The Economics of Low Carbon Cities

A Mini-Stern Review for the Sheffield City Region

Low Carbon Futures 2050

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Climate Change and Economics

The Stern Review changed the political landscape on climate change by claiming that:

- The cost of avoiding dangerous climate change (1-2% of GDP).

Is much less than

- The costs of dangerous climate change (5-20% of GDP).

But this hasn't led to a global agreement, and is very distant from local realities.

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The Key Questions

Is there a business case for investing in the low carbon economy at the local level?

Is there also a wider social and economic case?

Where are the economic opportunities, what do they look like, how can they be financed?

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The Approach

- Build a baseline that extrapolates current trends to project energy use, bills, carbon footprints through to 2022.
- Identify lists of the energy saving and small scale renewables measures that could be adopted in each sector.
- Collect realistic data on the costs (purchase, installation, running), benefits (energy, economic, carbon), lifetimes etc. of measures.
- Forecast out how many times each measure could realistically be adopted in each sector in the city through to 2022.
- Aggregate all of the above to build a ‘macro’ picture of investment needs, payback periods, carbon savings etc.

Headline Findings for the Sheffield City Region

£3.4 billion (c13% of £26bn GDP) left the SCR economy in 2011 through payment of the energy bill. This figure is forecast to grow to **£4.6 billion** by 2022.

There is a commercially attractive opportunity to bring **£3.7 billion** of investment into the SCR economy to exploit cost effective low carbon and energy efficient options.

Such investments would pay for themselves in 5 years, cutting energy bills by **£723 million** a year.

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Opportunities by Local Authority

	Energy bill in 2011	Level of investment that could be secured	Potential cut in annual energy bill	Jobs created	Carbon saved by 2022 (1990 baseline)
Barnsley	£418 million	£410 million	£88 million	357	36%
Bassetlaw	£267 million	£260 million	£53 million	221	50%
Bolsover	£247 million	£160 million	£29 million	124	28%
Chesterfield	£159 million	£223 million	£43 million	187	36%
Derbyshire Dales	£195 million	£206 million	£38 million	109	39%
Doncaster	£647 million	£599 million	£120 million	509	36%
North East Derbyshire	£175 million	£178 million	£35 million	132	31%
Rotherham	£475 million	£530 million	£101 million	435	45%
Sheffield	£827 million	£1124 million	£219 million	955	43%
SCR	£3.4 billion	£3.7 billion	£723 million	3,029	40%

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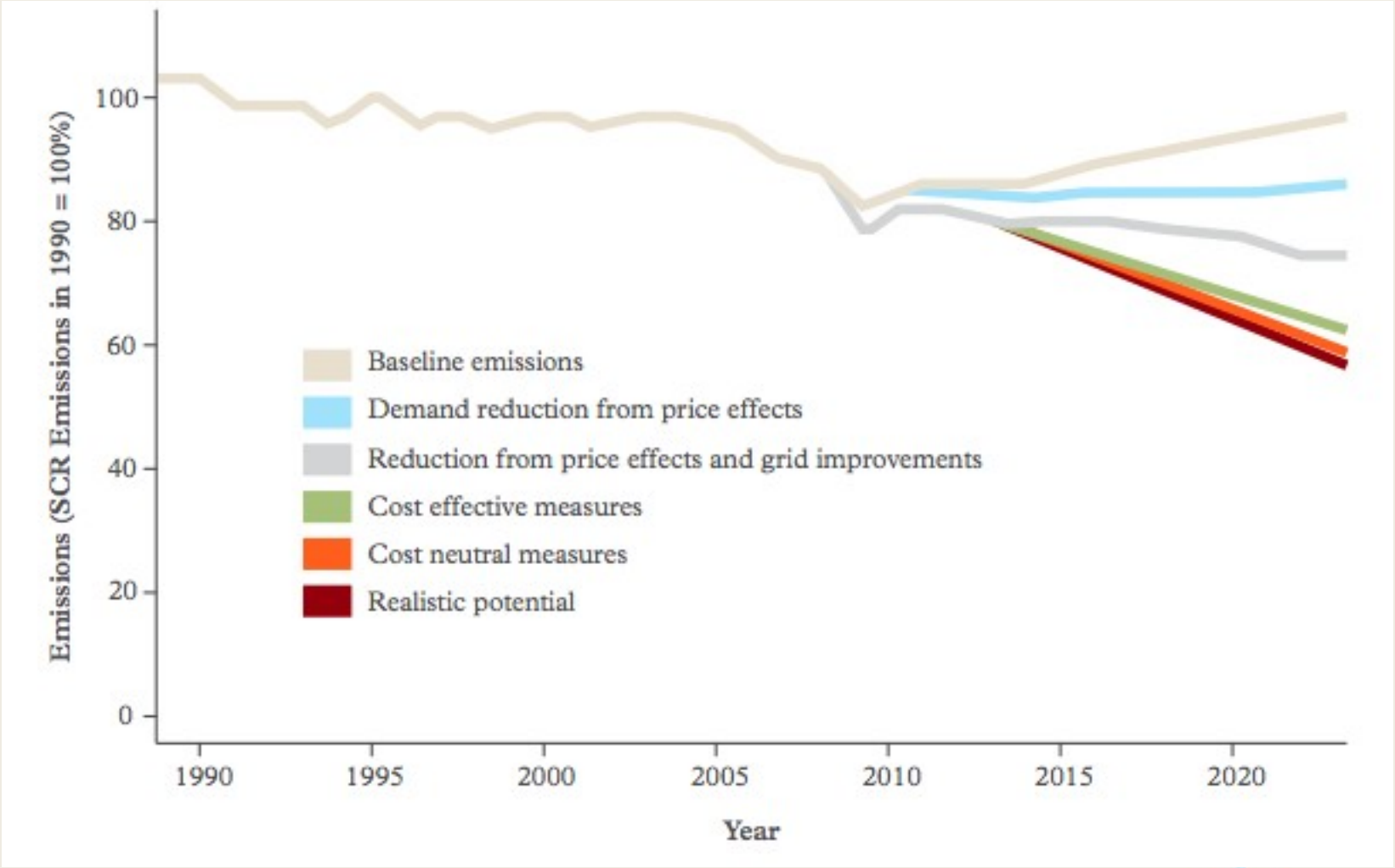
The Carbon Impact



