

Towards the delivery of a national residential energy efficiency programme:

creating the conditions in which we will halve the energy consumed in the UK's homes in 25 years

Christopher Jofeh, 8 February 2016



TISED

Trottier Institute for Sustainability
in Engineering and Design

UK	Canada
Chancellor of the Exchequer	Minister of Finance
Treasury	Department of Finance
National Health Service (NHS)	Medicare

What's Next After the Green Deal?

The Need for a New National Domestic Retrofit Programme for the UK

Keynote Address - Lord Deben, Chairman of the Committee on Climate Change





Source: Andrew Hazard Photography and Design

Structure of the talk

- The size of the challenge
- Benefits to the UK
- Creating and maintaining demand at scale
- The main components of a national residential energy efficiency programme
- Creating the right conditions
- Making the business case
- Outline timetable
- Indicative uptake

The size of the challenge

ELIZABETH II

c. 27



Climate Change Act 2008

1 The target for 2050

- (1) It is the duty of the Secretary of State to ensure that the net UK carbon account for the year 2050 is at least 80% lower than the 1990 baseline.

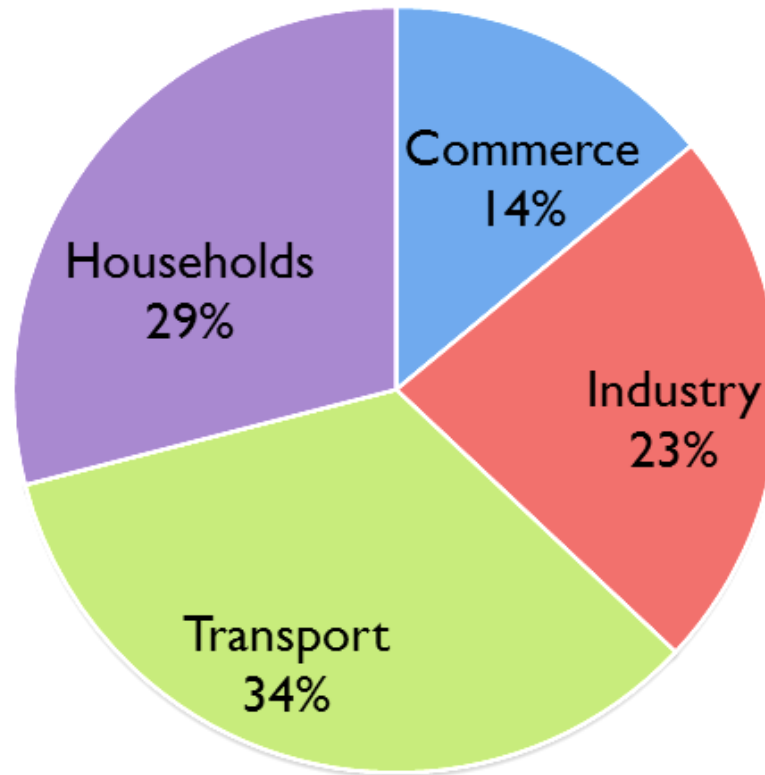


“Current ambition and funding commitments are inadequate for meeting carbon budgets and further funding is likely to be needed to meet the proposed EPC targets.”

Main recommendation for buildings

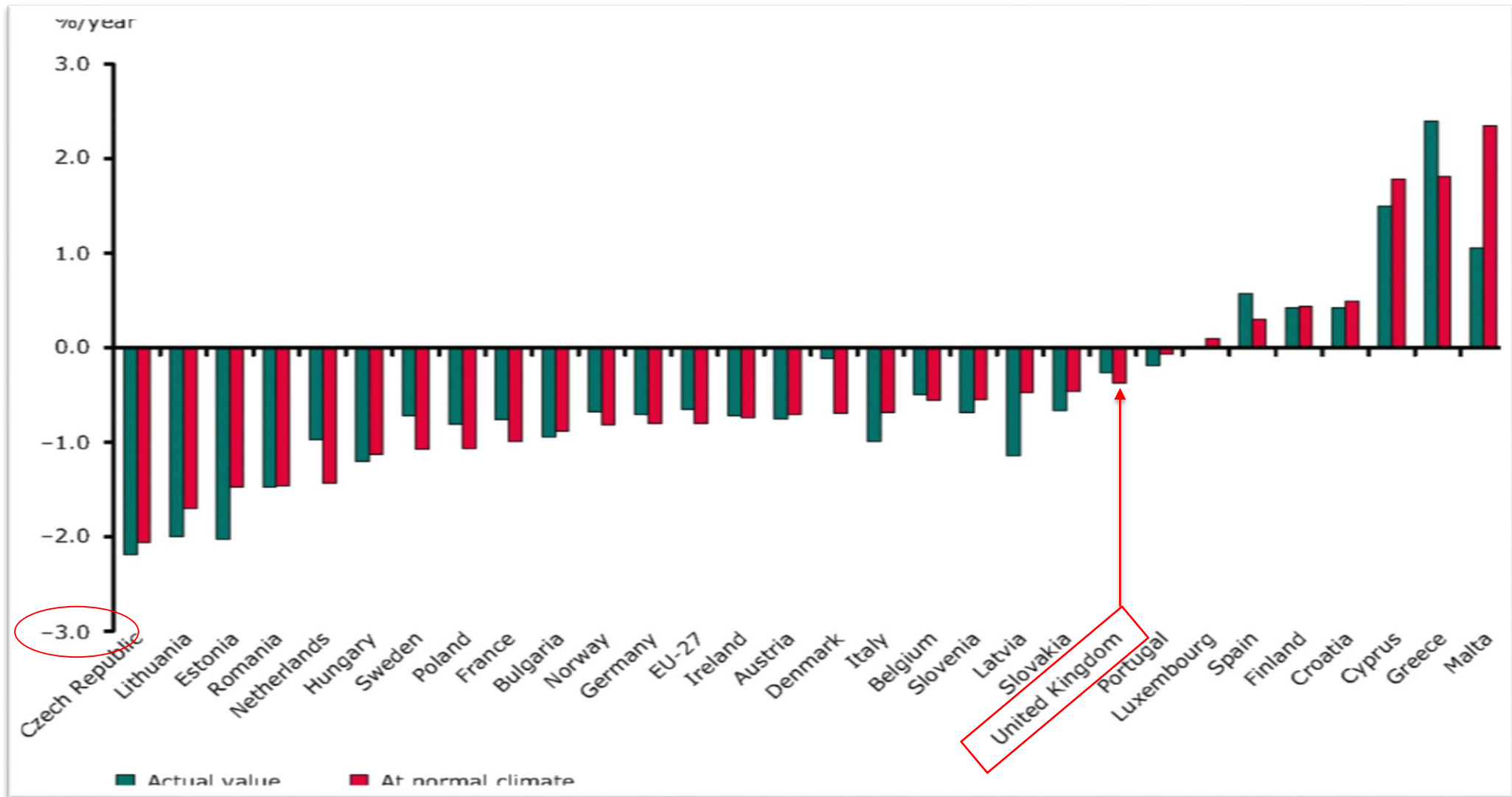
“Develop an action plan to address the significant shortfall in low-carbon heat, ensuring a better integration with energy efficiency and fuel poverty.”

UK Energy consumption by sector



- Households consume 29% of total energy
- Average energy consumption per dwelling ~18 000kWh

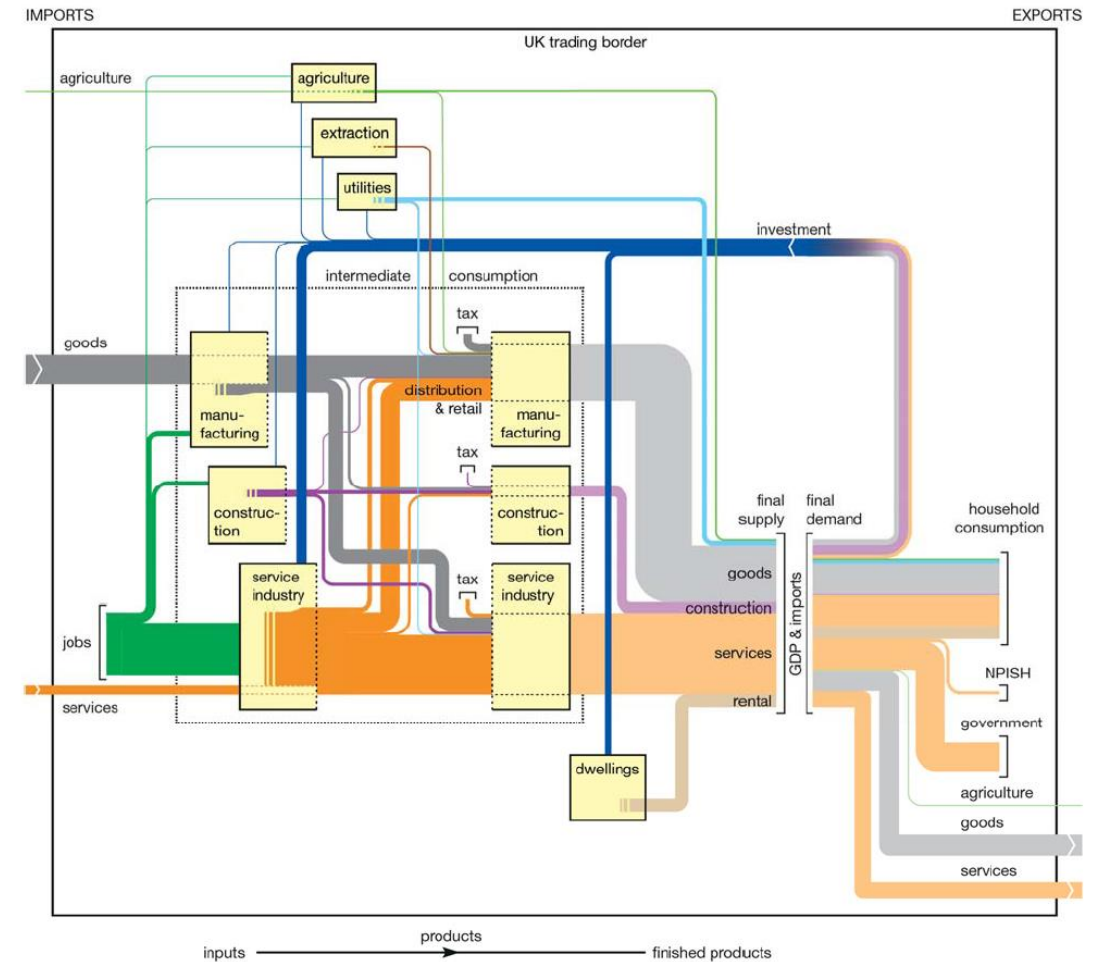
Source: Eurostat



Annual rate of change of energy consumption per dwelling, 1990-2009.

Source: European Environment Agency, 2012

“The 7see model demonstrates that the low-carbon scenario does indeed reduce emissions while maintaining economic growth and, importantly, avoiding any increase in unemployment.”

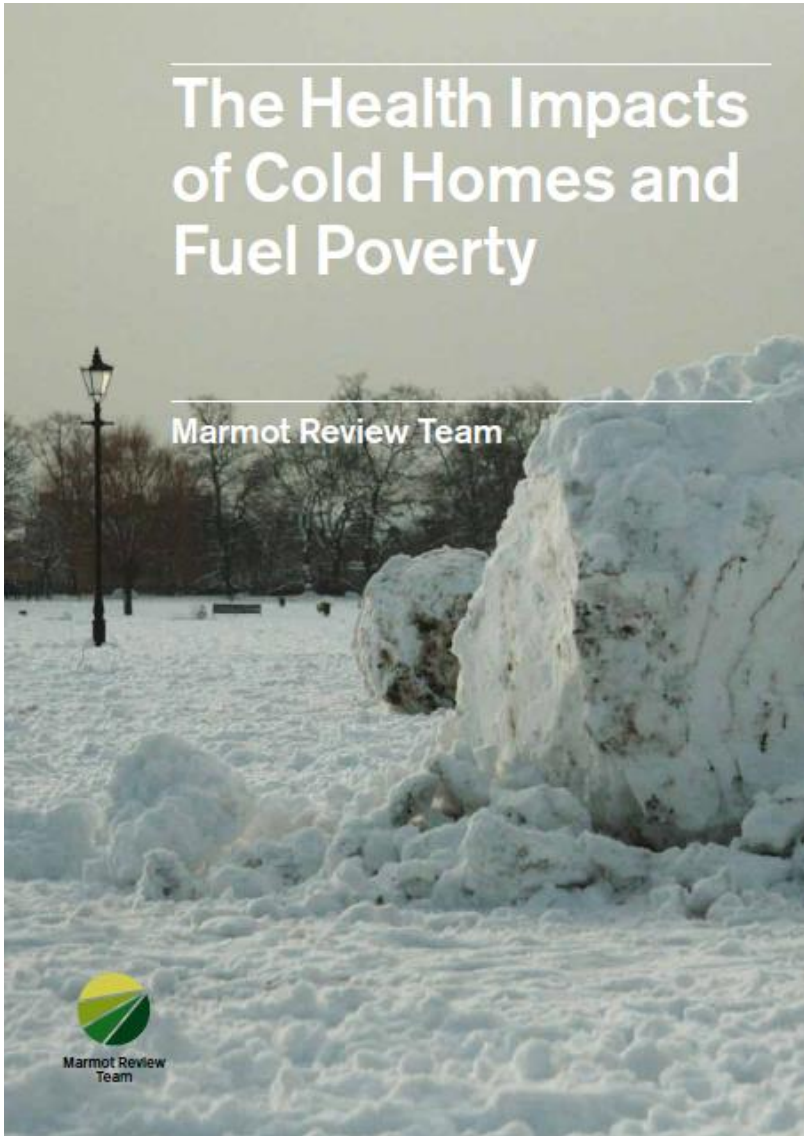


Tenure of properties in the UK. Source: DCLG, 2014

Thousands of dwellings						
Year	Owner Occupied	Rented Privately or with a job or business	Rented from Housing Associations	Rented from Local Authorities	Other public sector dwellings	All dwellings
2012	17,835	4,920	2,747	2,189	75	27,767

