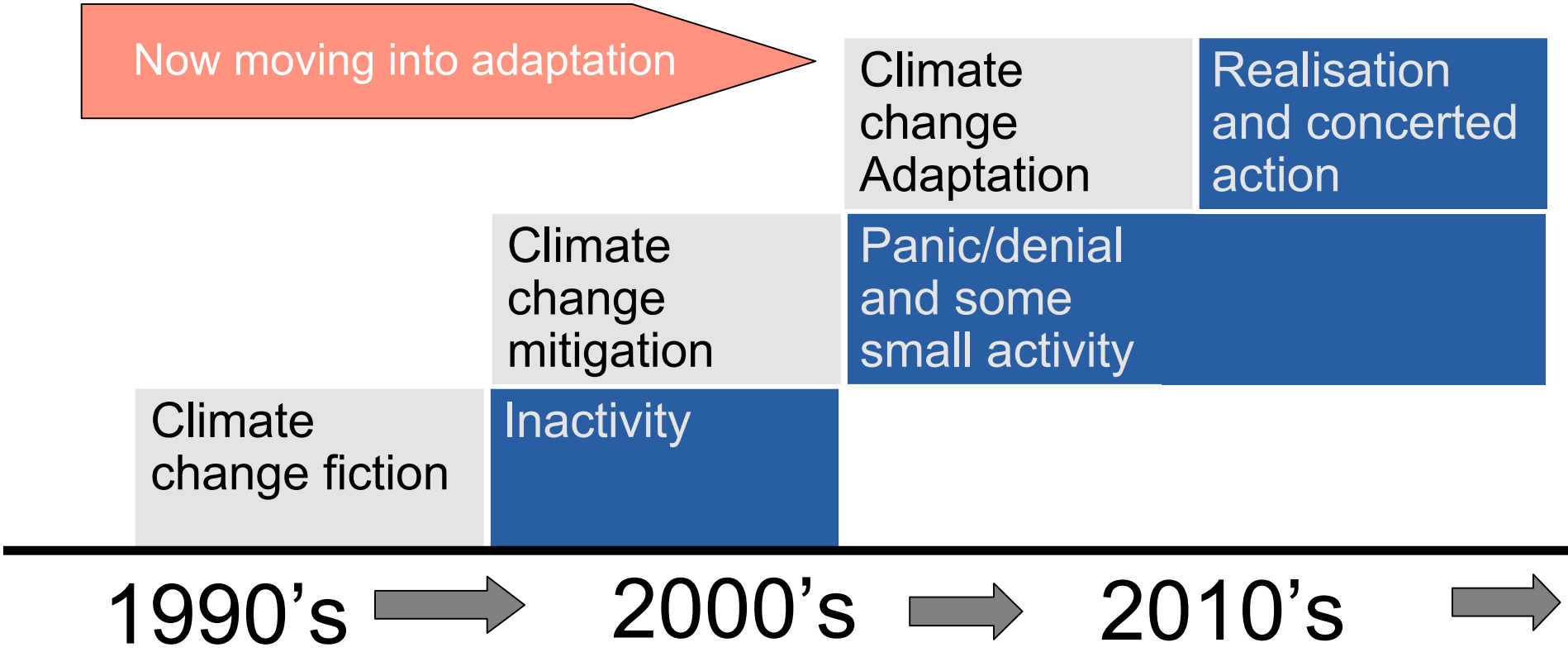
Stepping in the right direction



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