Putting energy savings within reach

why some home energy efficiency programmes work

2011 Churchill Memorial Trust Fellowship to US state and city home energy efficiency programmes

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Executive Summary

Home energy use accounts for about one-quarter of Scotland's and the UK's carbon emissions. With tough climate change targets to reach by 2020, making homes more energy efficient has to be part of the solution. Energy efficiency saves money for consumers, creates green jobs, and helps reduce fuel poverty. Yet, despite these advantages, only modest progress has been made, and homeowners remain unwilling to undertake major retrofits. The UK has relied on a voluntary approach to encourage people to upgrade their homes – with awareness raising campaigns and incentives to cut the cost of renewables and insulation. In late 2012 the Green Deal[1] will be introduced, a 'Pay as You Save' financing scheme which relies on the market to provide home energy upgrade packages. Regulation to enforce minimum standards of energy performance are also being explored.

Through a Churchill Memorial Trust Travelling Fellowship I analysed what the US experience, recently expanded with funding under the American Recovery and Reinvestment Act (ARRA 2009)[2] could offer in terms of lessons. I visited five exemplar state and municipal programmes in Vermont, Maine, Flagstaff (Arizona), Berkeley (California), and Oregon. The purpose of the fellowship was to seek an understanding of what motivates homeowners and landlords, and how governments at all levels can use their powers and influence to encourage change. In sum, there is no single ingredient to success – rather it is the collection of ingredients, an entire recipe, that can clinch the deal. Based on the study visits, the following recommendations can be made for the UK and Scotland, for government policy, programme design, and utility regulation:

Government Programmes

Driving Demand

Assess current and planned programmes against the recommendations of the *Driving Demand for Home Energy Improvements* report[3] from the Lawrence Berkeley National Laboratory (see Appendix 3). Although this report is based on the US experience, many of the lessons can be directly applied to the UK. The recommendations are given for two categories: marketing and outreach, and programme design and implementation.

Scorecard

An independent scorecard of national, local and utility-led programmes should be produced, to encourage and promote best practice. The scorecard could be modelled on the American Council for an Energy Efficient Economy (ACEEE) publication, *2011 State Energy Efficiency Scorecard*[4]. The report provides a comprehensive ranking of the states

1 http://www.decc.gov.uk/en/content/cms/tackling/green_deal/green_deal.aspx
2 http://www.recovery.gov/About/Pages/The_Act.aspx
3 http://drivingdemand.lbl.gov/
4 http://aceee.org/sector/state-policy/scorecard

based on an array of metrics that capture best practices and recognize leadership in energy efficiency policy and program implementation.

Set performance standards
Develop and implement mandatory standards of energy performance to complement energy efficiency programmes. While the UK is ahead of the US on some aspects of this agenda, the US experience still offers some useful lessons. First, regulation and performance standards are inevitable, and the evidence to date shows that they work when aligned with strong programmes of technical support, financial assistance, and marketing. Second, the regulator should have in place a means to enforce the standard and a database through which the assessment can be shared easily with buyers, sellers and renters. Third, the standards should be developed through a stakeholder process which takes account of all concerns and results in better compliance. Fourth, make sure the assessment is 'fit for purpose' – affordable but detailed enough to inform improvements.

Programme Delivery

Guarantee Quality
Require 'testing out' (eg air tightness testing) to ensure the predicted energy savings can be achieved. Payment of incentives to the installer should be dependent on the test out results. The profession of energy auditors and contractors need training, support and pump priming. Independent certification, cooperative marketing, and training in customer service are all important. Providing some form of customer satisfaction rating and track record would be useful. Support for capital investment for small, local companies that need to scale up quickly, but find it difficult to get the necessary capital in place, is equally important.

Make it a good customer experience
Build capacity among contractors on technical, marketing and customer service aspects. Provide consistent and long-term incentives. Generate enough demand for energy upgrades and turn over to trusted trade allies who can deliver the product and continue to market to the target audience. Maintain customer relationship over time through correspondence and phone contact to increase conversions to upgrades now and in the future. Remember, the energy adviser and contractor will be the ones to clinch the deal.

Provide finance as part of an energy upgrade programme
Finance is important but needs to be an integral part of the overall programme with all the ingredients for success – an easy customer journey resulting in a quality upgrade.

Work with social norms
Develop public-private partnerships with local organisations to engage a whole community effort in reducing energy use. Take the time to understand the community or segment the audience and design a programme that engages with their values and needs – one size fits all approaches will not work. Use trusted local people to promote the programme through a range of on-the-ground activities – dinner parties to show off upgrades, door-to-door visits, school events, competitions. In today's world of virtual communities, it is just as important to use social media. Social applications need to be developed for the UK market which encourage people to share and compare their

energy use and experiences. They should be based on public-private partnerships which can be trusted in order to maximise uptake.

Widen funding sources
Identify new sources of funding – such as 'crowd sourcing' for solar panels from the local community, to supplement government and private funding and encourage broad-based support for the agenda.

Utility Regulation

Consolidate energy efficiency efforts
Consider an alternative to the carbon emission reduction targets and ECO (Energy Company Obligation) which leaves separate utilities competing to delivery energy efficiency services. Instead, explore means to pool 'ratepayer' funding into one pot and divided by devolved administration, giving it to independent 'public purpose' organisations in each devolved country to design and deliver home energy efficiency programmes against a set of performance measures. These organisations would have to bid for the contract to provide this service for a certain number of years. Private contractors who were certified could compete to deliver the audits and upgrades. This provides a streamlined approach to delivery of energy efficiency services – no duplication, no confusion, one trusted, credible and independent source of advice, incentives, and delivery. The independent organisation would work with contractors to build capacity and transform the market. This model would work well with the Green Deal approach.

Energy Efficiency Utility
Another interesting possibility would be to create Energy Efficiency Utility(s) like Efficiency Vermont – organisations that can sell energy efficiency as a resource on the market as energy costs avoided. This gives a market value to energy efficiency and provides another funding source for efficiency programmes.

Billing and social media
Work with utilities to ensure information on energy bills taps into the 'flocking tendency' of people to conform to what 'people like them' are doing. If people know their neighbours are using less energy, they will be motivated to save energy too. This is already happening to some extent – but are the utilities using the latest methods? And what can utilities do to promote social media applications which compare energy use? In short, regulators have the potential to rewrite the 'rules of the game' for utilities and give more incentives for energy efficiency. Regulators should be maximising this potential.

Conclusion
While US energy and housing policies are different in several respects from that in Scotland and the UK, the experience in delivering home energy efficiency programmes has much to offer. US programmes show a market approach can work, but only if the right ingredients are mixed together and given careful support. There is no 'silver bullet' that will motivate homeowners on its own. A coherent package must be offered as one attractive and streamlined customer journey. Community engagement, targeted marketing and products, a professional workforce, independent advice, affordable finance, minimum standards, consistent assessment – these are the main ingredients. If any are missing, the programme will falter and discredit similar efforts for the future.

The lessons in this report are of particular value as the Green Deal is made available to the public in late 2012. The Green Deal is a critical part of the UK Government's effort to meet its legislative climate change targets. If the Green Deal is able to build on the US experience as outlined in this report, it could achieve genuine transformation of social norms and the market, leading to the pace and scale of change needed for a low-carbon Britain.

Introduction

Home energy use accounts for about one-quarter of Scotland's and the UK's carbon emissions[5]. With tough climate change targets to reach by 2020 (42% reduction on 1990 levels for Scotland)[6], making homes more energy efficient has to be part of the solution. Some 85% of existing homes will still be homes in 2050, so it is essential to improve their energy performance. Energy efficiency saves money for consumers, creates green jobs, and helps reduce fuel poverty. Yet, despite these advantages, progress has been slow. Home energy demand is stable, fuel poverty is rising, and for the most part, homeowners are unwilling to undertake major retrofits of their homes.

The UK has relied on a voluntary approach to encourage people to upgrade their homes, using awareness-raising campaigns and incentives to cut the cost of renewables and insulation. More recently, incentives in the form of feed-in-tariffs have sparked a huge increase in photovoltaics. In late 2012 the Green Deal[7] will be introduced, a 'Pay as You Save' financing mechanism which relies on the market to provide and service Green Deal packages.

Thus far, UK programmes simply have not delivered the upgrades expected despite massive investment. Can the US experience, recently expanded with funding under the American Recovery and Reinvestment Act (ARRA 2009)[8] offer any lessons? The US approach relies on a combination of financial incentives, support to suppliers and community engagement to create change. The programmes are based on the belief that the market will deliver for energy efficiency – with some pump priming in the right places.

Through a Churchill Travelling Fellowship, I visited five exemplar state and municipal programs: Vermont, Maine, Flagstaff (Arizona), Berkeley (California), and Oregon (see Appendix 2 for full itinerary and contact details). The purpose of the fellowship was to explore what motivates homeowners and landlords, and how governments at all levels can use their powers and influence to encourage change. The research included visits to programme designers, utility companies, home performance contractors, visits to home retrofits and interviews with customers. The programmes were chosen for the variety of approaches – financial incentives, community engagement, regulation, and market transformation. They also have excellent reputations - all but two of the states come out in the top 10 in the American Council for Energy Efficiency State Energy Efficiency Scorecard[9] out of a total of 50, with the exception of Maine (12) and Arizona (17).