Official fuel poverty estimates for different parts of the UK (multiple sources, 2014)

Nation	Number of households (million)	In fuel poverty (million)	Proportion in fuel poverty
England	22.1	2.39	11%
Scotland	2.37	0.64	27%
Wales	1.30	0.39	30%
Northern Ireland	0.70	0.30	42%
Totals	26.5	3.7	14%



[uk/latest-news/archive/cold-homes-cost-nhs-1-point-36-billion/](#)
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Over half of people aged 65+ targeted by fraudsters

Spend on social care tumbles

Life in Britain has got worse, say third of over-65s

Winter fuel payments prevent 12,000 deaths yearly

Developing countries face ageing revolution

Social care spending falls by £1.1billion

Age UK calls for safeguards on pension reform

Cold homes cost NHS £1.36 billion

Source : Richard Brooks
Published on 22 November 2012 12:01 AM

But Age UK says improving energy efficiency could help save lives and money.

Cold homes are costing the NHS in England £1.36 billion every year in hospital and primary care due to their devastating impact on older people's health, according to new analysis by Age UK.

In its new report 'The Cost of Cold', published today, the charity warns of a hidden public health scandal as thousands of older people continue to die prematurely from cold-related illnesses because their homes are too cold.

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Hypothermia is not the biggest killer

Each year there are around 27,000 excess winter deaths, most of them among older people and caused by respiratory problems, strokes and heart-attacks due to cold temperatures - 15 times the number of road deaths.

Corsham

[Change location](#)

Your Age UK

Click on the map below to see everything that Age UK offers in your areas.

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See what Age UK does in your area.

Energy efficiency

'Boiler on prescription' scheme transforms lives and saves NHS money

Pilot project in Sunderland hailed a success with GP and outpatient visits reduced by a third and heating bills cut by £30 a month

Damian Carrington

@dpcarrington

Tuesday 9 December 2014 16.01 GMT



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This trial boiler on prescription scheme in Sunderland was seen to make a 'massive' difference to people's lives, raising temperatures by 3C and saving £30 a month. Photograph: Gentoo

Family doctors prescribing double glazing and loft insulation for patients living in cold, damp homes can transform lives and slash the huge sums spent by the NHS on cold-related ill health, a ground-breaking trial has shown.

The pilot project in Sunderland found GP and outpatient visits plummeted by a third after patients' homes were made warmer and cheaper to heat to the tune of

Boilers on Prescription The Gentoo story so far

Paul Burns, Green Futures Manager
Gentoo Group





ResPublica
Recommends...

After the Green Deal: Empowering people and places to improve their homes

by Dr Jan Rosenow and Richard Sagar

Britain's current energy efficiency policy has failed. The number of home-owners fitting energy saving measures in their homes has plummeted in recent years and the industries supplying them have suffered low demand and job losses. This needs to change. Energy efficiency is too important to be ignored or botched. In this report we outline the multiple benefits of domestic energy efficiency, the primary problems with the previous approach (the Green Deal), and we propose an ambitious and practical set of recommendations to engage consumers, drive demand and enable consumers to improve the energy efficiency of their homes.

The Benefits of Energy Efficiency

Improving the thermal efficiency of the UK's housing stock has multiple benefits. Alongside reducing energy demand, driving down carbon emissions and reducing consumers' energy bills, there are also demonstrable positive impacts to public health and wellbeing.¹ It is in this context that a recent International Energy Agency (IEA) report stated that the most important fuel for the future is energy efficiency.² Likewise, the IEA's 2050 mitigation scenarios indicate that energy efficiency is the most important carbon reduction measure. This is because the cheapest energy is energy we don't use. Energy efficiency and reducing energy demand are the most effective and cost efficient means to reduce carbon emissions. The most recent

report from the Intergovernmental Panel on Climate Change (IPCC) also allocates a key role to energy efficiency in all of their mitigation pathways.³

(Figure 1 see next page)

Analysis by Ricardo AEA for the UK Committee on Climate Change also demonstrated that energy efficiency plays a crucial role in UK climate change mitigation.⁴ Our homes offer the significant potential for relatively cheap and substantial energy savings, particularly as Britain has one of the least housing stocks in Western Europe.⁵ In addition, evidence from Public Health England has shown that there are significant potential public health gains from a robust programme of energy efficiency.⁶

In the past few decades, substantial efforts were made to tap into the potential carbon savings offered by energy efficiency. Traditionally, policy focused on reducing energy demand in the UK via incentivising energy efficiency improvements, consisted of a wide ranging portfolio of measures involving regulations for new buildings and major alterations of existing buildings, taxpayer funded grant programmes (including Warm Front and similar programmes in devolved administrations), and, most importantly in terms of scale, energy or carbon savings obligations (the Carbon Emissions Reduction Target (CERT) and its predecessors).⁷



The future of the Energy Company Obligation (ECO)

Improving the energy efficiency of the UK's housing stock has an important role to play in overcoming the UK's energy and climate change challenges. Moreover, at a time of squeezed household incomes, energy efficiency offers an attractive long-term solution to managing consumer bills.

However, efforts to reap the benefits of retrofitting the UK's housing stock have not delivered their full potential and there remain a range of challenges that must be overcome, including establishing a successor to the Energy Company Obligation that better delivers for fuel poor households as an urgent priority, whilst paving the way to a sustainable energy market.

Energy efficiency is a vital part of a long-term approach to meeting our energy and climate change challenges and helping consumers manage their energy bills.

Energy efficiency is a key part of a long-term approach to managing consumer bills, reducing carbon emissions and easing pressure on security of supply. There are also wider advantages including the economic benefit of creating jobs in this sector, and the health benefits that come from living in warmer, more comfortable homes.

However, in light of recent cuts to the Green Deal Home Improvement Fund (GHIF), no further funding for the Green Deal Finance Company, and the scrapping of Zero Carbon Homes, there is growing uncertainty around the future of energy efficiency policy. Indeed, there has been little indication of the government's intentions beyond the Conservative manifesto pledge of supporting the delivery of low-cost energy efficiency measures to a million more homes over the course of the parliament. The government recently commissioned a review that will consider some aspects of energy efficiency challenges, but the broader direction for policy remains to be considered, clarified and confirmed.¹

The CBI's January 2015 policy briefing, *Effective Policy: Efficient Homes*, called for energy efficiency to be designated a national infrastructure priority.

¹ The government commissioned a review by Dr Peter Bonfield, BRE Chief Executive, who will consider standards, consumer protection and the affordances of energy efficiency schemes.

Helping hard working families to reduce their energy bills

Proposals for a national infrastructure programme

September 2015

Summary

Annual home energy consumption is equivalent to all UK gas imports. Despite being such a significant cost to UK plc, UK homes still waste more energy than almost all others in Western European nations. This has national implications: high fuel bills rank as one of householders' biggest concerns, over two million fuel poor households remain unable to adequately heat their homes, cold homes are estimated to cost the NHS £1.3bn per year, while concerns over energy security, additional energy infrastructure investment and the impact on climate change persist.

This is not to say that progress has been slow. Over the last 8 years domestic gas consumption has fallen by 30% and over the last 3 years domestic electricity use has reduced by 4% through various energy efficiency initiatives. In other words, the UK's domestic gas bills would have been 30% higher had this progress not been made. The challenge is how to continue this downward trajectory for energy demand, by reducing waste across all tenures and at scale, within the context of ensuring the UK 'lives within its means'.

Past initiatives have focused primarily on heavily subsidising measures. This approach was in response to the dichotomy that householders are very concerned about high energy bills but reluctant to invest in improving the energy efficiency of their home - even though this is economically rational and provides a more comfortable home. There is a market failure.

Recognising the national benefits of an energy efficient housing stock, as well as the need for the country to live within its means, energy efficiency should be classified as a national infrastructure priority. A national retrofit programme would have significant economic, environmental and social benefits for the UK. Cambridge Econometrics have modelled the macro economic impacts of a major national investment programme and shown that it would represent 'high value for money' as an infrastructure investment, returning £3.20 in increased GDP and £1.27 in tax revenues per £1 of government investment.¹

This paper proposes a combination of light-touch regulation, low interest loans and carefully targeted grants in order to deliver continued energy demand reduction at the pace required. Together these provide a framework for a national infrastructure programme which can help all UK householders to reduce their energy bills. The proposals need to be considered in the context of current policies to ensure a smooth transition and minimise disruption for the supply chain.

Helping the market to work - addressing the market failure

Householders, and the market generally, are not valuing homes that have lower energy bills. A different mind-set needs to be created if householders are to invest their own money in improving their situation. Different structural demand drivers are needed to encourage action in each housing sector.

For homeowners a SDLT Home Energy Adjustment is proposed to draw attention to the energy performance of a property at the point of sale / purchase coupled with consequential improvement

Bonfield floats proposals for Green Deal alternative

23 September 2015 | By Yousof Farah

Options include mass retrofitting of housing association homes and improved mortgage rates for green properties

The man leading the government's hunt for policies to replace the Green Deal, Peter Bonfield, is exploring proposals including mass retrofitting of housing association homes and improved mortgage rates for green properties, Building can reveal.

Speaking exclusively to Building, Bonfield said early proposals included rolling out energy efficiency improvements in housing association properties and investigating how mortgage and loan rates can be linked to energy efficiency in homes, with favourable rates for higher energy performance certificate-rated homes.

The Bonfield Review, co-commissioned by energy secretary Amber Rudd and communities secretary Greg Clark in July - was launched to come up with cost-effective energy efficiency schemes to replace the scrapped Green Deal, with an emphasis on consumer-focused ideas.

The review has since gathered momentum, with over 150 business leaders from across the energy and retrofit sectors attending a DECC workshop in London this month to submit and discuss ideas.

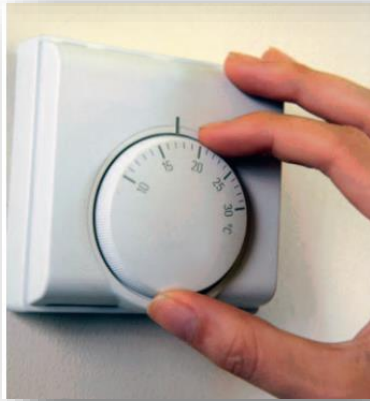
One focus will be insulation, looking at how we can get through to people to get it installed

