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Innovative financing models for low carbon transitions: Exploring the case for revolving funds for domestic energy efficiency programmes

Andy Gouldson [a,*], Niall Kerr [a], Joel Millward-Hopkins [a], Mark C. Freeman [b], Corrado Topi [c], Rory Sullivan [a]

[a] School of Earth and Environment, University of Leeds, Leeds LS2 9JT, UK
[b] School of Business and Economics, Loughborough University, UK
[c] Environment Department, University of York, UK

HIGHLIGHTS

- Examines the need for substantially higher levels of low carbon investment.
- Explores the need for innovative financing mechanisms such as revolving funds.
- Shows that revolving a fund could reduce the cost of UK retrofit by £9 billion or 26%.
- Also shows that a revolving fund could make retrofit cost-neutral in the long term.
- Concludes that revolving funds could dramatically increase low carbon investment.

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ABSTRACT

The IEA has estimated that over the next four decades US$31 trillion will be required to promote energy efficiency in buildings. However, the opportunities to make such investments are often constrained, particularly in contexts of austerity. We consider the potential of revolving funds as an innovative financing mechanism that could reduce investment requirements and enhance investment impacts by recovering and reinvesting some of the savings generated by early investments. Such funds have been created in various contexts, but there has never been a formal academic evaluation of their potential to contribute to low carbon transitions. To address this, we propose a generic revolving fund model and apply it using data on the costs and benefits of domestic sector retrofit in the UK. We find that a revolving fund could reduce the costs of domestic sector retrofit in the UK by 26%, or £9 billion, whilst also making such a scheme cost-neutral, albeit with significant up-front investments that would only pay for themselves over an extended period of time. We conclude that revolving funds could enable countries with limited resources to invest more heavily and more effectively in low carbon development, even in contexts of austerity.

1. Introduction

1.1. The importance of the climate finance gap

Tackling climate change undoubtedly represents an enormous challenge, but at the global scale the economic case for tackling it is compelling. Stern famously estimated that the costs of avoiding climate change could be between 1% and 2% of global GDP, but the costs of suffering climate change could amount to between 5% and 20% of GDP per year (Stern, 2007). Even with such a compelling global case for action, however, it is clear that an effective response still requires enormous levels of investment. It is also clear that the general, long term, social case for action on climate change does not always translate into a specific, short term, private case for investment, and that the availability of public funds is frequently constrained in contexts of austerity. Particularly in some settings, these factors have led to levels of financing for low carbon development that are much lower than many estimates of what is necessary. The IPCC (2014) estimated that global investment in climate mitigation and adaptation was in the range of USD

* Corresponding author.
E-mail addresses: a.gouldson@leeds.ac.uk (A. Gouldson), n.kerr@leeds.ac.uk (N. Kerr), jmhopkins@gmail.com (J. Millward-Hopkins), m.c.freeman@lboro.ac.uk (M.C. Freeman), corrado.topi@york.ac.uk (C. Topi), rory@rorysullivan.org (R. Sullivan).

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343–385 billion per year in the period between 2009 and 2012, and Buchner et al. (2013) suggested that global climate finance flows have plateaued at USD 359 billion. Both of these estimates equate to roughly 0.5% of global GDP; approximately one third of the upper end of the investment needs as estimated by McKinsey (2010), GEA (2012), WEF (2013), McCollum et al. (2013) and IEA (2013a) and one quarter of the upper end of the investment needs as set out in the Stern Review (Stern, 2007).

The need for an effective response to under-investment in climate mitigation is pressing. As the years pass, decisions are made that will lock the world in to high carbon development paths for years to come, whilst at the same time long lived emissions continue to accumulate in the atmosphere and the opportunity to make investments that will help to avoid dangerous climate change diminishes. Indeed, the IEA (2013a, p3) reported that 'the goal of limiting warming to 2 °C is becoming more difficult and more costly with each year that passes'. In assessing the scope to avoid dangerous levels of climate change by limiting atmospheric emissions to no more than 450 ppm, a level that is associated with a good chance of avoiding dangerous climate change (IPCC, 2014), the IEA (2013a, p3) finds that 'almost four-fifths of the CO2 emissions allowable by 2035 are already locked-in by existing power plants, factories, buildings, etc. If action to reduce CO2 emissions is not taken before 2017, all the allowable CO2 emissions would be locked-in by energy infrastructure existing at that time'.

