Response to the Stern Review

Professor Paul Fleming
Iraklis Argyriou
Andrew Wallace
Graeme Stuart

Institute of Energy and Sustainable Development
De Montfort University
The Gateway
Leicester
LE1 9BH

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1. Introduction

This response provides evidence that economic development at local and regional level can be compatible with the mitigation of climate change. In particular that investment in energy efficiency and renewable energy measures can increase economic growth.

2. The East Midlands Low Carbon Economy Vision

Work undertaken in January 2005 for the East Midlands Development Agency set targets for the economic activity within East Midlands region in the context of a low carbon economic development. Predictions based on the REEIO model show that there is a possibility for a decoupling of the economic growth from carbon emissions over time even **if no special action** is taken with the GVA/CO_2 ratio (in £1995m/Ktonnes) rising from nearly 1 in 2005 to 1.1 in 2010. This suggests that if additional measures are undertaken, such as large scale energy efficiency and renewable energy projects, even greater positive decoupling of the economy from CO_2 emissions can be achieved. Also, the model predicts the CO_2 emissions for the East Midlands as a whole and for the main sectors like power generation, transport, construction, and industry. All emissions are nearly unchanged up to 2015.

If this is the BAU (business as usual) scenario then low carbon investments can reduce emissions in future years. Also at regional level in England and Wales there is a huge potential for resource productivity gains that will bring increased profits and reduced environmental impacts. The REEIO model predicts the financial savings (in £m, 2000 prices) that could be made in each region. For East Midlands the figure is 227.21 £m (third higher) with the total reaching 2,265.81£m. With respect to the cost to the UK economy of the climate change policies it falls in the range of 0.5-2.0% of GDP by 2050. By comparison the estimates of GDP in 2050 are 300% of the present value. This means that reductions of emissions are compatible with strong economic growth.

The report presents metrics of a low carbon economy for East Midlands for the period of 2006-2010, like increase the GDP growth to 2.5% by 2010 (currently is 2.3.%), increase the proportion of businesses surviving their first year to 94% by 2010, increase the GVA per hour worked by an average of 0.7% per annum by 2010, increase the trend rate of GVA growth per capita to 2.5% by 2010 (currently being 2.0%), reduce the number of the wards in the East Midlands that are in the lowest quartile of the employment deprivation index to 120 by 2010, increase the percentage of electricity to be generated from renewable sources to 8.3% by 2010, increase the % of the workforce travelling to work on public transport to 10% by 2010 and finally increase the economic activity rates in cities and towns to 64.5% by 2010 (EMDA 2005).

3. Sustainable Housing Development

There are opportunities in the UK for zero emission housing developments. The anticipated scale of housing developments in the UK provides an exceptional opportunity to develop alternative models of energy supply and to drive the small scale renewable energy market. John Prescott announced this year that 1.1 million new homes will be built in the South East alone by 2016. A recent government commissioned review of housing concluded that 210,000 houses will need to be built each year throughout England to meet the demand for affordable homes. Yet the recent announcement about the generation plans for the Thames Gateway failed to guarantee that the communities to be built (including some 120,000 homes) will meet the highest achievable standards in terms of carbon emissions. A zero carbon Thames Gateway is technically feasible now, bringing with it environmental, social and economic benefits.

Technical cost studies have demonstrated that it is economically viable for government and the construction industry, and that residents could save money in the long term through lower bills. It is notable that people living in new zero emission homes could each save £94 a year on their energy bills compared to those living in new homes built to current standards (2002 building regulations). This represents nearly a 50% saving. The UK can learn from the experience of other countries. For example, a new home built to current UK building regulations will use on average 65% more energy than a home built in Sweden to Swedish building regulations. Denmark also has tighter building regulations than the UK. Finally, Germany installed 100 times more solar PV capacity on buildings than the UK in 2004 (Greenpeace 2005). Green buildings in the UK can earn higher rents and prices and attract tenants and buyers more quickly. They also cost less to operate and maintain (The Observer 2005)

4. Business Competitiveness

Many companies have found that reducing their carbon footprint can be cost effective and even profitable. For example, BP spent $20 million dollars implementing energy efficiency measures, but realised over $650 million in savings over three years as a result. Between 1990 and 2000 investing in energy efficiency allowed Dupont to hold energy use flat while increasing production 35% and saving the company $2 billion (The Climate Group 2005).

5. Market Development-Employment Creation-Emission Reductions

Market development could be seen high rises as a result of sustainable development activities. For example the World Energy Council projections indicate that cumulative investment in renewables will be worth between £500 billion and £1500 billion by 2020 (the start year is 2002). If UK wins just 5% of this figure then a £1 billion market will exist. Significant

employment creation can be achieved from the development of sustainable energy projects and industries. If wind turbine companies establish manufacturing bases in the UK, as Vestas have done at Macrihanish, then the number of jobs per megawatt could reach up to 22, in both direct and indirect employment in the manufacturing and supply of turbines and components and subsequent installation, operation and maintenance (Wilson 2002). Also the target of 20% electricity production from renewable energy sources requires significant investments in the renewable energy industry. On the supply side, two different potential technology mixes were used to test the sensitivity of outcomes to technology choice. In the first example wind power is the most substantial contributor. On land wind reaches 7,500MW by 2020, offshore wind 9,000MW. All the rest are under 500MW, except wave at around 1000MW, with PV at 300MW.

