

The Economics of Low Carbon Cities

Methods, Outcomes and Implications of a City-Scale Mini-Stern Review

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A mini-Stern review at the city-scale

What is the most effective and efficient way to decarbonise a city? There are thousands of low carbon options available and, although they present a significant opportunity to reduce energy bills and carbon footprints, there is often a lack of reliable information on their performance. The higher levels of risk and uncertainty that emerge as a result of this lack of reliable information can be a major barrier to action, making it hard to develop a political, business or social case for investment in low carbon options.

In an attempt to address this problem, this report outlines a new method for a city-scale mini-Stern review. This method evaluates the cost and carbon effectiveness of a wide range of existing low carbon options that could be applied in households, industry, commerce and transport. The research explores the scope for the deployment of these options at the city-scale, along with an analysis of the associated investment needs, financial returns, carbon savings and implications for the economy and employment.

Our approach

Our approach has been to develop a robust model for assessing the costs and benefits of different levels of decarbonisation at the city-scale. We use UK Committee on Climate Change data on the potential energy, cost and carbon savings from thousands of low carbon measures. We take into account changes in the economy and the wider energy infrastructure, but we focus primarily on the potential for the wider deployment of energy efficiency measures and small-scale renewables. We also assess the potential for their deployment and the rates at which they could be deployed.


We use realistic projections of the energy, cost and carbon savings emerging from different measures. Typical interest rates (8%) and energy prices are used and ambitious but realistic scenarios for the rate at which different technological and behavioural options are adopted.

Projected savings are reduced to take into account implementation gaps. The scope for the adoption of different measures is adjusted to take into account hard to reach households and businesses.

By 2022 cities such as the Leeds City Region could cut their 1990 levels of carbon emissions by 35% by exploiting the profitable opportunities and by 40% at no net cost.

The case

To test the method, we conduct a city-scale mini-Stern review for the Leeds City Region in the UK. This city region has a population of three million, an economy worth £52 billion a year and an energy bill of £5.4 billion a year. It is a fairly typical European city region in terms of its geography, building stock, transport systems, economic composition and energy use.



There is a strong and compelling business case for major investments in decarbonisation at the city scale.

The results and their wider relevance

The results highlight the presence of very significant and commercially viable opportunities for decarbonisation at the city-scale. Exploiting these would generate wider social and economic benefits.

When combined with the effects of projected energy price increases on demand, and of lower carbon forms of energy supply, we conclude that by 2022 cities such as the Leeds City Region could cut their 1990 levels of carbon emissions by 35% by exploiting the profitable opportunities and by 40% at no net cost.

Exploiting the profitable (i.e. cost effective) opportunities would require investments of 0.9% of GDP every year for ten years, but once made they would generate direct annual savings of 1.6% of GDP a year.

Exploiting the no net cost (i.e. cost neutral) opportunities would require investments of 2% of GDP every year for ten years, but once made they would generate direct annual savings of 2.2% of GDP a year

Every £1 billion of investment in low carbon options would generate £220 million of energy cost savings, paying back, on commercial terms, in just over four years.

Every £1 billion of investment would also create 1,000 new jobs and wider economic benefits of a further £50 million a year.

Such investments would also protect competitiveness, improve energy security, reduce fuel poverty and improve public health.

Recommendations going forward

The analysis highlights that there is considerable potential to reduce energy use and carbon footprints at the city-scale through cost effective and cost neutral investments on commercial terms.

Investing in and deploying cost effective low carbon measures has the potential to not only enable cities to dramatically reduce carbon emissions but to achieve this in an economically viable way with a commercially attractive return on investment.

Low carbon measures can deliver multiple benefits for cities, enabling them to meet carbon reduction targets whilst at the same time growing the economy, creating jobs, reducing exposure to increasing energy costs and securing a competitive edge in the global marketplace.

However, the fact that these opportunities exist on this scale is obviously not enough to ensure that they are actually exploited. Incentives – no matter how strong they are – have to be matched with appropriate levels of commitment if progress is to be made. The transition to low carbon cities depends on political and social capital as well as financial capital.

