Department of Energy & Climate Change

UK Government analysis of energy efficiency policies: cost benefits analysis, headline metrics and macroeconomic impacts

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OVERVIEW

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- Policy appraisal framework
- Estimating jobs and investment for the Green Deal and ECO
- Macro-economic modelling

Policy appraisal framework

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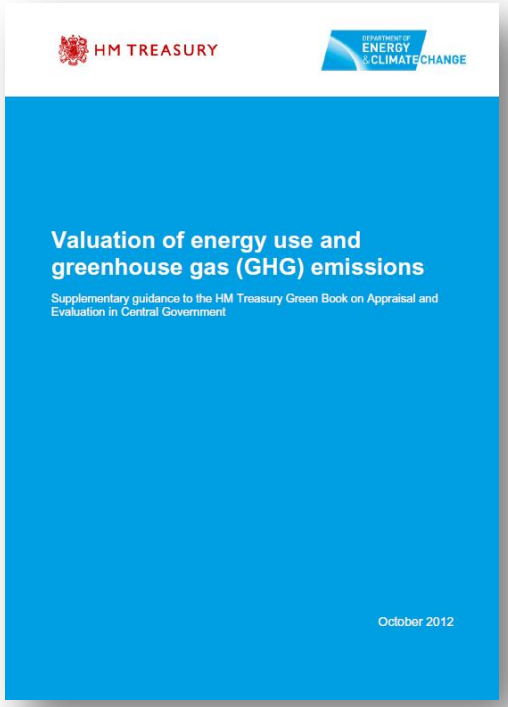
Components of cost-benefit analysis:

- Economic activity
  - capital costs
  - labour costs
  - finance costs
- Value of changes in energy consumption
  - long-run variable cost of energy supply
  - including impacts of the direct rebound effect (comfort-taking in domestic sector)
- Value of changes in GHG emissions
  - Emissions covered by the EU ETS
  - Emissions outside the EU ETS
- Distributional impacts and transfers
- Other impacts where appropriate, including health (air quality / thermal conditions); energy security; innovation rates; and changes in costs of meeting policy obligations / impacts on other policies



Modelling take up in the Green Deal Household Model

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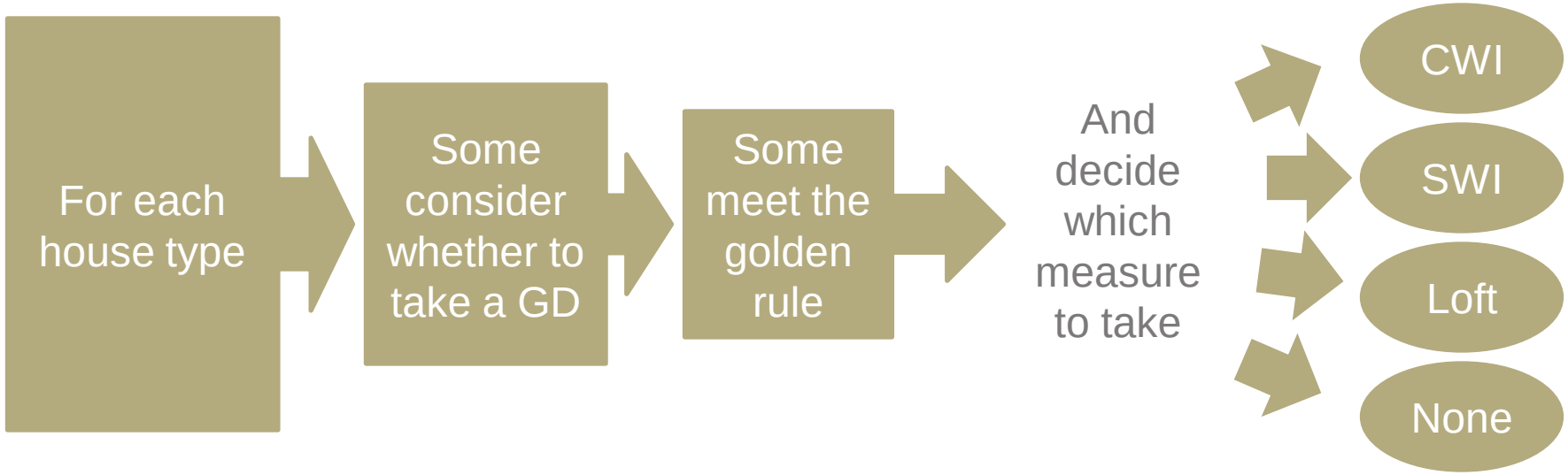
Housing stock divided into 3,866 different house types



