Crafting environmental policies into action: Energy consulting practices of craftspeople

Roger Andre Søraa

Abstract

This article discusses the emerging practices of craftspeople – particularly carpenters – in relation to policies of energy-efficient homes in the building sector. The Norwegian political goal of making buildings more sustainable and energy friendly by reducing the 40 percent of the energy used in the building sector provides new challenges for craftspeople that are tasked with effecting these changes. Based on qualitative interviews, this article explores how craftspeople working as 'energy consultants' form their new role as what I call 'green-collar workers'. The article explains how energy policies are translated into physical buildings by energy consultants. Four practices of craftspeople working as energy consultants are analysed – the practices of: economizing, controlling, coordinating and selling. These practices are part of a complex sustainable transition that is taking place in the building sector. As craftspeople are the workers actually enacting energy policies in the building sector by working with energy mitigation hands on (whilst also building on their traditional crafts experience), it is necessary to understand their practices in order to further reduce energy use in buildings.

Keywords

craftspeople; energy practices; green-collar worker; environment policy; energy consulting; buildings in transition

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1. Introduction

How can the energy usage in buildings be reduced through an understanding of the practices of craftspeople? Craft and craftsmanship has the possibility to adapt to and challenge technology and policy. With a future-oriented look on a specific craft expertise I will explore how novel understandings of craftsmanship can contribute to sustainable transitions. This article aims to add to the body of research on the ways energy policies are enacted in practice by focusing on professionals who provide hands-on work on energy upgrades in houses. It does so by providing insight into the ways sustainable transitions are performed through their hands-on practice.

Craftspeople is a wide category, and has traditionally denoted professionals who make something, primarily with their hands. Craftsmanship is also closely tied to the experience or meaning that the craftsperson attaches to their work (Pye 1968), doing "good work for its own sake" (Sennett 2008: 20) and by 'making something well through hand skill' (Adamson 2007: 3). This can truly be seen in the Scandinavian translation 'håndverker', meaning 'hand-worker'. Craft is not a static practice, but an evolving one; this adaptability can be beneficial when solving problems related to energy and climate. Craft has a multitude of connections to various sectors of society. One of the most prominent sectors for craft is the building industry.

Although the building industry represents a large environmental problem, the sector is also politically, economically and scientifically understood as a sector in which much progress can be made in reducing energy usage, especially compared to other sectors (Dokka et al. 2009; Ibenholt and Fiksen 2011). The global problem of excess energy use in buildings is emphasized by the United Nation's Environment Program's Sustainable Building and Climate Initiative (UNEP 2015), which states that 40 per cent of global energy is used in the building sector. The is also a European problem as claimed by the EU Common Building Directive 2002/91.

1.1 Situating the Norwegian building sector

This article focuses on the context of Norway, which follows EU directives according to the EEA (European Economic Area) agreement. The Norwegian building sector uses approximately 40 per cent of the country's total energy consumption (Dokka et al., 2009). The sector is regulated by Norwegian mandatory building standards "TEK", which are updated regularly. The Norwegian Climate Settlement from 2012 states that Norway should 'sharpen energy requirements in building technical regulations for passive house level in 2015, and nearly zero energy level in 2020'. Consequently, from 2017, new Technical Building Regulations (TEK17) were implemented, mandating that all new buildings in Norway must be at least at a passive house level. This has been much discussed in research (Andresen et al. 2007; Dahlstrøm et al. 2012; Müller and Berker 2013).

From the 1970s through the 1990s, Norwegian policies relating to energy and the environment were dominated by the idea of energy economizing, where local energy-suppliers were left to inform the energy users on Energy-economizing actions that they should do and potential gains (Sørensen 2007). Sørensen describes energy economizing as a discussion primarily between engineers, who saw energy efficiency as a technological phenomenon, and economists, who saw it in a cost-efficiency light; environmental issues had less focus. The Efficient Energy Use

Policy (ENØK) was challenged throughout the years and, in 2001, the responsibility for energy efficiency and saving was moved from suppliers to the governmental enterprise Enova. Operating under the Ministry of Petroleum and Energy Enova has broad responsibilities in managing policies for environmentally friendly energy production and consumption across a wide range of professions. In recent years Enova has included craftspeople, primarily carpenters, much more actively in energy consulting. This has been primarily effected through a policy called the 'Low-Energy Program's Certification of Energy Consultants', which educates and certifies craftspeople, engineers and architects as 'energy consultants'.

Various professions are involved in the planning, implementation and operation of energy efficiency in buildings. The activities of these professions are central to the way in which measures work in context. Discussion of these activities represents one strand of building research, comprising investigations of professions such as: engineers (Hojem 2012; Hojem and Lagesen 2011; Solli 2013), architects (Imrie 2007; Kjølle et. al. 2005; Kongsli et. al. 2008) and building operators (Aune et al. 2009). Craftspeople, on the other hand, have received relatively little research attention.

