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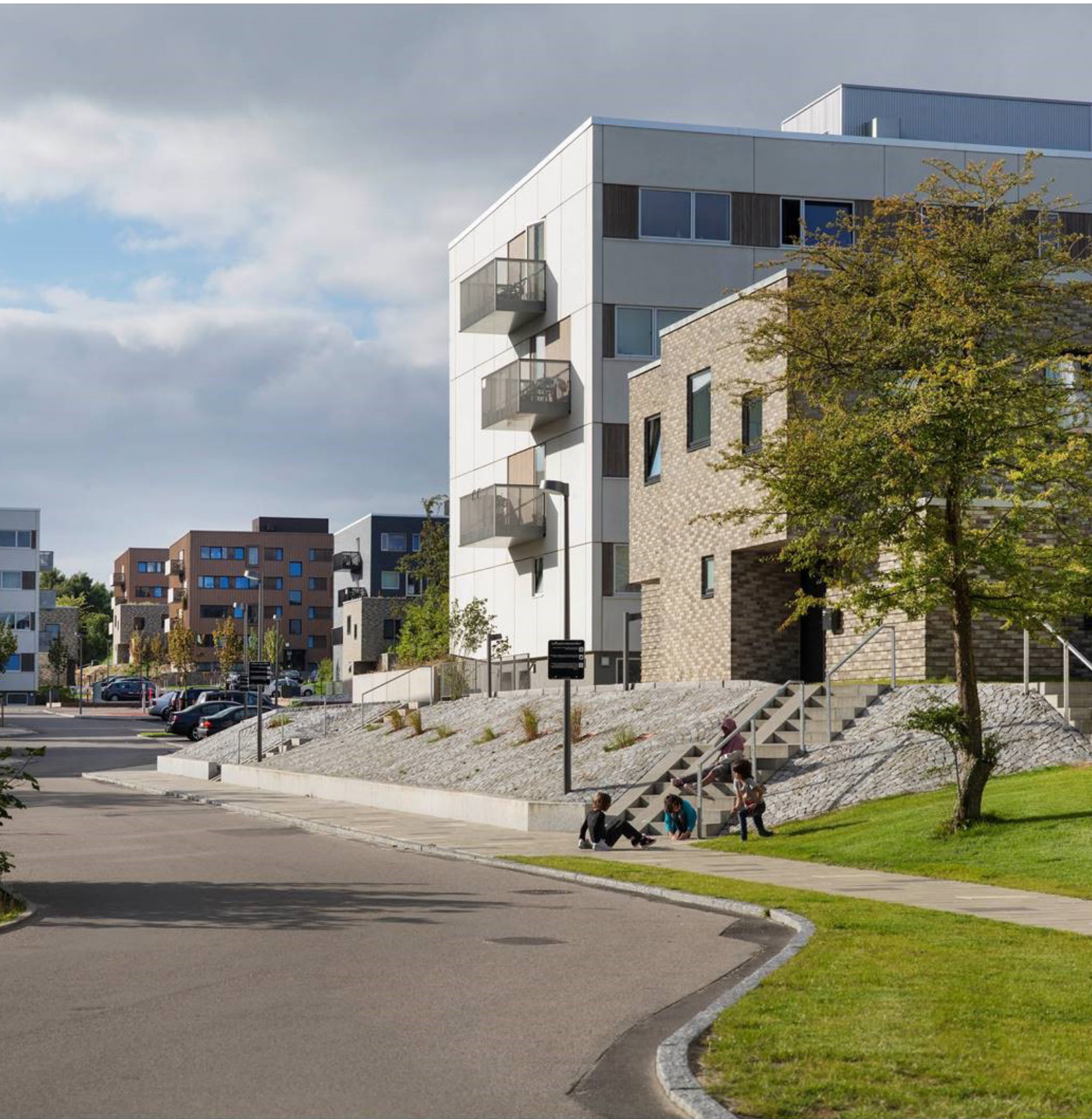

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THE ROLE OF THE ARCHITECT IN SUSTAINABLE HOUSING TRANSFORMATION: FOUR SWEDISH CASE STUDIES

