**Why energy retrofitting in private dwellings is difficult in Norway: Coordinating the framing practices of government, craftspeople and homeowners**

**Abstract**

Retrofitting private homes to meet strict energy demands is a prioritised goal in climate mitigation policy. In this article we approach the challenge by analysing how retrofitting is framed differently by the government, homeowners and craftspeople acting as energy consultants. We follow a programme designed to support substantial retrofitting of homes in Norway from its introduction in 2012 through 2016, documenting how the programme was developed and modified to make it attractive for homeowners, and how it somehow never succeeded in becoming attractive. We suggest framing analysis in order to highlight the challenges government actors face in aligning their policy to homeowners and intermediaries. We find that the governmental framing of energy retrofitting is characterized by a particular distance between a handful of bureaucrats and 2.2 million private homes to be governed; we call this a ‘distance in scale’. Three distinct ‘bridging’ activities are set up to handle this distance. We suggest that difficulties in aligning with the framings of homeowners and intermediaries relates to the dynamic between these bridges. We point out how it is necessary to consider and coordinate the various framings of all stakeholders when implementing energy policy.

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**Keywords**

Energy advice; craftspeople; retrofit; domestic energy consumption; construction; framing theory; system of professions

# 1. Introduction

The transition to more energy efficient buildings has been identified as a crucial aspect of realising a low carbon society, as buildings are responsible for approximately 40% of energy use (European Commission, 2011; Yeatts et al., 2017). For most developed countries, existing buildings hold the largest potential for energy reductions, as the building stock typically last for 50–100 years (Power, 2008). This implies that the majority of the building stock will, for a long time, consist of buildings built prior to current low energy regulation. As this will contribute significantly to the energy consumption, this is an essential target for energy policy. Gram-Hanssen (2014) argues that energy retrofitting of private dwellings is one of the most challenging areas of energy policy because this activity is often performed by the homeowners themselves who may have little interest in – or knowledge about – energy retrofitting. Despite a number of policy incentives deployed for homeowners to engage in this energy retrofitting, they seem ‘stubbornly resistant to improving their homes’ energy efficiency’ (Wilson et al., 2015: 19).

In order to mend this situation, Social Practice Theory and other approaches have been suggested to allow policy makers to grasp the nature of home retrofitting (Gram-Hanssen 2014; Judson and Maller 2014). The message is that home retrofitting practice cannot adequately be grasped by the kind of approach typical for policy approaches. The policy under critique seems to adhere to what Frigo (2017) calls the ‘traditional energy paradigm’, characterised by a certain reductionism. Such critique falls into a general tendency in social energy research identified by Sovacool (2014) in a major literature review. During the last 15 years, Sovacool argues that scholarship has come to understand the development of energy technology as shaped and constrained by much more than price signals and economic dimensions, i.e. social, political, cultural and technological aspects, including networks of actors.

The challenges of energy retrofitting does not only include homeowners and government, but also intermediary professionals such as carpenters, heating installers and other professionals carrying out renovation in homes. These professionals can have great influence on household energy practices (Owen and Mitchell 2015), and the dialogue between professionals and housekeepers holds potential to reduce energy performance gaps in renovated houses (Vlasova & Gram-Hanssenm 2014). According to Janda and Kilip (2010) the work practices and skills of these professions need to be redefined in order to for change to take place. Focusing on heating installers and architects, Wade et.al. (2018) point out that the role professional identity plays for domestic energy use often is overlooked, and sometimes even stands in the way for their possibility to advocate for energy efficiency (p. 51).

In the present case study, several of these dimensions come into play as we analyse one attempt to implement energy efficient retrofitting in Norway through the hands of craftspeople servng as intermediaries. Norwegian authorities have a 40-year history of energy efficiency policies, but social science energy research has shown that these initiatives have had quite limited success in reducing energy usage in buildings in general (Ryghaug & Sørensen, 2009), and private dwellings, more specifically (Enova, 2012). However, over the past decade efforts to achieve this goal through the implementation of strict building regulations have improved the energy efficiency for new buildings. Retrofitting of existing homes on the other hand are not subject to regulation in the same sense (one can retrofit up to a certain level without applying permission from government), making government dependent on non-regulatory incentives aimed. This has proven to be challenging; even though Norwegians spend more than €6 billion on home renovations each year, this is primarily motivated by aesthetics or the need for repair – not energy reduction (Risholt & Berker, 2013). Owner occupied dwellings, which comprise 80 per cent of all homes, represent the largest category of building-related energy usage. Thus, in the general effort to reduce energy use as part of climate change mitigation, the government considers it essential for these buildings to be upgraded to higher energy efficiency standards through retrofitting (Arnstad et al., 2010).

In this paper, we analyse a particular non-regulatory policy measure: a support programme aimed at enhancing ambitious energy retrofitting in private dwellings. We follow the programme through its development, implementation and further development over a five-year period from 2012 to 2016. The goal of the programme was to develop an effective market for holistic energy retrofitting. Holistic retrofitting implies the upgrade of an entire house (in terms of insulating the walls and roof and improving air tightening), with the aim of radically improving the house’s energy efficiency.

Over a five-year period, we followed the development of the support program and the related interactions between the government apparatus, craftspeople serving as consultants and homeowners. The programme aimed at making ambitious energy retrofitting projects more attractive to homeowners, but the success of the programme was limited. In this way, the Norwegian case falls into a pattern described in other countries (Wilson et al., 2015; Buessler, 2017), and the lessons from Norway should be relevant internationally. In order to make general lessons from the case study, we analyse the different ways in which energy retrofitting is framed by the government, homeowners and craftspeople. How does the encounter – and sometimes mismatch – between these framings impact the implementation of energy policy?

