

A multiple benefits perspective on energy efficiency

Sustainable cities: Energy efficiency and retrofit

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(DRAWING ON LESSONS LEARNED - EPSRC GRANT REF: EP/M00760X/1)



A wider policy perspective?

- Is it sufficient for energy policy actions to deliver on energy and environmental goals?
- *Need to gain wider public, political and policy support?*
- A new way of thinking.....multiple benefits?
- Not that new? 'Double dividend' argument (green taxation, CCL)
- Not just recognising policy trade offs anymore....



Consider current policy language



Harnessing the industrial opportunities from new energy technologies

In nuclear, the decision to proceed with the first new nuclear power station in a generation at Hinkley Point is accompanied by a commitment to develop a strong UK supply chain to support the sector, with EDF expecting over 60 per cent of the project's construction value to be placed with UK companies. In turn investment in nuclear skills – at college and university level – is upgrading both the domestic capacity to provide the labour required and the level of skills and income in the local workforce.

The pillars

7. **Delivering affordable energy and clean growth** – we need to keep costs down for businesses, and secure the economic benefits of the transition to a low-carbon economy.



Not just about the potential for benefits



The challenge

There are three major challenges for energy policy that our industrial strategy will address.

First, to ensure that the shift to a low carbon economy is done in a way that minimises the cost to UK businesses, taxpayers and consumers.

Energy efficiency may be a relatively 'easy sell'

- September 16 - Scottish Government inclusion of investment in energy efficiency in **post-Brexit economic stimulus package**
- Initial policy focus? – impacts on fuel poverty, public budgets.....output and job creation triggered by building activity to make homes and public buildings more energy efficient.... but how much **additional sustained activity?**



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**Exploring the Links
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Source: Lecca, P.,
 McGregor, P. G., Swales, J.
 K., & Turner, K. (2014).
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European
 Commission

Science for Environment Policy

Household energy efficiency could help boost the economy

Improving the energy efficiency of homes could have positive economy-wide impacts, recent UK research suggests. It would allow householders to spend the money they save on energy on other products and services. Although this additional demand and the associated production in non-energy sectors would partly offset the energy saved in the home, this 'rebound effect' does not completely outweigh the household energy savings.

This study explored the links between increased energy efficiency of UK households and the wider UK economy using 'general equilibrium' modelling. In particular, researchers investigated a potential 5% improvement in [energy](#) efficiency, which they assumed would occur as a result of technological improvements (e.g. more efficient appliances) that allow a household to continue operating at the same capacity, but using less energy.

Financial savings from this lower energy use will probably mean that householders use their appliances more than before, creating 'direct rebound effects'. This study also considered 'indirect rebound effects'. These occur because the cost savings allow householders to spend more money on goods and services other than energy. The energy used by other sectors that provide these goods and services can reduce the overall benefits of the initial improvement in household efficiency. To understand these rebound effects, the researchers assessed the energy usage of 21 economic sectors. These included four energy sectors (1. coal; 2. refined oil (and also nuclear fuel that goes to the electricity generation sector - analysed together with oil, as these two sectors were integrated in the study's source of data); 3. gas; 4. electricity) and 17 other sectors, including food, textiles/clothing and finance.

The model's results suggest that the 5% improvement would have positive effects on the national economy, because increased real income and spending on non-energy sectors has a greater economic impact than the same amount of spending on energy. The effects would

Energy efficiency has lasting stimulatory effects

- Further, and lasting, economic stimulus generated by what happens once increased efficiency takes effect
 - Increased disposable household income
 - Savings from lower energy bills redirected to spending on other things
 - Depending on how economy responds, some winners and losers
 - But potential for net lasting gains at economy-wide/macroeconomic level
- Even clearer story in efficiency improves in industrial energy use, particularly in energy and/or export intensive, or key upstream supply chain.....though still winners and losers



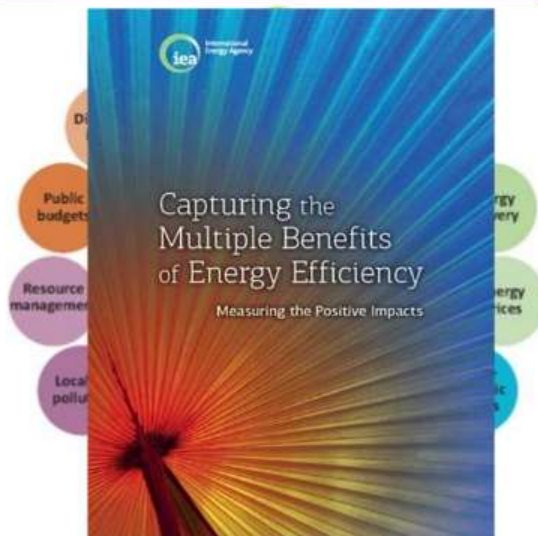
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Multiple Benefits of Energy Efficiency (IEA, 2014)