PAULA FEMENÍAS

Abstract

Sustainable housing renovation is often connected to broader transformation processes and a need of holistic approaches to deal with social, environmental and economic development. Architectural knowledge has been described as uniquely positioned to handle complex real-world problems by dealing with sustainability from a whole-systems perspective. In this paper, the role of the architect and the influence of architectural knowledge are explored in four cases of public housing renovation. The results show that most of the architects experience limited influence. The division of longer transformations into shorter projects under the direction of a series of architects rather than a single firm is a limiting factor, and public procurement another. Good experience is also reported from integrated design, suggesting that architects could play a productive role as educators of the design team. In order to fulfil that role, the architects might need to review their approach to sustainable renovation.

Keywords:
sustainable renovation, architectural knowledge, integrated design, holistic perspectives, public housing

1 Introduction

Renewal of existing housing areas is a great challenge for contemporary society, but also an opportunity to create more sustainable futures. Renovation provides opportunities to reduce energy use and contribute to the decarbonisation of the built environment, but also to improve the indoor climate and thermal comfort in dwellings (Kylili, Fokaides and Lopez Jimenez, 2016). Housing renewal is also discussed as a means to support broader social and economic regeneration of neighbourhoods (Smith, 2006; Turcu, 2012a). Modernisation and technical renovation have been seen as an opportunity for addressing both energy efficiency and social development in socio-economically vulnerable areas.

It is generally understood that creating sustainable built environments requires comprehensive and holistic approaches. A separation of design functions and processes often means missed opportunities to optimise the whole built environment system for best performance (Janda, 2011; Du Plessis, 2012). Objectives for sustainable renovation address social, environmental, economic and cultural aspects at the same time. This holistic view is reflected in the recent development of tools and process models to guide more sustainable renovation (Nielsen, et al., 2016; Sharifi and Murayama, 2013). Objectives for sustainable renovation originate in different knowledge fields, are attributed to different stakeholders or value perspectives, are often interconnected and are at times conflictual. The implementation of sustainable renovation will include a process in which different objects are weighed or balanced against each other.

The aim of this paper is to reflect upon the role of architectural knowledge in sustainable renovation. Architectural knowledge has within its own discipline been defined as having a unique place in handling contemporary complex real world problems (Fischer, 2000; Doucet and Janssens, 2011). Designers are trained to make judgements among a multitude of objectives, and to take decisions at times without complete information or knowledge of the actual sustainable outcomes of these decisions (Wahl and Baxter, 2008). Some authors also state that the architect could take a leading role in managing sustainable building processes (Rekola, Mäkeläinen and Häkkinen, 2012) or as an educator of the design team with respect to whole-systems perspectives (Janda, 2011). While there is a growing understanding of the necessity to link behavioural studies to environmental research (Sovacool, et al., 2015), the role and potential contribution of architectural knowledge in these processes is still under-researched.

This paper is based on four Swedish cases of the renovation of housing areas with pronounced ambitions for sustainability. It investigates the role and influence of the architects in these processes. The research questions regard factors that have framed the role and influence of the architect and their relation to sustainable results, and the architects' approach and working methods in sustainable renovation.

The four cases are large housing estates built in the early era of industrialised construction, known in Sweden as the "million homes programme" – a political programme to build a million new homes between 1965 and 1975. The large number of these buildings, combined with their relatively high energy use and the need for renovation, has focused attention on this segment of the housing stock for national debates on energy efficiency and renovation. An observation that sparked my curiosity and led to this study is that even with sustainable renovation projects that have been well covered in the media, the architect remains unknown.

2 Sustainable housing renovation

The principles and models for sustainable renovation propose a broad range of objectives, including environmental protection, resource conservation, affordability, community diversity, access to jobs, pride and sense of community, well-being, awakening awareness about sustainable behaviour, community involvement and governance (Stenberg, Thuvander and Femenías, 2009; Turcu, 2012b; Nielsen, et al., 2016). There is no universally accepted set of objectives; the objectives will vary depending on the location and character of the project (Turcu, 2012a).