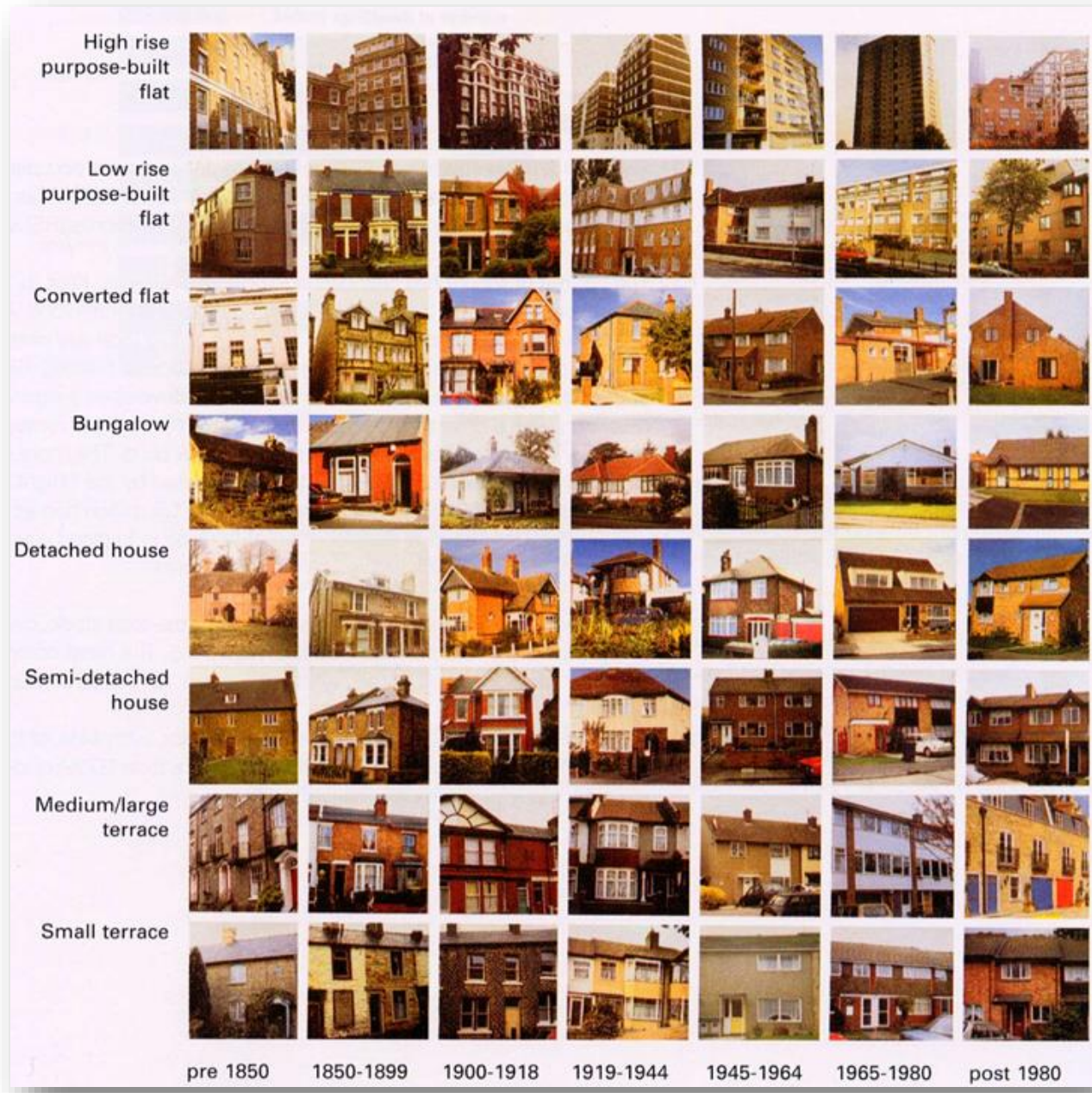
ResPublica

CBI

UK-GBC

Bonfield review





Source: bre

The benefits to the UK





**Energy efficiency:
An infrastructure priority**

September 2015

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Hard facts. Clear stories.



Multiple benefits of investing in energy efficient renovation of buildings

Impact on Public Finances

Commissioned by Renovate Europe
5 October 2012



Building the Future:

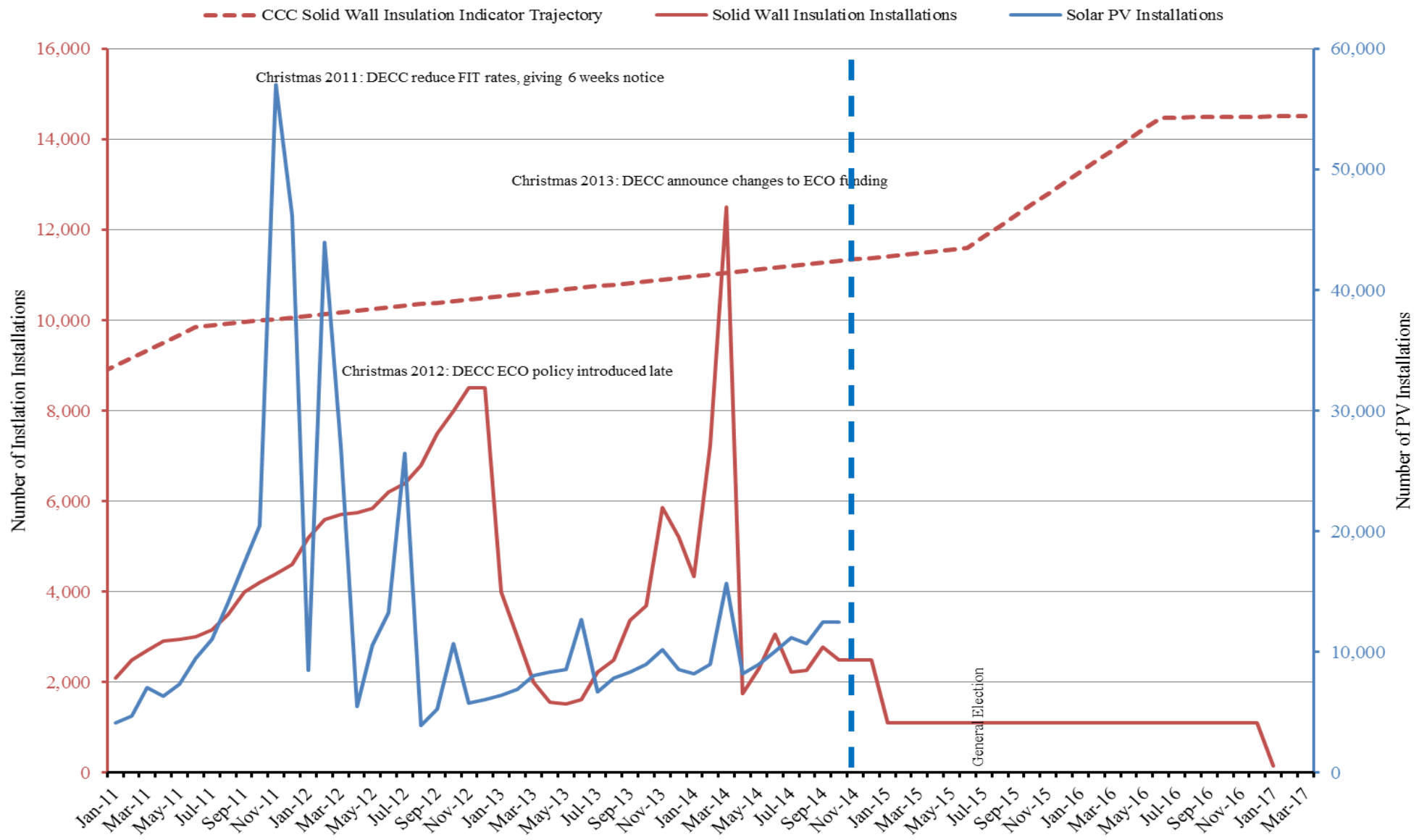
The economic and fiscal impacts of making homes energy efficient



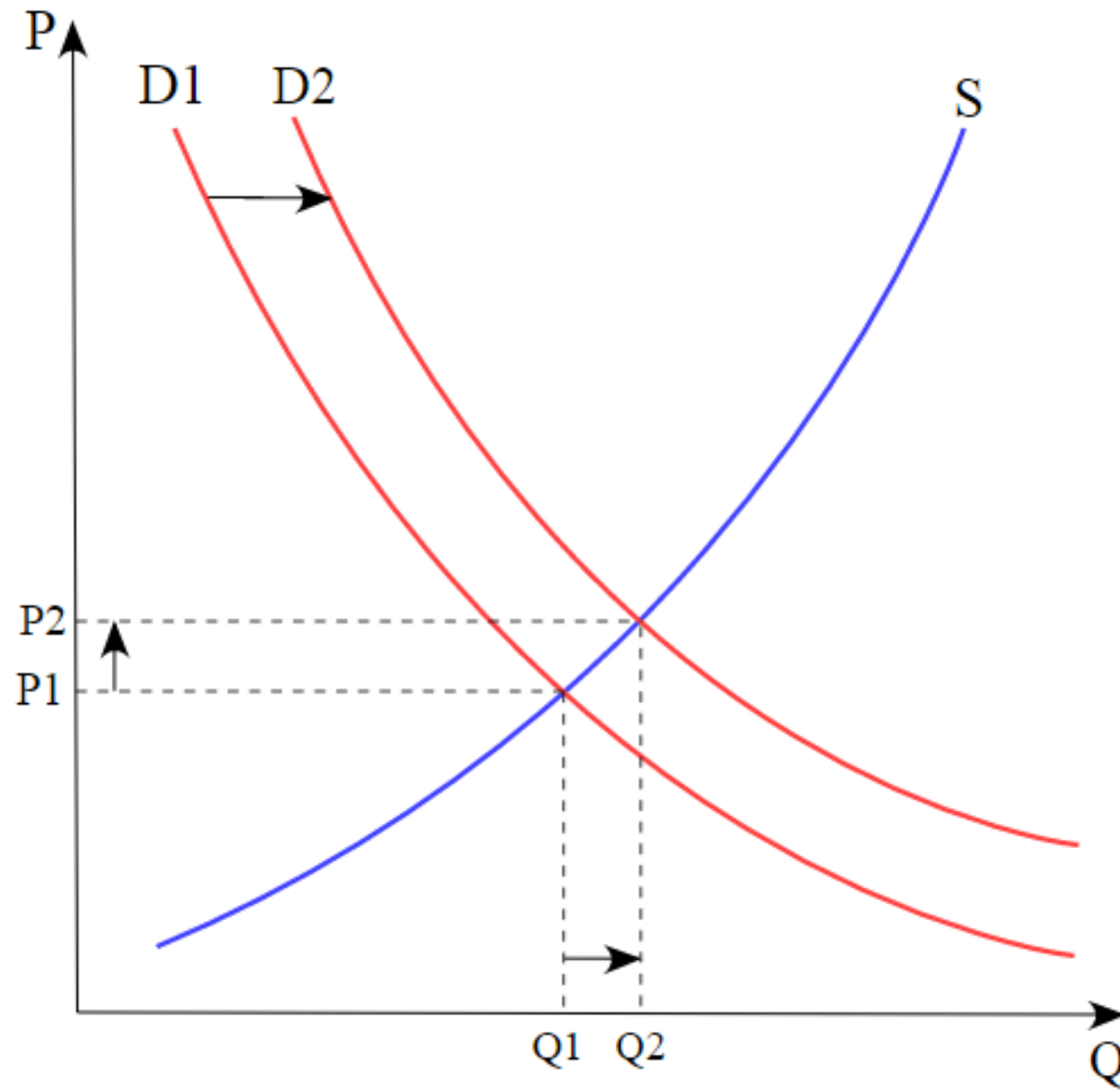
- **£3.20 returned through increased GDP per £1 invested by government**
- **0.6% relative GDP improvement** by 2030, increasing annual GDP in that year by £13.9bn
- **£1.25 in tax revenues per £1 of government investment**, through increased economic activity, such that the scheme has paid for itself by 2024 and generates net revenue for government thereafter
- **2.27 : 1 cost benefit ratio** (Value for Money), which would classify this as a “High” Value for Money infrastructure programme
- **Increased employment by up to 108,000 net jobs per annum over the period 2020-2030**, mostly in the service and construction sectors. These jobs would be spread across every region and constituency of the UK.
- **23.6MtCO₂ reductions per annum by 2030**, after accounting for rebound effects. This is roughly equivalent to cutting the CO₂ emissions of the UK transport fleet by one third.
- **Improved health and reduced healthcare expenditure**, due to warmer and more comfortable homes, and improved air quality. For every £1 spent on reducing fuel poverty, a return of 42 pence is expected in NHS savings.^{5 6}
- **A more resilient economy**, less at risk of shocks in gas prices, as the economy becomes less reliant on fossil fuels. Investment in energy efficiency in the domestic sector will result in a 26% reduction in imports of natural gas in 2030, worth £2.7bn in that year.

Creating and maintaining demand at scale

Policy Mechanism	Status
Energy Efficiency Commitment (EEC)	Introduced 2002 Overhauled 2005 Withdrawn 2008
Carbon Emissions Reduction Target (CERT)	Introduced 2008 Withdrawn 2013
Community Energy Saving Programme (CESP).	Introduced 2009 Withdrawn 2012
The Green Deal	Introduced October 2012 Withdrawn July 2015
Energy Company Obligation (ECO)	Introduced January 2013 Now under review, future currently unclear.