EE has multiple benefits

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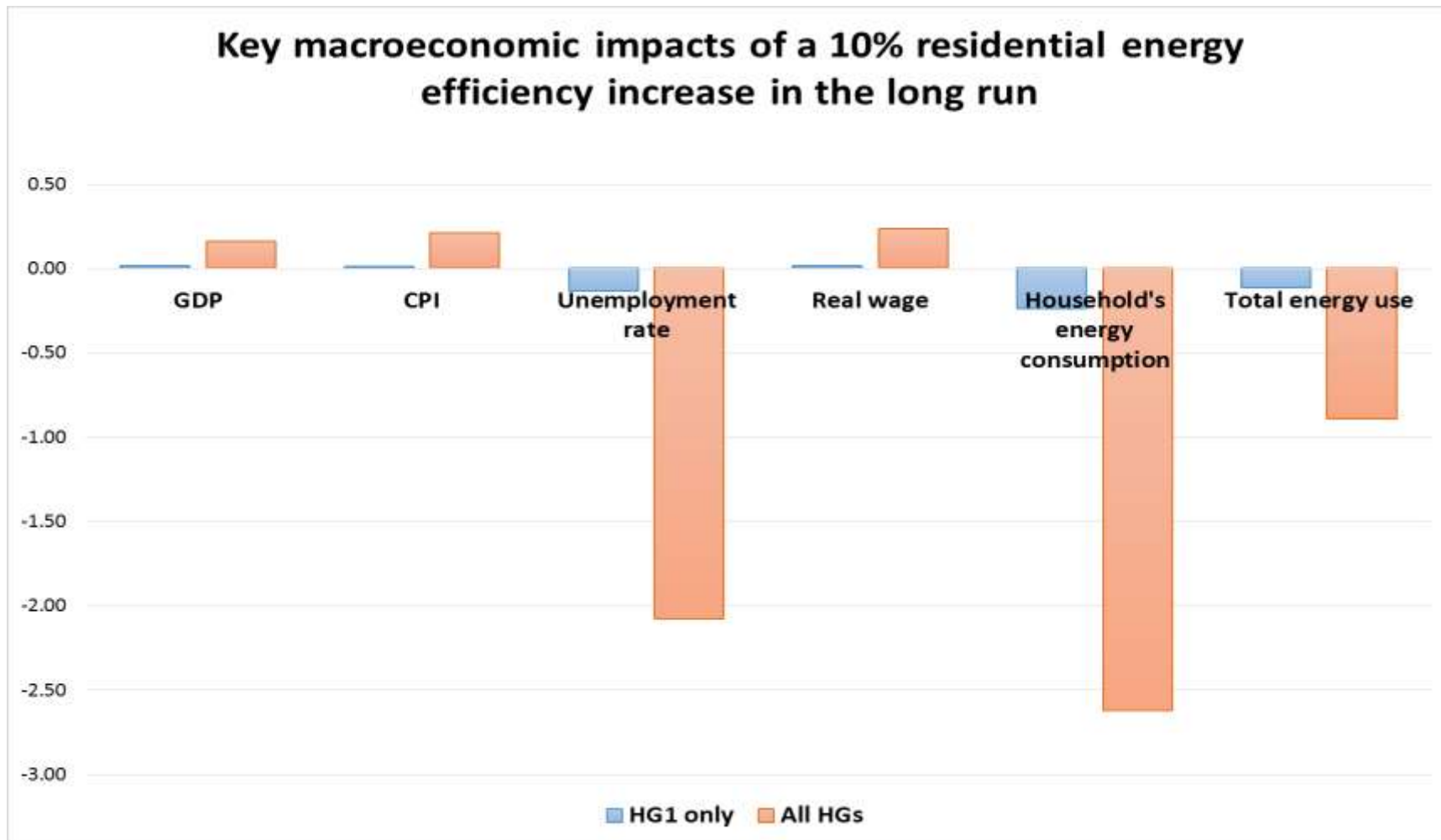


IEA (2014), *Capturing the Multiple Benefits of Energy Efficiency*, OECD/IEA, Paris.