# 2. Longitudinal study of a policy programme

The support programme in this case study was promoted, in particular, by two public enterprises in the Norwegian government apparatus that also played a dominant role in general efforts to reduce energy usage in private dwellings through retrofitting: One is the Norwegian Housing Bank (henceforth referred to as the ‘Housing Bank’) operating under the Ministry of Local Government and Regional Development. It was established in 1946 to improve the critical housing situation after World War II by providing preferential loans. Since its inception, the bank has financed more than half of all homes in Norway[[1]](#footnote-1). The preferential loans are also used as a policy tool to enhance energy efficiency: if a homeowner receives a preferential loan to retrofit her house, she must retrofit to an energy efficiency that is higher than the regulatory prescribed level. In addition, the Housing Bank also supports research and development projects and pioneering projects that promote energy efficient solutions.

The other enterprise, Enova, operates under the Ministry of Petroleum and Energy. Enova was formed in 2001 specifically to enhance the transition to more environmentally friendly energy usage and production in several sectors[[2]](#footnote-2). It also has a role in developing climate friendly technology and enhancing energy security. It is financed by the Norwegian ‘Energy Fund’ and a particular tax on electricity. While most of Enova’s efforts are aimed at larger industrial projects, it is still a main agent for upgrading the energy performance of existing private dwellings. For this task, Enova administers a number of policy tools, including financial support for retrofitting and technology, such as solar panels and heat pumps, as well as certification of energy consultants for private homes.

Both the Housing Bank and Enova offer information campaigns and counselling services as part of their strategies, and they participate in the network of people and agents operating in the energy and building field. Among their many programmes, the ‘Low-Energy Programme’, which was collaboratively formed by the Housing Bank, Enova and the building industry, is of particular interest for this paper. The Norwegian Water Resources and Energy Directorate (NVE), which operates under the Ministry of Petroleum and Energy, also played an essential role in this programme, as it was responsible for energy marking buildings (assigning buildings an energy performance and ‘cleanness’ mark). Employees in these organisations tend to refer to their respective institutions as *virkemiddelapparatet* (Norwegian), which roughly translates to ‘the government apparatus’.

This qualitative study is based on fieldwork (including in-depth interviews, participatory observation and document/web studies) amongst the government apparatus and a spectrum of actors involved in building-related energy policy in Norway. All informants are anonymised. The research is designed to gain a sense of the whole chain in action from government officials to individual homeowners, thus selected actors ranging from government agents responsible for implementing policy (e.g. employees of Enova and the Housing Bank), via energy consultants and other intermediary actors making home visits, to homeowners considering (or not considering) energy retrofitting projects. We put the most emphasis on the intermediary actors, as this was the least studied category. The research was conducted between 2012 and 2016, and the goal of the fieldwork was to observe transformations in energy policy and practice, with a particular focus on the support programme for holistic retrofitting.

Central informants from all of the major governmental actors were subject to semi structured, qualitative interviews. In 2012, seven in-depth interviews were conducted with representatives from Enova (3), the Housing Bank (3) and the Low-Energy Programme (1), and follow-up interviews of the same informants were carried out in 2013 and 2014. In 2015, two more in-depth interviews were conducted with representatives from Enova and one with a representative from NVE (Norwegian Water and Energy Directorate). The interviewees were chosen based on their knowledge and experience with the energy retrofitting program. With one exception, the informants were senior bureaucrats engaged not only in case handling but also in the development of policy tools. The majority of them had a background in economics. These actors constituted a mayor part of the relatively small informal network designing and implementing energy policy in private homes. Participation in events in this network, such as conferences, public meetings and courses, formed an important part of the fieldwork, enabling us to observe how the actors interacted and its context.

The energy consultants, who operated in the sphere between government actors and homeowners, consisted mainly of small private sector firms. These consultants were mainly craftspeople in the building and retrofitting industry (mostly carpenters), but a few were engineers who specialised in energy. Although there were also larger enterprises in this middle sphere, it was mainly smaller actors – typically firms with one to ten employees – who interacted with private homeowners. In 2013, four independent energy consultants were interviewed just prior to the establishment of the official consultation certification programme. After the programme was established, nineteen certified consultants were interviewed (seven in person in 2015, twelve over the telephone in 2016). Of particular importance for the study of these actors was one of the authors participation in the energy consultant course in 2014, as this enabled us to gain first-hand experience of the energy consultancy tools and facilitated a close observation of participants’ reception of the consultancy methods and theories.

Participatory observation, with active participation using notebooks, was particularly rewarding in encounters between actors at different levels in the energy retrofitting field. Such encounters occurred at the energy consultant course, where future energy consultants met representatives from public enterprises. Further, participation in public meetings enabled us to observe the encounter between energy consultants and homeowners. In particular, participation in a door-to-door energy consultancy campaign initiated by *Friends of the Earth Norway* in 2013, through which 26 homes received a low threshold energy consultation, was valuable for gaining insight into the consultant-homeowner encounter.

In addition, we conducted five interviews with homeowners. In order to highlight the homeowner perspective we selected five among the homeowners we encountered during the research period for interviews together with observations focusing on the material and technical aspects. These were selected as they were in the process of retrofitting their homes at the time we met them and thus were target for the energy policy we studied. These homeowners were all couples raging from their 20’s to 50’s, both with and without children. They were seen as representative of patterns that had emerged during the research process in terms of life situations, attitudes, and types of houses. These interviews were conducted in their respective homes.

As much of the interaction between homeowners and government takes place via web interfaces (such as energy calculators and digital application forms) we studied these interfaces by trying them out. Finally, we analysed documents (e.g. reports, white papers and regulations) that played a key role in Norwegian energy policy.

The empirical research was developed in close connection to the hermeneutical development of research questions during the research period (cf. Ulin, 2001). During this process, Bruno Latour’s (2005: 21) advice to ‘feed controversies’, i.e. focus on issues that are controversial and subject to debate or disagreement, drew our attention to the support programme for holistic energy renovation. As we picked up critical attitudes to the programme, we returned to key informants (mostly at Enova and the Housing Bank) to conduct follow-up interviews in order to discuss and get feedback on the criticisms. This back-and-forth dialogue was essential for developing our research questions and body of data.