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Funding Partner

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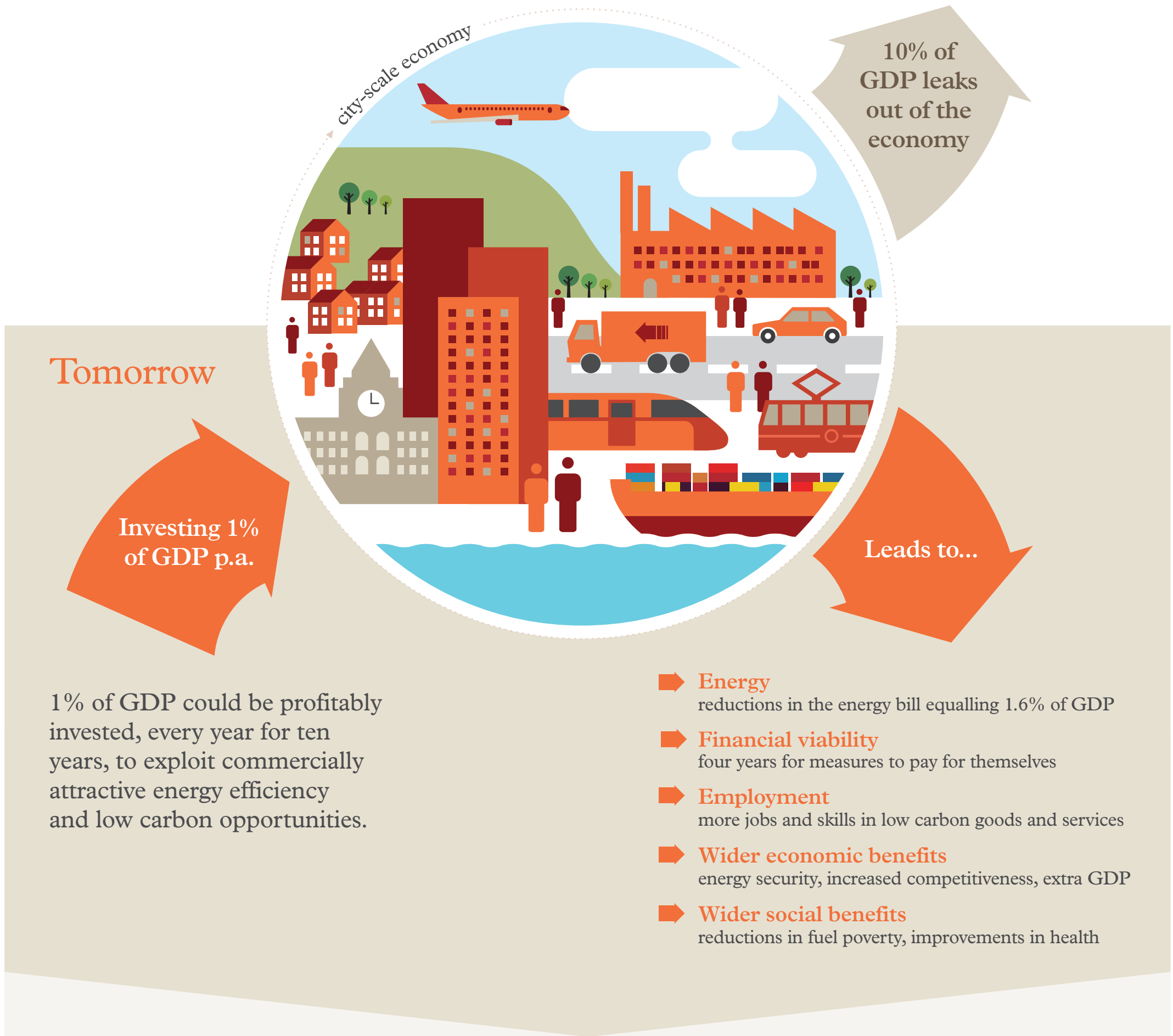
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Today

10% of city-scale GDP leaves the local economy every year through payment of the energy bill. By 2022, this is forecast to grow to 15%.



Potential to reduce CO₂ emissions

