

# **Innovative Financing Models for Low Carbon Transitions: Exploring the case for revolving funds for building energy efficiency programmes**

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# Climate Change and Investment (1)

- Tackling climate change is an enormous challenge, but at the global scale the economic case for tackling it is compelling.
- Stern (2007) estimated that the costs of avoiding climate change could be 1-2% of global GDP, but the costs of suffering climate change could be 5- 20% of global GDP p.a.
- However, even with such a compelling global case for action, 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 does not always translate into a specific, short term, private case for investment, and that investments of public funds are frequently constrained in an era of austerity.

## Climate Change and Investment (2)

- The IPCC (2014) estimated that global levels of investment in climate mitigation and adaptation were in the range of USD 343 to 385 billion per year in the period between 2009 and 2012 and Buchner (2013) finds that global climate finance flows have plateaued at USD 359 billion.
- Both of these estimates equate to c.0.5% of global GDP – this is roughly 1/3 to 1/4 of the upper end of estimated investment needs if dangerous climate change is to be avoided (c.f. Stern, 2007; McKinsey, 2010; IIASA, 2012; WEF, 2013; McCullum et al, 2013 and IEA, 2013a).

## Climate Change and Investment (3)

- The need for an effective response to under-investment in climate mitigation is pressing.
- 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’ and that ‘almost four-fifths of the CO2 emissions allowable by 2035 are already locked-in... 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.’

## **Climate Change and Investment (4)**

- But the conditions for investment in low carbon development have hardly been ideal in the last few years.
- Market instability and policy uncertainty continue to limit private investment in many markets/sectors
- Budget deficits, austerity and neo-liberal agendas continue to limit public investment in many countries
- Innovative ways of substantially increasing investment in low carbon development are needed.

## How this Relates to Energy Efficiency in Buildings

- Globally,  $\frac{1}{3}$  of all final energy and  $\frac{1}{2}$  of all electricity are consumed in buildings that are therefore responsible for  $\frac{1}{3}$  of global carbon emissions (IEA, 2013b).
- But many potentially attractive energy efficiency investments do not meet the short-term financial return criteria of businesses, investors, and individuals (IPCC, 2014).
- As a result, the IEA (2013b) predicts that without a concerted push from policy,  $\frac{2}{3}$  of the economically viable potential to improve energy efficiency in buildings will remain unexploited by 2035.
- New forms of policy support, new institutional arrangements, new forms of finance and new business models are required if the energy efficiency opportunities in buildings are to be exploited (IEA, 2013a; IPCC, 2014; DECC, 2012a).