A report from the Bygg21 ('Building 21') working group, founded in 2014, under the Norwegian Ministry of Local Government and Modernization, calls for more research on two topics: (1) the role of craftspeople in achieving energy efficiency in buildings and (2) social science perspectives on how barriers to energy efficiency can be dismantled (Lavenergiutvalget, 2009).

Barriers are often a key focus of research on sustainable buildings (Amundsen et al. 2010; Enova, 2012). Ryghaug and Sørensen identified the conservative nature of the building industry as one such barrier and one of the reasons why energy efficiency fails in the building industry (Ryghaug and Sørensen 2009). However, much have changed since then, as craftspeople have become involved in energy efficiency work through their role as energy consultants.

2. Transitioning from blue-collar to green-collar

This article draws on the theoretical framework of 'sustainable transitions' (Jackson 2009; Loorbach 2007; Schot and Geels 2008). The framework investigates how a thing or a concept undergoes a transition resulting in a more sustainable state. Although many transition studies focus on systems or networks, this article utilizes the concept on a more specific level, addressing the way in which a worker group (e.g. that of craftspeople) is undergoing a professional transition. It focuses on how the policy of sustainable transitions and the formation of strategies are played out in action (Jørgensen 2012; Åm 2015). This is explored through an analysis of how the craftspeople studied are transitioning from traditional blue-collar work to green-collar work, in the context of environmental building and energy conservation. As both public citizens and politicians turn their attention to green, sustainable solutions, there is increasing demand for professionals who have the relevant knowledge to handle sustainability problems, such as the energy consultants described in this article.

The term 'green-collar' was introduced by Patrick Heffernan (1975), and is increasingly used in both political and economic circles to discuss how new approaches to sustainability could both lower the unemployment rate and decrease human energy usage (Hatfield-Dodds et al. 2008; Jones and Conrad 2008; Pinderhughes 2008). Pinderhughes defines green-collar jobs as:

> Green collar jobs are high quality jobs, with low barriers to entry, in sectors that are growing. They provide policy makers and businesses owners with a unique

> opportunity to simultaneously improve environmental quality, develop the local economy, and reduce poverty and social inequality by providing good jobs to residents with barriers to employment.
> (Pinderhughes 2008: 26)

This article aims at further enriching the concept of 'green-collar workers' by looking at how sustainable transition workers form their work practices. In so doing, it will add a more specialized profession to the development of the theory. This will be done by utilizing the concept of practice theory, as Shove explains: 'understanding social change is in essence a matter of understanding how practices evolve, how they capture and lose us, their carriers, and how systems and complexes of practice form and fragment' (Shove 2010: 1279). Shove argues that practice involves materials, skills and meanings in synergy. This is particularly relevant to an examination of craftspeople, who form meaning-bearing activities through their skilled practice of manipulating materials. Practice theory thus allows for a focus on the actors who perform certain activities frequently (Hargreaves 2011; Hepworth et al. 2016; Nicolini, 2012).

3. Methodology

The main data for this article is based on qualitative, in-depth semi-structured interviews with seventeen energy consultants with a carpentry background. Five of these interviews were conducted in person, with meetings ranging from 45–90 minutes, whilst the remaining twelve were conducted over the telephone, with calls ranging from 15–30 minutes. The face-to-face interviews were conducted by the author and by another research team member in spring 2015. These will be referred to as A1 to A5. The author, alone, in autumn 2016, conducted the telephone interviews, which will be referred to as B1 to B12. All of the interviews were taped using a recorder and were later transcribed.

With their particular background in woodworking, the carpenters interviewed had a unique grasp of the typical Norwegian house, which utilizes much wooden material in its construction. The article also draws on supporting data based on a larger research project on craftspeople, – Crafting Climate Transitions from Below – which comprises more than 50 interviews and weeks of observation at construction sites.

4. Becoming an energy consultant

Ibenholt and Fiksen's (2011) study of energy efficiency in the existing building sector concluded that Norway should include energy consulting – professionals who make home audits and advise on energy performance in buildings – as a way of strengthening existing instruments (Ibenholt and Fiksen 2011). The government funded organization Enova has embarked upon such a project. The aim, which is quite ambitious, is that these energy consultants will contribute to lowering energy usage in buildings.