Even though spanning several years, this cases study focus on a single policy program and we are thus not in position to analyse the broader field of energy policy in Norway.

# 3. Framing analysis

Aune et. al. (2016) point to a mismatch between household consumers and energy economists regarding the underlying rationality of their framings of energy consumption. While economists conceive the electricity market in terms of economic theory, the household consumers had a more complex and inclusive framing, encompassing moral and other considerations. We suggest there might be a similar mismatch at work between the government apparatus, energy consultants and homeowners with respect to energy retrofitting. We articulate the mismatch through the concept of framing (Goffman, 1974; Callon, 1998).

Framing, as developed by Goffman (1974) refers to the way in which experience is organised. Like the frame of a picture defines and holds the picture together, experience is also organised by a certain context. In interaction, such as conversation, the framing directs the interpretation of what is said. According to Goffman (1974; 308ff) misunderstandings often are the result of wrong framing. Statements such as “jokes aside…” signal a shift of frame, indicating something serious needs to be said in an otherwise joyful conversation.

While Goffman focuses on face to face interaction, Callon (1998) apply the concept of framing to economic calculations. Any calculation implies a framing that will include certain aspects while other aspects are not included, these are called externalities. Unintended externalities caused by a particular calculative regime are described as overflows (sometimes leakage). An example can be the calculation of costs and benefits of a new plant for a company. If the environmental costs for society is not included in the calculations, they become overflows. Callon´s take on framing aims at identifying and possibly contain such overflows.

While Callon used the concept for economic calculations, to enable social understandings of how ‘markets’ and ‘calculativeness’ are made and done, Hahn et.al. (2014) argue for the potential in considering different cognitive framings of decisions in complex issues exemplified by corporate sustainability, where ordinary business case framings seem to be insufficient in making decisions regarding sustainability.

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We should note that Goffman´s analysis of interaction included more than cognitive aspects, for example context such as body (Goffman, 1974; 37) and architecture (Goffman 1959; 33). A statement uttered in courtroom is interpreted differently than an identical statement uttered in a bar. Also the issue of retrofitting and energy policy calls for an understanding of framing that should include aspects such as the material houses being retrofitted, governmental technology and bureaucratic practices – aspects that would be externalities in a purely economic or cognitive framework. As such, we suggest a more holistic approach to the analysis of framing.

The case study implies three different framings of energy retrofitting respectively for homeowners, government and intermediaries; each calls for slightly different nuances of theory. The framing of homeowners can be informed by phenomenological theories of dwelling (Ingold, 2000), where the sensual and existential qualities of living in a home is emphasised in contrast to the rationality of technocratic approaches. Also, holistic approaches to home retrofitting has been sought through Social Practice Theory (Bartiaux et al., 2014; Judson & Maller, 2014; Vlasova & Gram-Hanssen, 2014), where practice is analysed in terms of general elements such as materiality, meaning and skills; elements meant to encompass the wholeness of the situation studied. Implicit in the call for attention to practices of retrofitting is the assumption that many policy approaches neglect the social nature of practices (Bartaux et al., 2014: 536; Shove, 2010, 2014), a claim indicating that these aspects can be approached as externalities to the policy framing of the government apparatus, thus making it relevant for the present case study.

The particular framing of intermediary actors such as craftspeople serving as energy consultants, can be approached in terms of their role as professionals. Following Abbots (1988) ‘system of professions’ approach, a profession implies an organised occupational group applying a body of knowledge requiring specific formal training which makes the profession exclusive. A profession lays claim to a particular ‘jurisdiction’; a set of socially defined tasks which they both lay claim to and are bound to. The different professions may work according to different knowledge systems and have different ways to explain and justify their decisions (Janda 1999), and as pointed out by Wade et al. (2018), may have different approaches to energy retrofitting. As such, professionals may work within different framings. Craftspeople such as carpenters constitute an actor-group that has received relatively modest research attention (Authors 2018a). However, Tregear (2003) argues that craftspeople’s unique value set makes them unlikely to orient their behaviour according to market values. Their professional jurisdiction seems to provide a framing which not necessarily match that of the government apparatus.

We suggest that the framing of the government apparatus should be analysed in terms of Foucault’s (1984) concept of governmentality. This imply the practices by which government seeks to govern and shape citizens, focusing on mentality, rationality and the technical aspects of governing (Dean, 2009). This perspective goes well with Callon’s concept of framing, as the technical aspect – that is, the practical mechanisms enabling government to deal with citizens in great numbers – deals explicitly with calculation and quantification (Dean, 2009: 42). Ted Porter (1996: ix) describes quantification as a ‘technology of distance’, which is crucial for government to act at a distance when governing larger territories or organisations. What kinds of overflows are created when such technology encounters practices that are not easily quantified? Before proceeding to the case study, we will briefly present the three framings in question.

# 4. Three framings

In this section we briefly describe the three types of framings which meet in the case study. The descriptions are based on our empirical findings together with literature studies. While this analysis mainly focuses on the framings of the government apparatus and craftspeople serving as intermediary energy consultants, the home owners’ particular framing is still briefly described as a backdrop; the need for intermediaries are related to a certain incommensurability between the framings of homeowners and government.

## 4.1 The government apparatus

One essential feature of the way in which the government apparatus frames energy retrofitting is that they normally do not meet homeowners face to face. Together, Enova and the Housing Bank employ more than 400 people, but only (approximately) ten senior bureaucrats and case handlers work hands-on, energy retrofitting homes (the actual number varies, as most of these workers also perform other tasks). Enova has its main office in the city of Trondheim, while the Housing Bank has offices in several cities. The structures of these offices are quite similar: If homeowners visit either office, they must first address a reception desk at the entrance. If they are then granted an appointment with a bureaucrat, they are admitted into the locked area behind reception and into the appropriate office. In practice, most homeowners contact the offices by phone or online. The institutional websites are structured quite similarly to the physical offices. Online, users also meet a kind of ‘reception’ on the home page, with a menu that allows them to navigate to the appropriate ‘office’ to address their desired issue. When the offices are reached by phone, homeowners are asked to specify their request by pressing various numbers on their keypad.

