



Centre on Innovation and Energy Demand

A Review of our Research



Message from the CIED Director

The Centre on Innovation and Energy Demand (CIED) aims to contribute to the important task of understanding and accelerating the transition towards a low carbon and sustainable energy system for the 21st Century. Our work endeavours to gain a better understanding of the drivers behind socio-technical transitions for low energy or low carbon services, as well as developing conceptual tools that better understand them, case studies of decarbonisation in action, and an array of other dimensions such as policy mechanisms, business models, users and innovation.

As the first phase of our Centre draws to a close, I am pleased to showcase the work we have done across the themes of Energy Justice, Housing and Buildings, Transport, Energy Productivity, Accelerating Innovation and Industry. What our projects have in common is an emphasis on social science perspectives. Our research moves beyond an exclusive focus on technology and energy supply by examining how new, low energy innovations emerge and spread and how this process is shaped by market forces, government policy, social interactions and cultural norms.

Research for impact is a critical part of what CIED does, and as you can see in this booklet, we have actively engaged with stakeholders from a wide range of sectors including government, industry and the not-for-profit sector. Both at the centre and the project level we worked with stakeholders to understand their research needs and collaborated with them to achieve meaningful change in policy.

As the Director of CIED, I am proud of what we have collectively accomplished. We have tried to pursue academic rigour and excellence but also social and policy relevance, contributing to the national discussion on energy efficiency and training the next generation of scholars and change makers.

I hope you enjoy reading about what we have undertaken.



Prof Benjamin Sovacool
Director of CIED

Our themes



People

Researchers



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Themes in Focus: Houses and Buildings



Our research investigates innovations that could help to deliver more energy efficient buildings, including whole house retrofits, zero carbon homes and smart meters.

We also look at how business models – in particular, Energy Service Contracts – might help to deliver reductions in energy demand in this sector. CIED's research thus provides insights into the policy instruments, business models, finance mechanisms and intermediary activities that are necessary to deliver a step-change in energy demand reduction in buildings.



Policy Briefing: Unlocking Britain's First Fuel: The potential for energy savings in UK housing



Jan Rosenow giving evidence on the ‘Green Deal’ to the Public Accounts Committee in the House of Commons in May 2016.

Key findings

- one quarter of the energy currently used in UK households could be cost effectively saved by 2035
- improved energy efficiency in UK homes delivers a wide range of persistent benefits to the economy and society, such as improved health, better comfort, increased productivity, more skilled employment and reduced investment in electricity networks
- The key challenges constraining the household uptake of retrofits are: a widespread lack of information, engagement and trust; lack of guarantees on performance; and the perception that they involve significant complexity and disruption; and the problem of split incentives

Themes in Focus: Urban Transport



Transport is responsible for almost a quarter of the UK's greenhouse gas emissions and emissions from this sector are growing. Innovations in transport – from electric and autonomous vehicles to car sharing clubs – have enormous potential to reduce urban transport energy demand and emissions.

Our research seeks to understand how these innovations might be supported, the impact they may have on overall energy demand and what they might mean for other important policy questions, such as the need to improve air quality and address social inequality.

Accelerating the adoption of Electric Vehicles in Europe

Policy Briefing 11

July 2018

Background

Electric vehicles have the potential to contribute to a greener, more sustainable and cost-effective transport system. However, their adoption is still slow. This briefing examines the barriers to their widespread adoption and the role of policy in accelerating their uptake. It also looks at the potential for electric vehicles to reduce urban transport energy demand and emissions.

Year	Number of EVs
2010	~10,000
2011	~15,000
2012	~20,000
2013	~25,000
2014	~30,000
2015	~35,000
2016	~40,000
2017	~50,000

About the authors

The authors are members of the Centre for Innovation and Energy Demand, which is part of the Centre for Innovation and Energy Demand at the University of Cambridge. The authors are also members of the Centre for Innovation and Energy Demand at the University of Cambridge.

About the briefing

This briefing is part of a series of briefings on energy demand and emissions. It is intended to provide a high-level overview of the key issues and to provide a starting point for further research.

Policy Briefing: Accelerating the adoption of Electric Vehicles (EVs) in Europe



CIED and Aarhus University's study on car dealerships and EV sales was covered extensively in mainstream media, including the New York Times, The Independent and the BBC.

Key findings

- Car dealerships and sales personnel have been found to actively discourage customers from selecting an EV
- The omission of EVs by sales personnel is related to their willingness and knowledge (or lack thereof) to promote EVs.
- Highly educated women are an untapped but potentially lucrative market for electric vehicle sales because they have greater environmental and fuel efficiency awareness than men

Themes in Focus: Energy Justice



New technologies have the potential to revolutionise the way we use energy. But it is important that the transition to a new energy system is managed fairly and that everyone, especially the most vulnerable, has a say in what it will look like. We need to listen to groups within society whose voices aren't easily heard so that the principles of equity, fairness, and responsibility are adhered to.