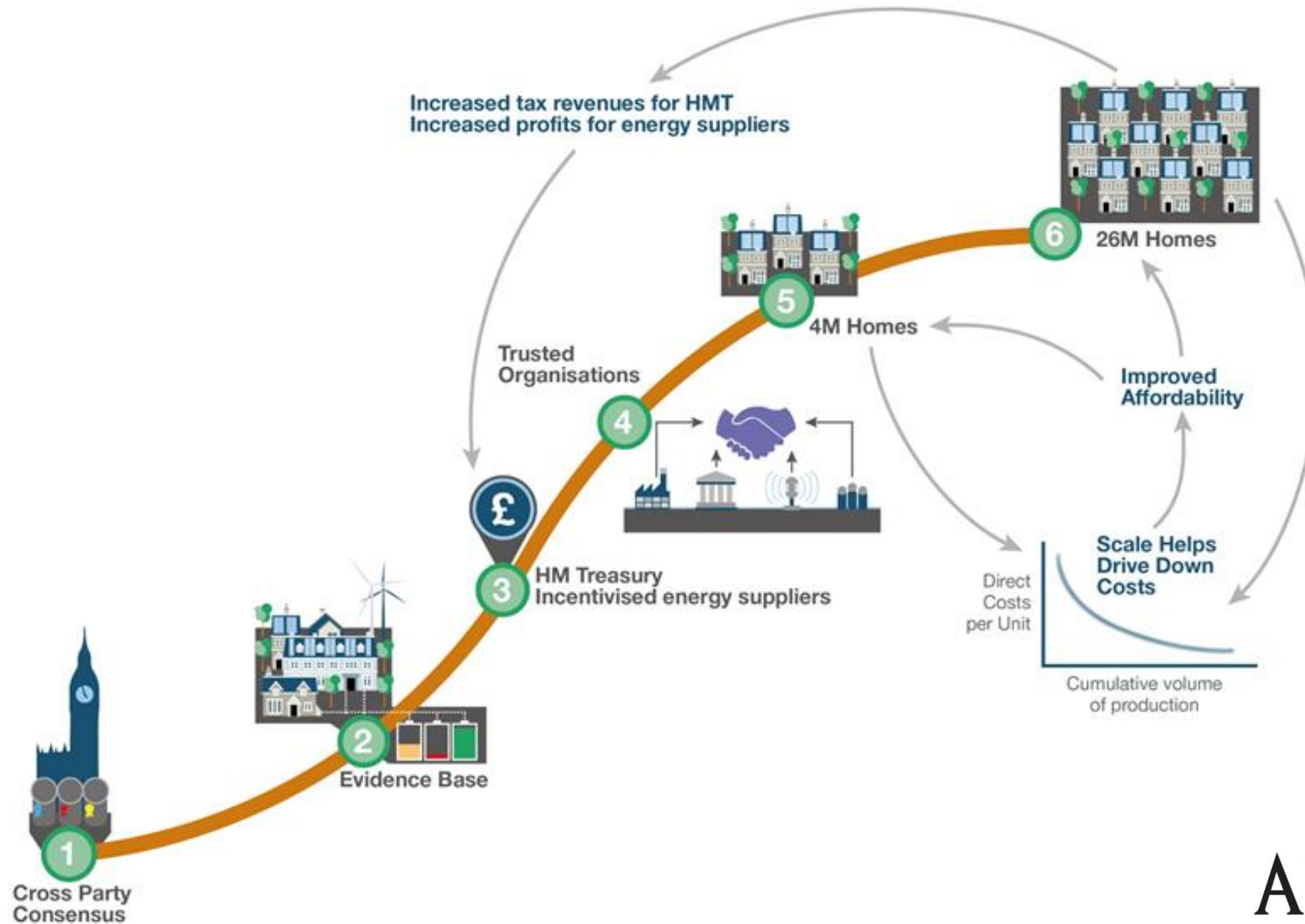
Source: DECC



Source: wikipedia

The main components of a national residential energy efficiency programme

The Delivery of a National Residential Retrofit Programme



By 2045 the energy consumed in the UK's homes will be halved

Create and maintain demand at scale

- Begin with a publically-funded scheme for homes in social ownership and fuel poverty
- Attract private sector investment
- Design around homeowners to create market pull

Learn and disseminate lessons from research and experience

- Build on what devolved administrations, local authorities, registered social landlords and private landlords have achieved already
- Draw out knowledge & insights from the data that exists
- Identify gaps in knowledge and undertake research to fill gaps
- Carry out pilots to test ideas

Create appropriate governance framework

- Learn & apply lessons from relevant projects such as London 2012, Crossrail, the digital switchover, smart meters and North Sea gas conversion
- Build on existing communities & networks



Creating the right conditions

Creating the right conditions

- Build on what we have achieved already, and on what is underway
- Use the data we have gathered
- Build on existing networks
- Industry needs to apply the principles of lean manufacturing and mass customization to retrofit
- Make the right funding available
- Design around the customers to create market pull



Devolved administrations

Wales Arbed and Nest

Scotland Home Energy Efficiency Programmes for Scotland (HEEPS)

Northern Ireland The Affordable Warmth Scheme

Housing Associations

Affinity Sutton

Charter Homes

Fusion21

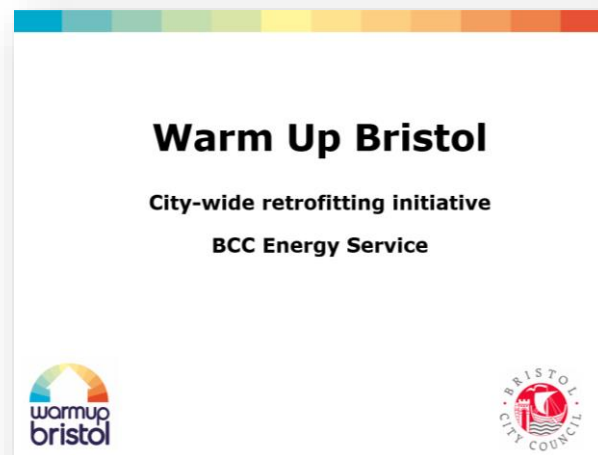
Gentoo

HHP

Melin Homes

Poplar Harca

etc., etc.



Local Authorities

Birmingham Energy Savers

Glasgow Energy Efficiency Loan Scheme EELS

Greater London Authority Retrofit Toolkit

Islington Council fuel poverty initiative SHINE

Leeds City Region Better Homes Yorkshire (Barnsley, Bradford, Calderdale, Craven, Harrogate, Kirklees, Leeds, Selby, York)

Sussex Energy Saving Partnership

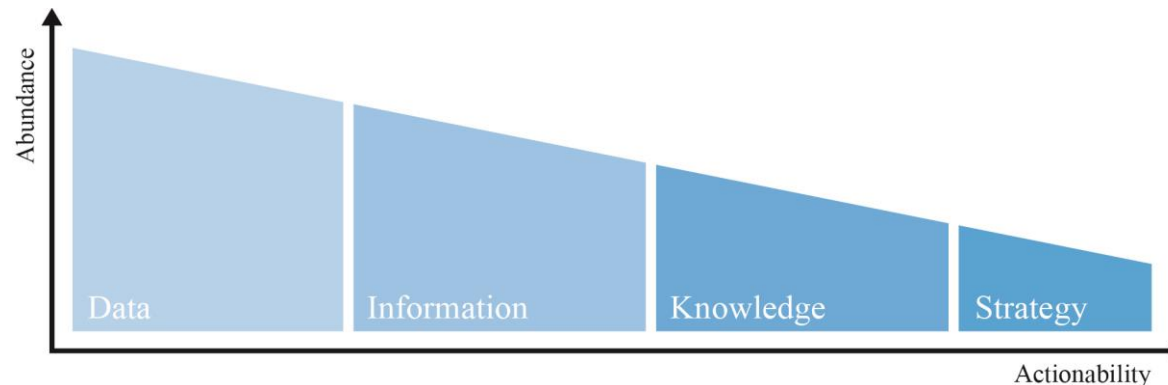
Warm Homes **Oldham**

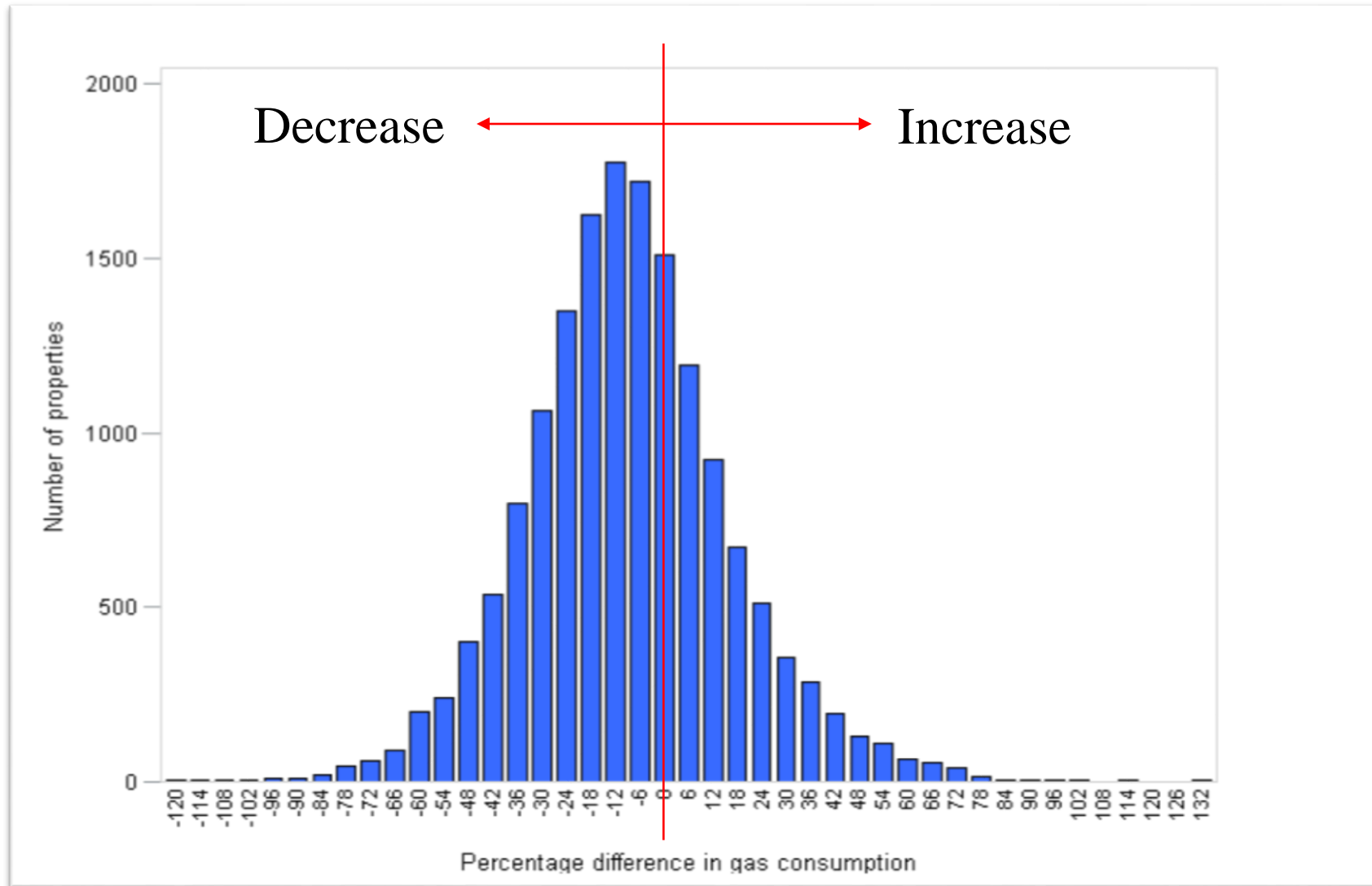
Warm Up **Bristol**

Warm Up **North** (Darlington, Durham, Gateshead, Hartlepool, Newcastle, Northumberland, Redcar and Cleveland, South Tyneside and Sunderland)

etc., etc.