The automated structure of the public interface seems necessary, as only a handful of case handlers are responsible for implementing energy policy in 2.2 million private dwellings (which puts each case worker in charge of approximately 220,000 dwellings). This creates a certain form of distance between the bureaucrats and the homeowners; we call it a ‘distance in scale’. This, together with the geographical distance, puts certain constraints on the way in which the case handlers meet their clients. All of our informants in the two enterprises stressed that they rarely had direct contact with the homeowners they aimed their policy at. We have identified three major strategies the government apparatus use in their attempt to bridge this distance. They relate to each other and seem to be essential in creating the framing of the government’s activity:

1) documenting the energy qualities of the 2.2 million homes in a standardised and numerical format;

2) conceptualising the 2.2 million homes as a market; and

3) relying on intermediaries.

In the following three sections, we will present these three bridging activities and point to how they contribute in framing energy retrofitting of private dwellings. The three ‘bridges’ can be conceptualized in Fig. 1 below:

## 4.1.1 Documenting the energy qualities of 2.2 million homes

One way in which bureaucrats communicate with homeowners is via the documents that pass through their desks (or computers). This is a technology of governance (Rose 1999) which allows auditing and action at a distance – through documents that capture retrofitting interventions and energy qualities. These documents reflect a certain practice where calculation plays an essential part. Briefly speaking, the documents record the energy qualities of a house (or policy measures) in numerical values; in so doing, they make energy qualities visible and possible to calculate for case handlers at a distance. As all measures are documented according to the same standard (in kWh, or kilowatt-hours), case handlers are able to compare the results of retrofitting measures with measures in other sectors.

In addition to Enova and the Housing Bank, the entire government relies on calculable documentation (i.e. the Ministry of Petroleum and Energy uses the same form of calculable documentation when auditing Enova). In the framing of this documentation, Enova’s effort to enhance energy efficiency is conceived of and measured as a ‘production of kWh’. In 2010, a contract was entered into between Enova and the Ministry, wherein Enova was required to ‘produce’ 6.25 TWh (terawatt-hours) of renewable energy by the end of 2015. As they met this goal, the contract was renewed in 2015. Before 2010, the production of renewable energy was measured according to specific goals, but it was not until the 2010 contract it was formulated as a *requirement*, signalling a change in government practice.

In the contract, only energy in calculable form, documented according to rigid and standardised procedures by certified agents, contributes to the contracted objective. Thus, any energy saving effect of Enova’s efforts that is not documented is externalised from its official production (Callon, 1998).

## 4.1.2 Conceptualising the 2.2 million homes as a market

The majority of the employees we interviewed in Enova and the Housing Bank framed the challenge of energy retrofitting in economic terms. Their activity – also in other sectors – tended to be framed through a general socioeconomic perspective, adhering to ideals such as a balanced market and the cost effectiveness of measures. For Enova, the main policy measure was economic support. They attempted to use this (via the market) to promote change, but they also had to ensure that their offer of support was cost effective. ‘The idea is that economic support should be balanced economically’, a representative from Enova explained (interview, autumn 2012), he continued, ‘for this is the goal: that the marginal cost of various measures, be it production of energy or rehabilitating, balances out’. Very expensive solutions with little gain were even described as ‘socioeconomically reprehensible’, indicating that economic framing was so deeply founded that it even became, in practice, a moral standard.

In the case of the energy retrofitting of private dwellings, a specific kind of market philosophy was applied. In both Enova and the Housing Bank, interviewees referred to the same book: *Business Model Generation* by Osterwalder and Pigneur (2010). Relying on Rogers’ (1962) curve for the diffusion of innovations, the fundamental idea of the book is that economic support should be used to help deliver the desired solutions across ‘the valley of death’ – the difficult phase between innovation and an established mass market. In light of this philosophy, both Enova and the Housing Bank saw themselves as market developers. This had not always been the case – particularly for the Housing Bank, which had a longer history than Enova. Previously, the Housing Bank had operated as a *corrective* to the market, whereby the basic loan was used as a permanent corrective to a market that did not, itself, incentivise the preferred solution or policy. Over the past two decades, the Housing Bank has become a *developer* of markets, as the basic loan is now used to develop free markets in which preferred solutions, such as energy efficiency, ‘ideally are demanded without subsidies’ (interview, autumn 2012). Enova uses its economic support for private dwellings in exactly the same manner. An employee from Enova summarised: ‘Our dream is that the homeowners naturally demand the preferred solutions, making us redundant’ (interview, autumn 2012).

The introduction of air-to-air heat pumps in private dwellings through Enova’s support programme in 2003 is often used as an example of this philosophy. At the time, heat pumps – used to warm Norwegian homes during cold winters – were considered a more energy efficient way to keep a house warm than electric radiators, which were then the dominant technology. Enova supported the purchase and installation of heat pumps to the value of approximately €575 per home (approximately 25 percent of the total cost). This support was relatively accessible for homeowners; all they had to do was fill in a simple application and show the receipt from the heat pump provider to receive it. From the producer, Enova required a certain documented quality and energy efficiency for the heat pumps to be included in the support programme. Thus, it challenged producers to deliver high quality products. After supporting approximately 50,000 heat pumps, Enova concluded that the market for heat pumps was self-sufficient and terminated the programme. With this programme, Enova contributed to developing a market for heat pumps with good energy quality in Norway. Financial support for other kinds of technology for energy retrofitting homes, such as solar panels or automatic pellet stoves, was offered according to the same philosophy. Also, non-economic measures, such as information services, pioneer projects and efforts aimed at technology producers, all had the long-term goal of developing independent markets for the technology.