This report analyses the different programmes and considers what lessons can be drawn for use in Scotland and the UK. It starts with a summary of the US context of home energy efficiency programmes, identifies key themes for discussion, and gives a

5 Maximising the Minimum, WWF Scotland, 2011 http://assets.wwf.org.uk/downloads/min_stds_full_web.pdf

6 Climate Change (Scotland) Act 2009

7 Energy Act 201, Green Deal financial mechanism, http://www.decc.gov.uk/en/content/cms/tackling/green_deal/green_deal.aspx

8 http://www.recovery.gov/About/Pages/The_Act.aspx

9 http://aceee.org/research-report/e115

short summary of each study visit. It then concludes with recommendations for the UK and Scotland. For more information and photos on the study visits, full postings are available at the blog http://warmerhomes.wordpress.com.

The US context

For the most part, residential energy efficiency programmes are run by state and municipal governments. These programmes often partner with local not-for-profit organisations and community groups. In some cases, these programmes are funded (or part-funded) by federal programmes or through federal tax cuts and rebates. The federal government can influence state programmes by setting standards (which can be a prerequisite for funding) and providing guidance and support.

Over the last 30 years, hundreds of millions of dollars of public money have been spent on residential energy efficiency programs.[10] Incentives, awareness-raising, training of contractors – a variety of approaches has been tried – all reliant on stimulating demand and supporting the market to deliver. Despite these efforts, there has been only modest progress, even for upgrades that are cost-effective in the short-term. Deep retrofits and whole-house upgrades have had even more limited success. However, the collective experience offers valuable insights for designing today's policies and programmes. One of the most obvious lessons is that programme designers and contractors alike need to do more to build on past experience, copy good ideas, and not reinvent wheels.

In 2009, the American Recovery and Reinvestment Act (ARRA) was signed into law, providing $25 billion to boost energy efficiency programmes. Altogether, ARRA is the single greatest federal investment in the American economy in United States' history. The purpose of the program is to spur economic growth, create jobs, save energy, and reduce greenhouse gas emissions through a process of market transformation. States and municipalities bid for the funds through a competitive process, to supplement existing programs or create new ones. Individuals access funds through rebates and tax credits. Special funding streams exist for low income housing, energy efficient appliance rebates, and renewables.[11] Though all ARRA funds must be spent by the end of March, 2012, its impact will be felt for many years to come. For example, 35 states used funding to establish revolving loan funds using $650 million of ARRA funds which is expected to leverage in enough private investment to fund projects worth $120 million a year for the next 20 years. Other benefits have been programmatic, improving coordination and knowledge between federal, state, local and private financial institutions.

Table 1[12]

Programme	FY2008	ARRA Stimulus Funding
Weatherization Assistance Programme (Low Income)	$227 million	$5 billion
State Energy Programme	$33 million	$3.1 billion
Energy Efficiency and	N/A	$3.2 billion

10 http://eetd.lbl.gov/EAP/EMP/reports/lbnl-3960e-web.pdf

11 For more detail of the ARRA funding components see the Alliance to Save Energy Factsheet on Energy Efficiency and the American Recovery and Reinvestment Act 2009, dated March 2009 http://ase.org/resources/recovery-act

12 http://aceee.org/research-report/e115

Conservation Block Programme		
Appliance Rebate Programme	N/A	$300 million
TOTAL	$260 million	$11.6 billion

Of course, ARRA is not the only funding source. Ratepayer (utility surcharge) programmes across the US have grown from $900 million in 1998, tripling to $3.1 billion in 2008, and are expected to double by 2020[13]. States also reach out to alternative sources such as Energy Saving Performance Contracts (EPSCs)[14]. These contracts are a performance-based arrangement with an Energy Services Company (ESCO) allowing the state to pay for services through future energy efficiency savings from installed measures. Other alternative sources include sales from emissions allowances, for example in the Northeastern states with the Regional Greenhouse Gas Initiative (RGGI)[15]. Since its start in September 2008, proceeds from allowances sold in 12 auctions came to $866.4 million. Over half of this money has been put towards energy efficiency programmes [16].

Despite these and other funding sources, there are concerns about the future of these programs as the ARRA money runs dry in 2012. In bad economic times, will homeowners invest without significant incentives? And if demand falters, how will the emerging market for contractors cope? In some states, energy efficiency programmes may not meet their targets and regulators may then allow utilities to miss theirs. State legislatures faced with the requirement to balance budgets, may raid formerly ring-fenced for energy efficiency.

Even so, it cannot be denied that the policy landscape has changed, and for the better. Energy efficiency has become and is expected to remain a major policy priority. It can respond to multiple challenges – energy security, job creation, energy savings, and climate change. Both Republican and Democrat states are trying to expand their energy efficiency programmes as they see the consequences of falling behind their neighbours and losing economic opportunities. Some are looking to how regulators can 'change the rules of the game' by making or incentivising utilities to prioritise energy efficiency more. This should place an even greater emphasis on treating least-cost energy supply – the 'negawatt' which in turn means more support for energy efficiency programmes. Another alternative for the future is community funding and 'crowd-sourcing' funds to local initiatives such as Solar Mosaic[17], which invites individuals to invest in solar panels for a community building.

A word about low income households

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13 The Shifting Landscape of Ratepayer -funded energy efficiency in the US, Barbose, Goldman and Schlegel, 2009, Berkeley National Laboratory http://eetd.lbl.gov/ea/ems/reports/lbnl-2258e.pdf

14 http://energyperformancecontracting.org/

15 http://www.rggi.org/

16 Investment of Proceeds from RGGI Allowances, Feb 2011, RGGI Inc. http://rggi.org/docs/Investment_of_RGGI_Allowance_Proceeds.pdf

17 http://solarmosaic.com/

The programmes visited, and thus this report, largely focused on the 'able to pay' as low income programmes are funded separately and often delivered by different agencies. The federal government (Department of Energy) provides significant funding to every state for 'weatherisation' of low income homes, and a separate fund to help pay energy bills. There is a real tension between funding for weatherisation and funding for the immediate hardship of energy bills. Each state can supplement the federal funding with state funding – and the level of support varies significantly from state to state. Many states already have long waiting lists and the situation is expected to get worse as federal funding shrinks and state budgets tighten.

For those lucky enough to be at the top of the list, they are given significant retrofits, with an average spend of $6,500 per unit. The low income programme is administered by an independent agency, which takes a comprehensive look at health and energy issues, and encourages cross-referrals to other social programmes. The low income programmes can work with homeowners or landlords of low income properties.

The DoE also demands strong quality control (blower door tests at audit and completion). Thanks to ARRA funding, several states offer significant incentives for household renewables. However, the DoE funding can be inflexible as it does not fund improvements to the structure of the house or other health issues eg lead, roof, that are necessary before putting place the energy efficiency measures. It also requires a savings to spend ratio of 1:1 (over the lifetime of the product installed) These restrictions lead to ‘walk-aways’ if the house can’t be treated within spending limit and yet often these are the most urgent of cases.

Key Themes and lessons learned

Energy efficiency is a hard sell – you can't see it or touch it, and the big financial savings come over time. Successful programmes sell the immediate benefits of comfort, health, warmth, energy security and savings on bills. As a rule in the US, concerns about climate change do not serve as a motivating factor and programmes work to policy goals related to energy saved, not emissions reduced. Most programmes reserve mention of carbon emissions and the environment for the small print in any promotional materials. The focus is on the value of energy efficiency – to the householder, the utility and the regulator.

Through the study visits, some key themes emerged on what worked to motivate householders to do upgrades, and what the main challenges are. All aspects are important – a loan programme could not succeed without successful marketing, standards could not succeed without incentives, and nothing succeeds without trusted contractors. In short, all relied on a positive customer journey. The key themes are:

- quality assurance
- customer journey, market transformation
- social norms – audience segmentation, community engagement, billing, social media
- finance – incentives and loans
- standards and regulation

Quality assurance
There is a strong emphasis on quality assurance in all the programmes visited. This helped build a professional contractor network, it gave customers confidence, and it meant programme managers had a good idea what savings were being achieved. In all cases, homes received an energy audit, including an air-tightness test, and once the measures were installed, the property was 'tested out' to make sure it would achieve the savings predicted. In some cases, payments were tiered to the level of savings. Usually the minimum energy savings expected was 30%. As the approach is performance-based, it meant that the upgrade could be tailored to the individual house based on the audit. The audit also gave the homeowner a 'road map' for the future, a guide on what measures to install over time. The downside is that the numbers of properties receiving upgrades is relatively low, and they tend to be 'able to pays'. However, some programmes are designing products aimed at the moderate income audience, and low income being served by federal weatherization programmes.

Customer Journey
Customer focus is what it is all about, making the customer journey rapid, professional, and meeting their needs. The best programmes had developed a strong contractor network which was local, qualified, trained in marketing and customer service, and could be counted on to deliver on time, on budget, and with the savings promised. The programmes benefited from consistent, mulit-year funding so they were able to offer good incentives over a significant period. This allowed the supply of quality contractors to build in tandem with the rising demand - market transformation in action.

Social Norms

Successful programmes latched onto the importance of engaging with social norms in order to influence behaviour change. 'Social norms' are the explicit or implicit rules and customs for guiding social behaviour in a community or group. People don't tend to make rational decisions based on information or even economics, but they will often conform to what their neighbours, friends, or community does.[18] So working with community groups and local champions is crucial, as is audience segmentation. Some examples are the Repower Bainbridge[19] project in Washington State, which works with the community to raise awareness and market energy upgrades. It identifies local families as energy champions, holds events in schools, and monitors the communities energy use.