1. Homes Energy Efficiency Database (HEED)
2. National Energy Efficiency Data-framework (NEED)
3. DECC and ONS: statistics covering energy, climate change, energy efficiency, fuel poverty and related areas.
4. The Energy Saving Trust: Home Analytics
5. The energy suppliers' meter point gas and electricity data.
6. English Housing Survey
7. Scottish House Condition Survey
8. Welsh House Condition Survey
9. Northern Ireland House Condition Survey
10. Valuation Office Agency council tax data
11. Census data
12. Benefits data
13. Local authority housing stock models
14. Housing association asset databases
15. Private landlord asset databases
16. Ordnance survey data
17. Calnea's residential transaction prices dataset
18. Landmark's Domestic EPC Register
19. Data on the outcomes of retrofit projects, such as the Embed project which holds data from Innovate UK's *Retrofit for the future* initiative.
20. NHS data on hospital admissions

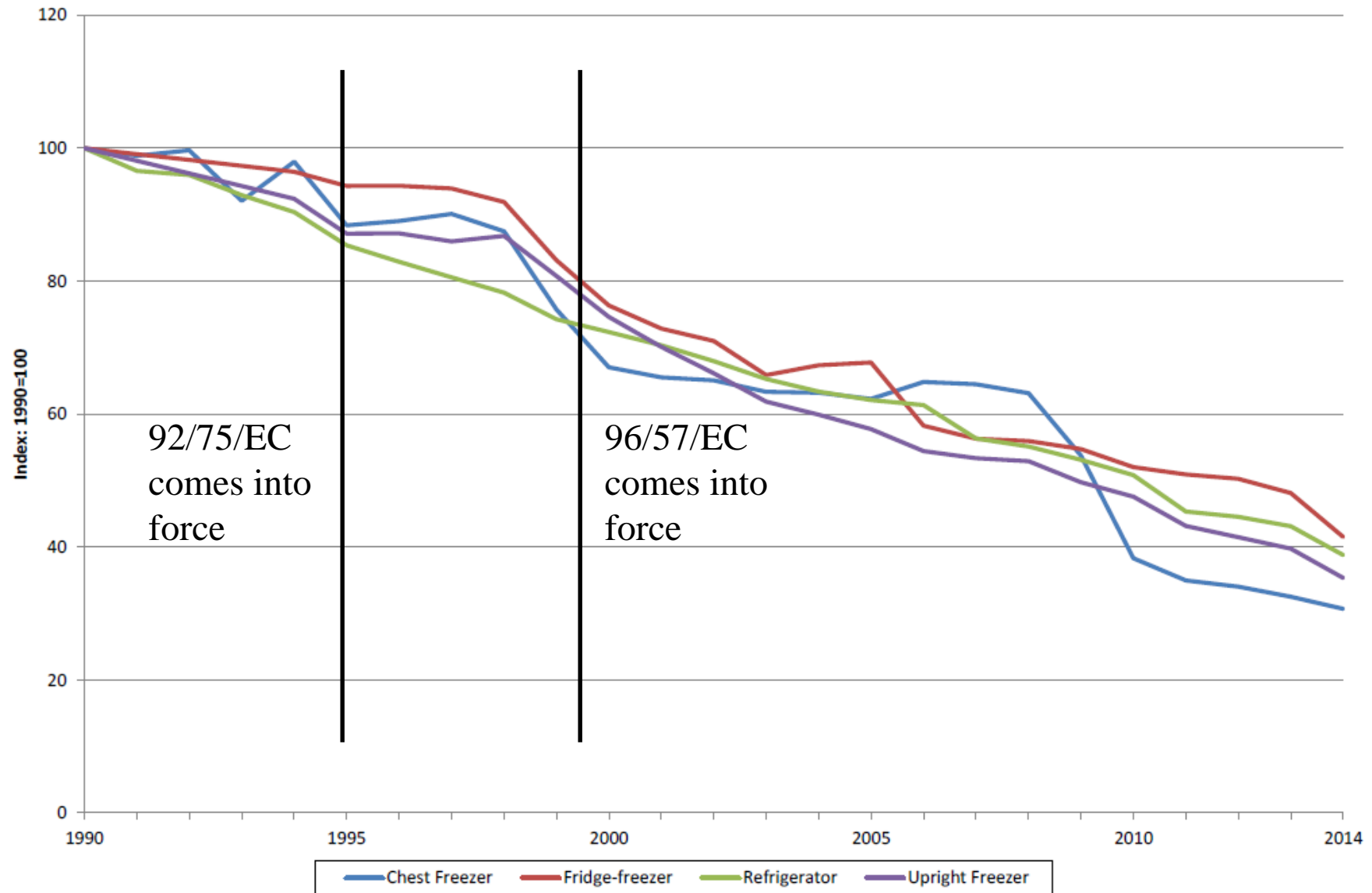




Distribution of savings for properties having cavity wall insulation installed in 2010.

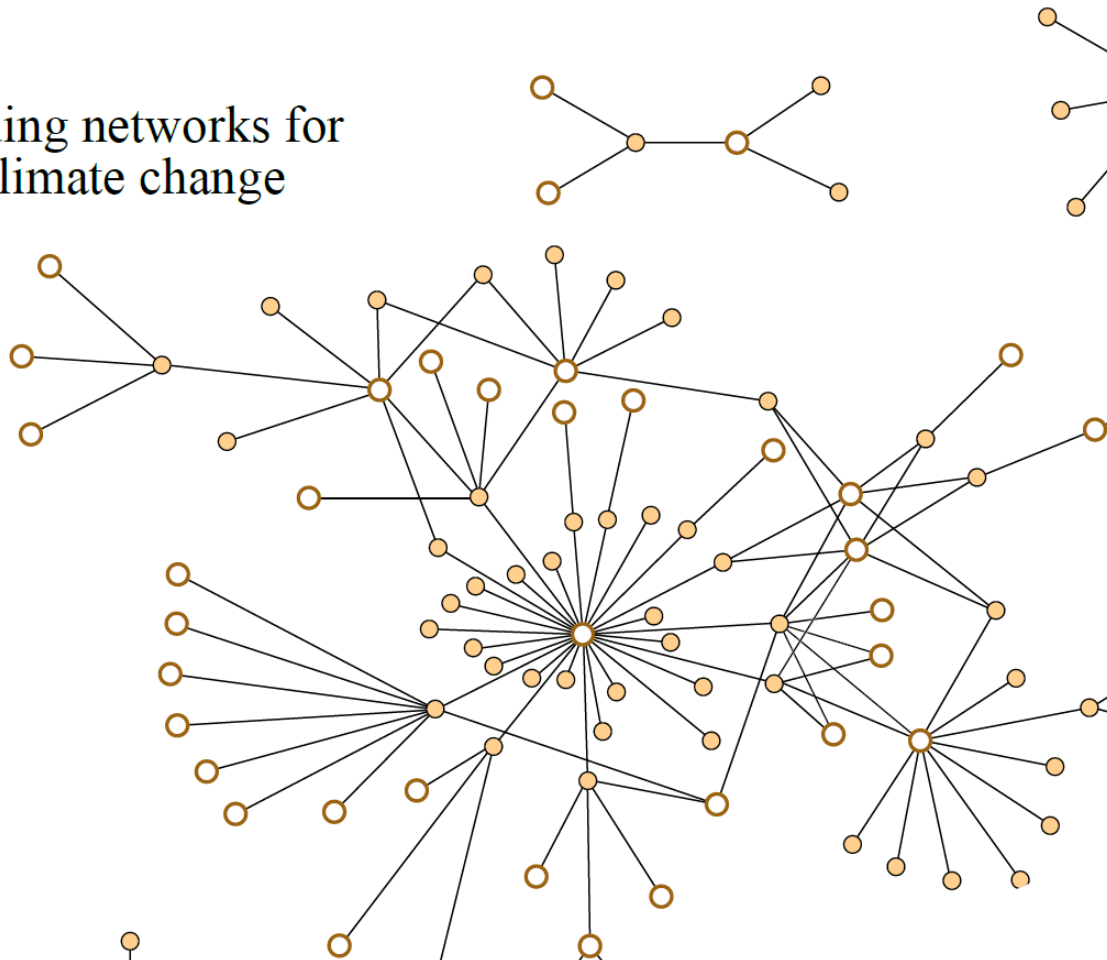
Source: DECC, 2013

Chart 6 Average energy consumption of new cold appliances, UK (1990 to 2014)



Source: DECC, ECUK (2015) Chapter 3

Understanding networks for cities and climate change



ARUP



Balancing act: Government roles in an energy conservation network

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ABSTRACT

Government-led interorganizational alliance networks present a sensible opportunity to overcome many societal challenges through collaborative governance. In particular, few researchers have studied alliance networks in the field of energy conservation in commercial buildings—a sector with unique barriers to greater diffusion of innovative cost-saving strategies. We applied an analytic inductive case-based method and social network analysis to study one particular alliance network: the United States Commercial Building Energy Alliances representing interests from retail, commercial real estate, and healthcare sectors. This alliance network was initiated by the United States Department of Energy, with assistance from several federally funded research laboratories in the United States, to promote the diffusion of knowledge and ultimately encourage greater deployment of energy efficiency and clean energy strategies in commercial buildings. We draw upon interview data from 28 cases of private, non-profit, and governmental organizations and complete network data from the alliance participants. We honed in on eight focal cases of governmental organizations to provide insight on how the four forms of energy and environmental data, information, and knowledge shared within an alliance network address the challenge of a vastly underutilized energy resource, namely conservation. Further, we identify and discuss the public's four roles—Commissioner, Interpreter, Marketer, and User—in providing balance to the diffusion of both private and public goods in a network.

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So be sure when you step, Step with care and great tact. And remember that life's A Great Balancing Act. And will you succeed? Yes! You will, indeed! (98 and ¾ percent guaranteed) Kid, you'll move mountains.

— Dr. Seuss, Oh, The Places You'll Go!

1. Introduction

Since the late 1970s, interorganizational networks or alliance networks have emerged as a governance strategy to diffuse both public and private goods in areas too complex for a single organization to handle on its own (O'Toole, 1997; Provan and Lemaire, 2012). In this study, we analyze such an alliance network intent on the diffusion of knowledge for the greater adoption of innovations related to energy efficiency and renewable energy strategies in commercial buildings. Where market instruments and regulatory pressure have shown inconsistent and often disappointing outcomes in promoting energy conservation in buildings, alliance

networks provide a sensible, collaborative cross-sector approach to overcome the barriers to greater adoption. Interorganizational networks—comprised of federally funded research laboratories, private firms, government entities, and trade associations—provide a platform to leverage stakeholders, collectively strategize, share best practices, validate new technologies, promote (and share) publicly-funded research, and develop new technologies. While the coupling of private industry with government-funded research in a network form presents a promising opportunity for industry transformation through the “sharing of organizational knowledge” (Aldrich and Ruef, 2006), research on interorganizational networks for energy conservation is surprisingly sparse (O'Hynn and Wanna, 2011; Poocharoen and Sovacool, 2012). Even less research exists on the multiple roles that governments are capable of assuming in the network governance form. This paper addresses two main questions: (1) What forms of public and private goods are developed and diffused within alliance networks; and (2) What is (are) the role(s) of government in the provision of both private and public goods within cross-sector alliance networks? We examine these questions by arguing that energy conservation includes elements of both public and private goods and by observing the context of a U.S. network focusing on the energy efficiency of commercial buildings.

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An Economy That Works

Association for Environment Conscious Building

Association of Plumbing and Heating Contractors

Association for the Conservation of Energy

BioRegional

British Energy Efficiency Federation

C40 Cities Private Sector Building Energy

Efficiency Network

Carbon Trust SME Network

Cavity Insulation Guarantee Agency

CBI

Centre for Refurbishment Excellence

Centre for Sustainable Energy

Circular Economy Network

Citizens Advice Bureau

Climate Action Network Europe

Climate Outreach & Information Network

Conservative Environment Network

Construction Industry Professional Institutions

Construction Industry Training Board (CITB)

Construction Products Association

Convention of Scottish Local Authorities

Core Cities

Cynnal Cymru – Sustain Wales

District Councils' Network

Electrical Contractors' Association

Ellen MacArthur Foundation

Energy Bill Revolution

Energy Efficiency Financial Institutions Group

Energy Saving Trust

Energy Services and Technology Association

EnR European Energy Network

Environmental Change Institute, Oxford

EU Fuel Poverty Network

European Council for an Energy Efficient Economy

Federation of Master Builders

Forum for the Built Environment

Friends of the Earth

Glass & Glazing Federation

Global Action Plan

Green Alliance

Greenpeace

Homes for Scotland

Housing Plus Academy

Institute for Sustainability

Investor Confidence Project Europe

Knowledge Transfer Network

Local Energy

Local Government Association

Local Partnerships

National Energy Action

National Energy Foundation

National Housing Federation

National Insulation Association

Northern Ireland Local Government Association

Open Data Institute

RCUK Centre for Energy Epidemiology

Research Councils UK

Renewable Energy Association

ResPublica

Rotary International

Rural Services Network

Scottish Fuel Poverty Forum

Sustainable Energy Association

Sustainable Homes Index for Tomorrow (SHIFT)