Economic and calculative frameworks intersected in Enova’s contract with the Ministry of Petroleum and Energy to ‘produce’ 6.25 TWh of renewable energy. Within this context, the use of economic support to enhance energy efficiency and thus contribute to fulfilling the contract was described as ‘purchasing kWh’. In demanding that production be as cost effective as possible, the Ministry practised a form of ‘value for money auditing’ (Power, 1997: 43) that contributed to framing Enova’s activity. This framing can be seen in light of a tendency to replace ‘the presumed inefficiency of hierarchical bureaucracy with the presumed efficiency of markets’, (Power, 1997: 43), implying a shift from bureaucratic mechanisms to market-based mechanisms as a frame and tool for control. However, such framing does not replace calculation and documentation; they work together in creating a sort of commodified energy calculations.

## 4.1.3. Relying on intermediaries

In addition to interacting with homeowners via documents and market manipulation, bureaucrats also interact with homeowners indirectly, through intermediary actors. Case handlers in the Housing Bank said they very rarely handled funding applications for energy renovation from individual homeowners; more frequently, applications were from larger entrepreneurs, housing cooperatives or municipalities, which again had connections to individual homeowners (interview, autumn 2012). The same was true for our informants from Enova. For example, in the support programme for heat pumps, contact with homeowners was said to have been limited to processing standardised applications that would progress through the system almost automatically. More substantial interaction – regarding, for example, documenting the effect of various heat pumps, procedures for sale and installation – was all conducted with heat pump producers and major retailers. At Enova, this tendency may have been enhanced by the fact that the enterprise produced most of its kWh through the support of larger industrial projects: ‘you can make binding agreements with them’, a representative from Enova explained (interview, Enova, autumn 2015). Such intermediary actors operated within the same kind of framing as Enova and were able to produce the same kind of documentation Enova relied on. This was not necessarily the case with homeowners.

## 4.2 Homeowners

As homeowners are not the main focus for this study, we will not give a full account of their framing, but rather point the certain aspects that seem incommensurable with the framing of government. One essential aspect of the way in which homeowners and other members of a household frame retrofitting is that they actually dwell in the house. Rather than representations in terms of the quantitative documentation characteristic of the first bridge, the qualities of a house tend to be described in terms of immediate experience: ‘The draft from that corner was so cold, we actually had to move the sofa away from the wall during winter’ (interview autumn 2013); ‘After I insulated, I barely hear the traffic any more. The house became so nice and quiet.’ (interview winter 2015).

Living in a house can be analysed as a practice of dwelling (Fyhn and Baron, 2017), drawing on Ingold’s (2000) concept of ‘dwelling’. Thus, rather than being an isolated event, home retrofitting can be seen as framed within a more general practice of ‘dwelling’ which includes continuously performing smaller or larger alterations to one’s property as an aspect of living in and maintaining the house. Retrofitting thus occurs according to the rhythms and needs of life in the house, including the material house itself. In this perspective, retrofitting does not necessarily imply calculations of the kind expected by mainstream economic theory. Fyhn & Baron (2017: 557) suggest that retrofitting projects not even need to be subject to the kinds of decisions that tend to be expected by the government apparatus. Nonetheless, documentation, quantification and calculation tends to be part of retrofitting projects, for example when negotiation a price with a carpenter, but such calculation is framed by the dwelling and the materiality of the house, it is not calculation that frames the dwelling and the house, as is the case when relying on calculation as a bridge across distance in scale. The situation is similar for the second bride, of manipulating markets: Even though home renovation include market logic in many cases, the engagement in renovation tends to be framed by the needs of dwelling, not market logic.

## 4.3 Craftspeople

The particular framing associated with craftspeople is essential in this study, as they actually perform as the third bridge between government apparatus and homeowners. Similar to homeowners, their framing is characterised by their physical presence in the house. They move from house to house, but their work consist of bodily interaction with the materiality of the house (cf. Wallenbourn and Wilhite 2014) and in face to face interaction with home owners. They relate to the kind of immediate sensual experience mentioned by homeowners, such as ‘the cold draft’, but it is rather their professional skills that frame this relation; they will typically address the qualities of the wall, rather than the qualities of ‘the cold draft’. The craftspeople also rely on documentation and calculation, associated with the first bridge, but not unlike homeowners, this is framed by their craftsmanship, not vice versa. For example when calculating the exact amount of materials for a retrofitting job, the carpenter engage with calculation but only as part of the practical work process, framed by the materiality and logic of the work and the carpenter skills.

For the craftsperson there is also a different temporality framing the relation to the house and the use of calculation compared to the government framing: the hose is never primarily seen as a set of atemporal calculations, our craftsperson-consultants rather saw the house as a series of retrofitting cycles in a long term perspective. For example, changing the roof had a different time cycle than changing panelling or draining the foundation, all of which depended on local weather conditions and use; the building and maintaining of a house is two sides of the same process.

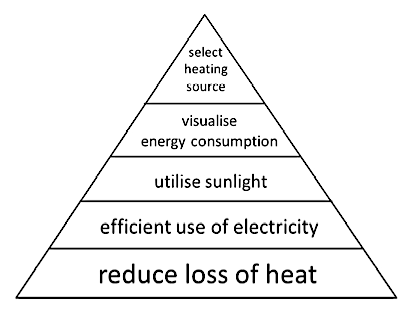
Considering the second bridge, there is also a difference between government and craftspeople in the relation to the market. Among the craftspeople, we saw great concern for business and monetary income, but equally important was preserving a good reputation as skilled and trustworthy craftspeople. New jobs depended strongly on their reputation amongst homeowners; thus, they stressed the importance of recommending solutions that would fit the economy of the homeowner and not be more expensive than necessary. This implied giving advice and doing work according to what is ‘right’ from a craftsmanship perspective rather than from the perspective of profit maximization. Price and various technical solutions tended to be negotiations in face to face interaction with homeowners, not at a distance; the concern for the homeowner had strong impact on the way in which craftspeople framed retrofitting. Face to face interaction with customers was not only about giving advice and selling renovation, it was also an arena self-presentation, or facework, where the craftsperson needed to convince the homeowners about ones professionality.