How are craftspeople engaged as practitioners of transitions in the building sector? To become a state certified energy consultant through Enova, one must take a course and pass a test. These weekend-long courses give attendees information about: energy regulations, energy calculations, energy labelling schemes, energy upgrade methods, the role of energy consultants, financing and subsidies information and practical information on using Enova's energy calculators. Those who graduate are entered in a public database of certified energy consultants. Here, homeowners can find energy consultants in their area and contact these people for energy audits. An energy audit by an energy consultant costs approximately 10,000

NOK (1,120 USD), of which Enova subsidizes up to 50 per cent. If a homeowner decides to refurbish their house with regards to Enova's energy standards, Enova again contributes a certain amount of money per m². Conducting an energy assessment is initially quite straightforward; specific things must be measured in specific ways, described by an energy consultant (A4) as `a state of the house control.´

The energy consultants use a calculation tool developed by Enova, which is described by Søraa et al. (forthcoming). As some informants described, only when a house is 'abnormal' does the work become time consuming, because, for example, the standard measurement inputs cannot account for all nooks and crannies of older houses. Some informants described a need for 'creativity' at this stage – especially concerning the translation of architectural plans into the real world. The homeowner can, of course, also renovate in their own fashion, although they likely would not necessarily receive financial support from Enova.

5. Four energy consulting practices

What happens when policy measures of energy consulting meet the practices of craftspeople? Through the interview material I have identified four new, emerging practices that add to more traditional practices relating to physical buildings. These practices are: economizing, controlling, coordinating and selling, exemplifying different practices enacted by craftspeople who 'put on the green-collar' when they enter the role of energy consultant. Craftspeople have traditionally worn blue-collar shirts, traditionally made of sturdier material than the 'white-collar shirts' of salaried professionals and office workers and the dirt accumulated from manual labor showed less on the blue collars. However, in this study, we see a tendency for craftspeople to perform tasks tied less to physical buildings and more to bureaucratic enterprise. Such work should not be confused with 'white-collar' work, as the craftspeople use their own expertise and skills gained from physical labor to perform these new jobs. In the context of environmental building and energy conservation, these green-collar workers are in direct contrast to Pinderhughes' definition of green-collar workers as primarily unskilled (Pinderhughes 2008). These new practices must be identified in order to understand the group, as green-collar work can be quite complex and require high expertise.

5.1. Economizing

One especially prominent practice found in the interviews is economizing. As mentioned in the introduction, energy economization was, for many decades, the ruling philosophy of Norwegian energy policy. Enova wanted to change this by utilizing hands-on workers inside the house (e.g. craftspeople) in their new refurbishment energy policy. As the craftspeople reported in our interviews, however, they did not escape energy economization. Their work is heavily tied to their interaction with customers and customers' preferences regarding pricing. An initial problem many energy consultants faced was explaining to customers that they would not be eligible for Enova subsidies unless they engaged in extensive and expensive renovations. There is a difference in the profiles of companies that solely perform energy consulting, due to the fact that some employees work fully in this niche market. But as Schot and Geels write: 'Niches are to be perceived as crucial for bringing about regime shifts, but they cannot do this on their own. Linkages with on-going external processes are also important' (Schot and Geels 2008: 537). This difference is particularly noticeable in customer relations. Some interviewees – primarily those who had energy consulting as their main trade – reported having wealthy customers who didn't care much about price, whilst many smaller, more carpentry-focused

companies for which energy advisement was a subsidiary income, reported having more price conscious customers (A5):

> The threshold to trigger funding is very high, so I think the ones who made the program have missed a bit in regards to the thoughts behind it. Doing so much for so little money, most people will not see why they should do it. You can't really defend it from an economic perspective, as you never earn back the money put in to get the support.

This informant was worried that the price was too high, making energy consulting only feasible for the wealthy, establishing the practice as a status symbol rather than a program that would have a meaningful, widespread reduction in energy usage. Similar sentiments were found in other interviews, where, in addition to viewing the energy consultant as the person who fixes a plan for the renovation, the energy consultant was also viewed as a status symbol, granting clients a 'pat on the back from the government' for having done something environmentally friendly. This illustrates how different households have contrasting priorities and budgets for retrofitting. Mitigating against these divergent priorities – that is, prompting homeowners to act in ways that are aligned with political goals – is one of the goals of the endorsing programme. This was also one of the strategies of the previous energy economization policy, which proved inefficient (Aune et al. 2016; Godbolt 2015; Skjølsvold et al. 2013), which Enova has attempted to change. One informant (B7) remarked: 'With a payback scenario of 60 years, that's not really good.' Tregear (2003) found that craftspeople's unique value set makes them unlikely to behave in market-oriented ways. Similarly, in the energy consultancy field, the reputation of craftspeople is seen as more important than short-term monetary gains.

Müller and Berker claim that passive houses are at a crossroad and describe the ways houses are developed for the future; the timeframe of which is crucial for the manner energy consultants sell it (Müller and Berker 2013). Many informants found it difficult to advocate for something they, themselves, did not believe was good, emphasizing that customers who were primarily concerned with money were difficult to reach: 'We see the competition more when dealing with very price concerned customers' (A3). Many craftspeople had difficulty presenting arguments to their customers for totally renovating the house all at once, especially since finances were at stake: 'it must be economically sensible, to do this in the maintenance phases of the building' (A1).