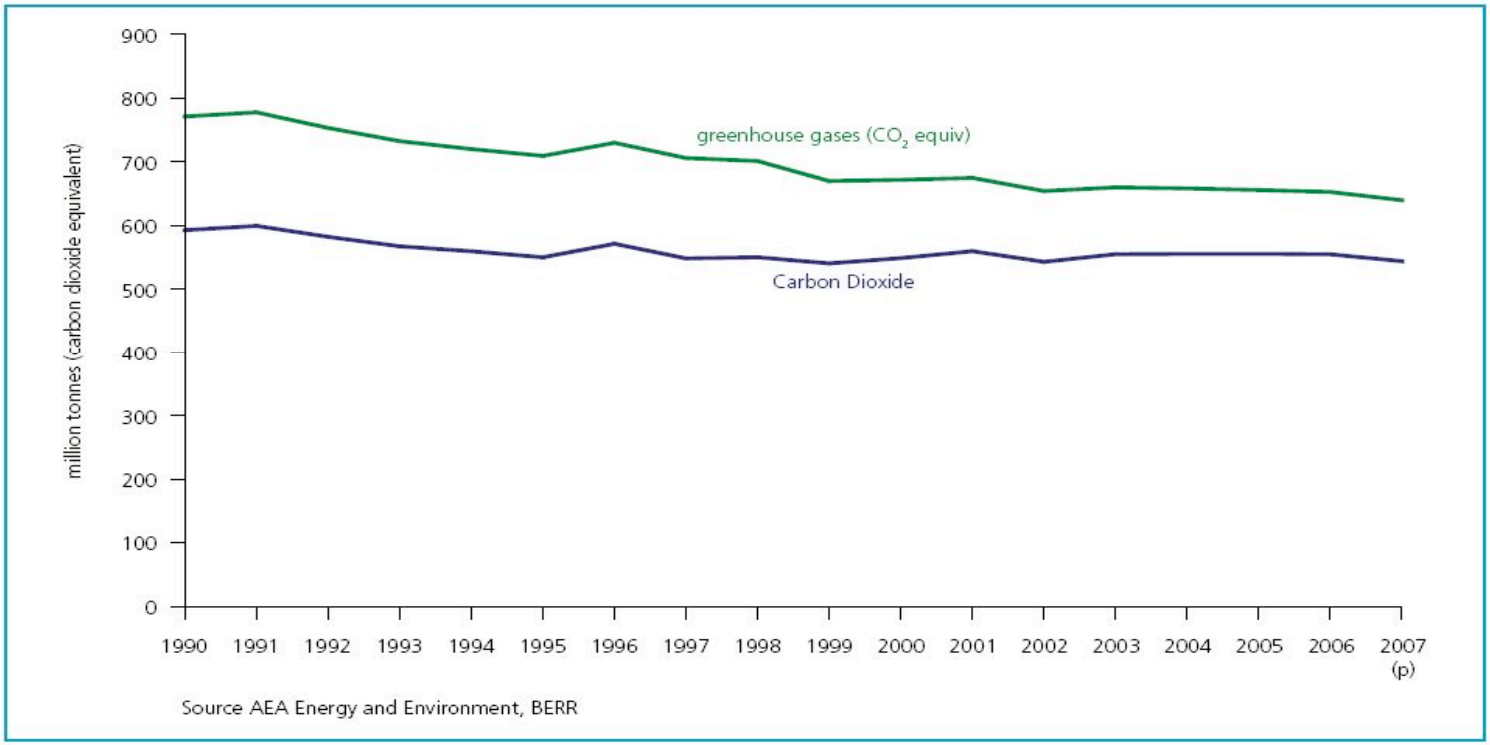
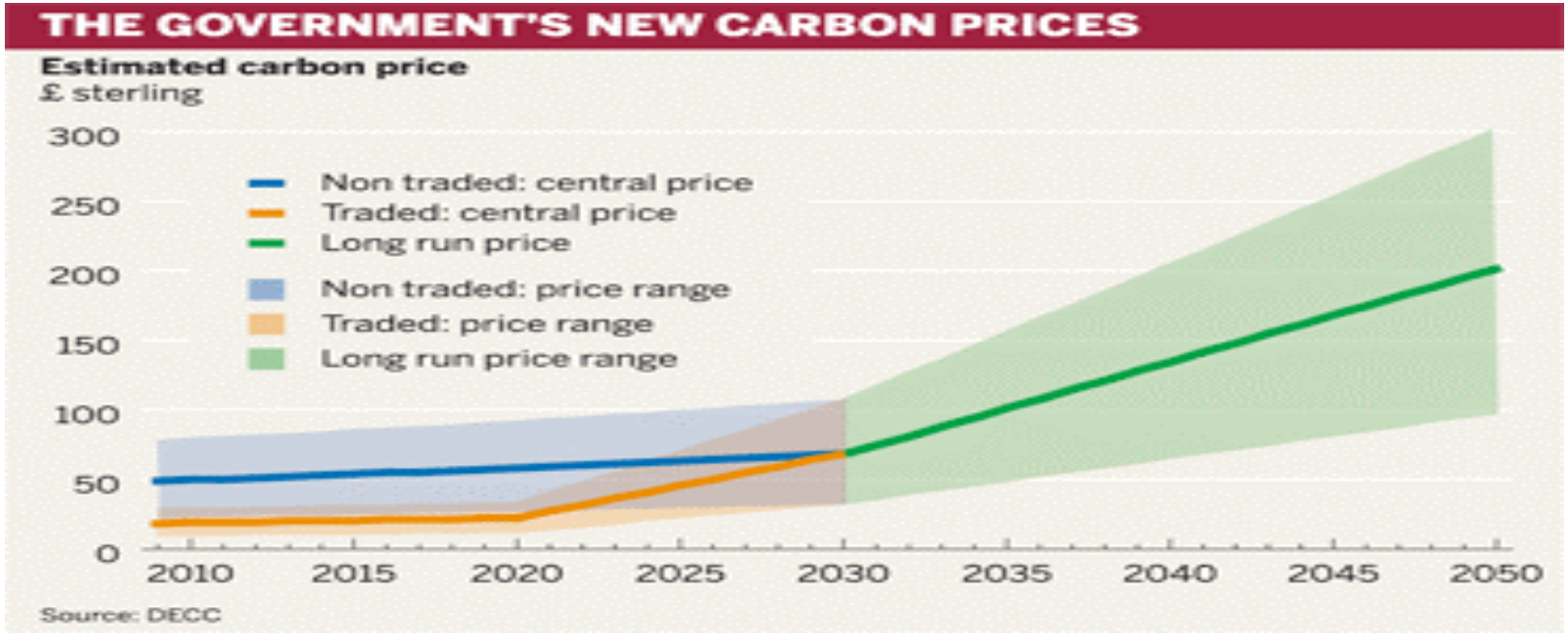
This is shown in results UK emissions..