Our research investigates the impact that new innovations might have on different people and groups within society and asked who stands to lose out and how this might be redressed.

Key findings

- Policy on energy demand needs to pay greater attention to the growing separation of systems of production and consumption as a result of which emissions are generated in one or several countries by multiple firms, for the benefit of consumers in another
- Sociotechnical transitions studies must better explore questions of ethics and justice.
- Ethical considerations can be integrated into business models as well as local and national policy mixes.



Emergence

Emerging technologies, behaviours, institutional arrangements and business models struggle to become established against more dominant systems. Space needs to be created for learning that leads to the development and improvement of new innovations. Our research looks at emerging innovations and uncovers the mechanisms and processes that provide the conditions for success.

Diffusion

Innovations spread when incentives, cultural values, infrastructures, research and policies support their diffusion and when they become aligned with people's expectations and behaviours. Diffusion is driven by market mechanisms, but also by consumers, businesses, policy makers and civil society. We explore how the diffusion of low-energy innovations occurs, with the aim of gaining insights on how infrastructures, business models, social norms, values and public policies need to change for particular innovations to spread more widely.

Impacts

It is difficult to estimate the historical or future impacts of low-energy innovations given the complexities of economic, institutional and social systems. The links between economic growth, energy efficiency improvements and energy consumption remain poorly understood. We use a variety of techniques to estimate the historical energy savings from low energy innovations and to identify the mechanisms that shape those impacts. These methods help us to explore future energy savings and identify how they might be increased.

Projects

Emergence

The energy implications of automated and smart freight mobility

The Fuel Bill Drop Shop Project

Low energy housing innovations and the role of intermediaries

Grassroots innovation in low energy digital fabrication

Innovations in urban transport

Diffusion

Evidence from history: deliberate acceleration of socio-technical transitions

Smart meter rollout in the UK: Dynamics of expectations

Learning about diffusion from experiences in other countries

The diffusion of energy service contracting

Impacts

Energy Economics

Futures of Personal Mobility

Energy saving innovations and economy-wide rebound effects

Cross-cutting

Reorienting investments and divesting from fossil fuel assets

Energy demand and the UK steel economy

Policy synergies and trade-offs for low energy innovation

Rebound effects in UK transport

Exergy Economics



Exergy economics examines the interaction between energy use and society by focusing upon the useful stage of the energy provision chain. In particular, we focus upon useful exergy – the portion of energy flows which can be put to productive use.

CIED is part of the Exergy Economics network, collaborating with the Centre on Industrial Energy, Materials and Products (CIE-MAP) on the project.

Key findings

- The importance of energy in driving economic growth may have been underestimated by orthodox economics
- A new approach, based upon the thermodynamic concept of ‘useful exergy’, is offering new insights into the relationship between energy and growth. Although this research is at an early stage, activity is growing, and initial results are promising
- Recent studies from the ‘exergy economics network’ suggest that improvements in thermodynamic efficiency have driven up to one quarter of UK economic growth since 1970, and that improvements in thermodynamic efficiency in China have increased in energy consumption



In July 2016 CIED and CIE-MAP hosted the Second International Exergy Economics Workshop at the University of Sussex.

Reorienting investments and divesting from fossil fuel assets



How can the investment community be reoriented away from investments in fossil fuels and towards investment in low carbon options, especially energy efficiency and energy demand measures? This project is researching the challenges of financing a transition to a low carbon and low energy demand economy, and the implications for the financial sector, government and civil society.



Key findings

- There are important roles for government in any large-scale initiative for energy efficient retrofitting of UK homes, even if the mechanisms are market based. These include: signalling long-term policy consistency, reducing risks for financial investment, and supporting industry innovators and decentralised actors.
- Domestic energy efficiency policy needs a new, more positive framing that moves beyond addressing barriers and market failures. This could help link finance to energy efficiency projects by better addressing the needs of both householders and investors, creating investable opportunities that are appropriate and attractive.
- The direct impacts from the fossil fuel divestment movement are small, yet its indirect impacts are significant. It put questions of finance and climate change on the agenda, playing a central role in changing discourse around the legitimacy, reputation and viability of the fossil fuel industry.

“The divestment movement has managed to make local actions really add up to global impacts, which has otherwise often been the problem with small scale local actions.”

Noam Bergman interviewed about his divestment research by Swedish newspaper Dagens ETC (Left)

Energy demand and the UK steel economy



How can the investment community be reoriented away from investments in fossil fuels and towards investment in low carbon options, especially energy efficiency and energy demand measures?

This project is researching the challenges of financing a transition to a low-carbon and low-energy demand economy, and the implications for the financial sector, government and civil society.