In the second example the mix of technologies included a greater amount of capacity from biomass and wave/tidal energy devices. On-land wind is only at around 3,900MW, offshore wind, 3,800MW, but biomass (energy crops and MSW) goes up to around 4000MW, while wave goes to 3000MW and tidal to 1000MW. By 2020, it was calculated that, to achieve these contributions, and meet the 2020 aspiration for a 20% contribution to electricity supplies from renewables, approximately £15-19 billion capital expenditure would be required, depending on the technology mix. The study concluded that as a result 17,000 to 35,000 jobs could be sustained by the industry (Energy Projects 2004).

An example of regional wave power exploitation in the South West coast of England called Wave Hub is notable. The Wave Hub would bridge the difficult gap between production prototypes and full commercial wave farms. It would also generate enough clean, renewable energy to power 14,000 homes (South West of England Renewable Energy Agency 2005). The Web Hub will provide the infrastructure necessary for several different companies to install arrays of wave energy generators in a favourable environment. The Wave Hub will comprise of an offshore connection point, a cable running to shore and a connection to the national grid via a substation (South West of England Regional Development Agency 2005). Wave Hub could create 100 jobs directly, and be a catalyst for the creation of an entire new industry building on the South West's traditional strengths of maritime and engineering expertise. The South West RDA is now identifying a range of support measures to encourage device developers to manufacture in the South West and export their expertise around the globe. The indirect benefits of such an industry are calculated at up to 450 new jobs and £15 million a year to the regional economy by 2010, rising to around 700 jobs and £27 million a year by 2020. At least 40% of these jobs and 20% of the GVA benefits could be realised in Cornwall.

The energy efficient upgrades of the Newark and Sherwood District Council housing is estimated that bring CO_2 savings of 12,000 tonnes per year and have created 639 job years locally (Friends of the Earth 1996). Also, the Peterborough rural energy efficiency project contributes to 428,000tonnes of CO_2 savings per year. Around £120,000 was spent on insulation and repairs, over 100 homes received funding from at least one source, and over 3,000 light bulbs were distributed (Energy Saving Trust 2005).

6 The Benefits from Energy Efficiency and Distributed Electricity Generation

Energy efficiency produces economic benefits because it is reduces waste. Wasting energy (i.e. consuming energy without gaining any benefit from it) simply increases sales of energy suppliers. The UK is a net importer of gas so wasted gas consumption is a fairly direct drain on the UK economy as we buy it from abroad unnecessarily. This includes the wasted gas from domestic, industrial and commercial use as well as that used for electricity generation. Any

improvements in efficiency of gas consumption reduces the nation's gas bill without reducing the benefits we obtain from burning gas.

Energy efficiency is a sound investment that in many cases is guaranteed to pay for itself fairly quickly. It can only be effectively implemented at a local and regional level. Once any initial investment is paid for (i.e. after the payback period), if efficiency levels are maintained (using sophisticated monitoring techniques of course) then the investment continues to generate savings that can be allocated elsewhere. If a long-term view is taken then savings from low cost energy efficiency measures can be used to fund more investment in energy efficiency thus generating even more savings. Once savings are allocated elsewhere in an organisation (or a home) any reduction in efficiency constitutes an extra cost that cannot be justified. Preventing this is a matter of good energy management (with effective monitoring).

As for electricity generation, there must also be benefits of moving from centralised power stations to a more distributed model. Generating electricity from efficient CHP district heating systems takes advantage of the free heat that was previously being dumped in cooling towers. This must be an economic benefit in terms of getting more out of every unit of fuel. Using locally produced biomass creates local employment and when coupled with large scale investment in energy demand management can contribute to both local and national energy autonomy.

Transporting energy wastes energy. Moving electricity from power station to end user results in a significant proportion of the energy being used to heat up wires providing no economic benefits. Heat distribution is similar but the problem can be mitigated by the use of insulation. Distributed generation reduces the distances between producers and consumers of energy thereby reducing the distribution overhead associated with every delivered unit.

Manage supply to make the most of local energy resources

The converting of energy sources (Solar radiation, natural gas, coal, wind etc..) into delivered energy (electricity, heat etc..) is done by a whole host of technologies both simple and sophisticated (passive building design, power stations, PV panels, boilers etc..). An **economically** efficient combination of these is one where the infrastructure and inputs are cheap and the output per unit input (the efficiency) is maximised. Renewable energy sources often have low conversion efficiencies but have inputs that are free (e.g. sun and wind). Technologies such as condensing boilers, CHP and heat pumps can provide very high conversion efficiencies.

Manage demand to reduce wasteful consumption

Delivered energy must be used effectively so that each unit is used for a purpose rather than being wasted. Both long term decisions (such as passive solar building design) and short term decisions (occupant behaviour, good energy 'housekeeping') have significant effects on energy demand. Though every unit of delivered energy has an associated cost (that is dependant on supply management above), little benefit (economic or otherwise) is gained from simply wasting it.

Energy efficiency is economically efficient, it simply requires an investment now for a long term benefit. Energy savings are available at low cost and at no cost. This presents an opportunity to develop a fund from cost savings for use in longer term energy investment.

7. Conclusions

Large scale developments of energy efficiency and renewable energy projects have multiple benefits for the UK. These include wealth creation, job opportunities, reduced CO_2 and air pollutant emissions and increased business competitiveness. Energy efficiency is the best means at local level to reduce energy consumption and emissions in a cost effective way whilst increasing economic growth.

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