ECO point supply curve for Carbon Saving Obligation in High, Central and Low uptake scenarios

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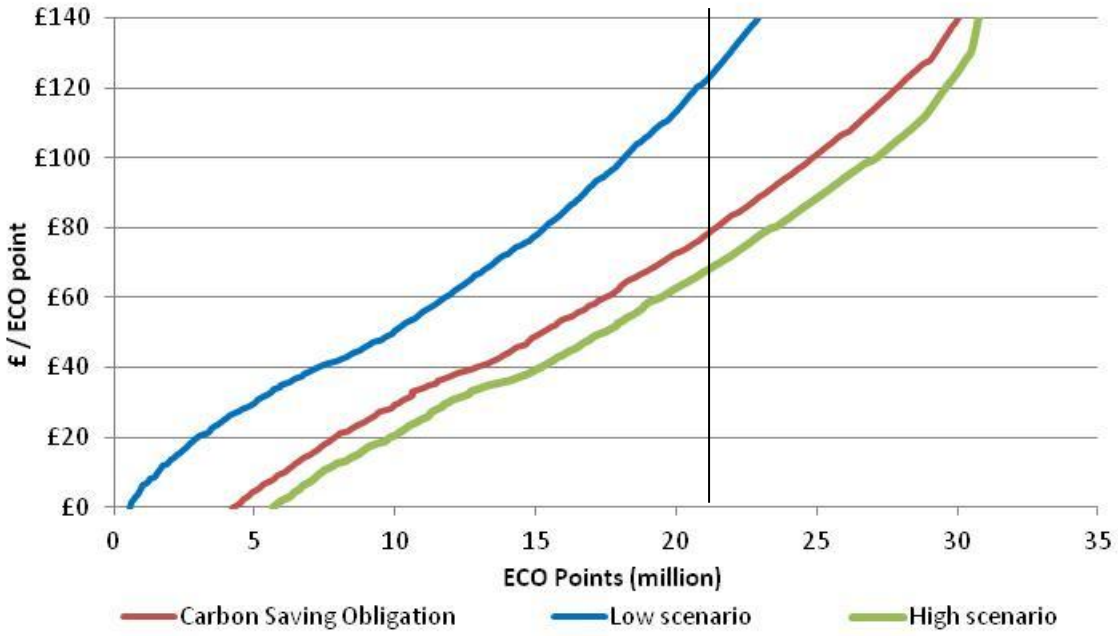

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Green Deal installations

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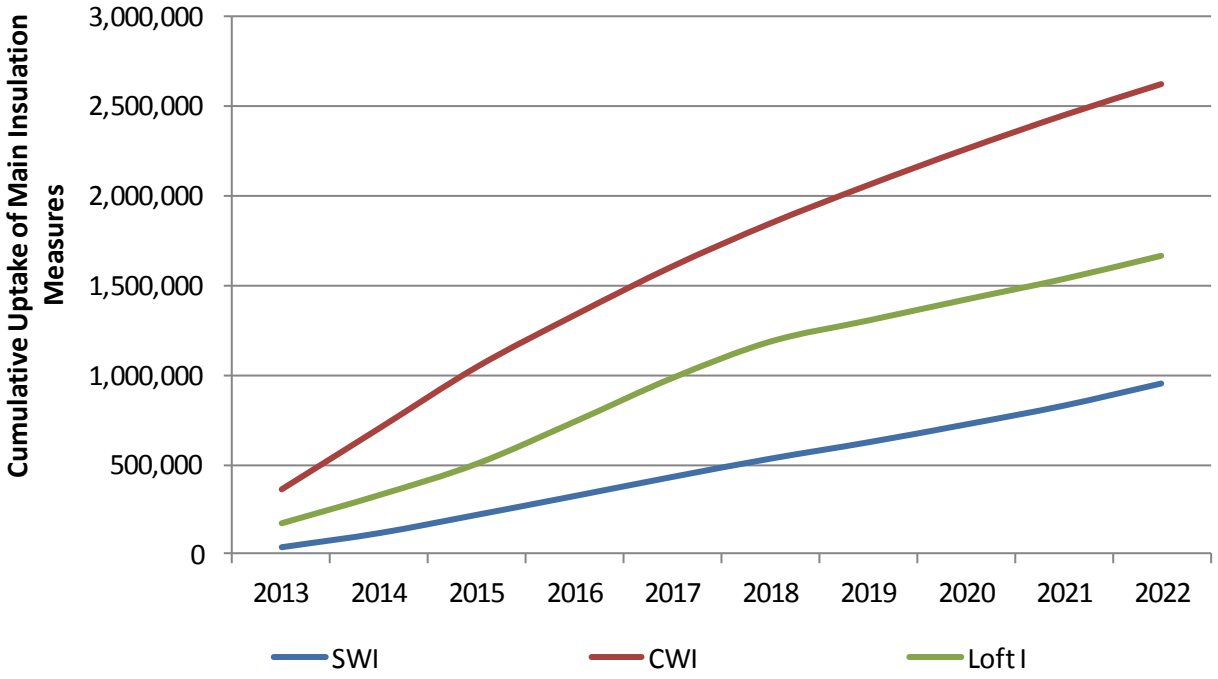