Figure 1: UK greenhouse gas emissions 1990 – 2007 (Note: 2007 results are provisional)



So what has been coming online…

- Climate Change Acts – Holyrood and Westminster
- Carbon Budgets set
- Guidance on the cost of carbon – huge implications
- Vehicle manufacturers starting to take action



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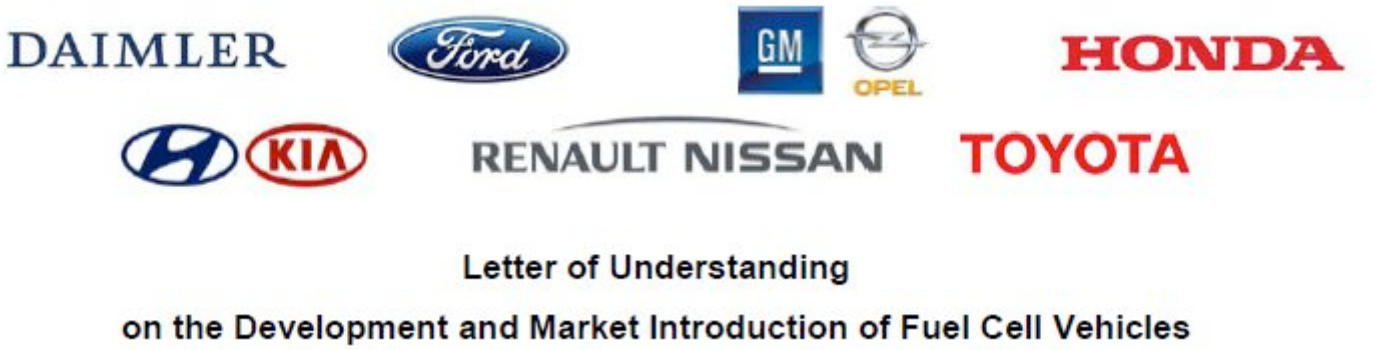
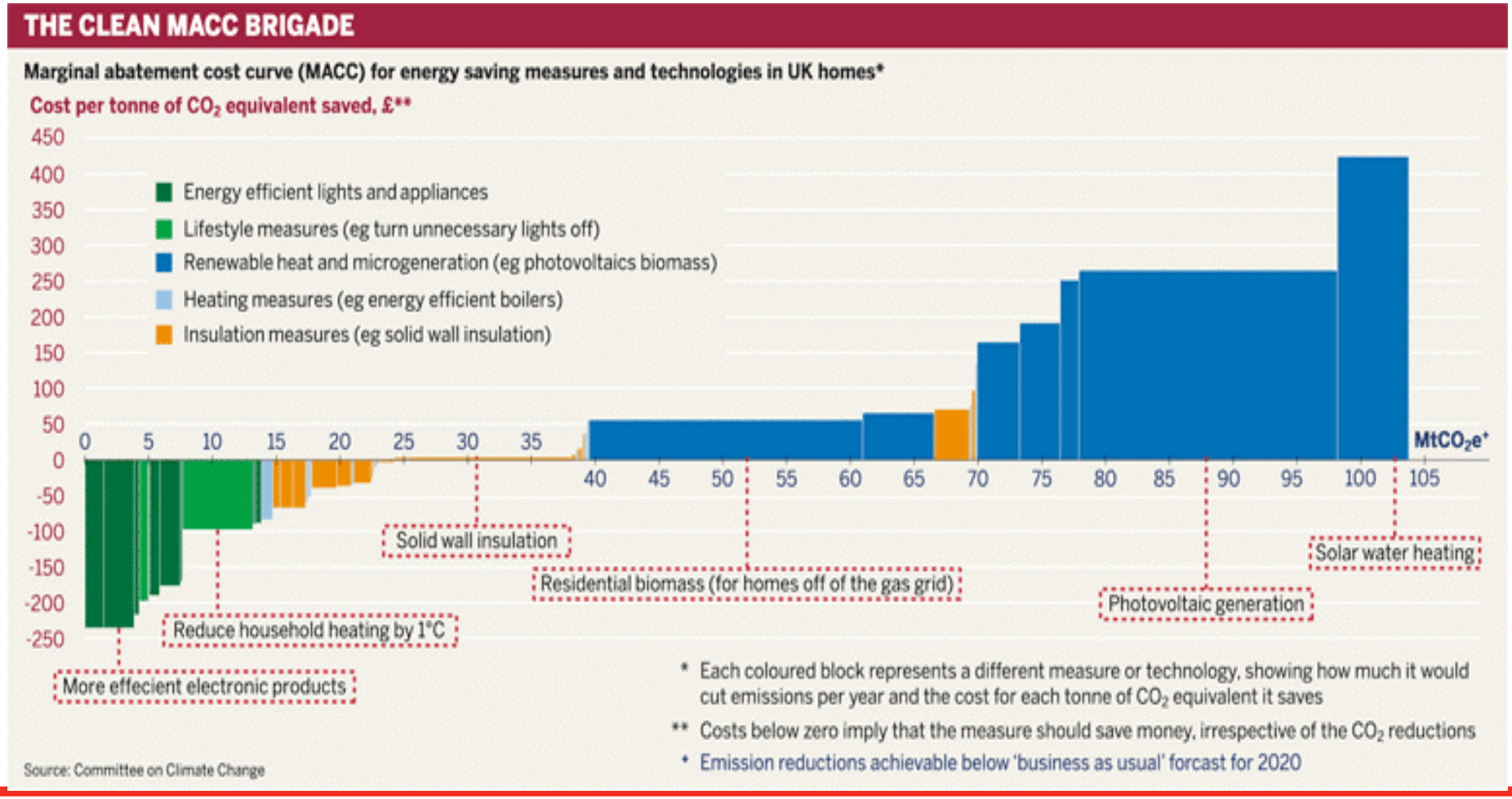
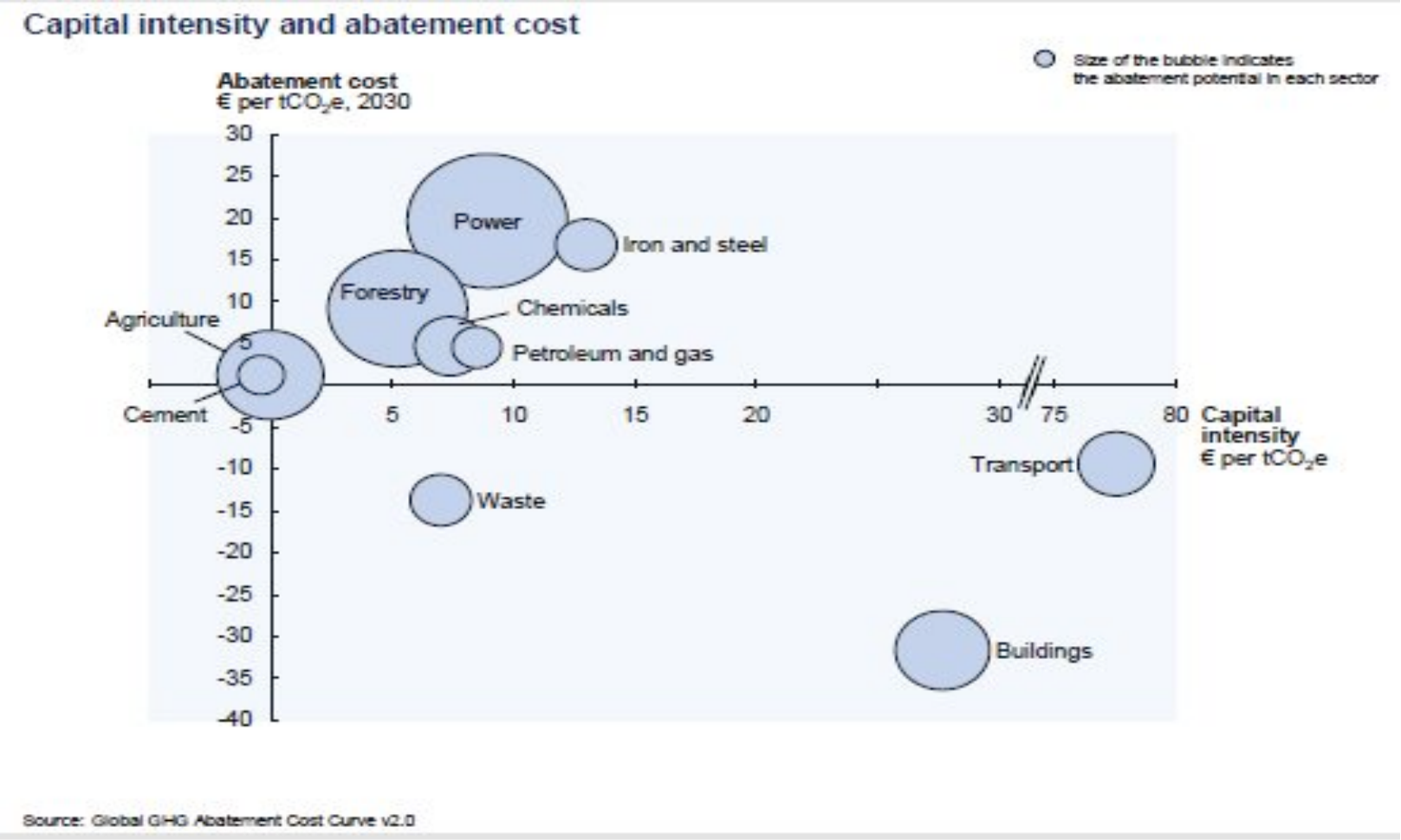
Fantastic news….



