Institution:

University of Leeds

Unit of Assessment:

7, Earth Systems and Environmental Sciences

Title of case study:

Case study 1: Providing the evidence to enable cities in the UK and internationally to adopt, target, finance and deliver economically viable low carbon development strategies

1. Summary of the impact (indicative maximum 100 words)

Our research on the economics of low carbon cities has impacted on energy and low carbon strategies and on investment decision-making in major UK cities including Leeds, Sheffield and Birmingham. It has also influenced guidance issued to local authorities by the Committee on Climate Change and the Department for Communities and Local Government, and has helped to embed strategies and targets for green growth in the next five-year plan for China. The research was voted one of the most transformative ideas to be presented at the UN climate negotiations in Durban in December 2011, and the approach is now being replicated in cities in India, Peru, Malaysia and Indonesia.

2. Underpinning research (indicative maximum 500 words)

More than half of the world's population lives in cities, more than half of all economic output comes from cities and cities are responsible for up to 70% of global carbon emissions. Cities therefore play a pivotal role in the fight against climate change. But what is the most effective and efficient way to decarbonise a city? A lack of a reliable and locally specific evidence base commonly prevents carbon reduction targets from being adopted, investments from being raised and changes from being made in the most effective or efficient ways. This slows the rate and increases the cost of their transition to a low carbon economy.

Building on his 2006 work on the relationship between economic development and the environment **[1]**, **Andrew Gouldson** has carried out further research since 2009 to develop a new method of creating an evidence base to allow cities to adopt, target, finance and deliver their own low-carbon economic development strategies **[2,3,4]**. The research has been carried out under the auspices of the Centre for Low Carbon Futures, consisting of a consortium of universities. The research relevant to this case study was carried out at both the University of Leeds and the University of York, with the significant majority of the work (*c*. 80%) undertaken by **Gouldson** at Leeds.

The method has a number of key elements. First, it evaluates the performance, in both cost and carbon terms, of the thousands of low carbon options that could be applied at the local level in the domestic, commercial, industrial and transport sectors. Second, it assesses the scope for the deployment of each low carbon option in different sectors at the local level. Third, it adds up the costs and benefits of the widespread deployment of different low carbon options and it assesses the investment needs and payback periods for different levels of change. Fourth, it develops a baseline that takes into account the future impacts of on-going trends in energy use. Against this baseline, the impacts of different levels of change are added, allowing the assessment to identify the levels of cost and carbon saving that could be achieved with different levels of investment. The subsequent evidence base is detailed and robust enough to enable cities to focus their activities on the most cost- or carbon-effective options, and to secure the finances needed to invest in exploiting these.

For example, applying this method to the Leeds City Region, it is found that £5.4 billion (10% of its GDP) leaks out of the local economy every year through payment of its energy bill **[2,3]**. However, the research also shows that there are commercially attractive opportunities to invest £4.9 billion to exploit profitable low carbon measures that would cut the energy bill by £1.2 billion a year, paying for themselves within four years, creating 4,500 jobs in the low carbon goods and services sector and cutting the carbon footprint by 36%.

The research therefore demonstrates that there can be a compelling business case for major scale investments in low carbon options at the local level, and that this business case is supported by a wider social and economic case. This evidence base enables these investments to be made **[4]**. It also enables the production of league tables of the most cost and carbon effective measures available for the domestic, commercial, industrial and transport sectors, allowing more focused and incisive decisions to be taken both on policy and investment terms in different contexts. This work therefore provides a practical way of identifying opportunities and creating the preconditions for, but importantly also recognising the limits of **[5]**, approaches that seek to decouple economic growth from environmental impact.

Key researcher

Andrew Gouldson, Professor of Sustainability Research (2006-present) in the School of Earth and Environment, University of Leeds.

3. References to the research (indicative maximum of six references)

1. **Gouldson, A.** (2008) `Understanding Business Decision Making on the Environment', *Energy Policy,* Vol 36, 4618–4620. DOI: 10.1016/j.enpol.2008.09.047.
2. **Gouldson**, A., Kerr, N., Topi, C. Dawkins, E., Kuylenstierna, J. and Pearce, R. (2012) '*The Economics of Low Carbon Cities: A Mini-Stern Review for the Leeds City Region'*, report published by the Centre for Low Carbon Futures.
3. **Gouldson, A.,** Kerr, N., Topi, C., Kuylenstierna, J. and Pearce, R. (2013) 'The Economics of Low Carbon Cities: Approaches to a City-Scale Mini-Stern Review' in Simpson, R. and Zimmerman, M. (eds) *The Economy of Green Cities: A World Compendium on the Green Urban Economy*, Springer.
4. Sullivan, R., **Gouldson, A**. and Webber, P. (2012) 'Funding Low Carbon Cities: Local Perspectives on Opportunities and Risks', *Climate Policy*, vol 13, 514-529. DOI: 10.1080/14693062.2012.745113.
5. Bailey, I., **Gouldson, A**. and Newell, P. (2011) Ecological Modernisation and the Governance of Carbon: A Critical Analysis, *Antipode,* Vol 43, 682-703. DOI: 10.1111/j.1467-8330.2011.00880.x.