Another project is Green Sneakers in Maine which uses volunteers to help host neighbourhood dinner parties at a home which has been upgraded. The homeowner and contractor talk about their experience, show people the changes, and encourage their friends and neighbours to do the same. This work is time-consuming and expensive, but hopes are it will pay off in the long run. Funding for the on-the-ground community work is difficult to find, so community efforts could rarely afford to evaluate their success, and often ran for only six months at a time. Study visits showed that if partnerships could be forged between government, charities and the utilities then multi-year programmes could make real progress.

If a community project is not possible, looking to virtual communities through social media (eg MyEnergy[20]) that allow individuals to share information on their energy use and savings is something new that is underway. At the least, tailored information on energy bills has been shown to reduce energy usage. In the case of Opower, a company that partners with utilities to work with customers to reduce their energy use by comparing it with their neighbours and giving specific tips on how to save that are matched to the household. Opower has also launched a 'social energy application' in partnership with Facebook and the Natural Resources Defense Council, a prominent environmental group in the US[21].

Audience segmentation is equally as important. Knowing the audience and devising a product that works for them has worked for the Energy Trust of Oregon. Their most recent example is the Moderate Income Programme[22]. This audience has tended to be under-served in the past – they don't qualify for low income programmes, and don't have enough income to go ahead with upgrades based on the usual incentives. So this programme ups the incentives enough to make it affordable to this income group.

Financing

Consistent and long-term financing programmes are essential to build demand and trust. Short-term incentive programmes may initiate a burst of activity, but contractors will find it hard to respond, undermining confidence in the profession. Householders will also lose faith in stop-go incentive programmes, assuming they have run out of money and so

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18 Cialdini, Robert, Influence: The Psychology of Persuasion, six key principles of persuasion
19 http://www.positiveenergybi.org/repowerbainbridge
20 https://www.myenergy.com/
21 http://opower.com/company/news-press/press_releases/40
22 http://energytrust.org/income-qualified-assistance/savingswithinreach/

won't bother to apply. Yet even with the best financing, it is not enough to attract much uptake on its own.

In an ACEEE report on loan programmes, *What Have We Learned from Energy Efficiency Financing Programmes?*[23], it concluded that loan programmes are not fulfilling their potential. Uptake tends to be low, on average only 3% of the target audience in the loan programmes surveyed. There is a chronic lack of private capital for financing for energy efficiency loans so most of the programmes are small, experimental pilots, relying on one-off federal funding, ratepayer funds and credit unions to administer. There is a lack of data, uniform standards and loan terms, so it is difficult to scale up and recapitalize the original loan fund. The report recommends future loan programmes must budget for long-term marketing, simplify the application and approval process, provide attractive loan terms, on-bill financing, and design for a particular target audience. In order to achieve the most energy savings, a whole house energy audit should be required, and the financing should be packaged with other incentives and rebates. Ideally programme benefits should be segmented to incentivise greater savings. Finally, contractors should be supported and trained in marketing, customer service, to help sell the product.

The Clean Energy Works Oregon[24] programme provides several different options for financing. Importantly, it includes an energy advisor to take the household through the process, making it as straightforward as getting financing for a car. Another example is the Maine PACE[25] (Property Assessed Clean Energy) programme, which offers affordable finance through a revolving loan fund, and promoting it in partnership with municipalities.

Standards and regulation

In most US states, there is no requirement to assess and disclose the energy performance of the house at sale or rental as in the UK. However, there is growing interest in exploring what assessments, scores, and standards can do to motivate energy upgrades. Over a dozen states or municipalities are exploring just this and seven new policies are in place as of 2009[26]. In the states visited, all were considering the use of standards, and could point to other cities such as Boulder, Colorado and the City of Berkeley, which has had a Regional Conservation Ordinance since 1992.

The US Department of Energy is promoting its Home Energy Score[27], which is somewhat similar to the European-mandated Energy Performance Certificate[28]. The Home Energy Score is an attempt to create a national assessment method that is

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23 What have we learned from Energy Efficiency Financing Programmes? Sep 2011, ACEEE http://www.aceee.org/sites/default/files/publications/researchreports/u115.pdf

24 http://www.cleanenergyworksoregon.org/

25 http://www.efficiencymaine.com/docs/PACE

26 Northeast Energy Efficiency Partnerships, *Valuing Energy Efficiency through Disclosure and Upgrade Policies.* neep.org/uploads/policy/NEEP_BER_Report_12.14.09.pdf

27 http://homeenergyscore.lbl.gov/

28 http://www.direct.gov.uk/en/HomeAndCommunity/BuyingAndSellingYourHome/Energyperformancecertificates/DG_177026

comparable, as there are a plethora of scoring methods available that can lead to confusion. At the same time, the variety of methods puts the US in a good place to analyse the best approach to assessment and scoring. There is growing pressure to decide on the best methodology as many believe the introduction of minimum performance standards is inevitable and a common method is needed if the market is expected to buy in. Regulation could be through building codes, licensing regimes, linked to incentives, or through the sale and rental process.

Experience in the US has shown that any standard must be introduced alongside a strong programme with good technical and financial support. At the same time, any standard will only be meaningful if it is enforced, with the mechanism to enforce (eg licensing scheme) in place before implementation. Householders and landlords will respond if they believe the standard will give some monetary value to the energy upgrade, so systems to disclose and market the value of the rating must be implemented and supported. Most important, stakeholders need to be brought on board through development of the regulation so their concerns are fairly addressed. The City of Boulder, Colorado conducted a two-year stakeholder process before finally introducing regulations[29] that enforced a minimum standard on rental properties.

Study Visit Summaries

Efficiency Vermont

Vermont has been in the business of promoting energy efficiency for over 20 years. They are known for their creative approaches, ambitious targets, and consistent investment in energy efficiency. In 2000, the state consolidated the utility-run energy efficiency programs (bar one in Burlington) by establishing an Energy Efficiency Utility (EEU), the first of its kind in the US[30]. Instead of providing units of energy, the EEU, called Efficiency Vermont, provides units of energy efficiency. This innovative approach stems from the state regulator of utilities (Public Services Board[31]) working to a 'least cost' management approach.

The Board defines energy efficiency as a resource in utility regulation because it recognises the clear cost advantage of providing energy savings at typically one-third the cost of new generating facilities. Thus, investments in energy efficiency and its benefits can be factored directly into decision-making on investments to existing and new operating systems. Vermont's aggressive energy efficiency measures remain cost-effective, even after 20 years of work. The benefit (lifetime economic value of investments) to cost ratio of Efficiency Vermont services in 2009 was 2.4 to 1 – a tremendous value.

Efficiency Vermont[32] provides energy efficiency services to homes and businesses state-wide, serving a population of 620,000. The Vermont Energy Investment

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29 http://eetd.lbl.gov/ea/emp/reports/mi-policybrief-3-16-2012.pdf

30 http://www.efficiencyvermont.com/about_us/information_reports/how_we_work.aspx

31 www.veic.org

32 www.efficiencyvermont.com

Corporation[33](VEIC), a non-profit organisation dedicated to energy efficiency, now has a 12 year appointment to run Efficiency Vermont, which allows for long-term planning and investment. Efficiency Vermont has three ongoing funding sources in addition to state and federal funding:

- a 5% surcharge on electricity bills from all utilities which is pooled to provide a uniform and consistent service across the state, rather than duplicative services from each utility.
- Bidding into the New England wholesale market for energy and capacity to deliver a certain amount of capacity through energy efficiency (approximately $2 million in 2011)
- Emission allowances sales through the Regional Greenhouse Gas Initiative(RGGI). RGGI is a cap and trade program in 10 New England and mid-Atlantic states to curb ghg emissions. Vermont is under the cap, so it sells its allowances and invests the proceeds in energy efficiency programs.

The funding from the electricity bill surcharge has to be used for electric efficiency. As most of the funding comes from this source, it limits the ability of Efficiency Vermont to provide incentives for home heating, air sealing and insulation. Most of Vermont relies on heating oil which is unregulated and therefore the Public Services Board cannot place a surcharge on bills. This is a matter of ongoing debate and there is a proposal to place a tax on heating oil, though this failed in the last state legislature.

In addition, Efficiency Vermont received funding through the Recovery Act:

- $69 million for Smart Grid implementation. The smart grid will relay information back and forth between the customer and the utility, and between the utility and various components of the electric grid. When fully operational, the smart grid will provide a more reliable electric system, with the ability to incorporate renewable energy sources, and to offer customers tools to manage their electric use. The federal funding is being matched with $69 million in funding from Vermont utilities.
- participate in the in-store $50 rebate program for energy efficient appliances (washer and refrigerators)
- $31.6 million for renewable energy and energy efficiency – homes, businesses and schools, low income households[34].

How is Efficiency Vermont's budget determined?

The Public Services Board sets Efficiency Vermont’s budget by devising scenarios to assess the energy efficiency potential that is 'reasonably' cost-effective. Cost effectiveness is considered in a societal context, considering the lifetime of measures, avoided costs of transmission upgrades, the future costs of purchasing energy, and geographic and social equity. There is no 'climate change' target, or link to the state policy to retrofit 80,000 homes. The process is open to public debate and written submissions from all parties. It is currently funded at 4.4% of utility revenues - about 5 times the national average. The Public Services Board sets three year budgets, and for

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33 www.veic.org

34 http://www.vermontbiz.com/news/july/vermont-praised-use-arra-energy-funds

2011 the budget is nearly $36 million with targets to achieve approximately 2.2% annual savings.