5.2. Controlling

Being involved in the early stages of the building gave consultants an advantage in later phases, as we will see in relation to the practice of controlling. Perhaps the primary function of energy consultants is to control the house. That is, to translate the physical house into a digital representation in a computer programme, by way of an energy audit. This is done by using energy calculators (see Søraa et al., forthcoming, for a critical view of how craftspeople are *not* involved in making and upgrading these calculators). Norwegian law requires that all houses sold must be energy marked. Although homeowners can energy mark their own house, they may also hire energy consultants for this job. The benefits of this is that the energy report will be much more thorough and will provide more detailed information on how renovation can save more energy. Controlling the house thus implies going through the physical house to find its digital values. One energy consultant (B12) described the process:

> I see the house not only theoretically, but physically. It's a great benefit that I am inside the house. You never know what is behind the constructions of the house until you open it. The information and the reality of the house don't always match.

As houses become more technically advanced, much knowledge – both hands-on and theoretical – is required to 'tame the house' – that is, to control it in such a manner that it produces the desired results (e.g. energy performance, comfort and isolation). Similarities can be seen in the automobile industry, where, just some decades ago, a local handyman was qualified to fix a car; now, automobiles must be serviced at specialized workshops. Similarly, houses are starting to become technologies that are far too advanced for normal homeowners to control. This has given rise to a specialized role for craftspeople – that of 'house controller'. This was one of the main intentions of Enova in their decision to employ 'on-site' energy consultants (i.e. craftspeople who would come to the home). However, the Enova policy dictates that houses must be countable and measurable in order to be translated into computer variables (Søraa et al. forthcoming). This is partly what the house controller role implies. Aune et.al. (2009) discovered similar tasks in their analysis of building operators, another group that performs hands-on work with buildings (Aune et. al. 2009).

In their role as house controllers, craftspeople can be seen as agents of governance through their practice of keeping dwellings updated to national standards, which are measurable in computer programs as objects subject to control. An interesting case is that of a homeowner who used the registry to contact a carpenter energy consultant (A3), but didn't use the system:

> I wrote a special report to him afterwards on what he could do and the approximate cost after he had realized that he wouldn't get the Enova support. My special report won't cost him more than 5,000 NOK, about the same [as Enova's] I think. But I don't have to add all the data in [Enova's] programme, so it becomes more a combination of assessment and cost estimate.

The outcome of this example was beneficial for the energy consultant, as he used fewer hours than using the Enova programme would have required. However, the homeowner was not subsequently eligible for further renovation through Enova, and the house was not 'correctly' added to the network as a unit measured in the forms preferred by the government. The energy consultant might have profited in this case, but not necessarily utilized the expertise gained from the course in the manner intended by the course. The craftsman's behaviour was logical from a craft practice perspective but not from a system control perspective, thus showing how these perspectives can differ widely.

5.3. Coordinating

A third role that energy consultants occasionally occupy is coordinating between different actor groups working on house projects. Some energy consultants worked as networking nodes, organizing not only the work of their own companies but also that of sub-contractors while facilitating communication between architects, engineers, homeowners and so forth. As one energy consultant (B5) said:

> In a few days, this and that craftsman must enter, electricians, plumbers, and we must move onwards. Things can't stop, you can't wait around, and we have the knowledge to organize everyone.

Although Heffernan predicted that green jobs would soar (Heffernan 1975), it has become clear that governing these jobs will require continual work. Within energy consulting there seems to be a mismatch between practitioners and system builders. What Enova deems the goal of energy consulting and the ideal synergy between energy consulting and renovation does not necessarily correlate with craftspeople's (system professionals) and homeowners' (system users) desired use of the system. In extreme cases, when the system is demeaned (e.g. when 'normal' advice is given instead of standardized energy advice), the system fails. During interviews, it became clear that many craftspeople had great expertise in renovation work and thinking 'outside of the box', even when their thinking was in direct conflict with the policy and programme.

Craftspeople formed their own networks of carpenters, electricians, architects, building material stores and so forth. The networking aspect of their job shows how blue-collar work of direct commands become more fluid in these novel green-collar practices (Bjørnå and Aarsæther 2010). One carpenter who reported that the course did not result in any specific renovation jobs noted that the learning experience had a transmission value when different scenarios were communicated to the customer: 'It is normally us who stand face-to-face with the customer and shall recommend the smartest solution' (interview with energy advisor, March 2015). Craftspeople, unlike engineers and architects, have much more face-to-face communication with clients; this can explain why interpersonal relationships, especially concerning trust and reputation, were reported as being important. Maintaining a good reputation was described by many informants as more important than getting the most money out of a project; their reputation would be transmissible to future projects and is essential for their survival in their business. Gaining a foothold in a homeowner's circle of acquaintances could lead to many further jobs.