But the conditions for investment in low carbon development have hardly been ideal in the last few years. The failure to reach a global agreement on climate change in Copenhagen in 2009 coincided with the financial crisis and the start – in many countries – of a period of instability, uncertainty, recession and austerity. In many settings, for the past few years at least, more emphasis has been placed on these economic and financial issues than on tackling climate change. Indeed, as market instability and policy uncertainty limit private investment, and budget deficits and austerity limit public investment, it seems appropriate to explore some innovative ways of substantially increasing investment in low carbon development.

1.2. The potential role of revolving funds

With this in mind, this paper explores the case for the creation of an innovative financing mechanism – the revolving fund – where the savings from investments in energy efficiency and other forms of low carbon development are captured and reinvested to either reduce the need for new finance or to increase the impact of what finance there is. Such funds have been discussed before (EC, 2011; Forum for the Future, 2011; DECC, 2012a; IEA, 2013b) and have been adopted in different contexts to fulfil a range of objectives including energy efficiency upgrades, promotion of renewables, the provision of clean water and the clean up of contaminated land. Examples of such revolving funds include:

- The US Clean Water State Revolving Fund that was established in the 1990s and has provided over 33,000 loans with a total value of over $100 billion (USEPA, 2015).
- The Thai Energy Efficiency Revolving Fund that since its creation in 2003 has invested c$470m in 294 energy efficiency projects, mostly in factories (Grüning et al., 2012).
- The UK SALIX revolving fund that since its establishment in 2004 has invested £339 million in over 12,000 energy efficiency and renewable energy projects in the public sector with estimated fuel cost savings of £1.2 billion (SALIX, 2015).
- The US Sustainable Endowments Initiative that was set up in 2005 and has since helped to create 79 revolving funds that invested over $100 million of investment in energy efficiency and renewable energy projects in higher education institutes (SEI, 2015).

Various other revolving funds have also been created for urban regeneration, infrastructure provision and economic development. However, although there were evaluations of revolving funds for water and infrastructure provision in the 1990s (see Holcombe, 1992; O'Toole, 1996), as far as we are aware there has never been a formal academic evaluation of the contribution that such funds can make either to reducing the cost of achieving particular carbon reduction targets or to enhancing the impacts of scarce low carbon investment funds. This lack of academic analysis on the potential of revolving funds to help mitigate climate change is not unusual – indeed the IPCC (2014) notes that the scientific literature on investment and finance to address climate change is still very limited and that knowledge gaps are substantial.

1.3. The need for investment in energy efficiency in buildings

These factors are particularly significant for the buildings sector. Globally, over one-third of all final energy and half of electricity are consumed in buildings that are therefore responsible for approximately one-third of global carbon emissions (IEA, 2013b). Energy use in buildings is therefore of critical importance, and many reports highlight the presence of cost-effective opportunities to improve their energy efficiency (IPCC, 2014). However, the IPCC (2014) noted that many potentially attractive energy efficiency investments do not meet the short-term financial return criteria of businesses, investors, and individuals. As a result, the IEA (2013b) predicted that without a concerted push from policy, two-thirds of the economically viable potential to improve energy efficiency in buildings will remain unexploited by 2035.

The reasons for this inertia relate to the presence of strong barriers to change. The IPCC (2014) cited imperfect information, split incentives, lack of awareness, transaction costs, inadequate access to finance, industry fragmentation, the need for new delivery mechanisms and the absence of pipelines of bankable energy efficiency projects as significant barriers. Focusing specifically on the financial barriers, the IEA (2013a) highlighted the importance of up-front costs, levels of risk, issues with interest and discount rates and the inadequacy of traditional financing mechanisms for energy-efficient projects. New forms of policy support, new institutional arrangements, new forms of finance, and new business models are therefore required if the energy efficiency opportunities in buildings are to be exploited (DECC, 2012a; GEA, 2012; IEA, 2013a; IPCC, 2014).

The scale of the challenge is formidable – the IEA (2013b) estimated that over the next four decades USD 31 trillion will be required to promote energy efficiency in buildings at a rate that gives the world a good chance of limiting the temperature increases associated with climate change to 2 °C. Whilst the IEA (2013a) suggests that 'it is widely recognised that mobilising huge investment into energy efficiency is essential' it also argues that 'offering advantageous financing mechanisms is likely to require public funds and these may be harder to justify with tighter public budgets' and that as a result mobilising private as well as public sector financing will be essential. In 2008, the IEA argued that one way of doing this might be to establish revolving funds for building refurbishment and retrofit (IEA, 2008).

1.4. The European context

These issues are particularly relevant in Europe. The European Commission has set a target of reducing energy consumption by 20% by 2020, with performance assessed relative to business as usual projections that include assessments of background trends in energy use and energy efficiency (EU, 2012). It has also recognised that €100 billion a year will be needed to reach this target, and it has set aside €27 billion to support the transition to a