Through the energy consultation programme, these craftspeople saw a change in their daily work practices and jurisdiction as they were recruited to bridge distance in scale for the government apparatus. Before returning to this situation, we will present the program established to promote holistic energy retrofitting.

# 5. Reframing ambitious energy retrofitting

The background for this case study is that the introduction of specific technologies such as heat pumps has only a limited effect in reducing overall energy usage in homes. A major study of the technical potential for energy reduction in existing dwellings identified opportunities for large increases in energy efficiency (13.4 TWh), while also suggested that these dwellings must be retrofitted in a deep, ambitious and holistic manner in order to realise such gains (Enova, 2012b). Accordingly, there was consensus among the main actors in Norwegian energy policy that, in order to significantly reduce the energy usage in homes, the complete house must be retrofitted holistically (Dokka & Andersen, 2012).

In this respect, insulation and work on a building’s envelope is considered more important than the adoption and use of particular technologies in the building. Thus, in 2012, Enova introduced a support programme for holistic retrofitting with the long-term goal of developing a self-sufficient market for this work. The programme was coordinated with the Housing Bank’s programme for affordable loans. The principle of holistic retrofitting was visualised in the ‘Kyoto pyramid’ (Fig. 2), which was developed by the Housing Bank in conjunction with the research institution SINTEF (Dokka & Andersen, 2012).



**Fig. 2.** The Kyoto pyramid.

When planning retrofitting, one should start from the base of the pyramid by reducing any loss of heat. This action serves as the foundation for all other measures and is achieved by passive measures such as increasing insulation and improving tightening. Following this, one should progress to the next step and ensure that electricity is used as efficiently as possible. In this fashion, one continues up the pyramid, step by step, until reaching the top, when one selects an appropriate heating source. In abiding by this holistic approach, one avoids taking measures that prevent optimal solutions in the future. For example, if a homeowner were to install a heating system that was calibrated for a house with poor insulation, the system would be over-dimensioned and sub-optimal when the house was later insulated and the demand for heating reduced; at this point, the heat source would be difficult to dispose of, and would create ‘energy lock-in’.

The support programme for holistic retrofitting was set up to support complete retrofitting, with the aim of avoiding energy lock-in. The idea was to convince bout to renovate that energy retrofitting should be part of their project. In this programme, a house’s total energy reduction qualified it for financial support. When a house achieved a ‘low energy level’ – a standard slightly more ambitious than the building code in 2012 – Enova offered €69 per square meter (up to a total of €12,600) in support, directly to the homeowners. One of the conditions for this support was that the house needed to be retrofitted by a professional who could describe the work in a binding contract. Also, the retrofitting had to be performed in a single operation (i.e. homeowners did not receive support for, e.g., insulating the foundation one year and the walls and roof the next year). With this new support program the relation between the three bridging mechanisms became more problematic than in previous programs.

## 5.1. Documentation practices creating overflows

Briefly speaking, documentation transforms the energy qualities of a house and the energy gained by retrofitting into a numerical value. This process makes the energy qualities visible and calculable as kWh for case handlers. When made calculable, poor tightening in the corner of a home transforms it from a cold draft (as experienced by the dwellers) into a numerical ‘leakage value’. Similarly, the wall’s ability to keep cold out and heat inside transforms it from being a wall that feels cold to the touch to one that is no more than a numerical u-value (a measure of thermal transmittance). When the house is represented in numerical values, its energy usage can be estimated through calculations and represented in kWh/m2/y (kWh per square meter per year). From this perspective, improved energy quality equals a lower kWh/m2/y value. The case handlers at Enova used these documented values to determine who qualified for support for holistic renovation and to report back to the Ministry.

Documentation was also required in the support programme for heat pumps, but this did not cause overflows, as the pump producers had systems and practices in place to document the properties of the pumps. With the programme for holistic retrofitting, however, documentation became a source of overflow, as the average homeowner did not have systems and practices in place to provide such documentation. We discussed the issue with one of the first homeowners to receive support for holistic retrofitting in 2012. He said that in order to achieve support he had to hire a consultant to document the energy effect of the retrofitting. This consultant operated within the same calculative framing as the programme and was an actor Enova could make binding agreements with. Documentation of the house proved to be a substantial job and, in the end, the consultant’s fee was 70 to 80 per cent of the total funding the homeowner received. ‘I really had hoped it would be the other way around’, he said, shaking his head (retrospective interview, winter 2015). Could it be possible to relinquish the rigid documentation procedures? A representative from Enova (interview, spring 2012)explained: ‘We need a system to assure us that the money we hand out is actually being used to improve the building you have applied for. It may sound bureaucratic, but we are dependent on certain systems for auditing.’

Such documentation procedures – and the framing they represent – had been part of Enova’s practices from the start. They were necessary as a bridging intermediary, due to the way in which public enterprises worked across distance in quantity and scale. This framing did not emerge as a problematic issue in Enova’s dealings with intermediaries such as heat pump producers, but when homeowners suddenly had to organise documentation, it caused overflows as such documentation procedures was not contained by the homeowners’ framing of retrofitting. Enova’s staff were aware of the problem from the start, but they could not do away with their framing as the entire government apparatus relied on calculable documentation. Also, Enova needed to document their production of kWh in order to fulfil their contract with the Ministry. Because only energy documented in a calculable form counted in this contract, they passed the obligation to provide such documentation down to the homeowners, causing overflows.

## 5.2. Craftspeople consultants containing overflow

The responsible parties in Enova worked to solve the problem. In 2014, a solution was introduced: a course was set up to train builders in energy consulting. By receiving this training, small-scale contracting builders who already had a foot in the 2.2 million homes and carried out much of the practical retrofitting work also became qualified to document the work. In this way, a new class of intermediaries was created. Those taking the course were mostly master builders and builders (carpenters and other craftspeople), though a few were architects or engineers. Those who passed became Enova-certified energy consultants and were allowed to perform the necessary consultation and documentation work for homeowners to achieve support from Enova for holistic retrofitting. In this way, Enova sought to contain the overflow caused when homeowners had to deal with energy documentation. A consultation by a craftsperson-consultant normally cost €1000, and Enova would refund 50 per cent of the consultation fee (up to €500). In order to ease the documentation procedures, an ‘energy calculator’, which automatically made the energy calculations, was developed as part of the programme.

