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Turning National Retrofit Policies into Local Action: Examples from the US BBNP and the Canadian Eco-Energy Programs

A. Gillich[a], E. Mohareb[b,*]

[a] Civil & Building Services Engineering, London South Bank University, UK
[b] Construction Management & Engineering, School of the Built Environment, University of Reading, UK
* +44 1183 788204, e.mohareb@reading.ac.uk
* gillicha@lsbu.ac.uk

Abstract:

Improving energy efficiency in existing dwellings is critical in efforts to address climate change. National level retrofit policies are useful for delivering large volumes of funding with a coordinated program brand. However, for countries such as the US and Canada, energy issues vary considerably nationwide and are therefore governed at the state or provincial level. Finding ways to calibrate national level policy objectives and structures for effective delivery at the local level is a critical policy priority, but is poorly understood by policymakers and underrepresented in academic research.

This paper addresses this gap by analysing the US Better Buildings Neighborhood Program (2010-2013), and the Canadian Eco-Energy Retrofit Program (2009-2013). Both of these programs were created with a national level overarching structure and objectives, but were implemented in different ways at the state/provincial and local levels. The impact evaluations of each program found that they were broadly successful at the national level. This paper considers how each program targeted local action along three themes. 1) Housing stock factors including population, social, and demographic issues inherent to the spatial distribution and fundamentally unchangeable. 2) Program design factors consider issues such as leveraging local funding and resource pools. 3) Program delivery factors include implementation strategies for driving demand and workforce engagement.

The results suggest that demographic factors are not predictive of overall program success (measured as total upgrades and/or energy savings). Effective program design and implementation can compensate for housing stock factors. A set of best practice principles are described for adapting national level program structures for effective local program delivery.

Keywords:
Domestic retrofit, policy design, program implementation

1. Introduction

Barriers to domestic retrofit have been the topic of extensive study both in academia and in policy making for decades (see e.g. [1] [2] [3] [4]), Arguably one of the most interesting aspects of this issue is that it is still in fact an issue at all. Decades of research could be distilled to say that thermal retrofits have yet to find a sufficiently compelling value proposition for homeowners. This does not suggest that there is no value, only that the perceived benefits to homeowners are insufficient to overcome the barriers present [4]. Given the longstanding nature of these barriers any treatment of the topic at this point must also consider how the considerable body of knowledge on the topic has so far failed to sufficiently address the issue.

This paper will argue that a great part of this failure is due to a lack of coordination between national and local scale action. National scale ambition is essential for market stability, and local action is equally essential for market implementation. Mapping national frameworks to local circumstances is subtler than it appears and is an area of policy and program design that is worthy of dedicated attention.

To that end, this paper will begin with a brief summary of the most relevant barriers, focusing on why these remain particularly entrenched in the able to pay market. It will introduce two case studies, the Canadian ecoENERGY Program and the US BBNP. The method of analysis is given. Best practice principles for translating national policies to local action are discussed along three themes: 1) Housing stock factors, 2) Program design factors, and 3) Program delivery factors.

2. Literature

Policies based on price signals and conveying the benefits of improved comfort have convinced the early adopters in most retrofit markets but have failed to drive self-sustaining changes at scale. The core barriers of the low priority of energy issues, information asymmetries, upfront cost, and split incentives have not fundamentally changed in decades of study and political action [3] [5].

One notable change in retrofit program design since the 1980s has been a gradual shift away from demand side management (DSM) programs towards market-based, whole house approaches. DSM

programs typically have discrete objectives such as deploying energy efficient lighting [6], boilers, and insulation. This is critically distinguished from market transformation, which targets changes in market effects over time [7]. Due in part to supply chain fragmentation and the pervasive nature of the barriers present, programs seeking a whole house approach are required to be more comprehensive than the DSM programs of the past.

It has been shown that a retrofit program whose design is solely based on the provision of grants will stimulate the market only as long as the grant remains. Once the grant is removed, the market effect is likely to disappear [8]. Some markets can be maintained through programs such as the Weatherisation Assistance Program in the US, or a number of Efficiency Obligation schemes across the EU. However, these programs largely target the social housing sector, and many countries are reluctant to similarly support able to pay markets. Most policies targeting the able to pay market are created as temporary subsidies with the aim of kick starting self-sustaining changes [9] [10].

In order to avoid the 'boom and bust' cycle of removing a grant and losing the market impact, programs are becoming increasingly sophisticated in how they stimulate not simply kWh savings, but changes in critical market effects such as levels of knowledge, workforce skills, and data gaps. In the past decade the EcoENERGY program in Canada and the BBNP in the United States were created with the stated objectives of supporting able to pay retrofit markets. These offer considerable insight in how modern retrofit programs are transforming markets with a national scale vision calibrated through local delivery.