Key findings

- Recent responses to the UK's steel 'crisis' have focussed on contemporary factors such as high energy prices, climate policies and cheap Chinese imports, but largely ignored interactions between national historical path dependencies and shifting global dynamics.
- Long-term contributing factors at the national level to the decline of the UK steel industry include the reluctance of successive UK governments to proactively support the industry, under-investment in the sector and the absence of a coherent national industrial strategy.
- Weak labour law and trade unions in the UK relative to European counterparts poses a challenge to the long-term sustainability of Tata Steel UK's operations.



Policy synergies and trade-offs for low energy innovation



Policy mixes are particularly important for supporting transitions to lower-energy systems. Do current UK energy policy goals and instruments add up to a coherent policy mix suitable for fostering such transitions? What is the impact of the current policy mix? This project aims to identify policy goals and instruments which potentially foster or obstruct the emergence and diffusion of low-energy innovations in the areas of mobility, heat, and electricity use. The researchers also analyse these existing policy mixes by identifying gaps, complementarities, synergies and trade-offs and explain their development over time.

Accelerating low-carbon innovation: the role for phase-out policies

Policy Briefing 05
March 2017

Summary

The rapid development and deployment of low-carbon innovations requires policies to support new technologies. Despite these policies, we also need to phase out carbon-intensive activities.

Policy measures that phase out high-carbon practices facilitate innovation by creating strong market signals about the direction of travel. In addition, by accelerating the transition process, they can help to avoid inertia, stranded assets, and other inefficiencies.

Phase-out policies include:

- **Cancel policies that create artificial limits** (such as technology-specific subsidies)
- **Changing market rules** that address discrimination of a single market, sector or system
- **Reduced support** (such as tax breaks or subsidies) for high-carbon technologies
- **Policies to create a balanced debate** that considers both new systems and incumbents (such as the creation of new conditions of materials)

Recommendations

1. The Government's plans to phase out carbon-intensive technologies should be a good start, but more attention should be paid to decarbonising the heat and transport sectors.
2. The Government's industrial strategy should review the high-carbon practices that should not be phased out to create jobs and foster innovation in manufacturing and services.
3. Phase-out policies combined with low-carbon incentives will be "fit" as a part of Brexit.
4. Policy makers should start by reviewing the current policy portfolio and assessing where there is a need to address stranded assets to allow low-carbon innovation and avoid inefficiencies.

About the authors: The authors are a group of researchers from the Centre for Innovation and Energy Demand (CIED) at the University of Cambridge, including Prof. David Foray, Prof. Richard Haywood, Prof. John Hens, Prof. Michael Manly, Prof. Peter Neuhoff, Prof. Paul Straker, Prof. David Foray, Prof. Richard Haywood, Prof. John Hens, Prof. Michael Manly, Prof. Peter Neuhoff, Prof. Paul Straker.

About this briefing: This briefing is available on the Centre for Innovation and Energy Demand website (www.cied.ac.uk).

www.cied.ac.uk [@CIEDonline](https://twitter.com/CIEDonline)

Policy Briefing: Accelerating low carbon innovation: the role for phase-out policies

Key findings

- By focusing policy attention on phasing out carbon-intensive technologies and practices, policy makers can create very strong market signals, thereby incentivising the creation of a low carbon economy.
- Policy makers need to develop well managed portfolios of policy goals, strategies and instruments to foster energy transitions
- The policy mix should incentivise investments in customer-side efficiency (including end-use energy efficiency and demand response) rather than focusing on energy infrastructure, fuels and supply alone



In 2017 CIED hosted an international workshop on policy mixes for sustainability transitions. The 16 papers presented at the workshop were later submitted as a Special Issue to Research Policy.

Futures of Personal Mobility



The future of personal mobility, including the role of the car in a sustainable transport future, is an important and topical debate, which ties into discussions about greenhouse gas emissions, technological innovation, economic growth and energy security. This project looks at imagined futures of sustainable transport in the UK, considering a variety of techniques for predicting, anticipating, preparing for and potentially shaping the future, such as forecasts, visions, scenarios and roadmaps.

The Road to Sustainable Travel: The role of visions, forecasts and pathways

Policy Briefing 09
April 2018

Summary

History of the Road: personal mobility, as seen in forecasts, roadmaps and policies widely used by stakeholders and the automotive industry, tend to assume little change in car use and government spending in new types of cars. What is more, while there are many examples of successfully forecasting innovation and transport policy, there are few that allow vision and insight. This theme also argues that an understanding of the future requires challenging existing views.

Many scenarios project a single one - future transportation or transportation systems and transportation systems will be dominated by cars with some additional modes and services. This does not play to the strength of research strengths which have made competing on cost, comfort, length of travel and other costs. But, New urban patterns, smart roads and mobility in the region will, and will increasingly, push mobility storage.