The varied objectives are interconnected and implementing them can be problematic. In many cases there will be a trade-off when realising the objectives. Lind and Lundström (2008) found that a sustainable renovation project can contribute to lowered crime rates and improved health. However, such positive social development can also be attributed in part to the emigration of vulnerable households to other areas as a result of the renovation (Borelius and Wennerström, 2009; Stenberg, Thuvander and Femenías, 2009; Bråmå, 2011). Another link is found between environmental objectives and social aspects of behaviour. For example, positive results from energy saving investments will be dependent on user behaviour. Long-term results of energy saving and waste separation will be dependent on efforts among staff operating the system, but also on the continuous information to new and remaining residents about resource conservation (Stenberg, Thuvander and Femenías, 2009).

The objectives for energy efficiency and social welfare are an area of conflict, especially in the absence of public resources. Current national and European policy propose energy efficiency through renovation but the responsibility for costs is not clear. Attempts to transfer energy renovation costs to tenants has led to conflicts between property owners and tenants (Ástmarsson, Jensen and Maslesa, 2013). The problem is especially delicate because large needs for energy retrofitting correspond to those areas with the most socially vulnerable residents (Mangold, et al., 2016). A national debate on the larger societal effects of what has been called "renoviction" – when tenants are forced to move due to rent increases from renovation (Molina and Westin, 2012) – has led to changed

political directives. At present, public housing owners value social ambition over investment in energy efficiency (Thuvander, Femenías and Brunkluas, 2017).

2.1 Participation and integrated processes

The renovation process can roughly be divided, in the same way as the design of a new building, into pre-design, design, construction and operation. What differs in renovation is the greater importance attached to the pre-design inventory phase, when information is collected about the existing structure, its performance and residents (Thuvander, et al., 2012).

In order to handle the multitude of objectives in sustainable renovation, an increasing number of tools and methods propose a multi-criteria assessment that includes social and cultural aspects (Nielsen, et al., 2016). However, due to the complexity, not least with regards to long-term social implications, these assessments might have more validity for technical and economic guidance. Sustainability assessments have the disadvantage of only presenting a snap-shot evaluation of the outcome, and they are often made in the design phase, while it might not be possible to evaluate the real sustainability of investments until the building has been in use for several years (Turcu, 2012a).

More collaboration among the various actors and fields of expertise during the design process has been highlighted as a way to achieve more sustainable renovation (Thuvander, Femenías and Meiling, 2011). Sustainable integrated design, or whole-system design, defines processes through which all professional actors and expertise areas work together, preferably from the start and throughout the whole design process (Cole, 2004; Charnley, Lemon and Evans, 2011). Round-table discussion will facilitate the exchange of knowledge and contribute to a design driven by a shared, comprehensive vision. It has also been proposed to widen that circle to include not only those professional actors normally involved in the design team, but also users and management staff (Kaatz, Root and Bowen, 2005).

Democracy and participation is one of the pillars of sustainable development (WCED, 1987). The participation of the residents in planning, and also in the continued governance and management of the areas, has been extoled as paramount for reaching long-term objectives for sustainable regeneration (Smith, 2006; Turcu, 2012a; Stenberg, Thuvander and Femenías, 2009). Resident participation has been emphasised from a management perspective as well, though on more operational grounds. Participation has been emphasised with respect to the value of the local knowledge that residents can bring to the project, and to the value of developing shared visions and creating legitimacy to ensure a smoother transformation process (Marthur, Price and Austin, 2008). In Sweden,

tenant involvement in the planning of renovation has a history that dates back to the 1980s. At present, consent is needed by each tenant if the renovation project affects the standard of the dwellings enough to result in a rent increase. However, the tenants' lack of real influence on decisions in renovation has been criticised (Stenberg, 2015). Traditionally, public property managers have been reluctant to include their tenants in decision-making (Femenías, Gluch and Mjörnell, 2017). They are consulted only in the later phases, after most decisions have already been taken, if they are consulted at all. Their objections are often overruled with reference to the owner's mandate to secure the security and value of their property.