The Efficiency Vermont model has proven so successful, that the VEIC has been asked to help set up similar energy efficiency utilities in Washington, DC and Ohio. Other states and Canadian provinces have copied the Efficiency Vermont model - Pennsylvania, Michigan, Maine, New Brunswick and Nova Scotia.

Efficiency Vermont and Home Energy Efficiency Upgrades

Efficiency Vermont uses the US Environmental Protection Agency and Department of Energy Home Performance with Energy Star[35] programme. This federal programme provides a framework for state and municipal initiatives, taking a comprehensive, whole-house approach. More than 75,000 families across 32 states have had their homes improved through this program as of March, 2011. The framework allows for flexibility and each state can design a programme that suits their situation. Efficiency Vermont believes the Energy Star brand resonates with customers and lends credibility to the programme.

In Vermont the programme provides advice, financial incentives, and technical assistance to householders and businesses to improve energy performance. They partner with contractors to provide training and certification. First, the homeowner is taken through a comprehensive energy audit (2-3 hours) including air-tightness testing (a blower door test) by a certified contractor. The contractor agrees a plan with the homeowner, does the installations, then conducts another air-tightness test to make sure the work was successful. Incentives (up to $2,500) are paid out based on how much air leakage is reduced. Interestingly, most contractors use cellulose insulation as fibreglass cannot easily achieve air-tightness requirements.

Efficiency Vermont decided several years ago to take the long term view and invest in transforming the market - building demand for home upgrades and supply of qualified contractors slowly and in tandem. While this has meant a slower rate of refurbishments, it is creating a steady and sustainable marketplace which can scale up when more resources are made available. It also avoids the boom and bust problems of short-term programs.

Vermont Gas

Jeremy King, Energy Auditor with Vermont Gas, conducted a follow-up visit to a house they had upgraded a couple of years ago. They provide a free energy audit (worth about $500) including air tightness testing, thermal imaging, and safety testing of appliances. The auditor talks with the homeowner about what is important to them - comfort, cost savings, and the environment. The results are fed into a computer model to project energy savings, and recommendations presented to the customer in terms of economic benefits and a payback period.

The first priority is always to address air tightness - in the basement, walls, attic and even the roof slopes (coombed ceilings). Vermont Gas pays for 1/3 the cost of the measures and then offers a 0% interest loan for the rest. If it is for a landlord, they will

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35 http://www.energystar.gov/ia/home_improvement/HPwES_Utility_Intro_FactSheet.pdf

pay half the cost with the 0% loan. The loan is administered through a local credit union, with Vermont Gas filling the gap on the interest rate. They also work with the homeowner to select a certified contractor - and Vermont Gas deals with all the administration and bills. With such an attractive offer, it is not surprising that approximately 50% of those audited go ahead with an upgrade.

So why does Vermont Gas do it? They've been offering this program since 1992 because they want to reduce peak load demand and avoid costs of new infrastructure and expansion. It is all about least cost energy supply - so if the 'negawatt' - energy efficiency is cheaper - that's what Vermont Gas wants to supply. Quality control is all important - after each upgrade there is a follow-up blower door test and inspection of measures, and 2 years later, Vermont Gas checks the energy bills to make sure the homeowner is getting the savings predicted.

All in all, this program seems to provide what the homeowner wants - quality service, easy administration, and excellent value for money. At the same time, it makes economic sense for Vermont Gas. However, the program, though well marketed, relies on homeowners making the first move - so it does not achieve the pace and scale of upgrade required to meet the climate change challenge.

Efficiency Maine

Efficiency Maine is based on the Efficiency Vermont model, though it does take some different approaches to the home retrofit agenda. It is a Trust which operates all energy efficiency and renewable energy programs for the state of Maine. As with Efficiency Vermont, Efficiency Maine is funded through a system benefit charge included in electricity rates, the regional greenhouse gas initiative and federal grants. The cumulative ratio of benefits to the costs of running Efficiency Maine from 2004 through 2009 is 3:1, that is, every dollar spent has generated nearly $3 in lifetime economic benefits[36].

Efficiency Maine serves a population of 1,328,000 mainly focused on creating demand. They believe that in the not too distant future, the private market will sell energy efficiency without any need for intervention. As well as creating demand, Efficiency Maine has concentrated on building a strong energy adviser profession which will be ready to meet the expected surge in demand which is predicted due to rising oil prices. In the meantime, Efficiency Maine uses its small budget for incentives and marketing to spark demand.

Efficiency Maine's residential program has four components:

- partner with retailers to promote rebates for energy efficient appliances and lighting
- promote the PACE loan program within the Home Energy Savings Program framework
- support for energy auditors and installers
- incentives for household renewables (wind and solar)

Until recently, the Home Energy Savings Program offered rebates of up to $3,000 for insulation and air sealing thanks to ARRA and state funds. Combined with federal tax cuts of up to $500, these incentives were enough to cut the cost of a typical job by one-third and have proved a very successful 'bribe' in persuading homeowners to upgrade. However, this funding is no longer available and homeowners are directed to the loan programme instead, though still within the rules of the Home Energy Savings Program.

Home Energy Savings Program
Efficiency Maine was concerned at the low level of actual home upgrades taking place (only 20 homes in 2007) so they used focus groups to test marketing approaches for their residential program and looked at how to improve the customer relationship between homeowners and energy advisers. Some of the conclusions of this review were:

- use positive language about improving the home – so 'energy upgrade' as opposed to 'retrofit' – which sounded negative and too technical.
- keep the name of the program simple – Home Energy Savings Program is what it says on the tin. The focus group research found that the federal program Home Performance with Energy Star name did not resonate with homeowners.

36 http://www.efficiencymaine.com

- rebates needed to be set high enough to trigger an upgrade – in Maine's case an incentive of at least $1,500 (or 30% of upgrade cost on average) made the difference.
- use marketing techniques such as 'limited time offer' with extra incentives (extra $1,000). This proved great for encouraging take-up, but made it difficult for contractors to respond to the sudden (and temporary) increase in demand with the kind of quality customer service that they want to give. Furthermore, as funding was used up within 6 months of the financial year, it is questionable if this approach was right to provide a stable, steady market.
- help make sure every audit leads to an upgrade – Efficiency Maine have a calculator[37] on their website which helps homeowners determine the level of savings they are likely to achieve with an upgrade and therefore understand if it is worth going ahead with an audit or not. Importantly, the calculator compares your energy use to others, using the power of peer pressure to encourage uptake.
- homeowner testimonials on the website and in the local news to sell the benefits of energy upgrades. In addition, Efficiency Maine considered using 'graduate referrals' - a rebate of $100 to someone who has upgraded their home and refers a friend to the program. If your friend upgrades their home, they also get $100. In the end, this program was not implemented as they had sufficient take-up.
- help ensure good quality of workmanship and customer care. Like the Vermont residential programme, the Home Energy Savings Program requires a thorough audit including pre and post-air tightness testing, and the upgrade must achieve at least a 25% reduction in energy use to receive the financial incentives.

Matchmaking between homeowners and contractors

Efficiency Maine sees itself as the 'matchmaker' between the advisers and the homeowners - rather than promoting audits and hoping the upgrades will follow. Efficiency Maine has 'participating' energy advisers listed on their website which means they are independently certified. Efficiency Maine goes one step further to assist homeowners in selecting the best contractor. It takes a 'trip advisor' approach, giving a customer satisfaction score and sorting by the number of upgrades (not just audits) completed. This system has helped build a solid core of professional, experienced contractors who have a strong track record.

One barrier that Efficiency Maine has helped address is the 'sales pitch'. Jobs simply were not moving from audit to upgrade regardless of the quality of the contractor or level of incentive. This is because energy advisers tended to be strong on building science, but terrible at selling their product. Efficiency Maine developed a 'weatherisation sales' course for energy advisers and contractors. Instead of jargon, they talk about comfort, financial savings, health - and speak to the interests of the homeowner. Since running this course, 60% of those who get an audit go through to complete the upgrade (as opposed to 20%). This course is now getting copied in other states.

While the program has jumped from 20 homes a year in 2007 to an expected 3,000+ (each with an average of 36% energy savings), it is a long way from achieving the Maine

37 http://www.efficiencymaine.com/at-home/hesp_program/calculator

state goal of 500,000 homes upgraded by 2030. Much relies on the success of the loan program, and/or state moves to provide more funding for incentives to pump-prime the market.

Maine PACE

PACE stands for Property Assessed Clean Energy - an initiative to finance home energy improvements going forward in several states. Maine is lucky to have American Recovery and Reinvestment Act (ARRA) funding of $30 million to capitalize, administer and market the loans. Efficiency Maine administers the programme for the whole state, and the ARRA funding will provide the initial capital for the loans. The intention is to use the funding to grow the loan fund by attracting other capital investment. While Maine will be looked to as a pilot PACE program, it is in the unique position of having capital financing from the word go. Hence Efficiency Maine is careful to call it 'Maine PACE' as it is not a genuine PACE program which relies on municipalities raising the capital through bonds which are then paid for through property assessments.

Under the Maine PACE programme[38] one can borrow up to $15,000 at 4.99% for up to 15 years, an attractive rate. The loan is transferable on sale of the property, though in practice Efficiency Maine thinks this would all become part of the sale price. You can use the money for insulation, air tightness, new windows, doors, more efficient heating system, lighting and appliances, and household renewables. All work must meet the Home Energy Savings Program requirements to ensure quality control - an audit with an approved advisor, air tightness and insulation must be completed if recommended, and a follow-up audit to make sure there has been at least a 25% improvement.