The era of the MACC



However..
The transport sector is facing the biggest challenge



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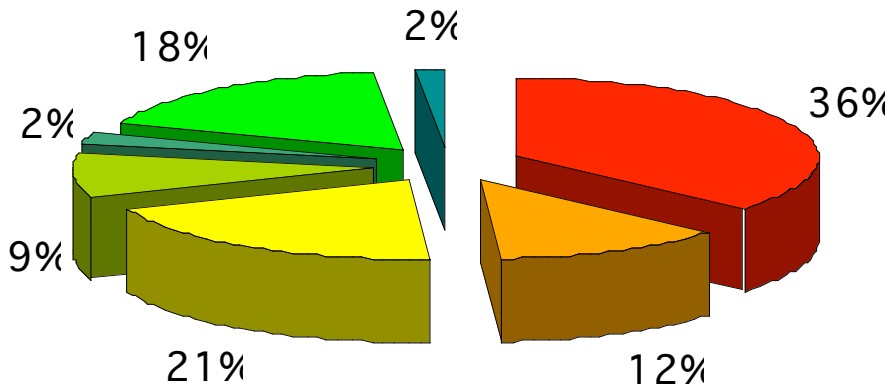
Royal Mail Group context

- One of the largest employers in the UK - c.176,000 employees
- Handle 75 million items every working day
- 113,000 collection points
- 28 million delivery addresses
- 33,000 vehicles travelling 1.8 million miles a day
- 135 million litres of diesel annually
- 12,000 retail outlets.

Annual impacts

- CO_2 emissions would fill 99 billion party balloons
- Road mileage is equivalent to a return trip to Jupiter
- Diesel volume would fill 59 Olympic-sized swimming pools
- Energy consumption would power 43,731 UK homes
- Landfill waste is equivalent to 17,410 fully laden Ford Transits
- Water consumption equivalent to > 33 litres for everyone in the UK.

Royal Mail Group footprint 2008/09



- Scope 1 Business road
- Scope 1 Natural gas and
- Scope 2 Grid electricity
- Scope 3 Business air & r
- Scope 3 Personal travel (on business)
- Scope 3 Commuting to work
- Scope 3 Business mail in privately owned vehicles