2.2 The role of the architect in sustainable design

The introduction of participative and collaborative approaches to deal with sustainable design will face several challenges in contemporary building practice (Charnley, Lemon and Evans, 2011). Discrepancies among professional discourses, cultures and agendas, and the deleterious influence those discrepancies have on communication, has been identified as one of the most significant barriers to the realisation of more sustainable building practices (Häkkinen and Belloni, 2011). For generations, building professionals have prepared themselves to solve complex problems by becoming increasingly specialised. Building projects involve a large and growing number of specialised building professionals, and the building process has been likened to a relay race in which actors and phases independently relieve one another. In addition, roles in the organisation of a building project are highly institutionalised, which can build up barriers between cultures and power structures and impede the sharing of knowledge (Kadefors, 1997). Resistance can also build up against new procedures that threaten old power structures and knowledge domains (Gluch, Gustavsson and Thuvander, 2009). Furthermore, most professionals in the building sector are not trained to handle tasks of a social nature (Dainty, Cheng and Moore, 2005), and such training would be advantageous when engaging with user participation in processes.

There is no clear consensus on the management of more integrated design processes and the role of the architect in these. Rekola, Mäkeläinen and Häkkinen (2012) emphasise the statuary role of a chief architect as manager of sustainable building projects. Charnley, Lemon and Evans (2011) instead see the value of a facilitator and emphasise the dynamics of a flattened hierarchy for whole-system design to encourage joint ownership and democratic governance. Stanislas, Gavin and Janda (2011) argue that there might be room for new professional actors or that existing actors might need to expand their customary roles to meet demands for transitions to more sustainable practices, for example in the field of whole-system integration.

The possibility for a statuary role of a chief architect will be challenged by an emerging variety of procurement routes (Tzortzopoulos and Cooper, 2007). In design-build contracts and project delivery, responsibility for the management of the design falls to the principle contractor rather than the architect as it would in more traditional forms of contracts (Mills and Glass, 2009). Tzortzopoulos and Cooper (2007) emphasise the contractors' lack of appropriate understanding, skills and knowledge, which can impede the efficient management of the design process. In Sweden, the number of design-build contracts is increasing, especially in projects that are considered routine, such as housing production (Bougrain and Femenías, 2014). The same situation is reported in the United Kingdom (Tzortzopoulos and Cooper, 2007). Dewick and Miozzo (2004) found a preference for traditional over design-build contracts among architects and consultants for achieving more sustainable results. In contrast, it was found that contractors prefer alternative contracting forms, with the motivation that these contracts could support their early involvement in the design process.

Charnley, Lemon and Evans (2011) state that one of the biggest challenges for integrated or whole-system design is to encourage the team members to view the bigger picture and think holistically. The ability of the team to initiate processes of cross-discipline learning and awaken curiosity will be crucial for the successful outcome. Janda (2011) argues for the architects to take on the role of educators of the sustainable design team given their ability to think holistically and their understanding of the social aspects of shaping the built environment. However, reality might prove different. Palm and Reindl (2016) report from a Swedish sustainable renovation project that the architects felt they had limited influence on decisions, and that the design process was dominated by technical issues and technical consultants.

3 Methodology

A case study methodology was chosen and seven in-depth semi-structured interviews with seven architects involved in four cases of renovation were carried out. Interviews were also conducted with representatives from the property owners, and in some cases a few other key actors. Table 1 gives a short presentation of the case study areas, designated A, B, C and D, and of the interviewees. The four areas are owned and managed by four different locally operating semi-public clients – that is, municipally owned housing companies. Swedish municipal housing companies operate on a commercial basis at the same time as they are expected to fulfil the social responsibilities of providing local housing.

In total 18 semi-structured interviews were carried out between 2001 and 2015. A few actors have been interviewed on more than one occasion. The interviews lasted between one and two hours, and were recorded and

transcribed. The interview guides have varied over time. Early interviews searched for a more general understanding of the challenges for holistic sustainable housing transformation. Questions were also asked about the importance of human and economic resources, tools and project team collaboration. The later interviews, from 2015, have more specifically focused on the architect. Questions were asked about the role and influence of the architect and their methods of working with renovation, as well as how they deal with the values they find in the existing built environment.