Each municipality must approve PACE for their area, though they have no financial or administrative requirement. This is because it is important to have local partnerships and opinion leaders to promote PACE in their areas. Testimonials from the first PACE loans in Maine are starting to come in. Word of mouth, combined with rising heating oil prices might just be enough to drive up the demand for PACE. Some fine tuning of the program is underway - making sure there is something available for everyone, and streamlining the approval process so it comes as part of the audit – to make it as easy and commonplace as getting financing on a new car.

As of October 2011, Efficiency Maine had received over 450 PACE applications and closed on 91 PACE loans for a total amount of $1.2M in funded projects in the first 6 months of the program. PACE ordinances have been passed in 100 Maine municipalities making the loan program available to 57% of the state population. Efficiency Maine is marketing PACE through flyers enclosed with municipal property tax bills, online web-ads in all of the major newspaper websites in the state and a series of televised community cable television PACE forums held in city halls across the state.

Community partnerships

Efficiency Maine has partnered with the community group Green Sneakers[39] to raise awareness and create demand. Green Sneakers was born out of frustration on the part of environmental, health and faith groups with the lack of progress at the Copenhagen

38 http://www.efficiencymaine.com/pace

39 http://www.coolmaine.org/green-sneakers.html

Climate Change Conference. The Maine Partners for Cool Communities (made up of Maine Council of Churches, and the Maine chapters of the Sierra Club and the Physicians for Social Responsibility) - “solving global warming one Maine community at a time” - decided to set up a grass roots project to help individuals reduce their carbon footprint at home.

The project trains up volunteers to go door-to-door and do quick evaluations (one hour) to enthuse and motivate homeowners to upgrade their homes. The ‘walk thru’ includes talking about the current ‘energy plan’ and together they calculate the 10 year cost of doing nothing in dollars and carbon. They share case studies from the area, point out financial incentives, and then walk through the house to identify energy savings opportunities.

Green Sneakers has helped organise ‘house parties’ so homeowners can share their experience of the upgrade. The contractor comes along, the Green Sneakers volunteers make the food, and everyone brings their friends. Green Sneakers also puts out street signs where an upgrade or audit is taking place – “Another home saving energy” – as a means to raise awareness. Green Sneakers helps to promote the new PACE loans, as well as do-it-yourself approaches – such as the storm window (secondary glazing) inserts that can be made for about $10 a window. Community groups have embraced this low-cost approach promoted by the MidCoast Green Collaborative – organising workshops and church events to help all people be able to upgrade their homes – regardless of income or ability. “Anyone can make one” and the payback time is less than 7 months – cheaper than buying fuel this year”[40].

Green Sneakers is also running the Future Homeowners/Youth Leader Project – which recruits high school students to canvass their family and neighbours about energy saving opportunities. The students will be trained to do a simple energy audit of their homes, and to launch a community carbon challenge. This project will create a cadre of students and families educated in energy efficiency and building science. But does community work make a difference? Andy Burt, a leading activist with Maine Cool Communities for 11 years, believes it is essential: “we must approach the energy efficiency issue from both ends”. Community efforts can help educate and create demand – raise awareness of the health, environmental, and economic benefits. For example, Maine has the highest rate of childhood asthma in New England – how much is down to damp and draughty homes?

Just as important, community work helps to create the mandate federal and state policymakers need to put in place programs. For example, Cool Communities volunteers are helping to get PACE loan program ordinances passed at town meetings, giving evidence at the state capitol on building standards, helping towns and cities develop sustainable energy plans, and partnering with Efficiency Maine to promote PACE by introducing local contractors to local people. Why does it work? For Andy it is obvious – local volunteers are trusted messengers – be it for homeowners or politicians. Andy is a proponent of social-based marketing ideas for motivating and encouraging people to change – “we need to ‘build a movement that changes the social norm”.

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40 http://www.midcoastgreencollaborative.org/

Time will tell what impact Green Sneakers has made – though it will be difficult to measure its full success – from home upgrades to influence of policy. They are an interesting model that other communities can learn from – bringing together environmental, social, health and community groups for a common cause.

An energy advisor's perspective – Evergreen Home Performance

Evergreen Home Performance[41] is a young and growing company, dedicated to achieving greater home energy efficiency in the state of Maine. This company inspires and enthuses its customers, its employees, and even politicians. Their strapline is: safe, healthy, comfortable, durable and efficient homes. They say their work can cut energy bills in half, on average saving more than $1,000 a year. Richard Burbank, President of Evergreen Home Performance, uses a marketing approach which appeals to homeowners and their concerns - comfort, health, energy security, and financial savings. For the most part, concerns about climate change will be the 'icing on the cake' once a decision has been taken for one or more of the other concerns listed above.

One reason Richard got involved in energy efficiency is the whole issue of energy security, how that ties into the war in Iraq, and the consequent tragic loss of life and huge cost to the US economy (according to Richard, a 20% cut in energy use in the US would be equivalent to the cost of six months of the Iraq war). Some clients will decide on an upgrade just because of concerns about health. Richard says that when he sees a few inhalers on the kitchen table and smells the dampness, he knows there's a problem he can help solve. Whatever the reason, Richard sells a positive product that will make his customers happier.

Evergreen Home Performance offers a free consultation to find out the homeowner's concerns, what chimes with their values, and a quick look as to the potential for upgrade in the house and possible incentives. Based on this conversation, the homeowner decides whether or not to pursue a full audit (which is usually included in the price of the upgrade). In Richard's experience, this approach is more likely to ensure an upgrade actually follows the audit. Richard also believes the same company should do the audit and the installation. Staff need to be passionate about the building science (but not tied to one technology) and finding the leaks. Staff must be able to talk to homeowners' concerns, rather than bore them with building science. Last but not least, staff need to be valued, trained, and well paid.

Upgrades normally involve sealing off dampness in basements and then tackling air leaks with insulation (blown in cellulose) in the attic – a 'boots and hat' approach. Cellulose is used exclusively and fibreglass insulation is often removed as it has often degraded and is extremely difficult to make it tight. Problems of mould, poor air quality, ice dams on the roof, and high energy bills are all solved.

Will companies like Evergreen Home Performance always need incentives to survive? In Richard's view - the energy efficiency business can stand on its own two feet, but needs help with capital investment and training so the supply of quality energy advisers is ready to meet what will be (as a result of rising prices) a growing demand. Rebates and loans are important 'bribes' to attract homeowners, but they need to be long-term so as

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41 http://www.evergreenyourhome.com/

not to create blips in demand that are hard for small companies to meet. In any case, Richard believes the government support is well worth it. He estimates there is some $4 billion worth of work in home energy upgrades in Maine. This is work that cannot be outsourced from Maine so the money stays in Maine. The alternative is to keep paying the rising price of oil – this money does not stay in the Maine economy or create jobs.

City of Flagstaff, Arizona

Flagstaff certainly gets its fair share of sunshine, but living at nearly 7,000 feet means cold winters and windy days, with just as much need for insulation and air tightness as more northern states. The city decided to use ARRA funds (nearly $600,000) to support the Flagstaff Residential Energy Efficiency Programme[42]. They plan to treat 550 houses, create 8-12 jobs in the community, save 5 million kw of energy, offset 5.5 million pounds of carbon dioxide and save nearly $200,000 in utility bills annually. The energy audit and retrofit are available on an income-based fee structure starting at $25 and working up to $625 for incomes over $80,000. For this fee, the homeowner receives and upgrade worth $1,250. The upgrade focuses on insulation, weather stripping, duct sealing, furnace inspection, and efficient lighting and water fixtures, with an aim of reducing energy use by an average of 30% and bill savings of $450 a year.

The Flagstaff Sustainability Program makes the most of its networks and partners, such as the ReNews Regional Network for Energy and Water Sustainability[43], working with other government agencies, the university and community college to provide a coordinated approach. It helps fund the Sustainable Economic Development Initiative, which has a special task force on energy to encourage cooperation between government, business and non-profits on energy efficiency. And the Coconino County Sustainable Building Program[44] offers guidance, support, and tours on retrofits as well as new builds.

One interesting project is WACBAT, or the Weatherisation and Community Building Action Team[45]. This is a Northern Arizona University student, faculty and community group. It works in the poorest neighbourhoods to raise awareness of energy use, conducts audits and helps with installations. Homes and community buildings have benefited, with the aim of creating a more sustainable local economy.

In one of these communities, Southside, the Murdoch Community Centre is 'going solar'. It is raising money to pay for solar panels one tile at a time through an initiative called Solar Mosaic[46]. This financing project allows any individual to buy tiles – or shares- for $100 each, which will be earned back over time. So if a person can't afford to 'go solar' on their own home, they can have a stake in a community solar project, and still get the money back.

With ratepayer programmes as well through the Arizona utilities, there is a gradual growth in home upgrades and some renewables (though surprisingly few, given the sunny climate). However, even programme managers would admit the uptake remains slow. The end of ARRA funding will place a greater strain on programme budgets, just at a time when continuity of funding is needed to maintain steady growth in demand for and supply of home upgrades.

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42 http://flagstaff.az.gov/index.aspx?nid=1630

43 ReNews Regional Network for Energy and Water Sustainability, www.flagstaff.az.gov/index.aspx?NID=1761

44 Coconino County Sustainable Building Program, www.coconino.az.gov/comdev.aspx?id=148

45 Weatherisation and Community Building Action Team, www.green.nau.edu/dbart/wacbat.aspx

46 Solar Mosaic Murdoch Center, http://www.solarmosaic.com/flagstaff

City Berkeley, California

Beautiful sunny Berkeley is known to be one of the most politically liberal cities in the US. Located in the San Francisco Bay Area, it is home to the University of California Berkeley and Lawrence Berkeley Laboratories, two of the largest employers in the city. Berkeley's Residential Energy Conservation Ordinance[47] (RECO) is one of the longest running examples of using regulation to achieve a minimum energy performance standard in existing homes.