With this new programme, a homeowner considering retrofitting who wanted financial support from Enova was meant to, as a first step, call one of the certified energy consultants. After conducting a home audit, the consultant would document the energy efficiency of the house according to categories such as: type of insulation, sizes and u-values of windows and shape of the house. This numerical information would be fed into the energy calculator according to a rigorous and standardised procedure, and the calculator would estimate energy efficiency and provide an energy label for the house. In this process the calculator aided consultant transforms the house from the framing of house owners and craftspeople, which deals with the qualities of the material house, to the framing of government, which deals with numerical representations.

The next step would be for the energy consultant to suggest improvements to the house, such as better insulation or new windows. These suggestions would be fed into the calculator, which would estimate a *new* energy balance and generate a new energy label on the basis of the suggested measures. If the suggested measures enabled the house to achieve a ‘low energy level’ and thus qualify for support, the calculator would automatically create the application for this support. In the same operation, the calculator would also automatically provide an application to Enova to finance 50 per cent of the consultation fee.

With the help of the calculator, craftspeople in the building industry became enrolled in the governmental network of numbers (Rose, 1999). They proved able to engage in the calculation regime via the energy calculator, even though their traditional practices as craftspeople were not framed by the sort of calculations produced. Thus, by adapting to the bridge of documentation they carried out their role as intermediaries bridging the distance in scale between homeowners and government. They significantly reduced the cost of documentation, making it radically easier for homeowners to achieve support for holistic retrofitting. Thus, the overflow in the encounter between the government’s documentation practice and the practice of homeowners was contained.

However, operating between the two different framings of these actors was not easy. The craftspeople found themselves caught between on the one hand their role as a government representative facing homeowners in order to sell the energy retrofitting programme (bridge 2) and document the energy qualities of the house (bridge 1), and on the other their role as a carpenters dependent on creating a good dialogue with homeowners in order to find the best solutions for homes. In this situation, they had to negotiate between the two framings and the two roles, often implying ‘role incongruence’(Goffman, 1959), as the roles were more or less mutually exclusive. As energy consultants for the government, the craftspeople had to accept the techno-economic frame of the support programme, but their own framing of retrofitting was not given much place in the programme. This was particularly evident in the use of the energy calculator, around which the entire home consultation was structured. The calculator was developed according to the government framing and the craftspeople who used it had no opportunity to provide feedback on its design (even though they pointed out many areas for improvement) (Authors 2018b). Caught between the two frames and roles, our informants’ loyalty ended up being strongest to their role as a craftsperson; this was what they made a living from and identified with most strongly. Thus, the rigid framing of the consultation activity contributed to greater overflow, as the consultant – in most cases – ended up advising homeowners *not* to apply for the renovation programme. Thus, the energy consultant, serving as intermediary actor to bridge the distance in scale between homeowners and government, working within the framing of a craftsperson, end up turning the homeowner away from the bridges of calculable documentation and market creation, breaking the possible connection.

Several of the consultants we interviewed told us that they started the energy consultation course optimistic and enthusiastic, but ended up disappointed. One important reason for this was that it did not provide a good business for them. The number of homeowners receiving support from the program remained low. When the programme was introduced in 2012, it aimed at establishing a mass and natural market for holistic retrofitting, but by the end of the study period, no more than 100 homeowners a year had achieved support, or 500 in total (ca. 0.02% of the 2.2 million private dwellings in Norway). The numbers indicate that the programme for holistic retrofitting is far from repeating the success of the heat pump programme in terms of establishing a self-sufficient market. The craftspeople who serve as intermediaries between homeowners and the government apparatus presented several suggestions to this.

# 5.3. Reaching the limits of reframing

In the following, we present the reasons offered by craftsperson-consultants for the failure of the holistic energy retrofitting programme to achieve wide popularity. In response, we also present government explanations as to why the programme was designed as it was. We interpret the statements in terms of differences in framing and suggest that they point to limits of reframing.

The support programme demands that retrofitting be conducted in a single operation, but, according to an energy consultant: ‘this is simply not the way people retrofit; they do it batch by batch’ (interview, autumn 2013). ‘Over-time retrofitting’ (Fawcett, 2014: 478), which is performed according to the private economy and the rhythm of the household (Fyhn & Baron, 2017), seems the norm. Most energy consultants we spoke with agreed that, from a purely technical point of view, the best solution for maximising the energy benefit is to retrofit in a single operation; but from a professional point of view, taking the homeowner’s situation and the natural cycles of home renovation into account, they rarely recommend that homeowners retrofit the entire house in one operation. As they told us, advising an entire retrofit all at once ‘makes us appear unprofessional’ (interview, carpenter, autumn 2015). One energy consultant suggested a solution that would satisfy both the technical and the dwelling perspective: ‘Why not make a holistic retrofitting plan, with clearly defined measures, and then let the homeowners do the work in their own time?’ (interview, autumn 2013). We put this suggestion forward to a representative of Enova and received a clear answer why this could not be done: ‘We cannot stretch out a case in time like that’ (interview, autumn 2013). The real problem is not technical, but related to the framing of retrofitting projects that is stipulated by the bureaucratic practice of the policy apparatus. For a retrofitting job to enter the system, it must be defined as a case. A case must be opened, processed and swiftly closed, as only then can the results be counted.

Upgrading a house to a low energy level easily costs €150,000 or more. In light of this, €12,600 does not make enough of a difference to motivate people. ‘I think they have missed [the mark] with this programme. It fails when people see they have to do so much for so little money’, an energy consultant said (interview, spring 2014). By recommending the full suite of interventions needed to achieve the required energy level, the carpenters risked their professional reputation by giving advice that did not serve their customers well. ‘Either you need to lower the level of requirements, or you need to raise the level of support’, an energy consultant suggested (interview, spring 2015). For Enova, lowering ambitions is not an option. As their contract with the Ministry only counts energy reductions beyond the current building code, they have to demand ‘low energy level’. ‘Below the building code’ is also the Housing Bank’s criteria for handing out affordable loans.