5.4 Selling

What happens when the energy consultant becomes the renovator? This can lead to some potential conflict, as we see when investigating the practice of selling. If the energy consultant finds that the house they are consulting on has the potential to be renovated with funding from Enova, a dilemma arises: should the professional focus primarily on selling further services or consulting on the current job? These two tasks are not necessarily the same. Energy consulting was described by many informants as a 'short and not very profitable job'. However, when the consulting led to the customer to carry out the recommended renovation, there was huge potential for generating much more work and income for the energy consultants if they were able to undertake the renovations themselves. The interviewees therefore felt it was quite important for them to sell future services during their energy consultation, as such services could generate 100 times more income than energy consulting alone. Whereas an energy-consulting job could be completed in a few days, renovating the house in line with the energy plan could potentially provide months of work. As there can be a significant gap between projects, long-term engagements are crucial for job security.

However, many informants described the role of seller as being in direct conflict with their primary role as an energy consultant. Word of mouth is an important avenue to develop new business: 'Often, customers have either friends, acquaintances or relatives who use us' (B7). These referrals are jeopardized when the company performs poorly and develops a bad

reputation. Controllers have a similar situation, where long-term relationships with customers are imperative. One of the craftspeople we interviewed suggested that the energy consultant and selling roles should be clearly delineated and performed by different craftspeople. He strongly felt the difficulty of being both a seller and a consultant, as it raised ethical questions for him as a person, for his profession and for his reputation. If the product he was meant to recommend did not further require his presence 'in the loop' as a seller, he might not advise it. One informant (B6) said:

> I don't know if being a seller and advisor is the best combination, you do give the best advice, which makes the house the way the customer wants it. Someone might do a double 'win-win' scheme out of this though.

Several risks to credibility and reputation (in addition to the dangers of undertaking renovations that they may not adequately perform) arise from the economic incentive for the craftsperson to recommend more expensive renovations than necessary. As noted above, a craftsperson will make much more money from the subsequent renovations than the initial energy consultation. Sometimes they may be tempted to recommend more expensive renovations than the Enova guidelines would suggest. As one informant (A3) told us: 'If I get more for doing it my way instead of Enova's, I'll choose that.' This conflict of interest is not unique to energy consultants. It has also been observed among architects (Kongsli et. al. 2008) and engineers (Hojem and Lagsen 2011). Yet the renovations recommended by following the Enova guidelines are often already expensive. If they recommend major renovation, they can be perceived as recommending this only to get more work. But if the craftsperson recommends little renovation, they do not earn much from the customer.

This potential of a conflict of interest often colors the perception of the project by the customer. Jones and Conrad argue that employing many people in green professions solves both the problem of unemployment and the environmental problems (Jones and Conrad 2008); however, employees must be encouraged to sell green work as believable. Additionally, there are questions of 'what comes after advisement'. The programme's answer is that consulting should lead to renovation (presumably from the same craftsperson, who should, following the measurement job during consulting, know the house quite well). This puts the craftsperson in a dilemma. The craftsperson understandably wants both jobs, as they will produce profit. But if it is deemed necessary, for the sake of the credibility of the profession, to split the role of consultant and seller between different persons the craftsperson must choose between selling *or* consulting. One of the informants (B1) reported this as:

> Doing the renovation, that's what I want. Just doing the audit, there's not much money in it for me. To be honest, the renovation part is the reason I am an energy consultant, to get jobs for that stage. But it is the customer who must choose if he wants to continue using me.

If the split is done with care, energy advisement will not be a 'grab for further employment', but a serious, well-documented job. Although consulting can lead to high income renovation jobs, it can be damaging for the reputation of craftspeople to advise actions that go against their convictions. Enova has previously been criticized for not providing 'face-to-face' consulting (Tommerup et al. 2010), so finding a balance between this is highly needed.

6. Transitions through green-collar practices

In 2013, when craftspeople did not receive Enova's financial support for energy consulting, they were defined as a barrier by Risholt and Berker (2013: 1029):

> Due to a lack of knowledge and incentives, craftsmen are an important barrier to energy efficiency. But they could play an important role as mediators between available products and the specific building that has to be renovated.

Four years later, in 2017, they have gained both knowledge and incentives, the results of an active energy policy. These craftspeople have transitioned to 'green-collar workers', but how is this affecting their practices? This article has defined four practices of craftspeople: (1) economizing, (2) controlling, (3) coordinating and (4) selling. The craftspeople that work as energy advisors are balancing these practices; they are creative, and they form the practices partly by themselves. Norway, having a large middle-income working population, distinguishes itself from other countries by its relatively high salaries for craftspeople. Some green-collar practices are more suited than others for these craftspeople; a middle-actor might be well suited for some tasks, but not for others (Janda and Paraq 2013). Craftspeople are therefore often caught in between a 'personal paradigm of making [and] the broader paradigm of production' (Woolley 2011). How can we understand this middle position of craftspeople in a transitional manner?