3. Canadian ecoENERGY Program

The ecoENERGY Retrofit for Homes program ran in several phases nationwide from 2007-2012. It offered over $1 billion CAD in grants (up to $5,000 per household) for efficient heating appliances, insulation, windows, doors, air sealing, HVAC systems, and hot water heaters [11].

Energy advisors carried out home energy audits for over 640,000 single-family homes and over 90,000 homes received grants and successfully installed retrofit measures, which EcoENERGY credits with 0.32 Mt of GHG emissions reduction [10] [11]. This corresponds to a savings of $400 million on annual energy bills and an average 20% reduction in energy consumption for participant homes [12]. A parallel research effort has found that while the program was largely successful overall, results varied considerably nationwide. An early review of this data suggests that retrofits were not adopted with spatial or temporal uniformity (see Paper #052).

4. US Better Buildings Neighborhood Program

The US BBNP was created with the aim of kick-starting the economy in a way that also drove energy efficiency and thermal retrofit markets. They awarded a total of $508 million to 41 state and local programs which ran from 2010 to 2013. While the objectives of the ecoEnergy Program were more broadly stated as 'encouraging homes to be more energy efficient' [10], the US BBNP specifically targeted a permanent transformation of retrofit markets and awarded grant money based in part on the proposed strategy to sustain program activity beyond the grant period [13].

The BBNP was successful against nearly every stated objective, upgrading over 100,000 residential and commercial properties, creating over 10,000 jobs, delivering an average savings of at least 15% in energy costs per home upgraded, leveraging nearly $1.4 billion in private sector investment, and creating a lasting market impact with 84% of grantees continuing program elements in the post funding period [14].

5. Method

This paper analyses the Canadian ecoENERGY and US BBNP programs using the programs' own evaluation reports [10] [11] [14] [15] as well as supporting third party analyses such as net to gross studies [16] [17]. Existing research conducted on individual grantees or program elements will be referenced throughout.

Based on this document review, three themes were identified as particularly relevant for translating national policies into local action:

- Housing stock factors including population, social, and demographic issues inherent to the spatial distribution and fundamentally unchangeable.
- Program design factors consider issues such as leveraging local funding and resource pools.
- Program delivery factors include implementation strategies for driving demand and workforce engagement.

Based on the principles of success described in the program's own evaluation documents a set of best practice principles were distilled along these three themes using examples from each program as appropriate. As a qualitative study based on case study evidence, the findings are inherently limited in terms of external validity. However, the aim is to describe the extent to which the variables in each theme are linked to overall program success and note where they may hold wider relevance to retrofit program theory.

6. Analysis

Housing stock factors:

There are a number of program demographic factors inherent to the location of the program that cannot be fundamentally altered, but can critically impact how a program performs. For example, population, housing type, income distribution, levels of knowledge of both homeowners and the workforce, and the status of pre-existing programs to name but a few. Given that these factors will vary nationwide, it can be difficult to craft a national level policy with suitable relevance and fairness across the range of circumstances. The critical success factor at the national level is to allow local programs the flexibility to calibrate their programs to their own local markets.

With 41 program grantees across the US, the BBNP was faced with an extremely broad demographic and policy landscape. Grantees proved that nearly any program can be successful if suitably designed for the local circumstances [14]. The South Eastern Energy Alliance for example hosted many programs in areas with little to no prior experience in energy efficiency, few pre-existing programs, and below average levels of household income. The program was designed around these factors and featured heavy workforce engagement and training at the outset, and focused higher levels of subsidies on suitable technologies to overcome cost barriers [17].

The BBNP program structure at the national level was well designed to encourage this type of local calibration, with grantees setting out their own objectives and strategies to meet those objectives. The ecoENERGY program by contrast was more uniform across the country, with grants set at the national level [11]. 12 of 13 provinces and territories offered complimentary incentive programs [12], but in a less coordinated manner than the BBNP.

Local program design factors:

There are a number of factors which fall under the theme of local program design, but this section will focus primarily on how the program identified its market niche and leveraged the support of surrounding networks. In this area there are several best practice principles to draw upon from the two case study examples.

Finding a suitable market niche requires striking the balance between the national and local brand for the program. Some BBNP localities find that national brands embody trust and consistency while others value local identity. This also varies by brand. Some BBNP grantees existed in areas with low confidence in the brand offered by the federal energy program, but a high confidence in the national level Building Performance Institute (BPI) brand that certified the skills of the participant workforce. Efficiency Maine for example found that both the program and the BPI were trusted brands and created hats that contractors could wear to identify themselves as program participants when working on BBNP projects.