It will become important to an extent - change/transport systems in an increasingly urban and multi-modal and will require changes in how technologies change, along with changes in the way people (and they are often) including changing ownership patterns of cars. It is important to note, while many have been successful in policy management, traffic patterns and flow.

People and their behaviour are an - important consideration in the future, and it is not sufficient that more information, more data systems to get guidance, and not necessarily regulated by the "market" or "policy". Research could benefit from a more holistic and complete approach to road management, considering not only policy but changing urban forms and habits.

Recommendations

Our recommendations focus on the need for a common vision of vision of the future, that is wider than alternatives, as the basis for understanding. There should be a focus on making understanding of alternatives and shared with stakeholders of transport and planning to set of a vision for a more sustainable transport system.

Our research

The study is based on a study of the current and future mobility, and continues. We present an overview of research that can be used to inform the development of a common vision. The Department also aims to set for a range of alternatives for all transport modes. Including the Department for Transport (DfT), Department for Energy and Climate Change (DECC), the HM Treasury and the Department for Business, Innovation and Skills (BIS). The study also includes other research that is relevant to the study, including the work of the Centre for Innovation and Energy Demand (CIED).

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About this briefing:
This briefing is based on a report and a policy briefing prepared for the Centre for Innovation and Energy Demand (CIED) at the University of York.

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Policy Briefing: The Road to Sustainable Travel: The role of visions, forecasts and pathways

Key findings

- Policy for personal transport is informed by a narrow set of visions, which project a simple one-for-one replacement of conventional vehicles with low-emission vehicles over the coming decades, with an unrealistic lack of disruption or broader change to the transport system.
- These visions do not play to the strengths of electrified transport and could actually constrain the diffusion of electric vehicles. Transport policy informed by a broader set of visions, from a broader set of actors, would allow better planning and preparation for the future.
- More realistic portrayal of people is also necessary. Too many models assume people are ‘rational actors’, with behaviour portrayed as modal choice or even more narrowly as choice of vehicle purchased, ignoring the limits to this model and the contexts within which travel decisions are made.



Key findings

- The rebound effect could be a misleading indicator in that it only accounts for the 'negative' portion of the outcome of an efficiency improvement in energy use. Evaluations of energy efficiency programmes should adopt a holistic approach and carefully assess the full range of benefits and costs of such programmes without focusing solely on a single indicator
- Improving household energy efficiency delivers both reduced energy use and increased economic activity. However, there is typically an inverse relation between the energy savings achieved and the size of the economic expansion. A bigger economy requires more inputs such as labour and capital but also energy and other intermediate inputs.
- Government funded energy efficiency programmes can help low-income households who are not able to heat their homes properly. In addition, they can be used as a means of economic stimulus. However, the way in which the necessary funds are raised must be weighed carefully against the benefit of a more efficient use of energy.



Karen Turner presenting on the new Energy Demand Trilemma at the House of Commons in March 2016.

Rebound effects in UK transport



While the fuel efficiency of passenger and freight transport has improved, it may have unintentionally increased the number of cars on the road or encouraged the development of larger, more powerful

vehicles. This project will explore the nature and magnitude of these rebound effects for UK road passenger and freight transport and assess their policy implications.

Key findings

- Using a comprehensive set of models, we estimate a rebound effect for UK car travel of between 9% and 36% - with a mean estimate of ~19%. This estimate is consistent with the results of other studies and suggests that around one fifth of the potential fuel savings have been lost through increased driving
- The reductions in UK car travel after 2000 ('peak car') were driven by a combination of the rising fuel cost of

driving, increased urbanisation and the economic difficulties created by the 2008 financial crisis. There is some evidence that the rebound effect from improved fuel efficiency has increased over time.

- We estimate a direct rebound effect of 50–60% for UK road freight transport. This result is robust to different model specifications, but accuracy is limited by the availability of data

Evidence from history: Deliberate acceleration of socio-technical transitions



This project studies the rate of change in ‘socio-technical transitions’ – the complex social, technical, economic, and political processes that lead to the replacement of old technological systems, and the

social systems connected to them, with new ones. The project aims to analyse what deliberate actions can accelerate a transition by examining historical case studies.

Key findings

- Our case studies show that policymakers can decisively accelerate transitions
- Decisive acceleration decisions occur under particular conditions such as strong ‘push factors’ (an external shock disrupts the existing regime) or strong ‘pull factors’ related to niche innovations
- The influence of these external conditions is mediated by changes in policy regimes such as changes in policy paradigm (outlook, problem definitions, hierarchy of policy goals) and institutional arrangements (such as access to policymaking networks)

Smart meter rollout in the UK: dynamics of expectations



This research project focuses on the expectations behind the smart metering programme by various actors, including policymakers, NGOs, businesses, community groups and a wide range of other stakeholders. Particular attention is paid to how the expectations may differ, how they change over time, and how change in expectations link to real-time developments of the smart metering rollout.