When Pinderhughes claims that green-collar jobs provide the opportunity for low-income families to transition into the modern economy, she does not take note of relatively well-off green-collar workers who, in light of climate change, also play an important role (Pinderhughes 2008). However, 'green work' is not necessarily reserved for the poor, but also for middle and high-income groups – at least in the Norwegian case. When analyzing the craftspeople in the data in accordance with Pinderhughes' definition, one might say that the green-collar jobs explored in this article are, when measured by financial gain, high quality jobs.

Pinderhughes (2008: 2) argues that 'green collar jobs have low barriers to entry'. This is not necessarily true in the context studied in this article, as expertise is required to become an energy consultant (which we allege are green-collar workers in action). Such expertise is required to take houses through sustainable transitions, and the work can require significant coordination of other actors involved in the house building/renovating process. The key strength, and perhaps the initiative behind maintaining the co-identity of seller and consultant, is that the person selling the refurbishment knows exactly what should be done, based on their experience of energy consulting the building. This ties the work of the energy consultant to that of the house controller.

Craftspeople who become energy consultants go through a transition by learning new skills and acquiring new knowledge whilst still maintaining traditional craft expertise, e.g. carpentry skills. After transitioning, they have a greater capacity to work in specialized areas of the field. This article has developed the concept of 'green-collar worker' beyond the classical equation of them with 'low skill worker' assigned by previous researchers. It suggests that 'green-collar' can in fact suggest great expertise and skill, especially concerning the transition of the building sector to be greener and more environmentally friendly. Jørgensen (2012) suggests that sustainable transitions might require assistance with

intervening in the existing patterns of growth and socio-technical practices, to push them in in more sustainable directions.

This agrees with Åm's argument: that sustainable transition policies can be protected in niches until they are ready to be released on the market, as this will make them stronger and prepare them for competing with the 'status quo' (Åm 2015). The slow building transition may be partly due to premature implementation or an implementation that is incorrectly focused. The political goal is to lower energy usage in buildings, but the practices of craftspeople have a much wider application. The political governing bodies that offer the course 'promise' profit. The government labels qualified craftspeople as energy consultants and listed in the consultant database. But it is the responsibility of the energy consultants themselves to utilize this expertise by directly or indirectly contacting potential customers.

Although a policy is politically desirable, implementation on a local level might prove difficult. The process is implemented from the top down, whereas individual houses exist at the local governmental level. Larger projects were initially prioritized, which put small businesses in a difficult situation, as their renovation was often very resource demanding (Lavenergiutvalget 2009). Hovik and Reitan argue that 'local institutions are crucially important within the environmental policy domain' and that the top-down formulation of environmental ambitions can be inconsistent with the role of local government (Hovik and Reitan 2004: 687). However, local governments are more reactive than proactive when dealing with climate change issues, providing a rationale for top-down decision making (Amundsen et al., 2010).

Aune and Bye found in their study of building operators that 'tacit and experience based knowledge […] could be utilized to a greater extent in the design and construction phase and not only in the operation phase' (Aune and Bye 2005: 8). This tacit knowledge, along with its transference in pre-building phases, is something that can benefit craftspeople. Upgrading an entire sector takes time. There are 300,000 employees in the Norwegian building sector. It is estimated that the time necessary to train all of them in energy efficient building practices would result in reduced productivity valued at roughly 500,000,000 NOK annually ($58,300,000 USD) (Dokka et. al. 2009). This cost comes in addition to the cost of the trainings themselves. The economic impacts in time and money of upgrading the skill set of the entire building sector will be significant. Reaching sustainable energy transition goals is, however, seen as imperative (Dokka et al., 2009). Craftspeople are part of a complex sustainable transition that is taking place in the building sector; it is necessary to understand this profession in order to further reduce energy usage in buildings.

7. Conclusive implications for craftspeople and policy makers

This article has discussed new practices of craftspeople working as energy consultants, investigating the claim that craftspeople have partly been barriers in the transition to sustainable energy. By investigating how energy focused practices relate to craft, I have found that craft practices can be advanced to include highly specialized energy work, what I call 'green-collar work', in addition to their traditional expertise. This can be used to further refine the contemporary discussion of craft-practices.

Energy usage in buildings can be reduced through developing the practices of craftspeople. This article has discussed four prominent practices of this professional group. The practice of economization was used to show how the tenacious policy of increased energy efficiency has been partly transferred to this new role. The practice of controlling was addressed in relation to the issue of transferring a physical house into a static world of numbers. This discussion

showcased the strengths of craftspeople working as energy consultants. The practice of coordinating was used to show how craftspeople are working as networking nodes, coordinating other actors involved in home renovation and to describe the importance that is placed on their (honest) reputation. Lastly, the practice of selling discussed some unexpected challenges that are created when craftspeople are assigned a dual role of both consulting and selling. I argue that all of these practices are part of the new, larger role that craftspeople are transitioning to in the process of becoming 'green-collar workers', i.e. interacting with energy in an explicit manner. With a specialization in woodwork carpentry, the green focus was already present but has now been given added value in terms of energy conservation.