# The Potential of Revolving Funds

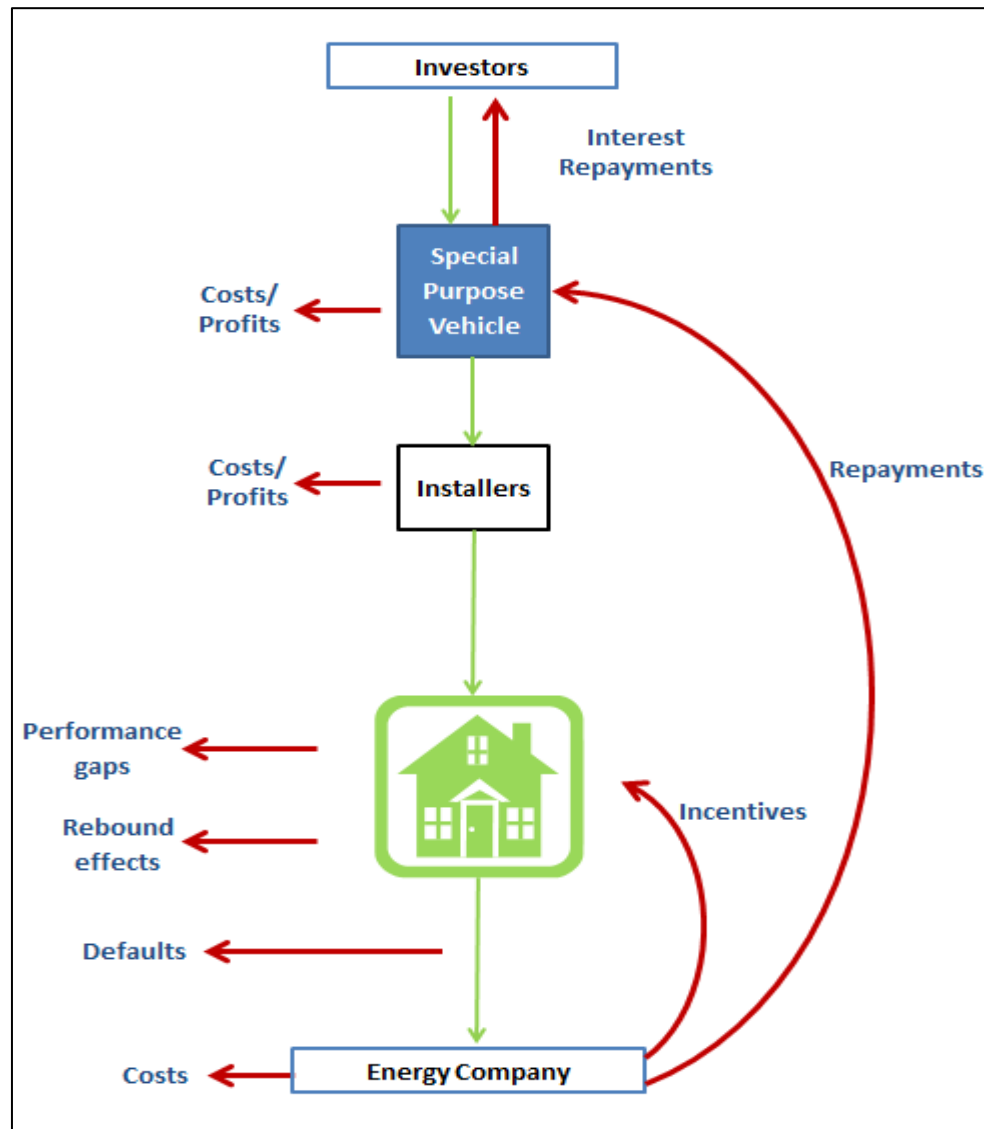
- In 2008, the IEA argued that one way of mobilising investment in the built environment might be to establish revolving funds for building refurbishment and retrofit (IEA, 2008).
- Revolving funds are where the savings from investments are collected and reinvested to either reduce the need for new finance 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 various contexts.
- However, as far as we are aware, there has never been a formal academic evaluation of the contribution that such funds can make.

# This Paper

- This paper explores the case for the creation of an innovative financing mechanism – the revolving fund.
- Focusing on the financing of building energy efficiency retrofits, it explores what they look like, how they work and what they could contribute.
- More broadly, it considers how they might be organised and governed, what they imply for the roles of public, private and civic actors and what they tell us about the governance of climate finance and the financing of sustainability.