4. Details of the impact (indicative maximum 750 words)

Local level impacts

The research 'provided the evidence base that directly underpins' a new low carbon economic strategy for the Leeds City Region Local Enterprise Partnership **[A]**. It 'strongly informed' the development of an EU Structural Funds Programme for the Leeds City Region which has led to a minimum £66m of funding for a low carbon development programme, and it was 'the primary evidence' used for a Leeds City Region Revolving Investment Fund which has initial funding of £10m and is set to grow significantly **[A]**. It 'informed the development, and provided the business case' for, the Leeds City Region Green Deal Programme which will deliver energy efficiency interventions to at least 12,000 homes across the city region **[A]** at a value to Leeds of *c*.£44m **[B]**. It was 'used as the evidence base' for the City Deal for Leeds, where central government devolves powers and funding to local government. As a direct result of this, almost £4m of funding for direct delivery of local low carbon interventions has been secured in the last 12 months **[A]**. It was also "'one of the catalysts for' the establishment of the Leeds Energy Forum, a private sector grouping which has successfully paved the way for a £2.5m bid for European funding which if successful will aim to attract *c*.£65m in capital investment in low carbon energy infrastructure projects" **[B]**.

At a strategic level, 'by providing an economic case for investments in the low carbon economy, the research has moved the climate change agenda ... beyond its traditional territory in environment and sustainability and into the mainstream of policy making on employment, economic development, business, finance, energy and urban regeneration' within Leeds City Council **[C]**. 'This has enabled the city to ensure that carbon related issues are given a higher priority in decision making generally and in mainstream decisions on economic development in particular' **[C].** It has led supported the development and guided the activities of new 'Green Commissions' and 'Low Carbon Roadmaps'

in Birmingham **[D]**, and it directly informed a new energy strategy for Calderdale **[E]**.

National level impacts

The research has directly informed the strategic guidance on low carbon transitions issued to local authorities by the UK Committee on Climate Change **[F]**.

International level impacts

The research is now being replicated by researchers from the University of Leeds in Kolkata, India; in Lima Peru where it is supported by the Inter American Development Bank, the Peruvian Ministries of Environment and Energy, the Municipal Government of Lima and the Foreign and Commonwealth Office; and in Johor Bahru, Malaysia and Palembang, Indonesia where it is supported by the Malaysian and Indonesian national governments, by the regional development agencies and city governments and by the UK Foreign and Commonwealth Offices **[G]**. Because the research led to **Gouldson** being appointed as international advisor to the project team, the research directly fed into a China Council for International Cooperation on Environment Development (CCICED) Special Policy Study on environmental strategy and the transformation of the development mode in Chinese cities and regions. The results of this study were presented to senior Chinese politicians including Li Keqiang (recently appointed as Chinese Premier), Zhou Shengxian (the Minister for Environmental Protection) and Xie Zhenhua (Vice Chairman of China's National Development and Reform Commission) in December 2012. With the small number of CCICED reports commissioned in 2012, the research helped to reinforce the strategies and targets for strategic transformation and green growth that have now been introduced in the 12th five year plan for China **[H, I]**.

5. Sources to corroborate the impact (indicative maximum of 10 references)

A. Email letter from the Leeds City Region Green Economy Panel (Dated 23/08/2013).

B. Email letter from the Head of Sustainability for Leeds City Council (Dated 09/07/2013).

C. Email letter from the Chief Executive of Leeds City Council (Dated 27/09/2013).

D. Email letter from the Head of Sustainability for Birmingham City Council (Dated 29/08/2013).

E. See the *Calderdale Energy Strategy*, discussion on p11 and 12. (p. 29, 'Methodology' chapter – the first entry is the report produced by this research) at: http://www.calderdale.gov.uk/environment/sustainability/environmental-projects/energy-future.html

F. See discussion on the work by the Centre for Low Carbon Futures on p27 and 28 of Committee on Climate Change Report on *How Local Authorities Can Reduce Emissions and Manage Climate Risks* (2012) at: http://archive.theccc.org.uk/aws/Local%20Authorites/1584 CCC LA%20Report bookmarked 1b.pdf.

G. See project documents and contracts with the Foreign and Commonwealth Office in Peru **[G 1]**, and Malaysia and Indonesia **[G 2]**.

H. Email letter from co-chair of Special Policy Study group, Kadoorie Institute, University of Hong Kong (Dated 29/09/2013).

I. See copy of report from CCICED and description of CCICED meeting at: http://www.cciced.net/encciced/newscenter/ccicedactivities/201212/t20121214 243766.html