Our approach to carbon management

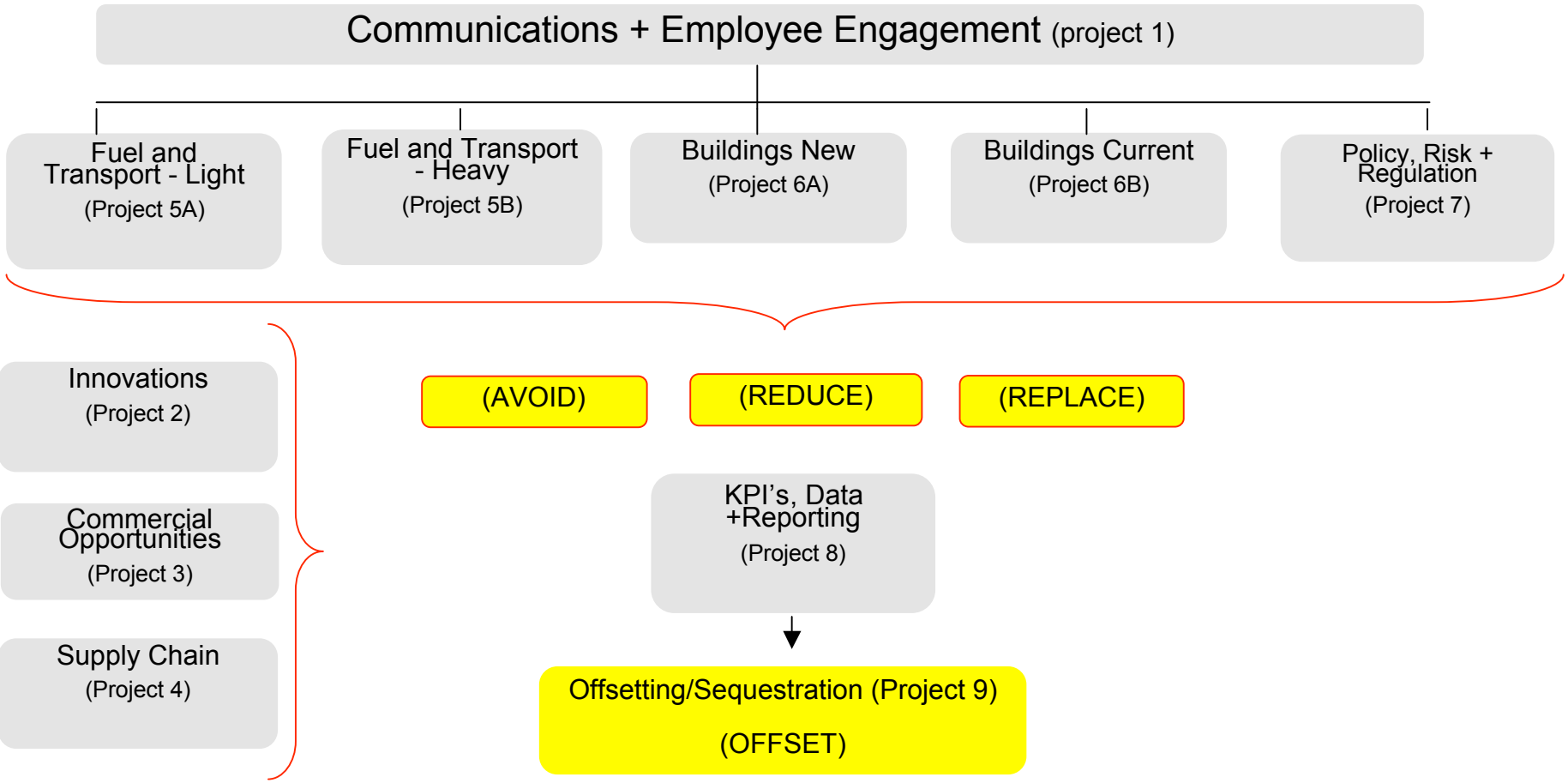
1. Avoid and Reduce fuel and energy consumption
2. Replace existing fuels with zero/low C equivalents