In addition to the interviews, a broader understanding of the cases has been supported by on-site observations, documents from the processes, other studies and reports, and information from the Internet. The cases and the interviewees have been anonymised out of respect for the interviewees even though some of the cases are well known and could be traced.

The study does not aim to make universally applicable generalisations and the cases have not been randomly selected. Instead a selection has been made of renovation projects with pronounced ambitions to achieve sustainability in terms of environmental and social development. The selection of cases has also been based on the expectations of the information that could be retrieved (Flyvbjerg, 2006). In some sense, cases A, C and to some extent B could be seen as extreme cases considering they were demonstration or pilot projects that were assigned extra financial resources from the city or the European Union.

With reference to the great importance of the residents in housing renovation, the fact that the residents' views have not been captured could be seen as a limitation of this study. It is an unfortunate reality of contemporary housing renovation that post-renovation feedback studies are seldom carried out (Thuvander, Femenías and Brunkluas, 2017). The landlords have also been reluctant to give the researchers permission to discuss directly with tenants in connection to on-going renovation projects.

Table 1
Short presentation of the case study areas, their renovations and the interviewees.

	Short description	Renovation	Interviewees
Case A	1000 apartments built 1969–72. 5-storey blocks with deck access, and 3-level slab buildings are arranged around square courtyards.	A first phase with approx. 250 apartments renovated 1999–2001. The area has since been subject to recurring renovation and improvements.	Architect A1 (2001; 2008, 2015) CEO of property owner (2008); District manager (2008); Energy researcher/consultant (2008)
Case B	1600 apartments built 1969–72. Lower 4-storey blocks surrounding courtyards, others of 4–6 stories with a single staircase, and a few blocks of 8–9 stories with several staircases.	A first phase was carried out in 2001. The renovation process is still on-going. Different renovation strategies are used. Some blocks are going through deep renovation to reach high energy efficiency.	Architect A2 (2015); Architect A3 (2015); Architect A4 (2015) District manager (2008; 2015); Project leader (2008)
Case C	300 apartments built 1971–73 in 4-storey blocks around courtyards.	Renovated 2007–14 with high ambitions for energy efficiency and focus on accessibility.	Architect A5 (2008; 2015); Architect A6 (2015) CEO of property owner (2008; 2015); Passive house architect (2008)
Case D	740 apartments built 1968–71 in 2- and 3-storey blocks, some with deck access.	A first phase was renovated 2009–13. A second phase will start 2017.	Architect A7 (2013; 2015) Information manager (2013) and "neighbourhood host" (2013; 2017), both employees at the property owner

4 Case studies

4.1 Case A: A solar energy project

Case A is a high-profile renovation of a larger housing estate that battled social exclusion and vacancy in the 1990s. A first renovation project in the late 1990s, often referred to as the Solar Houses, was the starting point for the broader transformation of the whole area that is still on-going. The project has been renowned for combining energy efficiency and solar energy with a social development of the area. Successful results include reduced energy and water use as well as reduced crime rates and improved well-being (Lind and Lundström, 2008). The increased attractiveness of the area can also be seen in an increase in investments in new housing. Furthermore, the municipal housing owner has been a pioneer in the use of social procurement and employment of a local workforce. In an attempt to support local decision-making, residents have been elected to be part of the steering board of the housing company, positions normally held only by local politicians. However, some

critical voices claim that social development has been gained at the expense and exclusion of socially vulnerable households (Borelius and Wennerström, 2009).

4.1.1 The architect's role and influence

The office of Architect A1 was one of the initiators of the Solar Houses project. It is a small office with extensive experience working with sustainability, solar energy and renovation. The firm says they are in general very engaged in their projects. Work is not just a task that needs to be solved – "that is not our style". They often take the lead in order to influence the outcome. One important factor is the principal architect's technical knowledge: he is in fact an inventor of both passive and active solar technology systems. This has been crucial for their influence in projects. "If you have knowledge you can influence a lot." They have also imposed in some projects their own choice of collaborators, for example a contractor that they could co-operate with.