6%
16%
28%
40%
44%
44%

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Cost Effective Investments – Domestic

- £800 million of investment opportunities
- Exploiting these would generate savings of £240 million a year
- Payback period under 3.3 years
- Would create 500 jobs per year
- Carbon savings equivalent to 3.6% of emissions

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Top 10 Measures - Domestic

Cost Effective

- Mini wind turbines (5kW) with FIT
- Biomass boilers with RHI
- Electronic products
- ICT products
- Integrated digital TVs
- Reduced standby consumption
- Reduce heating for washing machines
- A++ rated cold appliances
- A rated ovens
- Efficient lighting

Carbon Effective

- Reduce household heating by 1 C
- Biomass boilers with RHI
- Solid wall insulation
- Biomass district heating with RHI
- Ground Source Heat Pump with RHI
- Electronic products
- Pre ‘76 cavity wall insulation
- ICT products
- Air Source Heat Pump with RHI
- Efficient lighting

Cost effective – Cost neutral – Realistic potential

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Cost Effective Investments – Commercial

- £1.2 billion of investment opportunities
- Exploiting these would generate savings of £210 million a year
- Payback period 5.6 years
- Would create 600 jobs
- Carbon savings equivalent to 3.5% of emissions

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Top 10 Measures - Commercial

Cost Effective

- Vending machines - energy management
- Photocopier - energy management
- Computers - energy management
- Monitors - energy management
- Printers - energy management
- Most energy efficient monitor PC only
- Biomass boilers with RHI
- Lights - Turn off lights for an extra hour
- Lights - Sunrise-Sunset timers
- Lights – basic timer

Carbon Effective

- Air Source Heat Pump with RHI
- Most energy efficient boiler
- Programmable thermostats
- Biomass boilers with RHI
- Biomass district heating with RHI
- Reducing room temperature
- Ground Source Heat Pumps with RHI
- Most energy efficient double glazing
- Heating - Optimising start times
- Lights - Basic timer

Cost effective – **Cost neutral** – **Realistic potential**

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Cost Effective Investments – Industrial

- £1.1 billion of investment opportunities
- Exploiting these would generate savings of £180 million a year
- Payback period 6 years
- Would create 66 jobs
- Carbon savings equivalent to 3.5% of emissions

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Top 10 Measures - Industrial

Cost Effective

- Burners
- Refrigeration and air-conditioning
- Compressed air
- Lighting
- Fabrication and machining
- Design
- Operation and maintenance
- Low temperature heating
- Building energy management
- New food and drink plant

Carbon Effective

- Renewable heat
- High temperature heating
- Process improvement
- Motors and drives
- Others
- Controls
- Drying and separation
- Low temperature heating
- Operation and maintenance
- Heat recovery

Cost effective – Cost neutral – Realistic potential

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Cost Effective Investments – Transport

- £620 million of investment opportunities
- Exploiting these would generate savings of £100 million a year
- Payback period 6.5 years
- Would create 886 jobs
- Carbon savings equivalent to 1% of emissions