Transition Towns

UK Contractors Group

UK Green Building Council

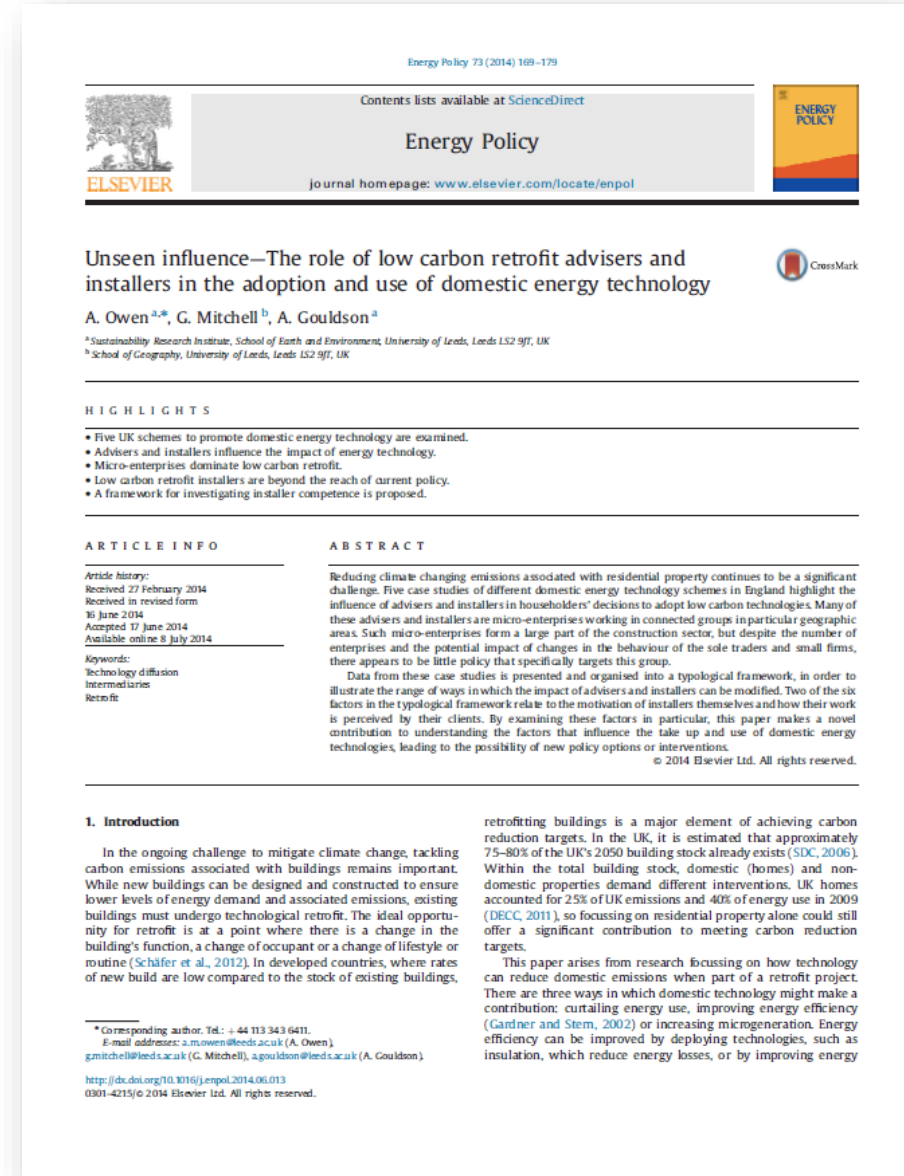
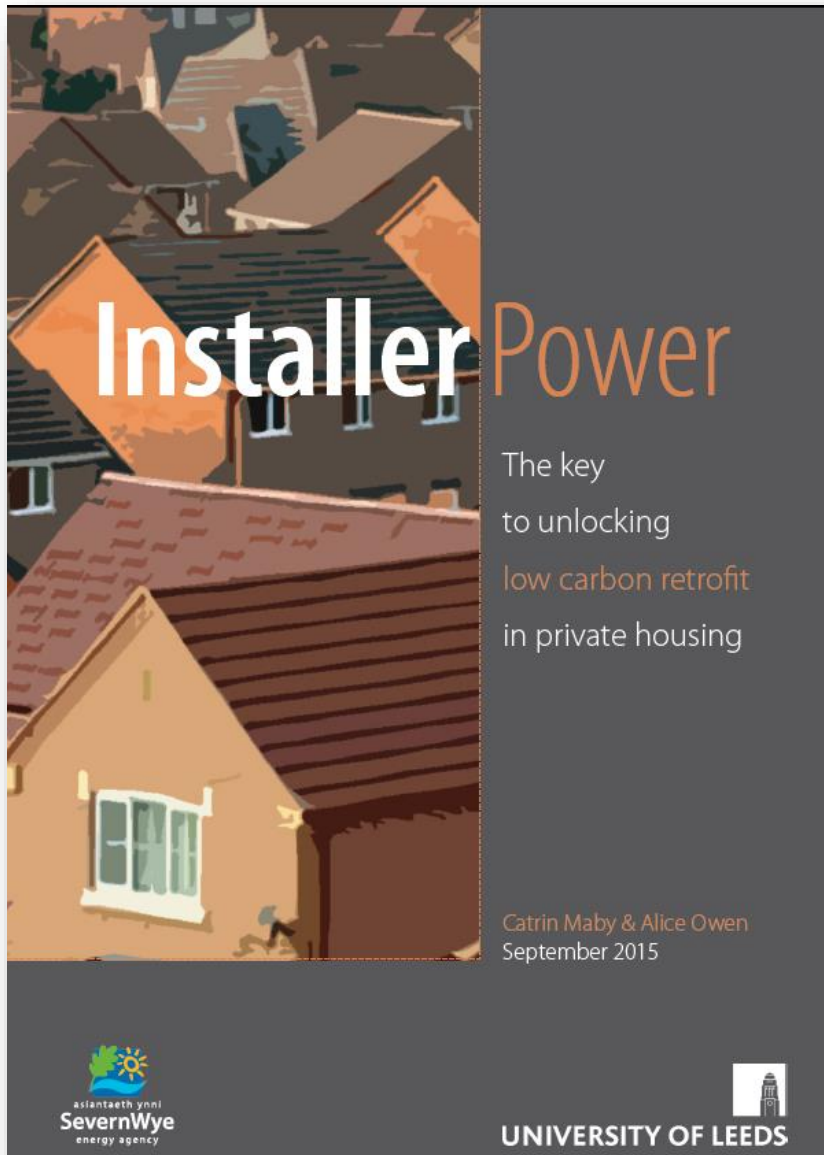
UK Public Health Association: Health Housing and Fuel Poverty Forum

University of Salford

Welsh Local Government Association

WWF-UK

Zero Carbon Hub





Corehaus



Energiesprong

IT STARTS WITH THE STYLE

Barberr's classic women's Wilshire trench starts at \$1,995. Tricking it out with options brings the total price to \$3,343.



Belt

The bridle leather wrap belt, compatible with the double cuff straps, adds \$250 to the tab.

Building the Coat

Shoppers can create one of almost 12 million trench coat combinations using the online Barberr's Bespoke program. Barberr's prevents certain combinations that it deems unfashionable.



Fur collar

The black fox overcollar is a \$395 option. Alternatives are curly black shearling at \$295, or black mink at \$725. The black leather aviator strap throat latch adds another \$150.



Buttons

Options are Barberr's branded horn buttons, slown, or metallic military buttons.



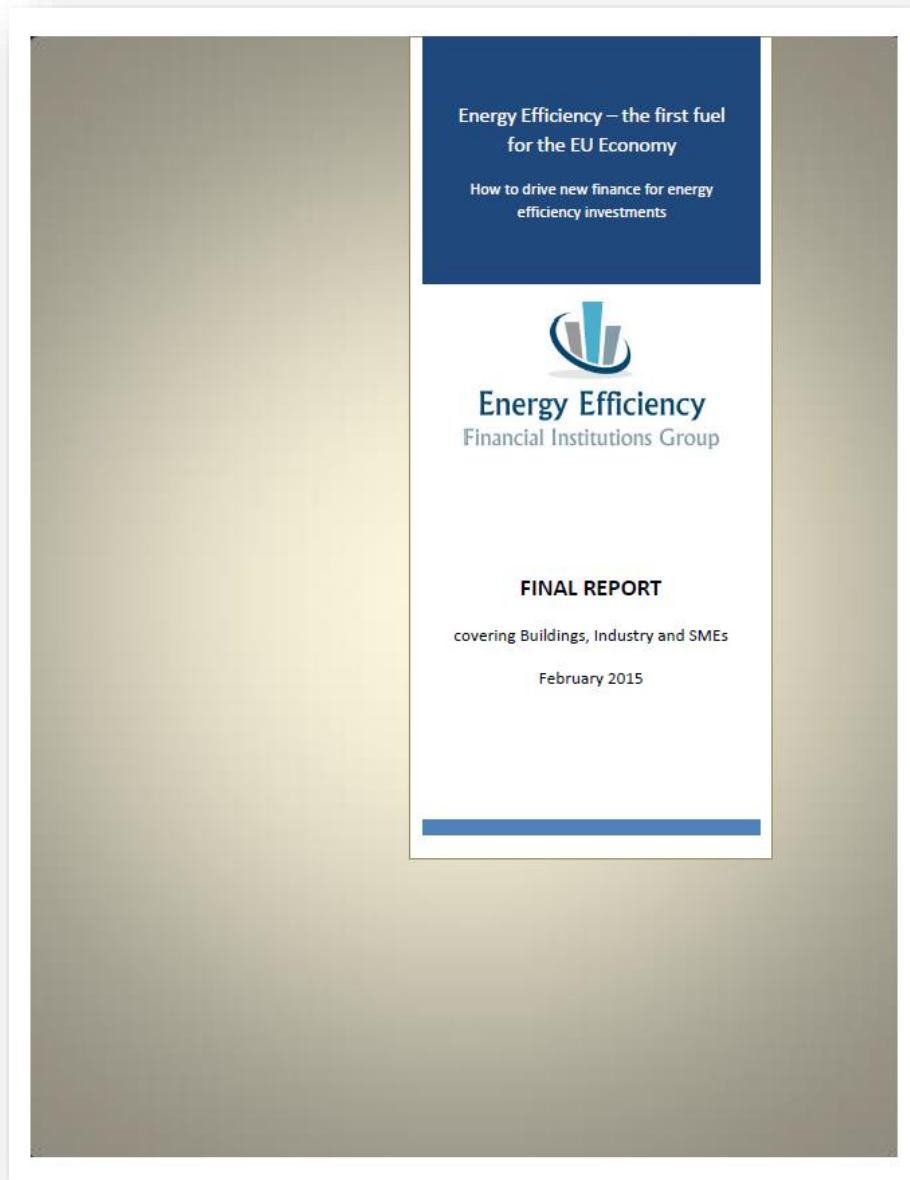
Cuffs

The double black bridle leather cuff straps correspond with leather garters and add \$395 to the cost.

Key principles

- Stimulate demand by *creating value for the homeowner*
- Stimulate demand by *providing competitive and affordable finance*
- Seek to *blend public funds with private sector investment* to address the risks and achieve the scale of financing needed.
- Engage with mortgage lenders
- *Minimise the financial burden* to the consumer and to Government.
- A main driver for housing retrofit is *sustained or improved asset values*.





“Residential buildings....often have economically attractive energy efficiency investment returns, yet this market segment is highly fragmented and requires a successful and low cost retail distribution strategy to engage at scale.”

Top Demand and Supply Driver of Energy Efficiency Investment: Standardisation

- Clear Business Case
- Increased Investor Confidence & Change in Risk Perception
- Transaction costs / simplicity
- Measurement, Reporting & Verification (MRV) and Quality Assurance

Impact of the lack of standardization

Governments

- High programme costs
- Lack of quality data
- Unsustainable public funding

Investors and Owners

- High diligence costs
- Project size is too small
- Can't build a project pipeline

Developers

- Hard to communicate project risk
- Difficulty accessing financing
- High transaction costs



- Standards should be developed for each element in the energy efficiency investment process
- These standards should be open source and establish a common vocabulary and shared knowledge across Europe.

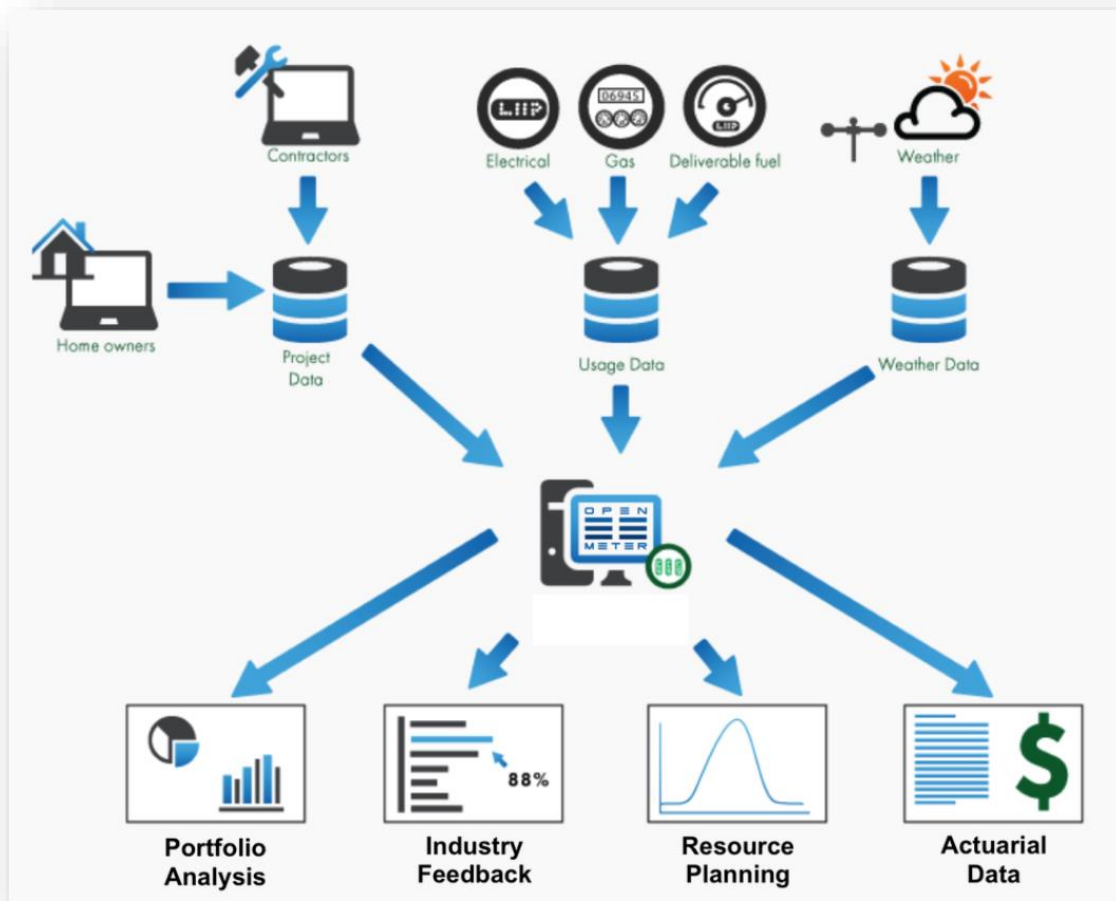


Energy Efficiency
Financial Institutions Group



- Provide **open source** tools and resources to help all energy efficiency market participants to improve renovation project performance and investment attractiveness





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PG&E's Pay-for-Performance Pilot is a Big Deal for Energy Efficiency

ENERGY EFFICIENCY

California Regulators Take Bold Steps Toward a New Energy Efficiency Paradigm

The California Public Utilities Commission is working quickly to implement pay-for-performance goals. That's a big deal, according to Matt Golden.

by Matt Golden
November 03, 2015

California has always been at the forefront of efforts to accelerate clean-energy innovation and address climate change. This past Friday, the state took another giant leap by updating several obscure but important regulations that were inadvertently hindering progress in energy efficiency.