In the Solar House project as well as a number of other demonstration projects they have engaged in, they have also brought finances to the project from research programmes:

> *When it comes to the process, we were very lucky because we initiated a project. We applied to the European Community for funding for an energy-efficient and healthy, sustainable renovation. We brought money into the project, and because of that we could set our rules. Actually we could say, "We get the money, but we want to do this and this", and then we collaborated with academia, and we had plenty of time to think. We had time to do feasibility studies. We could compare energy concepts, costs…. We had time – that was very important.*

The office recognises the value of having a "good" client with social ambitions in reaching their goals for a project. When developing the Solar Houses, they had problems convincing the client to make social investments. For example, their idea to build greenhouses as social meeting places met with doubt. They proposed the greenhouses based on experience from an earlier project in which a greenhouse attached to a public housing block contributed greatly to the satisfaction among tenants, resulting in social stability through reduced tenant turnover. But the Solar Houses client saw the greenhouses as unnecessary costs and was not something the residents explicitly asked for.

4.1.2 Approach and working methods

Regarding the working methods and tools for sustainable renovation, Architect 1 first mentions 3D modelling which they use in all their renovation projects. It is a good way of communicating ideas and visions to all stakeholders and actors that do not have a good understanding of drawings.

When taking on a renovation project they begin by informing themselves about the area and its qualities. They search for drawings and photographs in archives, but also for detailed information that the property owner might possess about the specific construction. They also walk the site to inventory qualities using camera and notebook. They find it important to invest in functional architecture rather than "cosmetic architecture", which is not very sustainable. They are proud that they were able to keep the original art in the Solar Houses area:

> *Oh, this is typical from the age when the building was constructed. What is worth keeping, what is the soul of the building, the main important architectural elements to keep. […] We do not use any special equipment – we take photos, we write down what is worth keeping, but we also think a lot, "We could change it into this". We see opportunities.*

The office has its own process outline for projects in general. It is used to communicating with clients and collaborators "to get everyone working the way we want". The process starts with the architect, but collaboration among all the other actors is paramount: "If you all work together, you get the best results". Depending on the character of the project they engage outside experts, like engineers for energy calculations or building conservators. They also use certification methods like BREAAM.

Figure 1
Case A. An original statue (left); the low- and mid-rise buildings (middle); and high-rise with solar panels on the roof and glazed balconies (right). No pictures are available from before the renovation.
PHOTO: P. FEMENÍAS.

One strategy is to give a lecture early on in the project to all involved, and to illustrate their intentions with images and photographs. It is a way to make the project group understand their intentions and to give them inspiration. "You have a dream and then you want to communicate that dream with the clients." Architect 1 emphasises the fact that they own the process but not the final results. Once the project is finished, it is everyone's to use.

The firm prefers to have direct contact with the residents in renovation projects. They were disappointed that their contact with the residents in this specific project was orchestrated by a local representative of the property owner.

4.2 Case B: An area with mixed strategies

This large housing estate has been in the process of renovation since the early 2000s, and the municipal owner is expecting it to take another 30 years before the process is completed. The renovation is connected to a larger transformation process that includes densification in order to complement the homogeneity of the area in terms of tenure form and dwelling type. The leading vision has been about "identity" and "orientation", and the municipal housing company has deliberately engaged different architects in order to create this variation. Architect A2 has been working with the area since the early 2000s to develop a design strategy for the area as a whole, and also as the architect of three separate renovation projects. The two first projects they were involved with focused on internal modernisation and attractive architecture without striving for energy savings. In 2008, Architect 2 was engaged in a high-profile pilot project in the area – the energy-efficient renovation of a small tower block and the follow-up projects of that pilot. The energy renovation was successful but expensive, and led to high rent increases in these blocks.