Green Deal: Job and investment impacts

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Jobs

Estimating the gross number of FTE posts required to install insulation measures

Installer Jobs	(Number of installations times days per insulation) / working days per year	Based on: industry estimates of labour requirements by measure
Supply chain jobs	Installer jobs x 4.75 (the Innovas multiplier)	Supply chain jobs estimated using installer to supply chain jobs ratio from Innovas report
Assessor jobs	(installations x 3) / working days per year	Estimated on the basis of 1 in 3 assessments leading to installation of a measure

Investment

Based on the capital costs of measures installed.
But no assessment of what investment is displaced

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Approach to estimating macro-economic impacts

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- Individual policies may not have a significant impact on their own (depending on the scale of the policy)
  - Interactions between policies are also important
- Modelling packages of measures
  - Using the HMRC CGE model
- When making general statements about the macroeconomic impacts of policies, draw upon economic theory and other evidence, e.g. from macroeconometric modelling

Macroeconomic evidence: impact of the Carbon Plan

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- HMRC **C**omputable **G**eneral **E**quilibrium (CGE) model: single country UK model; simulates economic behaviours and interactions of agents in economy; 19 sectors (incl. renewables, nuclear, gas, elec) & 19 products
- All markets are in equilibrium. Policies then ‘forced’ on to model (incremental capex, opex and changes in fuel consumption by fuel/sector). Agents adjust to resulting price changes until equilibrium restored. CGE model compares differences between baseline and policy scenario.
- Heavily dependent on fossil fuel prices & cost of low carbon technologies
- Modelling does not reflect all potential costs and benefits, e.g.: social factors like health benefits not included; innovation and productivity improvements not fully captured; largely assumes UK acts unilaterally.

Macroeconomic evidence: impact of the Carbon Plan

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- Results published in 2011 Carbon Plan (covering both energy efficiency and energy supply policies):
  - First three carbon budgets could be met at an average cost of around 0.4% of GDP over the period 2011-2022 (so level of GDP on average 0.4% lower due to policies)
  - The fourth carbon budget could be met at an average cost of around 0.6% of GDP over the period 2023-2027
- Working with HMRC to extend the model, in particular to fully capture productivity benefits of energy efficiency (by adjusting marginal production function and TFP)

The Energy Efficiency Strategy: General Case for macroeconomic impact of Energy Efficiency

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"Economic studies show that improved energy efficiency can bolster productivity, increasing growth and reducing inflation. A study of the Government's energy efficiency policy between 2000-2007 estimated that these policies increased the annual rate of economic growth by around 0.1 percentage points within that period. The study also estimated that these policies resulted in roughly 270,000 additional jobs in 2010 owing to the cumulative impact of higher growth."

Energy Efficiency Strategy, DECC, November 2012 quoting Barker, et al 2007

- Key (macro)economic areas for policy makers:
  - Jobs: through installing energy efficiency measures, in wider supply chain and through macroeconomic effects
  - Regional labour market conditions and the impact of energy efficiency
  - Productivity gains through cost-effective investments
  - Higher disposable income (and health benefits) to consumers
  - Innovation benefits and potential for exports
  - Improved energy security (internally and externally). Intermittency of renewable energy supply and reliance on imported fuel.