What is RECO? The Residential Energy Conservation Ordinance was adopted in 1987 (and revised in 1992) to increase water and energy efficiency. Specifically, it should help the residential sector do its part towards meeting greenhouse gas emission reduction goals of 33% by 2020 and 80% by 2050. The key components of RECO are:

- certain energy and water efficiency measures must be in place before selling the property or conducting a major renovation (these are modest measures - weather stripping, hot water tank and pipe insulation, attic insulation (R-30 or approx 215 mm), flow reduction devices on toilets, showers and faucets)
- the requirement may be passed on to the buyer who must meet the RECO requirements within one year
- city building inspectors check compliance as part of overall building inspection for remodels and a 3rd party contractors verifies compliance prior to property sale

While RECO has been successful (Berkeley housing consistently scores better on home energy use than neighbouring cities), city officials have been working on an update which could help drive more extensive energy upgrades and contribute to climate change goals. City officials proposed moving to a performance standard which would be more appropriate and accurate for more significant upgrades. Furthermore, officials were convinced that the measures-based approach was leading to lost opportunities or problems by not tailoring the upgrade to meet the needs of the particular house.

However, defining a performance standard is difficult due to concerns that assessments and improvements could present an unreasonable cost to homeowners and there has been an outcry from the local and statewide real estate industry concerned about mandatory requirements harming the real estate sector. The California State required a residential energy assessment, simulation and report - HERS 2 – which can takes up to 10 hours to complete. This makes it expensive and burdensome - especially for the temperate climate found along the coast of California where energy costs average only $1500 to $2000 per year. So in the words of city official Billi Romain, "RECO became a policy in search of a tool". It also was a policy pushing at the boundaries of political acceptance, even in a progressive city like Berkeley. As a result, the updated RECO is now looking like it will include the following:

- require a Home Energy Score at point of sale, rental and major renovation and installation of minimum insulation measures as required in the current RECO. The Home Energy Score is a simple audit, costing the homeowner about $200

47 http://www.ci.berkeley.ca.us/contentdisplay.aspx?id=16030

- require minimum prescriptive measures, such as weather stripping, fireplace closures, pipe insulation and low flow plumbing, consistent with the new building code

The hope is it will serve as an 'on ramp' for homeowners to make use of the incentives and rebates available. It is also hoped it will create a significant sampling of what a whole-house upgrade looks like and costs for Berkeley - and create case studies which can be used for marketing upgrades to others. Finally, if this approach fails over the next few years, city officials will be in a better position to argue the need for mandatory action, and they will know how much on average an upgrade to a certain standard will cost.

The city is also conducting research on the pros and cons of using HERS 2 or the Home Energy Score - which tool is fit for purpose? At the end of the day, the city wants the updated RECO to meet three criteria: 1) ensure homeowners do not suffer from lost opportunities; 2) drive demand for deep energy upgrades; and 3) provide measurable outcomes. The city is also aware that for a minimum standard to work, certain systems need to be in place. First, a publicly available database which allows the City, potential buyer and realtors to quickly and accurately show what properties have passed RECO; and second, a concerted means to market asset ratings to make them mean something in the property market.

What can we learn from Berkeley's experience?

- mandatory regulation works - as 10 years of the current RECO shows
- a prescriptive measures-based approach can lead to lost opportunities and even problems, and does not drive whole-house upgrades
- a performance-based approach has advantages, but needs an audit tool that is fit for purpose - sufficiently robust, at a reasonable price
- mandatory assessments with improvement incentives may work together to increase uptake of incentives
- incentives are important, but won't deliver change on their own
- asset ratings need to be a factor in the real estate marketplace
- support from stakeholders must be earned - from politicians, homeowners, real estate agents, and energy performance contractors
- energy performance contractors must up their game to earn the confidence of property owners

Energy Trust of Oregon

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The Energy Trust of Oregon[48] is an independent non-profit organisation funded by ratepayer surcharge on utility bills (gas and electric). Like Efficiency Vermont, this ratepayer funding is pooled into one pot, and given to a "public purpose" organisation to provide energy efficiency services to all utility customers. The Energy Trust was established in 2002 and works to tough performance measures set by the state public utilities regulator. Since 2002, the Energy Trust has saved participating homeowners $800 million on energy bills and more than $1.8 billion in investments that their utilities do not have to make for fuel, storage, transportation and generation of more expensive energy. The Energy Trust contracts CSG[49] (Conservation Services Group) to deliver the residential programme. CSG operates energy efficiency programs across the US in 22 states.

Market Transformation - Moderate Income Programme

The Energy Trust's Moderate Income Program – Savings within Reach – targets an under-served segment of the population – those with too much income to qualify for low income support, but too little to invest in energy upgrades. So there is more money per measure, going beyond what is strictly cost effective. The Energy Trust launched the moderate income program, then once demand was created, turned over the marketing to its trade allies - those contractors which can meet the Energy Trust requirements. This approach - market transformation in action - has allowed the Energy Trust's marketing budget to stay static for four years, while its goals have become more ambitious. Trade allies are given support through a cooperative marketing budget, which provides up to 33% of trade ally marketing costs. The Energy Trust also provides template advertising with Energy Trust branding.

A visit was made to one of the households upgraded through the moderate income programme. In this case, the trade ally had called the householder offering a free audit with blower door test and an energy upgrade with incentives from the Energy Trust and the local government. It turns out the homeowner was eligible, and he had been aware that this work needed to be done, so the phone call was just the right trigger. He arranged an appointment for the audit, which revealed the need to insulate the attic, duct work and floor. The work was completed and tested out to ensure the right energy savings have been made (if not, the incentives won't be paid so the contractor has a real stake in doing the job right). The homeowner was then encouraged to talk to his neighbours and encourage them to do the same. Signs are also posted outside his house to raise awareness of the upgrade. The whole process from start to finish took only two weeks.

The Energy Trust has worked hard building capacity with its trade allies to ensure they have the right blend of marketing and installation skills. In the case study above, the trade ally had just the right balance to create demand that can be met in a timely and professional way.

Market Transformation - Converting interest to upgrades

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48 http://energytrust.org/

49 http://www.csgrp.com/

The Energy Trust does a fair amount of marketing (web, radio, newspaper) to generate phone calls to their energy advisers. The energy advisers can provide a free audit over the phone, or will offer a free home visit and audit if the person wants or needs one. While this system is generating a significant number of jobs, the Energy Trust would like to improve the conversion rate – that is the number of audits following through to an upgrade. The Energy Trust is looking at improving customer engagement by increasing the number and quality of follow-up contacts once the free audit is completed. The contacts – either phone or email – are tailored to the individual's circumstances and refer to the 'road map' the homeowner received as part of the audit. The Energy Trust views their customer contacts as long-term relationships, and aim to work with the homeowner to upgrade the home over many years to come.

Performance Standards – an MPG for existing homes?

In Oregon, like most other US states, there is no requirement to assess and disclose the energy performance of the house at sale or rental. However, there is growing interest in doing so in the US - over a dozen states or municipalities are exploring it with seven new policies in place as of 2009, according to a report for the Northeast Energy Efficiency Partnerships, *Valuing Building Energy Efficiency through Disclosure and Upgrade Policies*.[50]

The Energy Trust of Oregon created the Energy Performance Score (EPS)[51], a tool to assess the energy consumption and carbon emissions of a home. This is an asset-based rating system - it does not take into account behaviour - or how an occupant actually uses the house. The EPS has achieved what it set out to do - created recognition and value for highly energy efficient new homes. But could it do the same for existing homes?

The Energy Trust believes, along with many in the profession, that a simple energy rating - like the miles per gallon figure for cars – would motivate homeowners to upgrade their home, or buy a more energy efficient home because they could understand how much energy the house uses and what it costs. Of course, houses are more complicated than cars - differing hugely in terms of age, size, structure, fuel types, climate, etc. Nevertheless, several tools have been developed to do just this – including the Energy Performance Score (EPS), which has been adapted for existing homes. With so many competing methods, the Energy Trust commissioned a report to explore a comparison of the different tools (including the EPS, the Department of Energy's Home Energy Score and the HERS (Home Energy Rating System) and explore consumer reaction to them. Comparisons to the European Union Energy Performance Certificate are also made in the report. The report, *Home Energy Scores: Efforts to date with modelling tool comparison and summary of key issues*[52], concluded that applying energy performance scores to existing homes poses several challenges:

- energy upgrades result in small changes in scores (so perhaps not actually motivating consumers to change)
- lack of consumer understanding of scores and units
- the need for an appropriate reference 'average' house (eg house performs 120% of average)

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50 http://neep.org/public-policy/building-energy-rating
51 http://energytrust.org/residential/new-home-solutions/eps.aspx
52 http://energytrust.org/About/PDF/Jan23EPSReport.pdf

- cross-fuel comparison
- comparison from one assessment tool to another

In terms of impact on the consumer, the report's results are inconclusive - the most significant factor in motivating action was the quality of the on-site audit and customer service rather than the score. However, 83% of participants said it would be useful to have a score when house-buying, and they were very interested in information on energy costs and potential savings from an independent source. So while scores are seen as useful, it appears they won't drive action on their own - particularly when done on a voluntary basis. They must be accompanied by a trusted and credible programme, with professional service and strong financing. And most important, the scores themselves must be improved to provide a clear, meaningful, comparable and consistent picture.