# A Generic Revolving Fund for the Built Environment



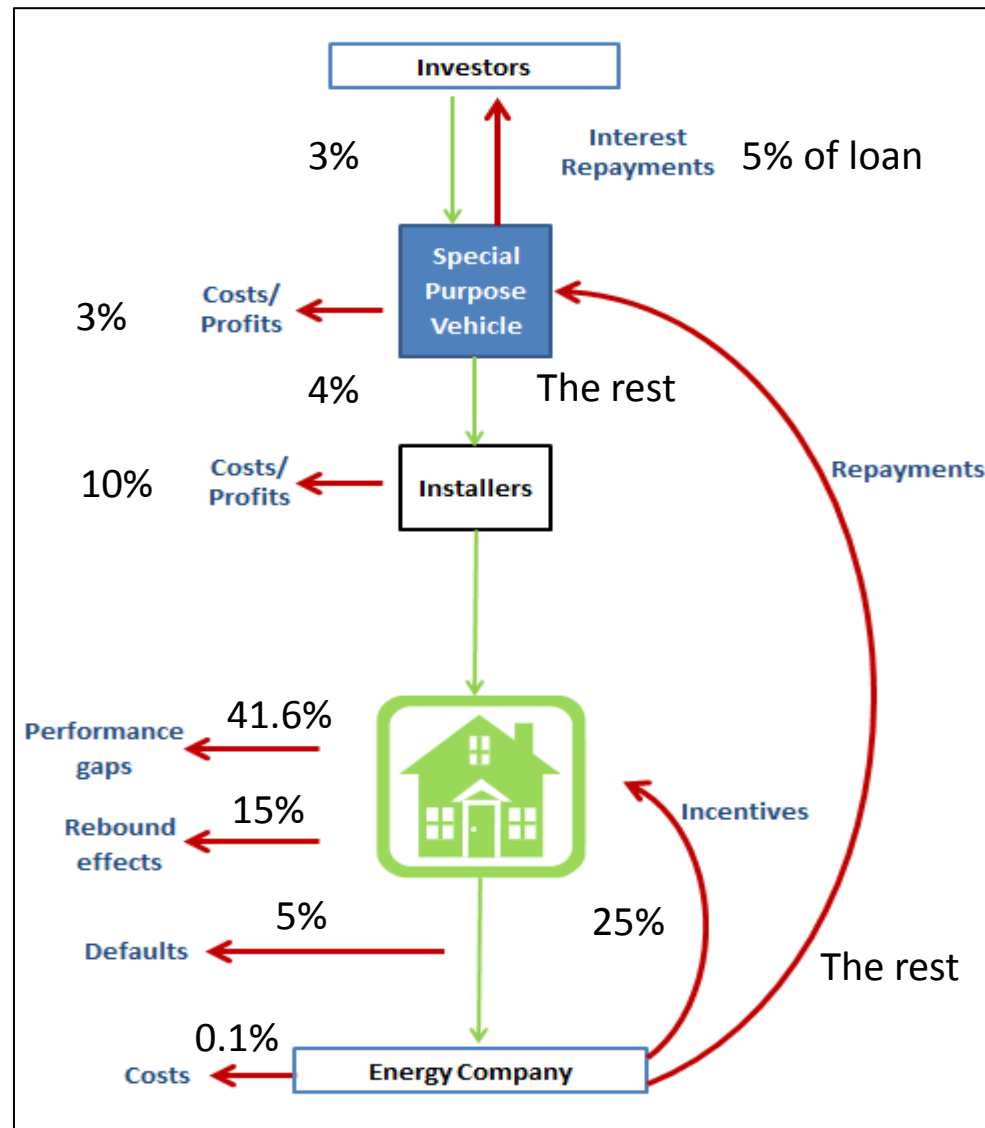
# The Case - Domestic Energy Efficiency Retrofit in the UK

- UK has an old and frequently energy inefficient housing stock that accounts for 25% of UK carbon emissions.
- Data on the costs, performance and scope for deployment of a range of energy efficiency and low carbon measures that could be applied in the UK housing stock are drawn from a model developed for the UK CCC.
- Data takes into account the purchase, installation, running and maintenance costs and lifespans of each measure.
- Data evaluates impacts of measures in an 'average' UK house already upgraded to a good standard of energy efficiency.
- By considering the scope for deployment of each measure across the UK, assessments of each individual measure can be scaled up to consider aggregated costs and benefits if all measures are installed in every suitable property in the UK.

# Energy Efficiency and Low Carbon Measures Considered

1. Loft insulation from 0 - 270mm
2. Loft insulation from 25 - 270mm
3. Loft insulation from 50 - 270mm
4. Loft insulation from 75 - 270mm
5. Loft insulation from 100 - 270mm
6. Cavity wall insulation for homes built before 1976
7. Cavity wall insulation for homes built between 1976 and 1983
8. Cavity wall insulation for homes built after 1983
9. DIY floor insulation for suspended timber floors
10. Solid wall insulation
11. Paper type solid wall insulation
12. Best practice standard windows
13. Uninsulated hot water cylinder to high performance cylinder
14. Modestly insulated hot water cylinder to high performance cylinder
15. Primary pipework insulation
16. Improve airtightness
17. Thermostatic radiator valves
18. Room thermostats
19. Hot water cylinder thermostat
20. Efficient lighting
21. A+ rated wet appliances
22. Photovoltaic generation with FIT
23. Micro wind turbines (1kW) with FIT
24. Mini wind turbines (5kw) with FIT