The smart meter rollout: Social questions and challenges

Policy Briefing 08
January 2018

Summary

Smart meters have the potential to bring benefits to consumers in terms of reduced energy bills through a more efficient and better managed energy system and through reduced energy consumption, enabled by improved information about energy usage. The first national stage of the smart meter programme in Great Britain started in November 2016 and the decision to fit every household has been taken for every household to be reached by the end of 2020.

Most of the debates around the progress of the rollout to date have focused on technical issues. However there are a number of other issues that have the potential to help or hinder the rollout. It is important that these subjects receive greater attention. In this briefing, we highlight four key issues:

1. Consumer expectations: What are the expectations of consumers about the rollout, how will it be able to deliver all the benefits that will allow a contribution towards the goal of the rollout through their energy bills, a better understanding of energy use and how this information will be used to influence their behaviour and the reasons for reaction.
2. Consumer expectations: What are the expectations of consumers about the rollout, how will it be able to deliver all the benefits that will allow a contribution towards the goal of the rollout through their energy bills, a better understanding of energy use and how this information will be used to influence their behaviour and the reasons for reaction.
3. Changes in energy consumption: The provision of real-time data (RTD) allows a utility to feed in significant levels of information about and to influence energy demand, it is important that this information is used to manage energy demand, it is important that this information is used to manage energy demand, it is important that this information is used to manage energy demand.
4. Other environmental impacts: Smart meters can reduce the carbon footprint of the rollout, it is important that this information is used to manage energy demand, it is important that this information is used to manage energy demand.



About the authors

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About this briefing

This briefing is part of the Smart Meter Rollout Policy Briefing Series, which aims to provide a high-level overview of the key issues and challenges associated with the rollout of smart meters in the UK. The briefing is intended for policymakers, industry stakeholders, and the public.






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Policy Briefing: The smart meter rollout: Social questions and challenges

Key findings

- To accelerate the diffusion of smart meters, it is important that certain social issues receive greater attention as they can help or hinder the rollout.
- The potential distributional impacts of the programme across vulnerable groups, such as older people, those with long-term health conditions and those with disabilities, need to be better understood
- Lifecycle and recycling standards may need to be strengthened for both smart meters and IHDs to minimise waste from the rollout

The screenshot shows a news article on The Telegraph website. The page header includes 'The Telegraph' logo and navigation links for HOME, NEWS, SPORT, BUSINESS, and ALL SECTIONS. The main section is 'Money | Bills and utilities'. Below this, there are sub-sections for Gas and electric, Broadband, TV, Phone, and Renewable energy. The article title is 'University study condemns smart meter rollout as 'missed opportunity''. The article is categorized under Money, Bills and utilities, and Gas and electric. There are social media sharing icons for Facebook, Twitter, and Email, and a 'Save 19' button. The main image shows a smart meter display on a table next to a plate of toast and a cup of coffee. The smart meter display shows 'Electricity used' with a gauge and 'Electricity' at £0.40, 'Gas' at £0.60, and '£0.41' at the bottom. To the right of the article is a green advertisement for 'DITCH COAL FOR 100% RENEWABLE ELECTRICITY' by OVO energy, with a 'FIND OUT MORE' button. Below the advertisement is a 'MORE STORIES' section with two numbered items: '1 How to retire at 35 and live off your dividends: plans for the 25, 35 and 45 year-old' and '2 'An estate agent will only submit my offer for a property if I use his conveyancer. What can I do?''.

CIED's research on the smart meter rollout was widely covered in the UK national media, including the Telegraph and the Sunday Times.

Learning about diffusion from experiences in other countries



European countries have seen some low-energy innovations, like district energy systems in Austria, gain popularity. This project aims to learn lessons from the successful diffusion of a selection of low-energy innovations in other European countries. Using in-depth case studies,

the researchers investigated how these innovations struggled against existing 'socio-technical regimes' and which co-evolutionary alignments helped to overcome inertia and cause diffusion to accelerate, leading to tipping points and breakthroughs.

Key findings

- The diffusion of technical systems (like district heating or tram networks) is more complex than the diffusion of products and cannot be fully understood with adoption models that dominates the diffusion literature
- Diffusion of large systems involves multiple interacting processes such as the adoption (of products or services) by users; physical construction of infrastructures by system builders; the circulation of knowledge and best practices between local projects and the wider embedding in cultural, business and policy contexts
- Countries like Austria or France use a wider set of innovation policy instruments than the UK to stimulate the diffusion of technical systems.



The diffusion of energy service contracts



Energy service contracts involve the outsourcing of energy-related services to a third party, or contractor. This project aims to identify the factors underpinning successful business models, to identify whether, how and under what conditions such models could diffuse more widely, and to assess their potential for reducing energy demand in order to provide recommendations for public policy.