It's hard to overstate the significance of these new rules and the directive to

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ENERGY EFFICIENCY

PG&E's Pay-for-Performance Pilot Is a Big Deal for Energy Efficiency

Pacific Gas & Electric is getting closer to making efficiency a resource that can be procured when needed.

by Katherine Tweed
December 01, 2015

Pacific Gas & Electric is hammering out the final details of a pay-for-performance energy-efficiency program for homes that will launch next year pending regulatory approval.

This is not a tweak to an existing program. It is a wholesale change in how to deliver and pay for efficiency upgrades.

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Consumer demand – the key to a sustainable energy efficiency market

To retrofit the UK's housing stock at scale, consumers need to be at the heart of the domestic energy efficiency agenda. Consumers need to be engaged at the right time, with a range of incentives and appropriate regulations that can underpin an effective and sustainable market for the benefit of both households and industry.

However, despite previous efforts to drive the take up of energy efficiency measures, consumers are yet to reap the multiple benefits of energy efficiency as policies have fallen short of expectations. In light of recent policy announcements on the Green Deal and zero carbon homes, business is experiencing significant uncertainty around the long-term future of policy in this area. To fix this, business wants to see a refreshed policy framework that drives consumer action.

A strong domestic energy efficiency market is a key part of the solution to our energy and climate change challenges

Energy efficient houses use less energy, emit fewer carbon emissions, and save people money on their energy bills. Given that domestic buildings account for 19% of the UK's carbon emissions¹ and 27% of the UK's total energy consumption,² there is a clear link between more efficient homes, and the energy and climate change challenges we face.

Moreover, in the context of the current and important focus on affordability, energy efficiency offers a long-term solution to managing energy bills, which account for 5% of a household's expenditure, on average.³ For some households, however, this figure is much higher.

Energy efficiency also has an important role to play economically. The 2013 CBI report *Shining a light* estimated that making UK businesses and households more energy efficient could contribute to a 1% boost in GDP and support a domestic market for products and services worth £17.6bn.⁴

Given these benefits, making our homes more energy efficient should be an attractive prospect for government, business and consumers. But today, the UK's housing stock remains one of the draughtiest in Europe. With 17.9 million homes with an Energy Performance Certificate (EPC) rating below 'C' in England alone, we have not yet broken the back of the energy efficiency challenge.⁵

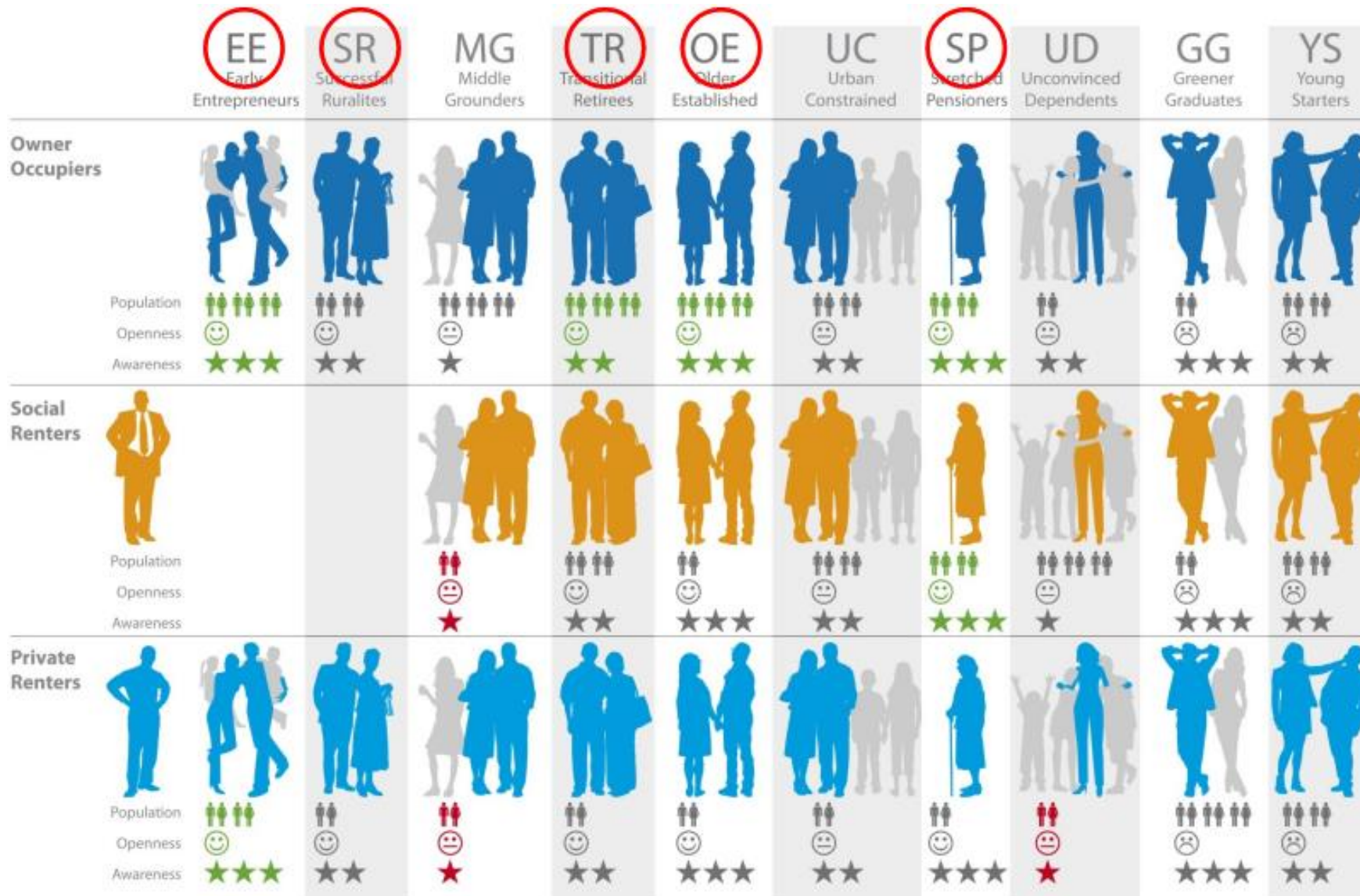


Built for living

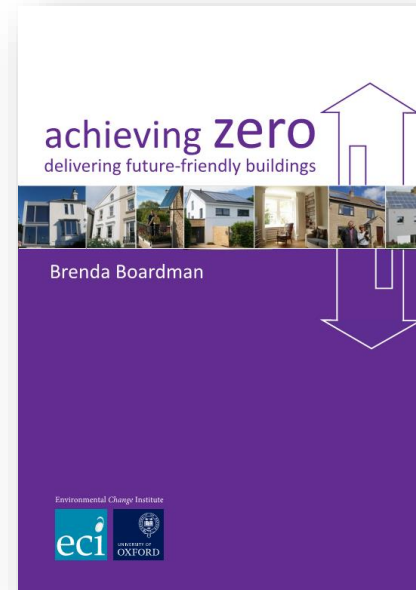
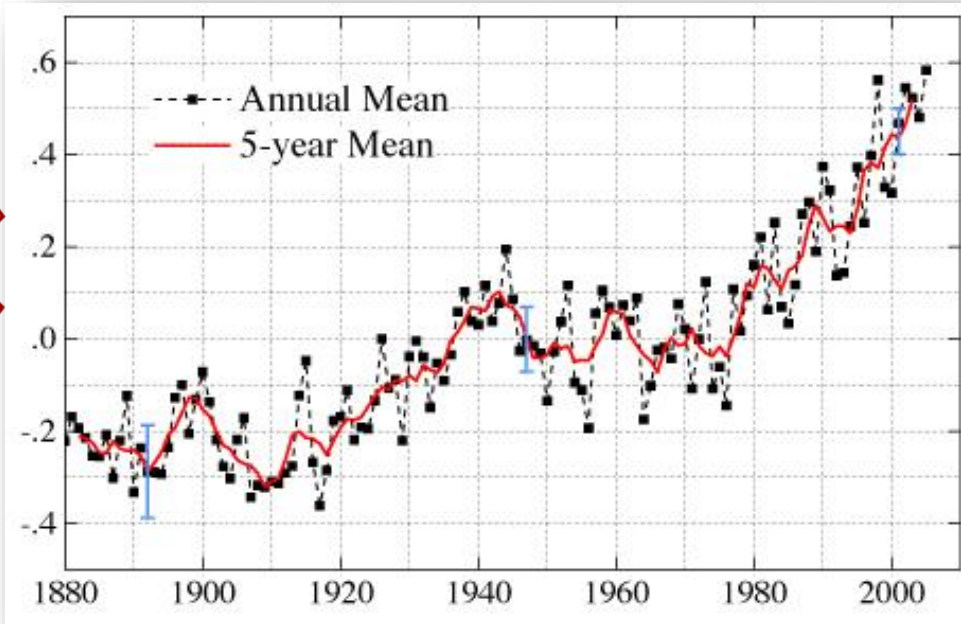
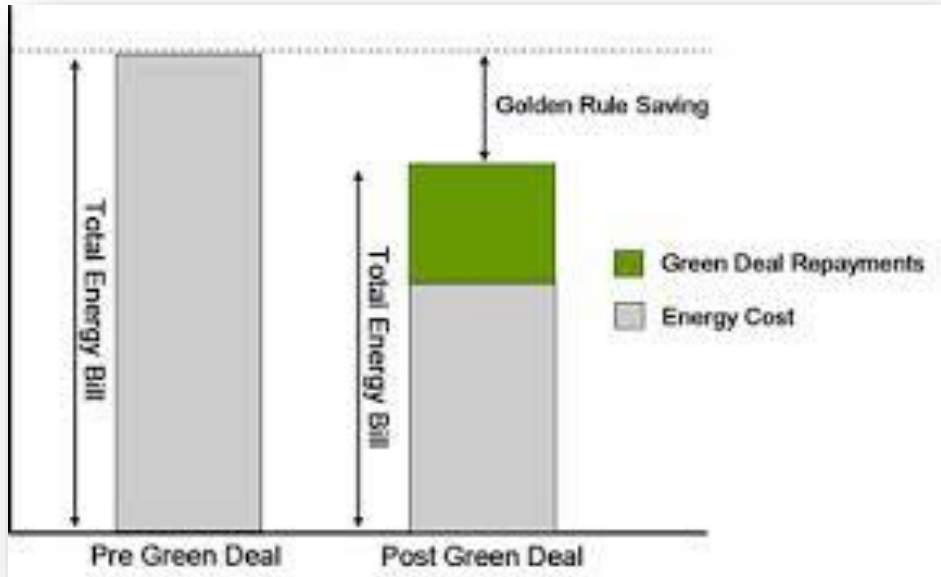
Understanding behaviour and the built environment through engineering and design

Report from a series of three workshops hosted by the Royal Academy of Engineering, RIBA and Arup.