If lowering ambitions is not an option, why not contain the overflow by raising the level of support? When suggesting this to a representative of Enova, we learned that this is also not an option – not due to a lack of money but due to the economic rationality that governs the enterprise. ‘We are not so much bound by technical criteria and requirements, but by what is economically justifiable’, the representative explained (interview, autumn 2012), referring to their ideology of balancing measures in a balanced market. They referred to the activity of supporting retrofitting and other energy saving projects as ‘purchasing kWh’ – a purchase framed by ‘value for money auditing’ from the Ministry. In this framing of economic rationality, it makes sense to ‘purchase’ the least expensive product when choosing between two equally good products. As all kWh are equal in the government calculations, kWh from private homes compete with kWh from large industrial projects. For private homes, this is bad news, as private homes represent the most expensive kWh: ‘Different areas have different costs. Supporting a large hotel downtown will often be cheaper per kWh than [supporting] individual homes, when case handling costs and everything connected to it is included’ (interview, Enova, autumn 2012). Enova still supports home retrofitting, despite these calculations; but as one representative said: ‘We should not push it too far’ (interview, autumn 2012). In other words, for the goal of producing 6.25 TWh, all kWh are equal; but for the long-term goal of developing a market for ambitious energy retrofitting in private homes, there is a huge difference between kWh from homes and kWh from hotels. This difference is a difficult overflow to contain within an ‘audit by prize’ framing.

During interviews, representatives from Enova and the Housing Bank acknowledged the overflows pointed out by the craftsperson-consultants, but they could not contain these, as they were bound by the governmental framing. The rigidity in the governmental framing creates inevitable overflows in cases when they cannot change the framings of homeowners and intermediaries. Still, they made many attempts at enhancing other measures with the long-term aim of developing markets for energy efficient solutions, that are independent of the support programme, thus able to avoid some of the problems pointed to here. However, as many such measures did not count in the production of kWh, they ultimately had to give priority to measures that implied ‘buying kWh’ for the production of 6.25 TWh. In the case of home energy retrofitting, they pointed to a direct contradiction between their requirement for kWh produced and the long-term goal of developing a market, the bridge of documentation and calculation, and that of creating a marked worked against each other. Only after Enova had secured the target they were audited by could they devote effort to the long-term market goal.

# 6. Conclusion

We have explored energy policies in private dwelling retrofitting by observing how a support programme for energy retrofitting was implemented and developed over a five-year period from 2012-2016, in order to contain overflows that occurred in the encounter between the respective framings of energy retrofitting among homeowners, craftspeople and the government. The implementation of the programme was analysed according to three ways in which the government apparatus bridged the distance in scale between government and homeowners: by relying on numerical documentation; conceptualising the mass of private homes as a market; and engaging craftspeople trained as energy consultants as intermediaries.

While these three strategies were aimed at reducing the inevitable distance in scale, we argue that they also produced a specific distance. In the program for holistic retrofitting the three bridging mechanisms started to work against each other, as for example the need for Enova to fulfil their short term production of numerically documentable kWhs contradicted the long term goal of creating a market for energy retrofitting. For the craftspeople serving as energy consultants the need to ‘sell’ holistic energy retrofitting contradicted their need to provide professional advice as craftspeople. Even though the craftspeople engaged were able to take part in the governmental practice of calculation, they found it difficult to sell the support programme to homeowners, as the recommended solutions were inconsistent with their professional jurisdiction facing home owners. The way in which these craftspeople found themselves torn between the framings of government and homeowners indicates that much of the problem lays in the difference, or distance between framings. As such, the attempts to bridge the distance in scale by intermediary actors revealed that there also is a *distance in framing* to be bridged; frames not being aligned can cut of bridges.

Previous studies have suggested that in order to achieve substantial energy reductions through home energy retrofitting, authorities need to take into account the practices of home owners (Gram-Hanssen 2014; Judson and Maller 2014). Similarly, it is also suggested that the jurisdiction of the professionals implementing energy solutions needs to be taken into account and redefined (Janda and Kilip 2010). Searching for a governmental energy paradigm, Frigo (2017) points to a certain reductionism, which sets it apart from the aspects highlighted in the qualitative studies cited here. Adding to these studies of specific groups, a lesson from the present study is that the practices and work of these groups need to be analysed in relation to each other. By approaching them in terms of framing analysis, we suggest a framework for such analysis. We argue that only when the framings of these groups are coordinated can the policy actually be successfully implemented. This should call policy makers to ask two questions: (1) How can any of these frames be transformed in order to be better coordinated to enhance energy policy? And (2) for that which cannot be transformed, how can policy be designed to better be carried out within all these frames? Answering these questions calls for a deeper understanding of the frames at work.

In the Norwegian case, transformation of frames has proven difficult, as the different frames seem deeply rooted in the practices and professional jurisdictions of the involved actors. We assume similar difficulties also exist in other contexts and welcome studies approaching these. One particular challenge we saw for improving energy policy is that although the government actors were aware of the critique posed at their policy, they still found it very difficult to adhere to much of the critique. While the energy consulting craftspeople suggested certain solutions that seemed reasonable from their perspective, these were impossible to implement within the governmental framing. We showed how this framing was not easy to change, as the larger governmental apparatus was structured around it. As a result, the framing of craftspeople was not given enough room for them to work well as energy consultants, despite government actors being aware of their problems. Figuring out how government can transform its framing in order to better enhance the work of other actors engaged in energy policy, is a challenge for the future. By approaching this framing in terms of the three bridging activities across distances in scale, we hope to contribute to such work.

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1. https://husbanken.no/om-husbanken [↑](#footnote-ref-1)
2. https://www.enova.no/om-enova [↑](#footnote-ref-2)