The role of Energy Service Contracts in delivering improved energy efficiency

Policy Briefing 07
December 2017

Summary

Energy Service Contracts (ESCs) offer a promising route to faster sector engagement to improve energy efficiency, reduce energy bills, cut carbon emissions and improve the comfort of building occupants. By outsourcing the provision of energy services to a specialist contractor, clients can benefit from increased capital investment and guaranteed energy savings.

A growing number of UK public sector organisations have adopted energy service contracts, and many have demonstrably reduced their energy bills as a result. But the provision of establishing such contracts can be complex and time-consuming, and opportunities may be missed over to half of expenditure in the national arena, or lost of track in the outsourcing model.

To take on these opportunities, it is necessary to find effective ways to reduce the costs, difficulties and risks faced by potential clients. This can be achieved through a combination of identification rigor frameworks for procuring energy service contracts, and expert assistance in negotiating and monitoring these contracts. Both of these have emerged at the UK, over the past decade and have become the primary driver of market growth. This experience enables important lessons for the future development of the ESC market, both in the UK and more widely.

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About this briefing

This briefing is based on work conducted as part of the ESC market, an initiative led by the Centre on Innovation and Energy Demand, The University of Cambridge, UK. Email: cied@cam.ac.uk

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Policy briefing: The role of energy service contracts in delivering improved energy efficiency

Key findings

- The UK market for energy service contracts is relatively large, highly diverse, concentrated in the public sector and overwhelmingly focused upon established technologies with high rates of return.
- By lowering transaction costs, public procurement frameworks have played a critical role in expanding the market for energy service contracts in the UK public sector. Support for such ‘intermediary organisations’ can yield high social returns.
- Energy service contracting is unlikely to develop further in the commercial building sector without different business models, tenancy arrangements and policy initiatives



The energy implications of automated and smart freight mobility



This project examines how energy demand reduction is understood by the freight industry, focusing on the potential contributions by innovations such as autonomous vehicles and other smart technologies in the smart city. It concentrates on the freight industry's views

and expectations regarding low-energy technological innovations by analysing how autonomous vehicles and related technologies are framed and understood by the media and various stakeholders in the freight industry.

Key findings

- Contemporary systems of mobility are undergoing a transition towards automation. The frame of a race to vehicle automation enforces the need to participate, or risk being left behind, reinforcing techno-optimism.
- The UK government's response has been centred on creating conditions for AV technology emergence and diffusion, rather than system-wide, long-term visioning, and a critical analysis of the role automation may play in future mobility.
- The approach is not sufficiently inclusive, democratic, diverse and open, with limited roles for publics, and space for dissent.



CIED and the Transport Studies Unit at Oxford University hosted a stakeholder workshop on 'Urban Freight Futures: Innovation and Experimentation', which took place on 10 May 2018 in Westminster.

Fuel Bill Drop Shop Project



In the light of persistency of the fuel poverty problem, new actors have emerged in the fight against fuel poverty. A number of community energy groups have hosted an ‘energy shop’ or ‘energy café’ in their local area. This is typically an advice desk staffed by volunteers who provide advice about energy issues to the public. This project investigates the ‘energy shop’ model as a way for community energy groups to help those living in fuel poverty. It seeks to understand what motivates energy shops and why they are run, establish whether they provide an effective form of intervention to alleviate fuel poverty and whether they are cost effective.

Alleviating fuel poverty: the role of the energy café

Policy Briefing 06
November 2017

Summary

As energy costs in local communities continue to rise, providing energy advice and assistance is an increasingly pressing issue. People who attend energy advice centres receive tailored advice, information and support on a range of issues, including how to effectively engage in the energy market to reduce energy bills, how to deal with fuel bills, and how to reduce energy consumption and energy costs by cutting unnecessary energy use and energy loss from their properties.

Energy advice provides good value for money – some have provided aggregated financial benefits for clients, the opportunities exceed the cost of delivering the programme. Carefully designed energy advice programmes could mark long steps in how local services can provide benefits of a similar magnitude to some of their poverty alleviation.

Energy advice provides an opportunity to involve vulnerable members of the community and offer them to other members such as housing, healthcare authorities. They could also act as a bridge between existing community services or other services such as a financial centre. The challenges relating to energy cost provision include providing and maintaining training, providing relevant staff and ensuring those who need assistance.

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About this briefing:

The briefing is based on work funded by the Department for Communities and Local Government as part of the Energy Demand Centre, University of Cambridge. It is supported by the Energy Demand Centre, University of Cambridge. It can be contacted at j.spence@qub.ac.uk

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Policy Brief: Alleviating fuel poverty: the role of the energy café

Key findings

- This was the first project of its kind to analyse community-led Energy Cafes in the UK
- The research showed that there is a need for community-led, trusted, fuel poverty advice, especially at the time when more people are facing problems with paying their energy bills
- Energy cafes can act as a triage service, referring those in need of help also to other services such as healthcare and housing.