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Top 10 Measures - Transport

Cost Effective

- Park and ride schemes
- Express bus/coach network
- Bus priority and quality enhancements
- Smarter choices
- Cycling
- Demand management
- Plug-in hybrid vehicles
- Mild hybrid vehicles
- Full hybrid vehicles
- Biofuels

Carbon Effective

- Biofuels
- Full hybrid vehicles
- Micro hybrid vehicles
- Plug-in hybrid vehicles
- Electric vehicles
- Mild hybrid vehicles
- Demand management
- Smarter choices
- Bus priority and quality enhancements
- Rail electrification

Cost effective – Cost neutral – Realistic potential

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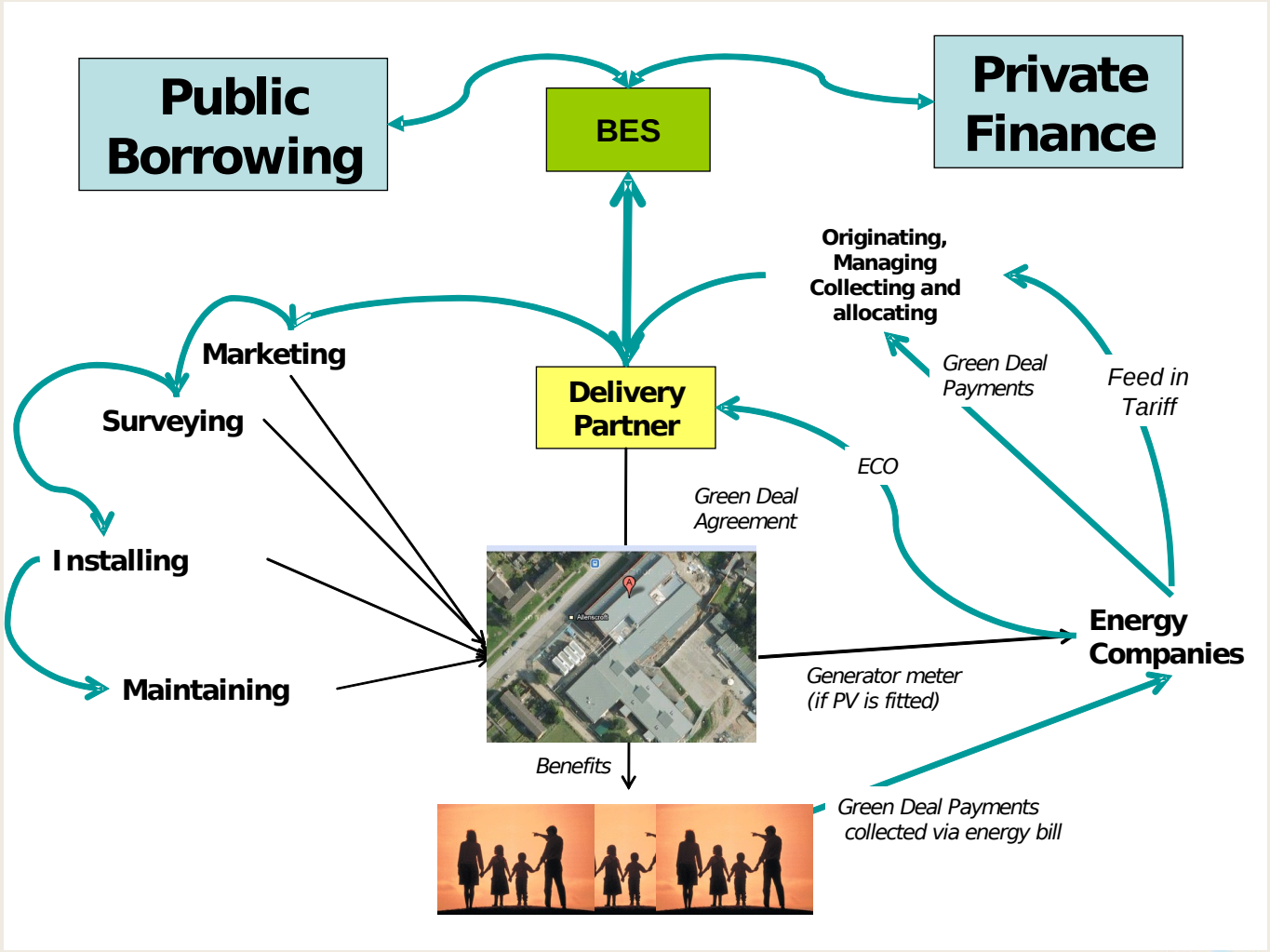
A Business Model



Conclusions

There are financially attractive ways of…

- stimulating the economy,
- reducing vulnerability,
- protecting competitiveness,
- creating employment,
- improving public health,
- strengthening communities.

And, at the same time, slashing your carbon footprint.

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