Source: Energy Technologies Institute



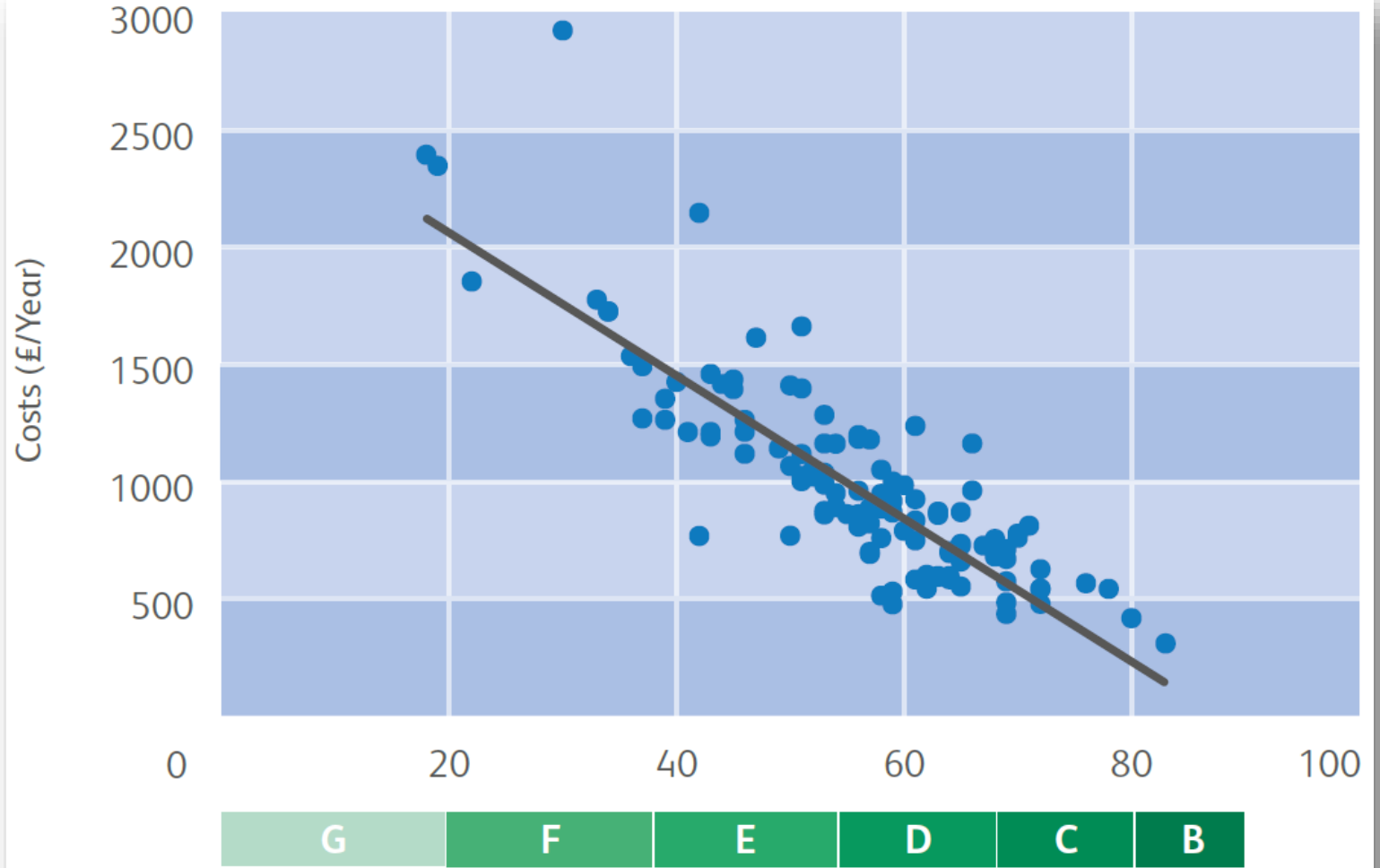
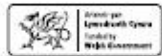
“It is an essential component of the strategy that energy-efficient buildings become worth more than energy-inefficient ones.”





Green Mortgages

Report 2014



Relationship between EPC and total annual energy spend (all fuels and all property types)

Making the business case to Treasury



HM TREASURY

THE GREEN BOOK

Appraisal and Evaluation in Central Government

Note explaining changes made to the Green Book in July 2011:

This is the 2003 edition of the Green Book. However, pages 57-58, which deal with the valuation of non-market goods have been updated alongside the release of a Green Book discussion paper on this subject - Fujiwara and Campbell (2011), Valuation Techniques for Social Cost-Benefit Analysis: Stated Preference, Revealed Preference, and Subjective Well-Being Approaches.

The changed text on pages 57-58 has been highlighted in red within this updated document. Because of the changes there is some duplication of paragraph numbers, and there is some change to the sequence of footnotes in this section.

Treasury Guidance

LONDON: TSO

PUBLIC SECTOR BUSINESS CASES USING THE FIVE CASE MODEL

GREEN BOOK SUPPLEMENTARY GUIDANCE ON

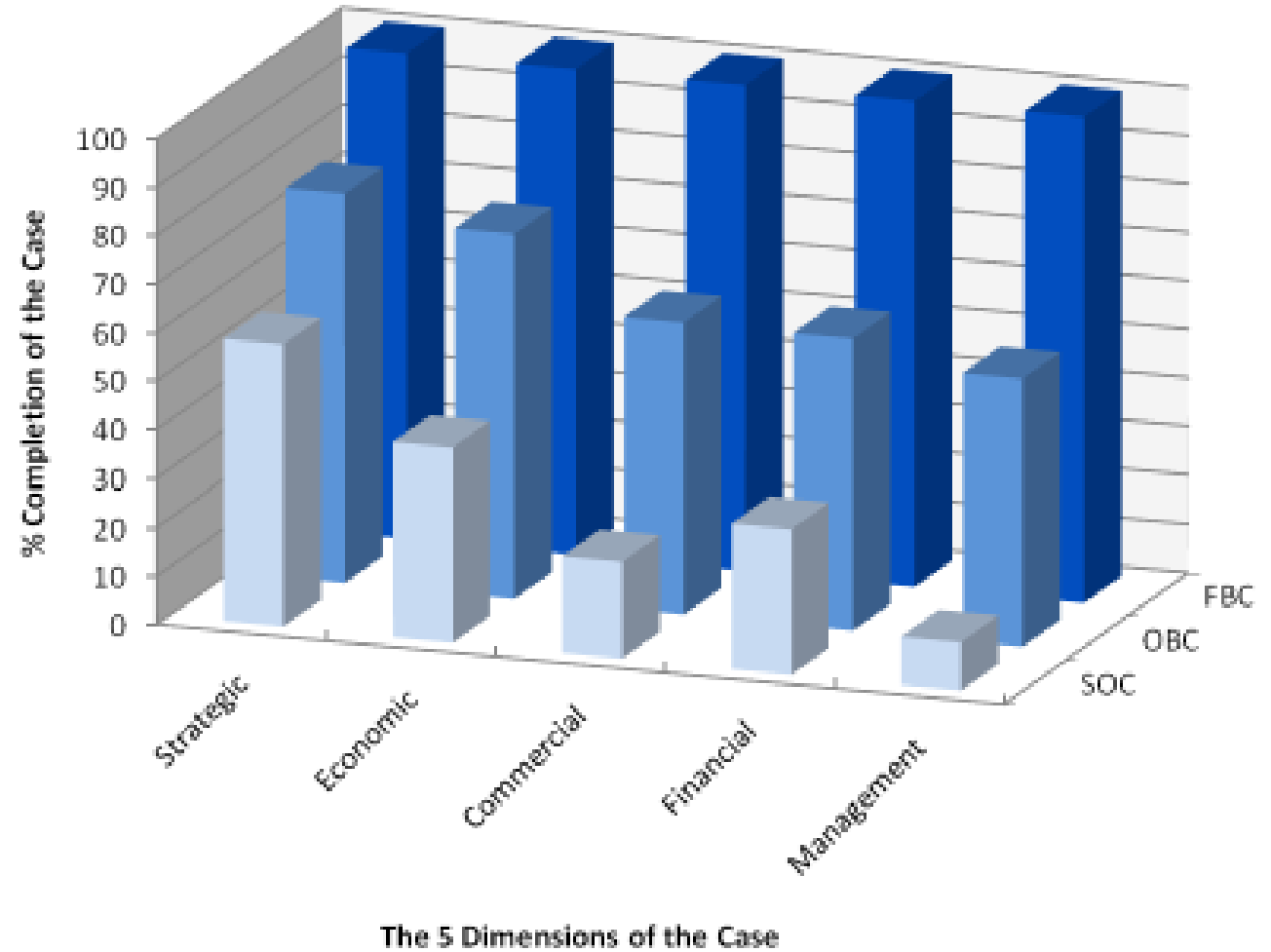
DELIVERING PUBLIC VALUE FROM SPENDING PROPOSALS

Four steps

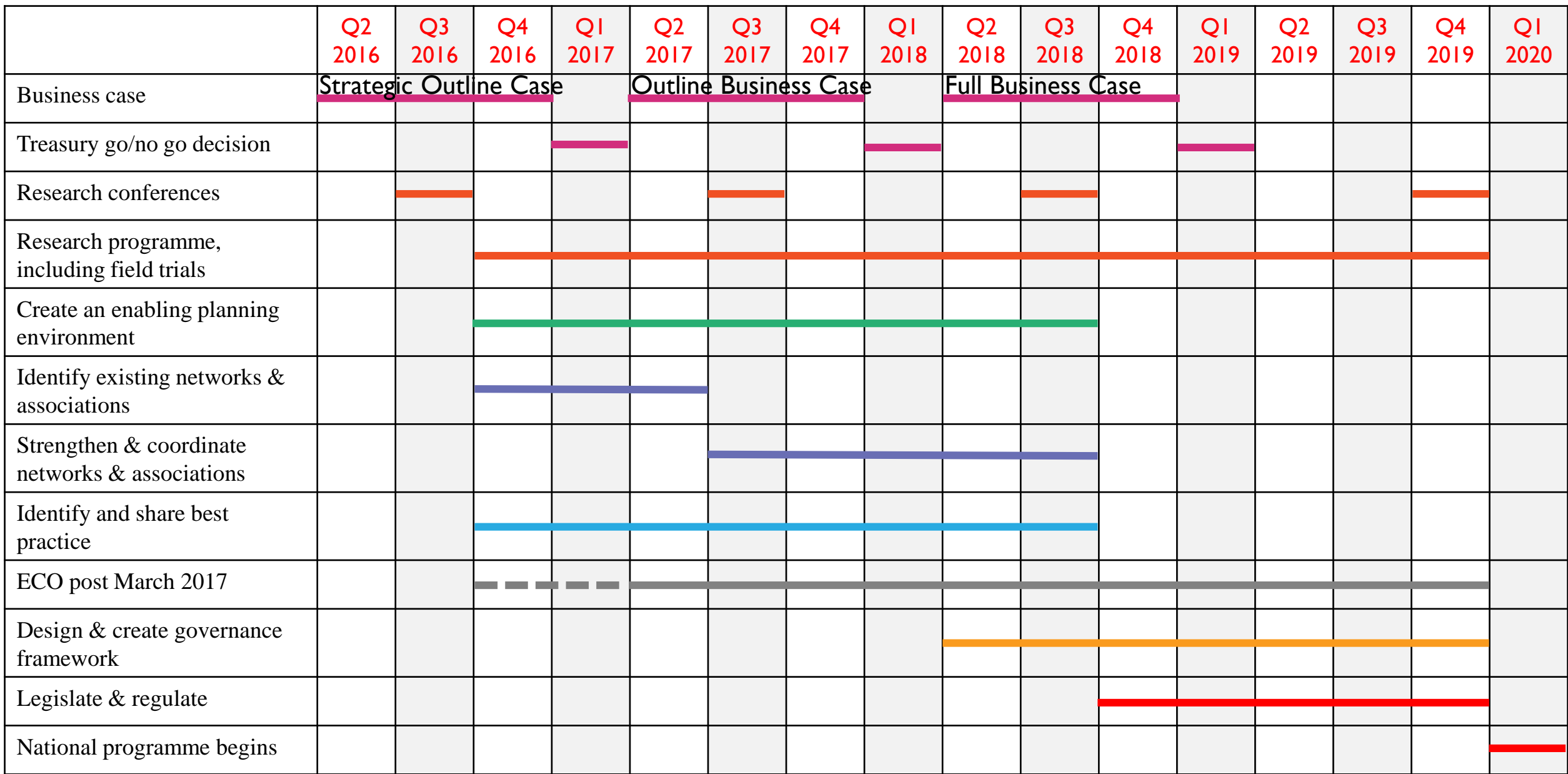
1. Strategic Outline Programme (SOP)
2. Strategic Outline Case (SOC)
3. Outline Business Case (OBC)
4. Full Business Case (FBC).

Five cases

1. Strategic case
2. Economic case
3. Commercial
4. Financial
5. Management case



Outline programme



ARUP

Towards the delivery of a national residential energy efficiency programme

Creating the conditions which will enable us to halve the energy consumed in all our homes in 25 years

January 2016

DRAFT FOR GROSVENOR REVIEW



Thank you