The environmental problems posed by the building sector can be tackled by effective energy policies. But the practice implied by these policies must be understood in order to make them effective. Seeing how energy policies are enacted in practice by investigating the practices of professionals who conduct hands-on energy upgrades in houses can help develop policies connected to energy mitigation. Energy is more than numbers in a system; it is something that practitioners deal with in a hands-on fashion. Enova has, through its policies, included craftspeople as consultants in the green shift to a sustainable energy society through its Low-Energy Programme. Although this policy has educated and certified energy consultants, it also has potential for improvement. This analysis has discussed the intersection between professional practice and energy policy, and I advocate for a closer incorporation of craftspeople's experiences and practices in further policy development. The green-collar worker concept would also benefit by comparable studies on other types of craft. Craftspeople can greatly contribute to energy upgrades and sustainable transitions for the building sector, especially when policy and practice work in synergy, whilst using their traditional craft practices and skills as a fundament.

8. References

Adamson, G. (2007), *Thinking through craft,* London: Bloomsbury.

Amundsen, H., Berglund, F., Westskogô, H. (2010), 'Overcoming barriers to climate change adaptationöa question of multilevel governance?' *Environment and Planning C: Government and Policy*, 28:2, pp. 276–289.

Andresen, I., Dokka, T.H., Klinski, M., et al. (2007), 'Passive house projects in Norway – An overview', *11th International Passive House Conference Bregenz,* Darmstadt: PHI, pp. 147–152.

Aune, M., Berker, T., Bye, R. (2009), 'The missing link which was already there: Building operators and energy management in non-residential buildings', *Facilities,* 27:1/2, pp. 44–55.

Aune, M., Bye, R. (2005), 'Buildings that learn – The role of building operators', *ECEEE 2005 Summer Study, What Works and Who Delivers*.

Aune, M., Godbolt, Å.L., Sørensen, K.H. (2016), 'Mismatch or misunderstanding? Calculation and qualculation among economists and consumers in their framings of the electricity market', *Acta Sociologica,* 59:4, pp. 347–361.

Bjørnå, H., Aarsæther, N. (2010), 'Networking for development in the North: Power, trust, and local democracy', *Environment and Planning C: Government and Policy,* 28:2, pp. 304–317.

Dahlstrøm, O., Sørnes, K., Eriksen, S.T., et al. (2012), 'Life cycle assessment of a single-family residence built to either conventional or passive house standard', *Energy and Buildings,* 54, pp. 470–479.

Dokka, T.H., Hauge, G., Thyholt, M., et al. (2009), 'Energieffektivisering i bygninger – mye miljø for pengene!', *SINTEF byggforsk,* Oslo.

Enova (2012), *Potensial og barrierestudie – Energieffektivisering i norske bygg* [*Potential and Barrier Study – Improving Energy Efficiency in Norwegian Buildings*].

Godbolt, Å.L. (2015), 'The ethos of energy efficiency: Framing consumer considerations in Norway, *Energy Research & Social Science',* 8, pp. 24–31.

Hargreaves, T. (2011), 'Practice-ing behaviour change: Applying social practice theory to pro-environmental behaviour change', *Journal of Consumer Culture,* 11:1, pp. 79–99.

Hatfield-Dodds, S., Turner, G., Schandl, H., et al. (2008), 'Growing the Green Collar Economy: Skills and Labour Challenges in Reducing our Greenhouse Emissions and National Environmental Footprint', *Dusseldrof Skills Forum*, Dusseldorf.

Heffernan, P. (1975), 'Jobs and the environment', *Sierra Club Bulletin,* 60, pp. 25–29.

Hepworth, D., Rooney, R., Rooney, G.D., et al. (2016), *Empowerment Series: Direct Social Work Practice: Theory and Skills,* 10th ed. Nelson Education.

Hojem, T. S. M. (2012), 'Bridging two worlds? The troubled transfer of new environmental knowledge from science to consulting engineers', *Acta Sociologica,* 55:4, pp. 321–334.

Hojem, T.S.M., Lagesen, V.A. (2011), 'Doing environmental concerns in consulting engineering', *Engineering Studies,* 3:2, pp. 123–143.

Hovik, S., Reitan, M. (2004), 'National environmental goals in search of local institutions', *Environment and Planning C: Government and Policy,* 22:5, pp. 687–700.

Ibenholt, K., Fiksen, K. (2011), *Energieffektivisering i eksisterende bygg*, Vista Analyse AS Rapport.