For those states considering mandatory asset ratings, the NEEP report noted above offers some useful recommendations:

- disclosure must be mandatory and early in the sale or rental process
- it should be an asset rating and come with recommendations
- rating costs should be reasonable (supported and over time the price will lower with economies of scale)
- enforcement should be a priority
- phase in over time, starting with public, then commercial and lastly homeowners
- state and local governments should build market demand by linking incentives to asset ratings

Repowering Communities

CSG, the organisation contracted to deliver residential energy efficiency services for the Energy Trust of Oregon, has similar contracts in 22 states either with municipalities, utilities, or public purpose organisations such as the Energy Trust.. In Washington Sate, they are working with three communities to reduce energy use. The Repower Bainbridge, Kitsap and Bremerton[53] programmes are funded by the Department of Energy and the American Reinvestment and Recovery Act and supported through public and private institutions (local utilities, Sierra Club, local credit unions, community college). Each programme follows a common template, though tailored to the particular community. For example, on Bainbridge Island the focus is on families, mainly working through the school, children's clubs, and sports activities. In Bremerton, where about 80% of properties are rented, local landlords are engaged as the energy champions. All the emphasis is on local people fixing a local issue. There is information on certified local contractors and local incentives. A community energy use dashboard, and regular community events and competitions help to create a sense of momentum, a reassuring feeling of change alongside neighbours and friends.

Does Repower offer a model for the future? Most agree that a key motivating factor for changing energy use is the influence of families, friends and community. Whether it be peer pressure, competition, or sheer security in numbers, the knowledge that others are 'doing it' tips the balance for many. But this work is expensive and unlikely to be cost-effective. So who should pay for the on-the-ground community work? Like Repower,

53 http://www.positiveenergybi.org/repowerbainbridge

public/private partnerships are the most likely way forward with local government, utilities, and local groups pulling together. While programs like this may not be cost-effective in the short run, in the longer term, if they make energy efficiency a desirable, valued, and respected thing to do for this community, it could pay off many times over.

Social Media

MyEnergy[54] is a social media platform for comparing your energy use with others and is promoted by CSG. It takes what most people think is a dull product - energy efficiency - and turns it into something trendy and cool to talk about and share through social networks. MyEnergy collects an individual's energy use data to help understand his/her energy consumption, how to reduce it, and how it compares against neighbours and other MyEnergy participants. It can provide information on local incentives and rebates, and rewards points for reducing consumption. These points earn discounts or free prizes with local businesses.

MyEnergy taps into people's need to conform to social norms. Knowing that your friends and neighbours are saving energy (and perhaps saving more than you are) is a more effective motivator than saving money. And getting a reward or recognition for that change is also a key motivator. While talking to neighbours and putting signs up outside the house help encourage that feeling of 'everyone else is doing it', in today's world of virtual communities through facebook and twitter, MyEnergy has something important to offer.

Finance and Clean Energy Works Oregon

Many householders want to do the right thing - but the upfront costs are simply out of reach. Even with incentives and rebates, people can't afford to be energy efficient. Clean Energy Works Oregon, a non-profit program that works with the Energy Trust, hopes to bridge this gap with loans that are no-money-down, easy financing and simple qualifications.

Clean Energy Works Oregon provides an 'all-in-one' solution with an energy adviser that works alongside the homeowner from start to finish, from audit, to finance, to installation. The adviser helps bundle multiple upgrades into one plan, coordinates certified contractors, helps obtain the best incentives, rebates and financing available.

Different loan offers have been negotiated with local banks. Low interest rates, a quick and easy approval process, and the ability to use a portion of the loan towards non-energy efficiency related improvements have made these attractive. In some cases repayment can be through utility bills. The program has been a fantastic success - 1 out of 3 applications converts to a project, thanks to pre-qualifying and targeting leads. This compares with the open market rate of about 1 to 6. This program also has a high conversion rate from assessment (audit) to upgrade at about 50%. This financing has only been made possible through public-private partnerships. It is intended that the upfront seed money will become a revolving loan as time goes on, generating capital to loan out to more homeowners.

Beyond financing, Clean Energy Works Oregon has made the home energy upgrade more user-friendly with a project management 'dashboard' on the website which allows you to check the progress of your project online. This is just another example of making

54 http://www.myenergy.com/

energy efficiency upgrades an attractive and easy thing to do. Finally, Clean Energy Works Oregon does not just do retrofits - it has a Community Workforce Agreement, with equity and diversity goals for contractors and a mission to build an inclusive green economy. It seems the 'all-in-one' solution Clean Energy Works Oregon provides is just what the market wants.

Boulder, Colorado

Although Boulder was not one of the study visits, it is such a good example of mandatory performance standards, a summary of their approach is included here.

Boulder is the home of left-leaning politically-correct environmentalists and outdoor enthusiasts. It is also home to University of Colorado Boulder and the Rocky Mountain Research Institute - both international leaders on energy, sustainability and climate change research. This is a city which puts its money where its mouth is when it comes to climate change. So it comes as no surprise that Boulder is the first city in the US to require all existing rental properties to meet a minimum energy efficiency standard by a set date (this differs from the City of Berkeley where the standard is measures-based at point of sale).[55]

In 2006, the Boulder City Council adopted a Climate Action Plan (CAP) and Boulder voters passed the CAP tax, the nation's first tax exclusively designed for climate change mitigation. The Plan sets a goal to reduce greenhouse gas emissions to 7% below 1990 levels by 2012 (tracking the Kyoto Protocol). Since CAP-funded programmes began in 2007, the community's carbon emissions have remained stable – so 4.5 percent less in 2010 than they could have been had pre-CAP trends continued. However, the city's emissions in 2010 remained 27 percent higher than the 2012 Kyoto goal. The city decided it needed new policies to help reduce emissions. Energy efficiency and tightening up building standards on new buildings were already a focus and attention turned to the existing stock. Rental properties make up over 50% of the building stock, so it made sense to target this market. The city also had a licensing system for health and safety standards which offered an ideal means to implement an energy efficiency standard.

The 'Smartregs' or Smart Regulation for Sustainable Places, seemed a logical next step in a community which is largely in favour of rigorous action on climate change, but the proposals met with some resistance. So the city invested in a two-year community stakeholder process, involving property owners, property managers, rental inspectors, student housing advocates, environmental groups and community interests. The process ranged from online surveys, social media, to official public hearings.
The SmartRegs finally gained support due to three changes: there would be an eight-year period for compliance, financial incentives and technical support would be offered through the EnergySmart program, and there would be two routes for compliance - prescriptive and a custom, energy assessment route.

The standard is relatively modest (using the HERS - Home Energy Rating System - about 20% more energy use than the 2006 International Energy Conservation Code) but nevertheless has driven unprecedented investment in upgrading rental units. In the first year, the city's goal of 1,000 units inspected and 500 compliant was more than doubled. Within two years, the city hopes to have inspected all units with 16% compliant. The average upgrade has cost about $2,000 before incentives, meaning a first year total of $1.2 million which has been largely self-funded.

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55 http://eetd.lbl.gov/ea/emp/reports/mi-policybrief-3-16-2012.pdf

The key ingredients for success appear to be: a mandate for action through a Climate Action Plan; a means to implement through some kind of licensing regime; attractive incentives and support; and a lengthy stakeholder process which resolves community concerns. This early success shows that other cities can follow Boulder's example.

Recommendations for UK and Scotland

The study visits facilitated a greater understanding of what motivates homeowners and landlords to undertake energy upgrades, and how governments have used this knowledge to achieve change. It comes as no surprise that there is no silver bullet, no magic incentive or marketing ploy that tips the balance. Rather, it is the collection of ingredients, the entire recipe, that can clinch the deal. The other key message is – it's about the customer! Customer needs, customer journey, customer service – the best programmes knew their customers well and put their needs first. Finally, programmes that build on the good practice of others are at a real advantage. While circumstances are not exactly the same in the UK, it is sufficiently familiar that much can be learned from the US experience. Based on the study visits, the following recommendations can be made for the UK and Scotland, for government policy, programme design, and utility regulation:

Government Programmes

Driving Demand

Assess current and planned programmes against the recommendations of the *Driving Demand for Home Energy Improvements* report[56] from the Lawrence Berkeley National Laboratory (see Appendix 1). Although this report is based on the US experience, many of the lessons can be directly applied to the UK. The recommendations are given for two categories: marketing and outreach, and programme design and implementation.

Scorecard

An independent scorecard of national, local and utility-led programmes should be produced, to encourage and promote best practice. The scorecard could be modelled on the American Council for an Energy Efficient Economy (ACEEE) publication, *2011 State Energy Efficiency Scorecard*[57]. The report provides a comprehensive ranking of the states based on an array of metrics that capture best practices and recognize leadership in energy efficiency policy and program implementation.

Set performance standards

Develop and implement mandatory standards of energy performance to complement energy efficiency programmes. While the UK is ahead of the US on some aspects of this agenda, the US experience still offers some useful lessons. First, regulation and performance standards are inevitable, and the evidence to date shows that they work when aligned with strong programmes of technical support, financial assistance, and marketing. Second, the regulator should have in place a means to enforce the standard and a database through which the assessment can be shared easily with buyers, sellers and renters. Third, the standards should be developed through a stakeholder process which takes account of all concerns and results in better compliance. Fourth, make sure the assessment is 'fit for purpose' – affordable but detailed enough to inform improvements.