and finally…

3. Offset residual emissions through sustainable projects.

Priority

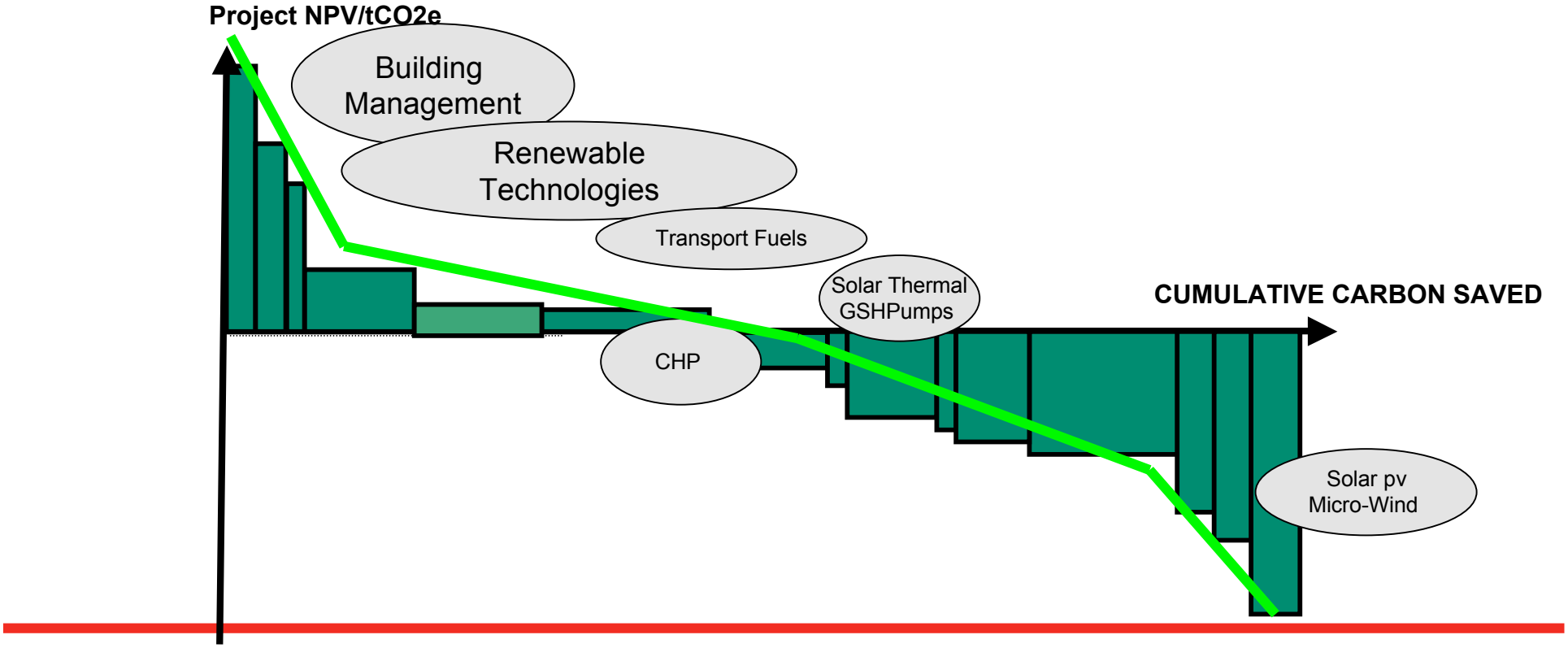
RMG Carbon Management Programme



Investment in Carbon Reduction Strategies can be prioritised using a Marginal Abatement Cost (MAC) Curve

Project Evaluation using whole life costing incorporate costs assumptions re:

Energy Market Prices Carbon Market Prices Fiscal Policy



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Greenhouse gas reduction programmes for transport

Vehicle utilisation
- Telemetry
- Route revisions
- Network reviews

Behavioural change
- Driver awareness activity
- Driver risk assessments
- Driver training
- ‘Think before you travel’ campaign
- Green travel planning

New Technology
- Aerodynamics/ double deck trailers
- Technical bolt ons
- Alternative fuel vehicles (e.g. biomethane

Microcab hydrogen fuel cell

Ford Transit- H_2 ICE

Greenhouse gas reduction programmes for buildings

Energy Management and Retrofit

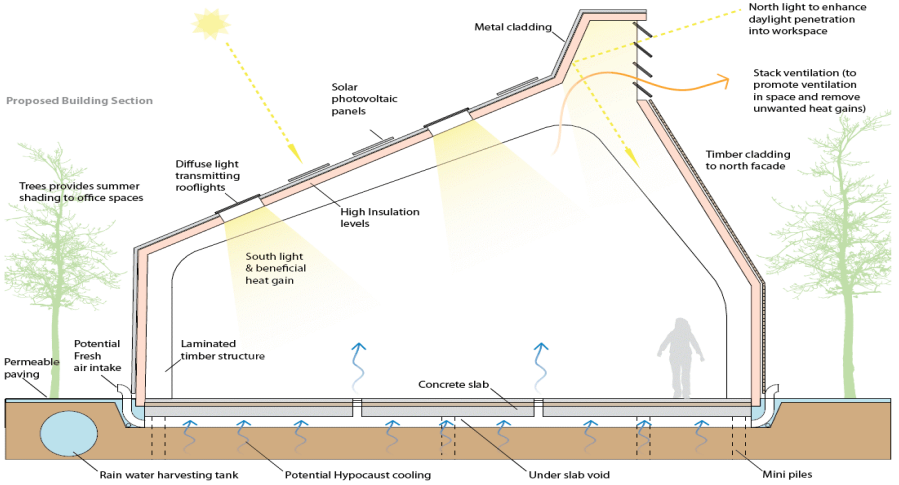
- MAC curve investments
- Energy efficiency measures
- Smart metering roll-out
- Improvement plans for worst performing sites

New Build Standards

- On-site energy
- Investment model to reflect whole life cost of investment
- Procurement guidelines

Behavioural Change

- Energy Challenge
- Site level accountability for energy
- Green champions
- Climate Challenge pack
- Edinburgh pilot – 20% savings linked to charity