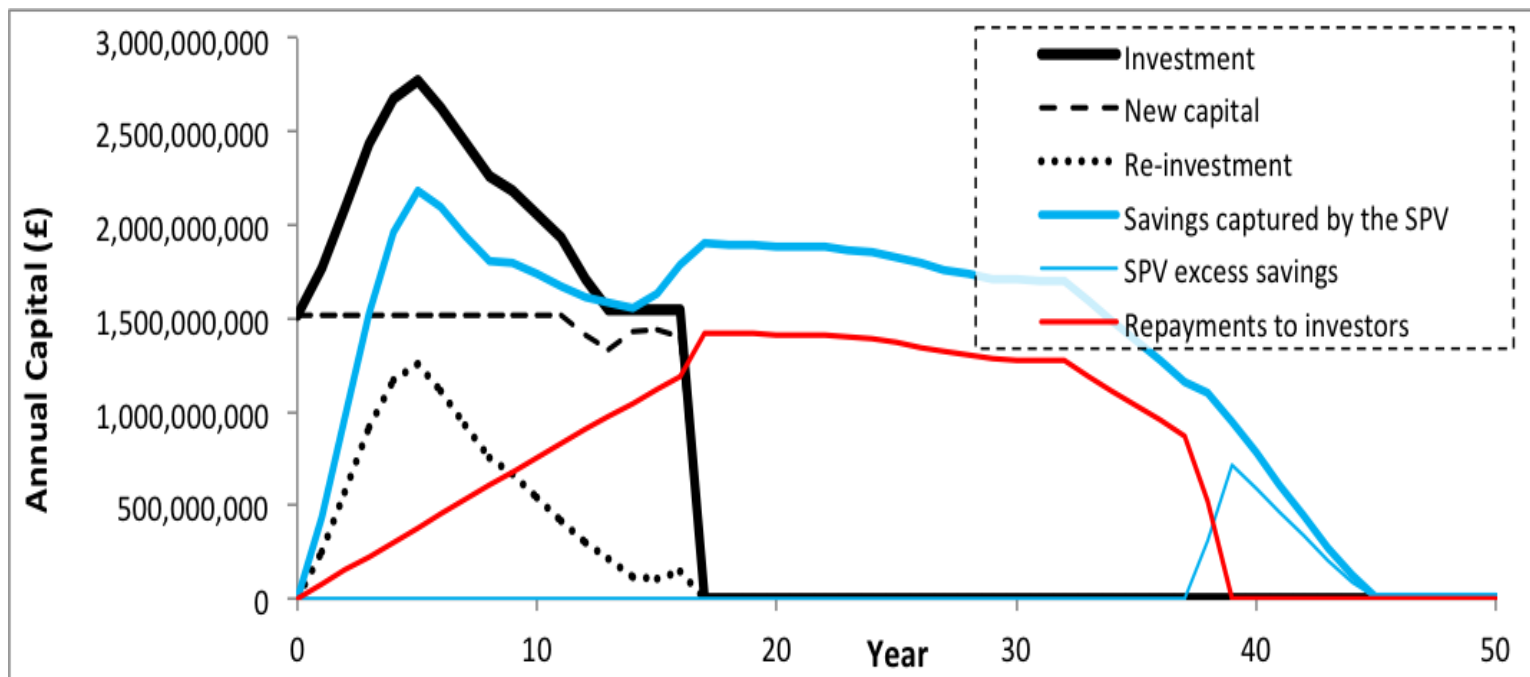
# A Generic Revolving Fund for the Built Environment



- Max investment levels p.a.
- Max exploitation of available potential of any option p.a.
- Scope for limited optimisation, i.e. by pay-back period