Architect A3 was involved in the second phase of the renovation and Architect A4 in a recent phase. The projects involving Architect A3 and A4 aimed at limiting the rent increases, and consequently energy-saving investments were not prioritised. What was important instead was to create a new architecture and image for the area, as expressed by the District manager at the municipal company:

> *We do not want to have the same again because we thought it was kind of boring, the area, before. Grey, grey, grey – everything was the same. That's why we have different architects, and several phases, since we don't want to rebuild it all again in the same style. That's why we're taking it step by step.*

4.2.1 The architects' role and influence

Architect A2 has a long history of working with the same municipal housing company, although she has been employed at different architecture firms during this time. She experienced a good relationship with the client built on trust. She found the client to be caring and ambitious. Architect A2 thinks that having a long-term vision of the transformation is really important: "Every building, or development, should have a more long-term idea." Without that bearing idea, the architect begins work on one part of the project without knowing what will happen on the next, and whether the ideas in the different phases will fit together. For example, once the windows are replaced, they'll have to be incorporated into later façade designs.

Architect A2 found her involvement in the energy pilot project to be interesting and creative. The project was a design-build contract in which all actors, consultants, researchers and the contractor worked together

from the early phases as a team. It was a creative process in which everybody could contribute their particular knowledge, but the architect suspects that it might have been an expensive procedure.

Architect A3 works at a larger architect office with over 125 employees. She says that they always try to do something even if the budget is constrained – constrained budgets force the architect to "do it very quickly and very efficiently". In this project, the client was perceived to be very engaged. Compared to new construction, renovation demands that she really intervene with people, "So it's a more interesting way of working". Architect A3 thinks that the client had a good relationship with the tenants and listened to them; however, she did not have any direct contact with the tenants herself, either in this project or in other similar projects.

Architect A4 has special expertise and long experience of working with renovation. She thinks that the communication and trust among the actors is the most important contributing factor in a good renovation project. In this project, she was happy about the good relationship with the contractor. Even though it was a design-build contract she was involved in the detailed planning and design of the renovation, which is not always the case:

> *That was an ideal situation. If the contractor lets you in, into the discussion, then it's more exiting – you can improvise, together with them. And you learn a lot about how they make decisions and what it costs, what they want to do. So, it's good for both. You're not this mysterious person that comes and goes, and you get a real person to talk to, which is very nice.*

Architect A4 says that the owner did not allow her to have any direct relationship with the tenants, although she thinks that architects are specifically trained to talk to people. On the whole, she thinks that the clients listen too much to the technical consultants and accept their cost estimates, while questions about architecture that would lift the whole area have much less legitimacy in the process. She further points to what she calls a new actor in the renovation process, the project leader. They are technical consultants, and she believes they take some of the architect's work, becoming an intermediary between the project, the client and the architect. This is a worrying situation and she feels that they are taking over the architect's role. There will also be a concurrence about resources among all the involved actors. She thinks one solution would be for architects to take on the role as project leaders: "I think more architects should go into the steering process. You have more access to the leaders then, the ones who do the calculations, but it is hard to get inside".

4.2.2 Approach and working methods

Architect A2 says that before developing a strategy for the renovation, they studied how people move in the area, and mapped activities. From that they defined three main geographical areas and gave them new names as a starting point to the transformation. She thinks that the best method in working with renovation is to listen to everybody: "Go there and develop your own idea of the area". You have to have all the information, she believes – all the facts, how much money there is, the standard of renovation they're aiming for, and then you can try to suggest a good solution:

> *I think to work as an architect, you have to be a good detective, take everything in and generate something good out of it. I think that is exciting as well, to take in problems and make something better.*

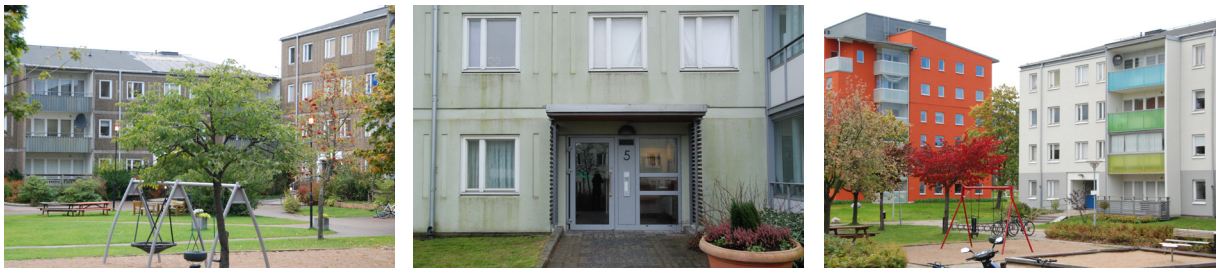

Figure 2
Case B before (left) with sea-stone facades and after (middle) renovation of phase two. The sea-stone façade was painted pale green to make it more attractive, a solution that has not aged well. To the right, the red pilot project with high energy saving and the coloured balconies from a recent phase of the renovation.
PHOTO: P. FEMENÍAS.