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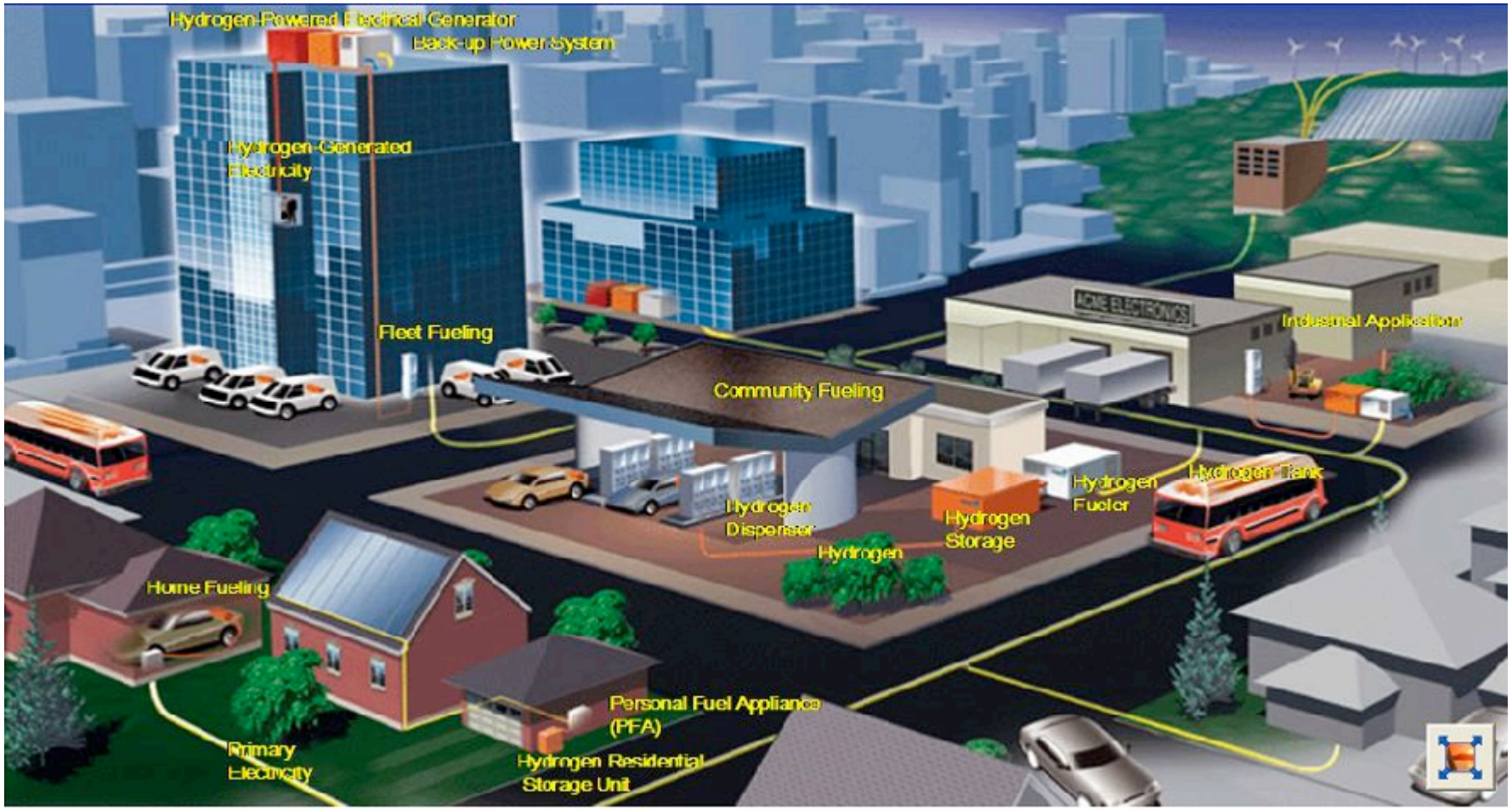
Hydrogen future..

‘people are still looking for the silver bullet for climate change. Why? It is already available and it’s the most ubiquitous molecule in the universe’ Dr Martin Blake

Potential for hydrogen use is not constrained..



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UK-Wide H_2&FC Project Proposal

- Plan to link into proposed networks: extend, support and create new
- Local/central Government driven schemes best chance of success
- Benefit in procurement strength and broad knowledge base of partners

Scotland's renewable portfolio

-Huge gap in installed capacity and potential capacity

Onshore wind
Offshore wind
Wave
Tidal stream
Hydro
Wood
Biomass (non wood)
Bio diesel
Landfill gas
Geothermal
Solar

Offer the ability for central and distributed electrolysis

Grid balancing and energy storage systems

Disentangle from oil prices

Mitigate volatility

Hydrogen generation feed in tariff??

Summary

- UK moving quicker than most, Scotland even quicker, but still a huge opportunity for Scotland overtake and become world leaders in provision of sustainable zero carbon infrastructure
- Scotland's renewable energy potential unsurpassed and could (should) easily become hydrogen capital of the world
- Need for focus on electrolysis and H2 storage systems

Thank you for your time.

Any questions?

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