In ecoENERGY, the Federal Home Renovation Tax Credit (HRTC) was seen as having a positive impact on uptake of the ecoENERGY program. The credit essentially allowed a double incentive to renovate. While there was confusion over the mixed branding of the offers, when ecoENERGY operatives were approached about HRTC, they were able to explain that both programs could be used together. HRTC thus served as an additional route to market for the ecoENERGY program and brought in homeowners that it otherwise may not have [16].

The other local program design factor that was critical to success was the degree to which the program embraced and collaborated with pre-established networks in the community. This could range from trade groups, credit unions, or community groups with no history of activity in housing. The success factor was creating the networks, often based on individual relationships, that enabled the program to extend its reach in the community and calibrate its activities in the most suitable manner. This local presence should include local workforce and could not be entirely made up of external program employees, as several grantees found that these were perceived as outsiders.

Program delivery factors:

This final theme deals with local program delivery. Once the program goals are suitably calibrated and the local networks are in place, success was driven by how well these networks identified and addressed the barriers at a local level. While the program brand or traditional marketing such as tv and print ads were useful for generating leads, they were not sufficient to convert these leads into retrofit action unless accompanied by a more personal outreach campaign [18]. This often meant an individual level, with program organisers creating personal engagement strategies to speak to homeowners, understand their needs, and help the program address these needs.

Similarly, program organisers found that engagement with the participant workforce was equally essential. Many retrofit markets are at such an early stage of development that it is necessary to stimulate the supply push as well as the demand pull. Contractors would need to be persuaded to undertake new energy efficiency work in addition to their business as usual home renovation portfolios [18]. If this required new skills, new staff, or new equipment, the program had to respond to these needs to ensure that a suitably qualified workforce was available to meet demand. A key success factor for the ecoENERGY program was the presence of an energy assessor in the home to directly answer homeowner questions. 69% of

respondents learned something new from their energy advisor and report, and 76% said that it helped them decide which retrofits to implement [11].

Here again, the circumstances varied enormously by location and the best practice principle at the national level was to give local programs the flexibility to spend program funds as they saw fit, even if that was on directly paying for training the workforce. The use of public funds for developing skills in private trades is controversial. Some feel that this is an area best addressed by market forces, with a baseline performance maintained through building codes and standards. While this might hold true for well developed markets given sufficient time, if program designers want to deliver a high volume of quality retrofit projects and increase the perceived value of retrofit within program timescales, then investing in skills development is all but essential.

EcoENERGY found that mid program, they faced shortages of energy advisors to conduct the home energy assessments, which created bottlenecks and prevented homeowners from accessing the program. They successfully addressed these capacity issues with a recruitment and training campaign [19]. The program trained more than 2000 energy advisors [12]. ecoENERGY found that most uptake was from people already planning to do a renovation and who wanted some guidance. In many instances contractors alerted them to the program [16]. This principle of contractors acting as the salesforce driving the program was common in the US BBNP as well [14], and many evaluations have found that this type of engagement with the workforce is essential to embedding the skills and practices of thermal retrofit alongside their existing home renovation work. This is a critical to leaving a lasting program effect beyond the funding period.

7. Results and discussions

In the case of the US SEEA program they successfully acknowledged gaps in their supply chain early in the program design process and focused efforts on driving training programs. They also acknowledged that certain parts of their state had a lower median income than neighbouring areas and that definitions of 'able to pay' required a subtle and bespoke set of financial incentives for local circumstances. Despite seemingly unfavourable demographic factors the program was among the successful BBNP grantees.

The program design factors considered how well the program leveraged local support and networks. Here the results distinctly show that national level programs should empower and support local partnerships, particularly with the aim of creating networks that can continue in the post funding period.

Program delivery required leveraging those local actors as trusted messengers to create program momentum. Engaging the workforce as program partners can help identify and address gaps, and also embed skills and practices in the local workforce that endure post program.

A critical difference between the US BBNP approach and the ecoENERGY program was that the BBNP competitively allocated funding to localities. Grantees had to identify their own barriers and design suitable solutions, this gave them considerable flexibility in allocate program funding where it was needed most.

The ecoENERGY program by contrast was more uniform nationwide, and served as an add-on to separately crafted local solutions. The common thread across the three themes explored in this paper is flexibility. The US program model favoured this flexibility and offers a useful program template for translating national program objectives and structure into locally suitable solutions across a very diverse nation.

8. Conclusions and outlook

Overall, in both Canada and the US, the national brand was useful for driving awareness with things such as the availability of funding, branding skills, and getting word out. But awareness didn't translate to delivery unless there was a strong local engagement that made use of existing networks, trusted messengers, and local knowledge. National scale retrofit programs should acknowledge this, and use their leverage to create a national brand for retrofit programs, but give local delivery bodies the autonomy to adapt that brand in the way they see fit.

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