In 2015 CIED organised a panel discussion on fuel poverty as part of the Festival of Social Science.



In 2018 Mari Martiskainen was invited to join the Mayor of London's Fuel Poverty Partnership. The first meeting took place in May.

Low energy housing innovations and the role of intermediaries



This project focuses on building and housing sector innovation in the UK that also delivers increased energy demand reduction potential. It pays particular attention to systemic innovation by focusing on whole house retrofits and zero carbon new built houses. It takes a socio-technical approach to innovation processes and pays particular attention to drivers and barriers, and the impact of intermediary actors in the overall transition.

Towards low energy homes:
Intermediaries supporting the
market for energy efficiency

Policy Briefing 10
 April 2018

Summary



Significant improvements are needed to meet national energy efficiency targets. Progress towards this target has been slow and uneven in nature. More attention and resources are needed to meet these targets. This briefing provides an overview of the current situation and the role of intermediaries in the UK.

Our research has found that in the absence of strong public drivers, the private sector and intermediaries are essential to the market for energy efficiency. This briefing provides an overview of the current situation and the role of intermediaries in the UK.

Our research has identified seven intermediate activities in the market for energy efficiency. These are:

1. Providing expertise, tailored knowledge and advice that is tailored to the local market.
2. Connecting different energy supply sources and networks.

3. Financing and formulating the nature of government programmes.
4. Developing robust project pipelines, involving technical support, operators and fixing, enabling project funding and delivery.
5. Coordinating between different interests of a fragmented supply chain and providing a single point of contact for consumers.
6. Ensuring the correct delivery of the products.
7. Raising the public awareness of the sector and the policy objectives.

Our research

The briefing is based on a project funded by the UK Energy Research Centre and the UK Energy Research Centre. It is based on a project funded by the UK Energy Research Centre and the UK Energy Research Centre. It is based on a project funded by the UK Energy Research Centre and the UK Energy Research Centre.

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About the briefing

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Policy Briefing: Low energy housing innovations and the role of intermediaries

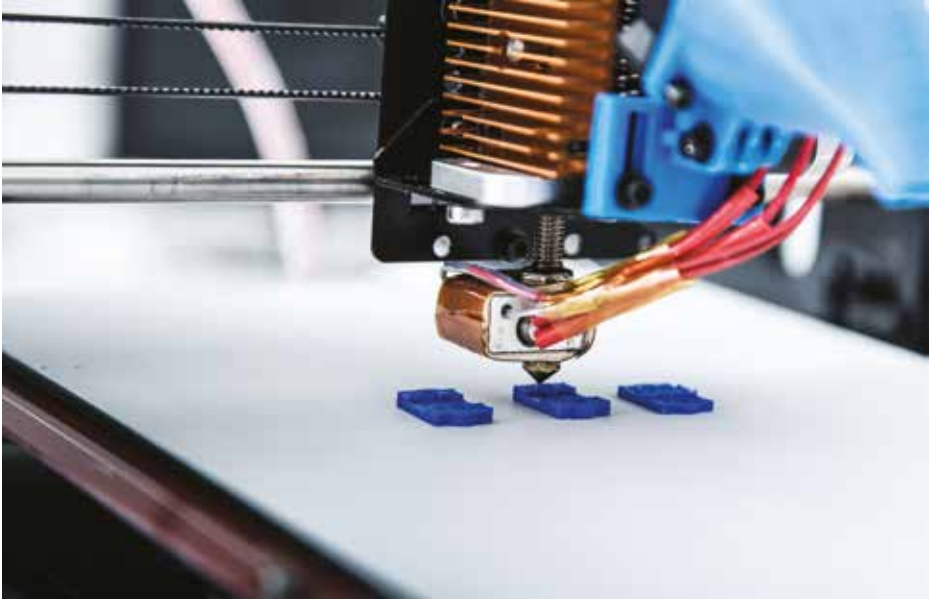
Key findings

- Intermediary actors and organisations are crucial in advancing building and retrofitting low energy homes, as the processes are complex, and they involve multiple different technology choices, suppliers and contractors
- CIED research showed that intermediary actors and organisations have in practice aided the delivery of low energy homes by providing improved opportunities for networking, learning, and sharing experiences from completed projects as well as providing impartial and reliable knowledge for homeowners.
- At a time when policy support for low energy homes is uncertain, intermediation by dedicated organisations is crucial and can provide much needed momentum to keep facilitating change



CIED hosted a workshop with the Energy Saving Trust on low energy housing policy in February 2017.