Imrie, R. (2007), 'The interrelationships between building regulations and architects' practices', *Environment and Planning B: Planning and Design*, 34:5, pp. 925-943.

Jackson, T. (2009), *Prosperity without Growth? The Transition to a Sustainable Economy,* Sustainable Development Commission.

Janda, K.B. and Parag, Y. (2013), 'A middle-out approach for improving energy performance in buildings', *Building Research & Information*, 41:1, pp.39-50.

Jones, V., Conrad, A. (2008), *The Green Collar Economy: How One Solution can Fix our Two Biggest Problems*, New York: Harper Collins.

Jørgensen, U. (2012), 'Mapping and navigating transitions – The multi-level perspective compared with arenas of development', *Research Policy,* 41:6, pp. 996–1010.

Kjølle, K. H., Blakstad, S. H., & Haugen, T. I. (2005). Boundary objects for design of knowledge workplaces. In *Proceedings of the CIB W096 Architectural Management 'Special Meeting' on Designing Value: New Directions in Architectural Management*, edited by S. Emmitt & M. Prins, Technical University of Denmark, pp. 141-150.

Kongsli, G., Ryghaug, M., Sørensen, K.H. (2008), 'Miljøarkitekten: Dirigent eller deltaker?', *Nordisk Arkitekturforskning,* 20, pp. 7–20.

Lavenergiutvalget (2009). Hovedrapport [Energy Efficiency–Part I: Main Report]. *Low Energy Commission on mandate of the Ministry for Oil and Energy, Oslo*.

Loorbach, D. (2007), *Transition Management: New Mode of Governance for Sustainable Development*, Dutch Research Institute for Transitions (DRIFT).

Müller, L., Berker, T. (2013), 'Passive house at the crossroads: The past and the present of a voluntary standard that managed to bridge the energy efficiency gap', *Energy Policy,* 60, pp. 586–593.

Nicolini, D. (2012), *Practice Theory, Work, and Organization: An Introduction*, Oxford: Oxford University Press.

Pinderhughes, R. (2008), *Green collar jobs: Work force opportunities in the growing green economy*, REDF report.

Pye, D. (1968), *The nature and art of workmanship*, Cambridge: Cambridge University Press.

Risholt, B. and Berker, T. (2013), 'Success for energy efficient renovation of dwellings—Learning from private homeowners', *Energy Policy*, *61*, pp. 1022-1030.

Ryghaug, M., Sørensen, K.H. (2009), 'How energy efficiency fails in the building industry', *Energy Policy,* 37:3, pp. 984–991.

Schot, J., Geels, F.W. (2008), 'Strategic niche management and sustainable innovation journeys: Theory, findings, research agenda, and policy', *Technology Analysis & Strategic Management,* 20:5, pp. 537–554.

Sennett, R. (2008), *The craftsman*, London: Penguin Books.

Shove, E. (2010), 'Beyond the ABC: Climate change policy and theories of social change', *Environment and Planning A,* 42:6, pp. 1273–1285.

Skjølsvold, T.M., Ryghaug, M., Dugstad, J. (2013), 'Building on Norway's energy goldmine: Policies for expertise, export, and market efficiencies', *Renewable Energy Governance,* pp. 337–349.

Solli, J. (2013), 'Navigating standards – Constituting engineering practices – How do engineers in consulting environments deal with standards'? *Engineering Studies*, 5:3, pp. 199–215.

Søraa, R.A., Solli, J., Fyhn, H. (Forthcoming), Design and domestication of a calculation tool for energy efficient buildings, *Facilities*.

Sørensen, K.H. (2007), 'Fra ''hvite kull'' til grønn varme? Utfordringer for energi', in: *Mellom Klima og komfort, Utfordringer for en bærekraftig teknologiutvikling*, Tapir Akademisk Forlag, Trondheim.

Tommerup, H., Vanhoutteghem, L., Svendsen, S., Paiho, S., Ala-Juusela, M., Mahapatra, K., Gustavsson, L., Haavik, T. and Aabrekk, S.E., (2010). Existing sustainable renovation concepts for single-family houses. In *SB10 Finland Conference Proceedings. Finnish Association of Civil Engineers RIL and VTT Technical Research Centre of Finland*.

Tregear, A. (2003), 'Market orientation and the craftsperson', *European Journal of Marketing*, 37:11/12, pp. 1621–1635.

UNEP (2015), United Nations Environment Programme (UNEP). http://www.unep.org/sbci/AboutSBCI/Background.asp. Accessed 09 October 2017.

Woolley, M. (2011), 'Beyond control: Rethinking industry and craft dynamics', *Craft Research*, 2:1, pp. 11-36.

Åm, H. (2015), 'The sun also rises in Norway: Solar scientists as transition actors', *Environmental Innovation and Societal Transitions*, 16, pp. 142-153.