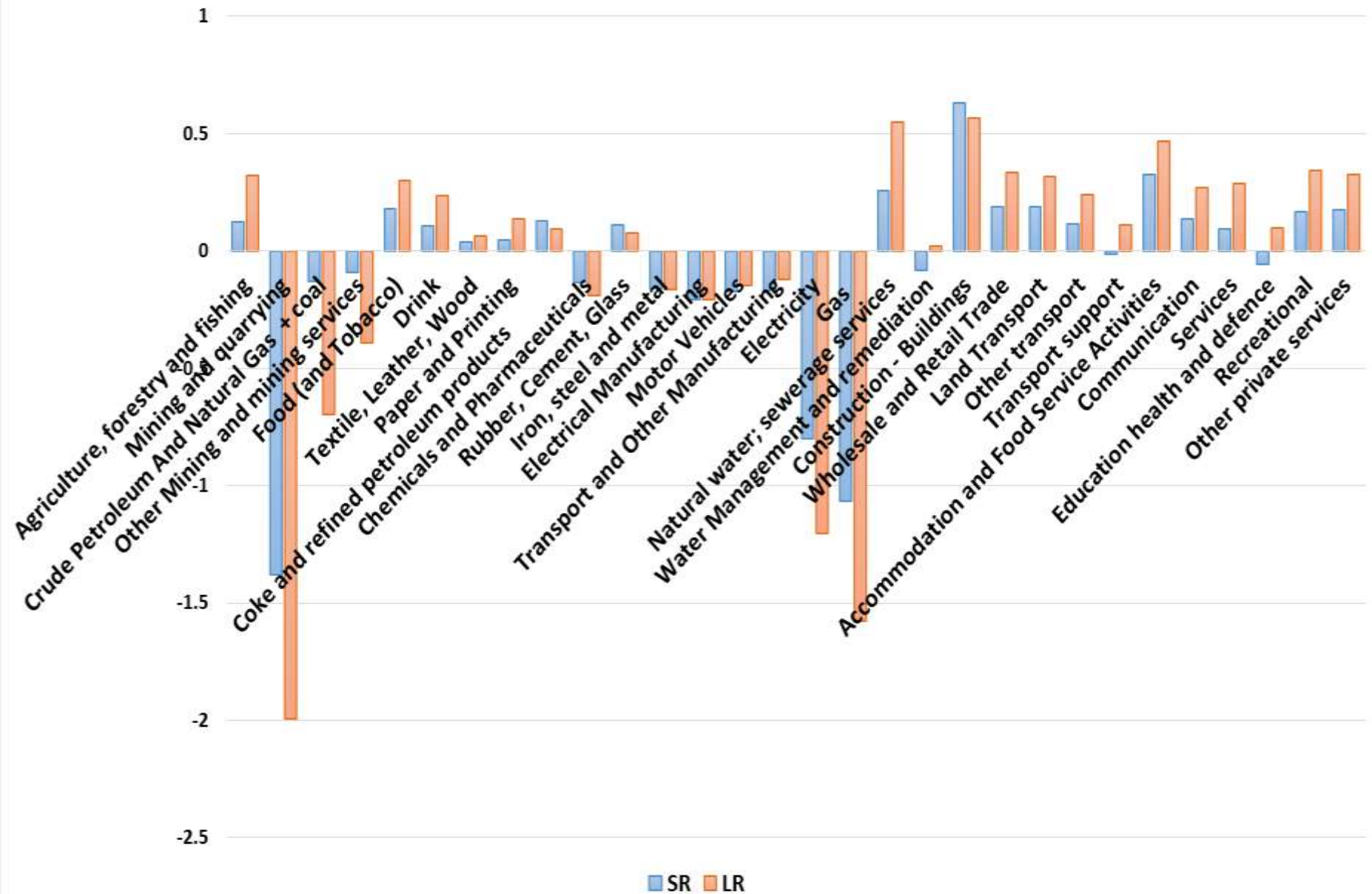




Experiment for the UK



Sector by sector gross output %change



Anticipated impacts of increased energy efficiency on the *production* side of the economy

- As with increased efficiency in household energy use, lowers marginal cost of energy services
- Decreased cost of production: may reduce output price, boosting economic productivity and competitiveness
- Both in sector where efficiency improves and downstream
- Process of ***productivity-led or cost-push economic expansion***
- *But net impacts on economy depend on extent of gains relative to losses where energy efficiency negatively impacts energy supply*



Key lesson learned?

- Need to consider different cases carefully – what type of efficiency improvement, what area of the economy, costs involved to realise efficiency improvement, who may gain and who may lose, over what time frame
- Where the economy expands, need to consider associated ‘rebound’ effects in energy use and impact on energy/carbon goals
- But basic idea of the multiple benefits framework holds
- Energy efficiency can do more than deliver energy savings and reduced carbon emissions
- But *who* recognises and values which benefits....relative to costs that *different public and private* actors may have to incur to deliver them
- The need, and opportunity, to consider and develop a (convincing and realistic) narrative