Network

56 http://drivingdemand.lbl.gov/
57 http://aceee.org/sector/state-policy/scorecard

Encourage and support learning networks amongst programme designers, energy advisers and contractors.

Programme Delivery

Guarantee Quality: Require 'testing out' (eg air tightness testing) to ensure the predicted energy savings can be achieved. Payment of incentives to the installer should be dependent on the test out results. The profession of energy auditors and contractors need training, support and pump priming. Independent certification, cooperative marketing, and training in customer service are all important. Providing some form of customer satisfaction rating and track record would be useful. Support for capital investment for small, local companies that need to scale up quickly, but find it difficult to get the necessary capital in place, is equally important.

Make it a good customer experience:
Build capacity among contractors on technical, marketing and customer service aspects. Provide consistent and long-term incentives. Generate enough demand for energy upgrades and turn over to trusted trade allies who can deliver the product and continue to market to the target audience. Maintain customer relationship over time through correspondence and phone contact to increase conversions to upgrades now and in the future. Remember, the energy adviser and contractor will be the ones to clinch the deal.

Provide finance as part of an energy upgrade programme
Finance is important but needs to be an integral part of the overall programme with all the ingredients for success – professional and easy customer journey resulting in a quality upgrade.

Work with social norms
Develop public-private partnerships with local organisations to engage a whole community effort in reducing energy use. Take the time to understand the community or segment the audience and design a programme that engages with their values and needs – one size fits all approaches will not work. Use trusted local people to promote the programme through a range of on-the-ground activities – dinner parties to show off upgrades, door-to-door visits, school events, competitions.

In today's world of virtual communities, it is just as important to use social media. Social applications need to be developed for the UK market which encourage people to share and compare their energy use and experiences. They should be based on public-private partnerships which can be trusted in order to maximise uptake.

Widen funding sources
Identify new sources of funding – such as 'crowd sourcing' for solar panels from the local community, to supplement government and private funding and encourage broad-based support for the agenda.

Utility Regulation

Consolidate energy efficiency efforts
Consider an alternative to the current CERT (carbon emission reduction targets) and ECO (Energy Company Obligation) which leaves separate utilities competing to delivery energy efficiency services. Instead, explore means to pool 'ratepayer' funding into one pot and divided by devolved administration, giving it to independent 'public purpose'

organisations in each devolved country to design and deliver home energy efficiency programmes against a set of performance measures. These organisations would have to bid for the contract to provide this service for a certain number of years. Private contractors who were certified could compete to deliver the audits and upgrades. This provides a streamlined approach to delivery of energy efficiency services – no duplication, no confusion, one trusted, credible and independent source of advice, incentives, and delivery. The independent organisation would work with contractors to build capacity and transform the market. This model would work well with the Green Deal approach.

Energy Efficiency Utility
Another interesting possibility would be to create Energy Efficiency Utility(s) like Efficiency Vermont – that is organisations that can sell energy efficiency as a resource on the market as energy costs avoided. This gives a market value to energy efficiency and provides another funding source for efficiency programmes.

Billing and social media
Work with utilities to ensure information on energy bills taps into the 'flocking tendency' of people to conform to what 'people like them' are doing. If people know their neighbours are using less energy, they will be motivated to save energy too. This is already happening to some extent – but are the utilities using the latest methods? And what can utilities do to promote social media applications which compare energy use?

In short, regulators have the potential to rewrite the 'rules of the game' for utilities and give more incentives for energy efficiency and should be maximising this potential.

Conclusion

The breadth of experience in home energy efficiency programmes in the US is impressive. Different types of marketing, finance, community engagement, and market transformation have all been tried and in some places are working well at a small scale. Yet despite all this effort, and millions of dollars of investment, progress has been slow overall. Programme managers have failed to learn from each other, duplicating and reinventing wheels rather than building on success. Funding has been erratic and never enough to achieve coherent and long-term programmes.

Despite this, there is little risk energy efficiency is going to disappear off legislators' business. Both political parties embrace energy efficiency as good for America – albeit for different reasons. The American Recovery and Reinvestment Act (ARRA) gave a once in a generation injection of cash to state and city programmes – either supplementing existing programmes, or piloting new initiatives. While the funding ran out in March 2012, its legacy will live on through the experience gained and funding leveraged from other sources. Now that national policymaking is stalled due to party politics, the states will increasingly need to dig into their own coffers and form partnerships to continue the push for energy efficiency. The programmes visited as part of this fellowship offer just a glimpse of what is possible with the right approach.

While US energy and housing policies are different in several respects from that in Scotland and the UK, the experience in delivering home energy efficiency programmes has much to offer. Like the US, UK programmes rely heavily on the market approach to achieve results. US programmes show this can work, but only if the right ingredients are mixed together and given careful support. Just one ingredient on its own will not motivate homeowners, the whole 'cake' has to be offered as one attractive and tasty customer journey. Community engagement, targeted marketing and products, a professional workforce, independent advice, affordable finance, minimum standards, consistent assessment – these are the main ingredients. If any are missing, the programme will falter, and it can even undermine efforts for some years to come. The whole package is what matters.

This report offers some food for thought for policy makers and programme designers as the UK embarks on one of the most significant initiatives on home energy in the last decade – the Green Deal – which will be launched in Autumn 2012. The UK Government is counting on the Green Deal to deliver significant emissions reductions from housing and it cannot afford to fail. Will it succeed? If it is able to build on the US experience as outlined in this report, and scale up to go beyond the modest progress to date, genuine transformation of social norms and the market can happen, leading to the pace and degree of upgrade needed.

Appendix 1

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Appendix 2

Churchill Memorial Trust Fellowship Itinerary 2011
Elizabeth Leighton

VERMONT
Efficiency Vermont
State of Vermont Energy Policy Office, Low Income Weatherization Program,
Vermont Gas
July 9-16, 2011

MAINE
Efficiency Maine
Evergreen Home Performance
Green Sneakers, Cool Maine Coalition
Community Connections Agency (State of Maine)
July 23-29, 2011

ARIZONA
City of Flagstaff, Sustainability Program
September 22, 2011
Coconino County Sustainable Building Program's 2011 Sustainable Home and Garden Tour
September 11, 2011
Sustainable Economic Development Initiative (SEDI) Green Drinks
October 5, 2011
SEDI Energy Efficiency and Renewable Energy Working Group
September 23, 2011

CALIFORNIA
City of Berkeley
Lawrence Berkeley National Laboratories Electricity Markets and Policy Division

January 31 - February 2, 2012

OREGON
Energy Trust of Oregon
Conservation Services Group
February 15 -17, 2012

BRITISH COLUMBIA, CANADA
Vancouver Island, Canada
Exchange with Elizabeth White, former EnerGuide for Houses advisor, writing up fellowship report
March 11 -16, 2012

SUMMARY OF STUDY VISITS

	Program Model	Key features	Website
Efficiency Vermont	Energy Efficiency Utility (EEU)	EEU model - independent trust funded largely through ratepayer surcharge funding to deliver energy efficiency services statewide. Also sells energy capacity through energy efficiency gains to the New England market.	www.efficiencyvermont.com
Efficiency Maine	As above	Marketing training for contractors partnership with local green group loan pilot - PACE	www.efficiencymaine.com
City of Flagstaff	Municipality	Coordination with city, county, state and federal initiatives to maximise incentives Liaison with university community regeneration student volunteers in low income areas Solar Mosaic – crowd-sourcing funding to solar power a community centre in a deprived area	http://flagstaff.az.gov/index.aspx?nid=1630 http://solarmosaic.com/flagstaff
City of Berkeley	Municipality Energy and Sustainable Development Department	Regional Energy Conservation Ordinance – minimum standards at point of sale since 1992	www.ci.berkeley.ca.us/SubUnitHome.aspx?id=15404
Energy Trust of Oregon Conservation Services Group	Public purpose organisation, rate-payer funded CSG – business delivering energy efficiency across the US	Transforming the market for home energy efficiency Growing 'trade ally' network Community initiatives Social media	www.Energytrust.org http://www.csgrp.com

Appendix 3

Driving Demand for Home Energy Improvements[58]
Key Lessons

Marketing and Outreach

- Sell something people want – comfort, health, community recognition
- Take the time to study the target population – blanket marketing is ineffective, segment the market and tailor products to them
- Partner with trusted messengers – larger incentives and bigger mailings won't work, but local champions, local organisations and networks can
- Language is powerful – avoid technical jargon, tap into people's existing frames and values, induce public commitments, make it personal, talk in terms of loss rather than gain, use vivid examples
- Contractors are ambassadors, they are the public face of the programme and are the ones to clinch the deal
- One touch is not enough – layered marketing, outreach, at least three times touch

Programme design and implementation

- Make it easy, make it fast – minimize paperwork, pre-approve contractors, pre-qualify loans
- Contractors as full partners – design a programme they want to sell
- Financing and incentives matter – they do motivate upgrades and are very important to market transformation
- Trustworthy workforce must be in place before programme is promoted – otherwise demand will outstrip supply, leading to unhappy customers and contractors
- Persistence and consistency – long term programmes can build credibility and professionalism – genuinely transforming the market whereas short programmes can undermine trust in the market.
- Measure success – design for data collection and evaluation, adjust at mid-term analysis.

58 http://drivingdemand.lbl.gov/reports/lbnl-3960e-execsumm.pdf