Grassroots innovation in low energy digital fabrication



Growing numbers of individuals, firms, and civil associations are experimenting with digital fabrication within ‘maker-spaces’. These provide technologies, materials, training, and access to digital networks that enable participants to design and make a wide range of products, from jewellery to eco-houses, bicycles to wi-fi systems, and to encourage community-based projects such as up-cycling.

This project aims to understand why there is so much interest in these developments, what contending narratives are influential in digital fabrication, how they are shaping material developments, what low energy innovations are arising, or potentially could arise in this setting, and how these developments could be shaped in a low energy direction.

Key findings

- Whilst the potential is real, sustainable developments are relatively rare in makerspaces: those makerspaces committed to sustainability principles are pursuing a variety of pathways
- Intangible outcomes from sustainability initiatives are just as important as material outputs – new identities, relations, tacit knowledge, skills, awareness, as much as objects, products and services
- Imaginative, flexible and open-ended support and funding arrangements need to be created to realise the full possibilities for makerspaces to help cultivate sustainable developments.



CIED and the STEPS Centre with Ann Light, Professor of Design & Creative Technology at the University of Sussex, organised a two-day workshop on 'Cultivating sustainable development in makerspaces' in October 2015.

Innovations in urban transport



The project looks at which factors and processes facilitate and obstruct low energy innovation in urban transport, examines to what extent these factors and processes are transferable across and within city-

regions, and provides suggestions about what (local) governments and other stakeholders can do to stimulate the success of such innovations.

Key findings

- Cities can be important places where a wide range of low-energy innovations in passenger mobility emerge and develop. Their role is however strongly dependent on support from national government and their relations with other cities
- Some of the innovations in passenger mobility, such as electric vehicle charging installations and car sharing initiatives, contribute to the resilience of automobility.
- Innovations that are supported by incumbent actors such as local government or existing bus companies seem to thrive more easily than those led by new entrants.



Visiting fellows

CIED hosted six visiting researchers of excellence from across the globe for capacity building, creating opportunities for collaboration and allowing the group to be exposed to different perspectives.

Here is how some of our visiting researchers found their experience:



“CIED has some of the top thinkers in sustainable energy research – it was a fantastic opportunity to visit and work with them. I’m eager to bring these new insights regarding energy innovations, policy and social theory back to my home institution.”

**Dr Jonn Axsen, Associate Professor,
Simon Fraser University**



“My fellowship with CIED was refreshing and stimulating. I met a number of the CIED team and learnt about the wide range of activities in the programme. Attending and giving seminars was a highlight. And the relationship is ongoing as Benjamin Sovacool and I are working on a paper that we devised during the fellowship.”

Dr Janet Stephenson, Research Associate Professor, Director of the Centre for Sustainability, University of Otago



“My fellowship at CIED was a lifetime experience which reoriented my focus to the need to get involved in multidisciplinary research addressing the global challenges around emission reduction. It also catalysed my eventual emergence as a SPRU scholar.”

Abbas AbdulRafiu, Senior Scientist, Global Green Growth Institute/SPRU Energy Policy MSc 2018

CIED Summer School



The CIED Summer School on 'Accelerating Innovation to Reduce Energy Demand' took place from 10-12th of July 2017 at the University of Sussex, Brighton. The CIED Summer School brought together 28 doctoral and early career researchers from multidisciplinary backgrounds who took part in a unique opportunity to hear from leading thinkers in the fields of innovation and energy demand.

With many of CIED's most established and internationally recognised researchers giving presentations about their work, there was a lot of ground to cover in a short period of time. Professor Frank Geels, Dr Karoline Rogge, Professor Johan Schot and Dr Paula Kivimaa each ran sessions that introduced socio-technical approaches, policy mixes for fast-tracking low carbon innovation and theoretical models of diffusion.

Dr Kirsten Jenkins ran a ‘Dragons’ Den’ style session that was designed to encourage the participants to think through the application of socio-technical concepts in practice, yet with an innovative and unusual twist. To get the groups thinking about how to apply socio-technical transitions theory, they were asked to introduce a niche product to the market, starting from the very beginning at the emergence stage, all the way through to its diffusion, whilst dealing with potential barriers and enablers that might feature during this process. The groups then had to pitch their new product as part of a marketing campaign to a very established panel of actors – the dragons (aka Jenny Bird, Dr Tim Schwanen, and Dr Mari Martiskainen) and convince them to invest in their product.



Finally, CIED Director Professor Benjamin Sovacool gave a presentation on ‘how to achieve academic impact’. It provided a refreshingly honest and inspiring insight into how current and future academics can be proactive about promoting their research, including information on how to engage with different publishers, journals, online databases and the media, as well as advice on how to make connections and network in the academic world.

Find out more about the CIED Summer School on our website:

www.cied.ac.uk/event/cied-summer-school-2017/



Centre on Innovation and Energy Demand

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Published in September 2018,
University of Sussex, Falmer, Brighton



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