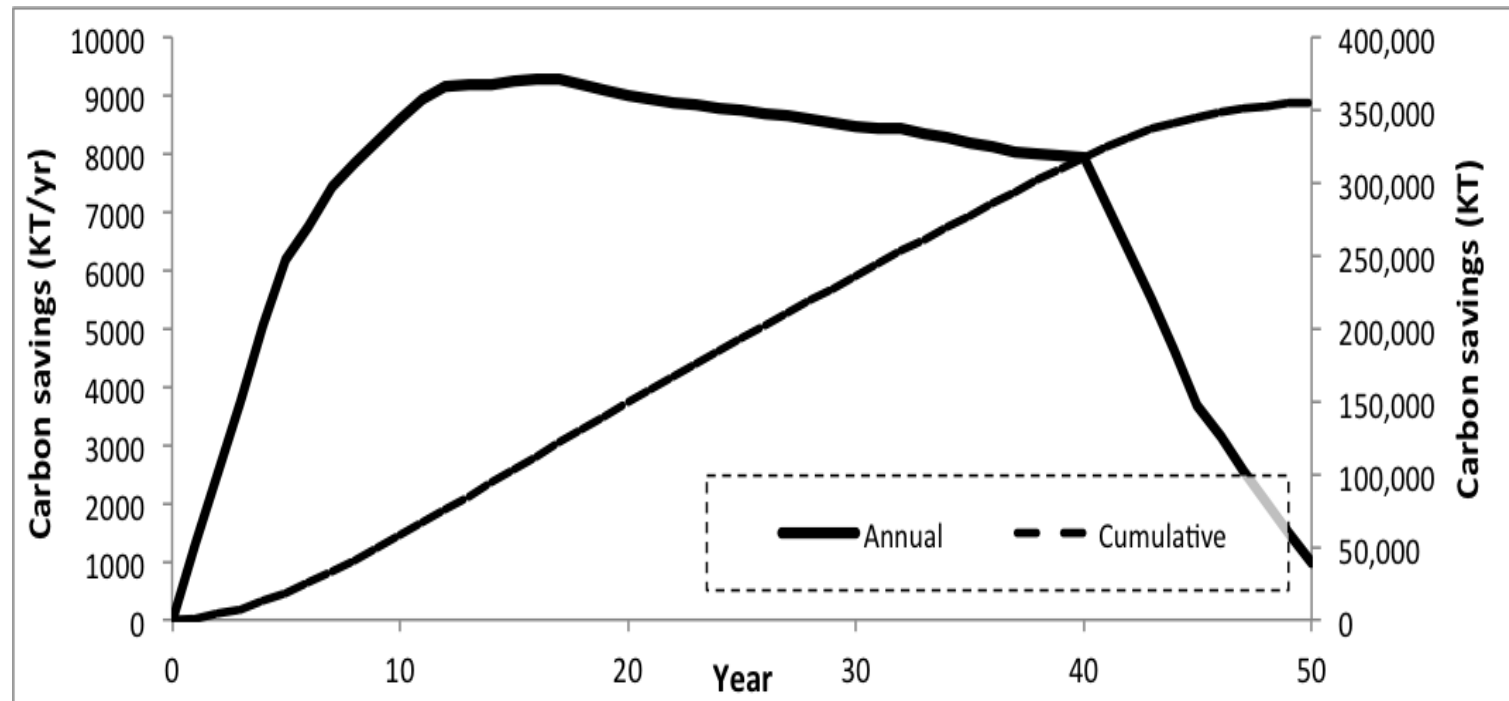
# Impacts on Investment

- Total investment required across the UK - £34.7 billion
- £25.2 bn from new capital, £9.5 bn from recycled investment
- All available opportunities exploited within 17 years.
- All loans repaid to investors after 38 years.



# Impacts on Carbon

- Investments would reduce UK domestic carbon emissions by 9 megatonnes (MT) per year  $\approx$  c6.5% of their 2012 level.
- Over the lifetime of the investments, total carbon savings of 363 MT would be generated  $\approx$  77% of the UK's 2012 emissions.



## Key Findings (1)

- With a revolving fund, an extensive domestic sector retrofit scheme could be made essentially cost-neutral, albeit with significant up-front investments that would only pay for themselves over an extended period of time.
- The up-front investment costs of such a scheme could be significantly reduced through the creation of a revolving fund.
- The investment needs and the associated investment gaps discussed at the beginning of this paper might be significantly reduced if revolving funds were widely deployed.

## **Key Findings (2)**

### **How might revolving funds might be organised and governed?**

- Different models exist with different roles for public, private or civic actors either as enablers, owners, investors, deliverers, governors. The direct impacts of such funds depend on the ways in which they are applied and governed.

### **What do they imply for public, private and civic actors?**

- The public sector probably has to play a significant enabling role if revolving funds are to be widely adopted – this means providing policy certainty, introducing enabling policies, lowering risk and cost of capital, lengthening time horizons, securing public interest outcomes...
- Thereafter, revolving funds could be financed and run by public, private or civic actors for either private or public benefit.



## Key Findings (3)

### What about broader systemic impacts?

- Innovative financing arrangements such as revolving funds could enable states with limited capacities and resources to act in contexts and on issues where action might otherwise be impossible.
- Pragmatically, therefore, it seems that revolving funds could have massive potential, particularly in an era of austerity. But their impacts depend on the ways in which they are organised and governed.
- However, paradoxically there is also a danger that revolving funds could be used by some to argue for the further curtailment of the powers of the state