The staff at Architect A3 takes pictures and consults existing drawings. The office has in-house experts on sustainability and energy. If necessary they bring in external consultants, such as a building conservator. They use what they call a process map, which includes all stakeholders and a timeline, as a way to sort things out and understand different angles that need to be considered when taking decisions.

Architect A4 also mainly uses original drawings and photos along with observations from the site to approach the project. In this specific case, she had a vision of re-creating some of the qualities of Swedish architecture from the 1950s. She used a darker shade at the base of the façade and a lighter shade on the upper floors. The balconies have glass fronts in different bright colours to make the area more attractive, actually the result of a dream she had. She did not take the design strategy created by Architect A2 for the area seriously – she thought it was a bit out-dated, proposing for example older technology for outdoor lighting.

4.3 Case C: Demonstrating energy saving renovation

Case C has the smallest number of apartments in the study but is internationally known due to its successful implementation of energy conservation and the involvement in European projects. The area is located in a small city and is owned by the local municipal housing company. The

project started off with a pilot project and a concept, which was then evaluated, adjusted and implemented across the entire area. The project has been carried out in partnering with a contractor.

The project has been driven by the ambition to do a "passive house" renovation and to reduce the operating energy consumption by as much as 60%. The concept was developed in collaboration with a local expert and founder of the Swedish Passive House Centre. The CEO of the company also had strong social ambitions, including greater accessibility for people with reduced mobility, which she sees as a future-proofing of the area with regard to an aging population. The motivation for the high cost of the project is that it will save money in the long run for the municipality. The company intended not to raise the rent levels, though ultimately it could not be avoided.

4.3.1 The architect's role and influence

No less than three architects have been involved in the project. The municipal company had a long-time contract with Architect A5, now replaced after her retirement. Her work was the long-term planning of the local housing stock through inventories of qualities and problems in each housing area. Architect A6 was hired to do the design for the pilot renovation project and two of the following blocks. In the later phases she was replaced by another office to complete the building permit plans.

Architect A5 calls herself a "program architect". She worked in parallel with Architect A6 and the last involved office throughout the entire process as a representative for the client. She believes that her mission was to ensure good function and architecture "so we got nice buildings". She was also an expert in design for accessibility. Architect A5 says that the authorship of the renovation is a bit tricky to ascribe due to the number of architects involved.

Architect A6 has special expertise in sustainability and was specifically engaged for the passive house design. However, a technical consulting company produced the detailed technical drawings and took legal responsibility for their correctness. Architect A6 mentions that she was especially happy about the good relationship with contractor. She found that they had could have an open dialogue about solutions: the contractor listened and understood. After the first blocks were realised, the client replaced Architect A6 with another office to "copy and paste" her design.

There has been some tension between Architect 6 and Architect 5 in the design process. Architect A6's impression is that the CEO of the municipal company listened more to Architect 5. The CEO recalls the initial design for the pilot project. At one point, she realised that the project was too

focused on energy saving: "That was not good because that is only one focus". The CEO had "fourteen sleepless nights" before engaging Architect 5 to ensure that original qualities of the area were safeguarded. This led to a re-design of the balconies, entrances and other features. As part of the passive house concept, the original balconies were to be incorporated into the interior of the apartments and new external balconies were to be added. Architect 6 had proposed a modern design. Architect 5, having listened to a tenant group, managed to convince the CEO that they should recreate a quality found in the original balconies: a concrete wall that separated neighbouring balconies for privacy (Figure 3).

Figure 3
Case C before the renovation (left) and after (middle and right), showing the final design of the balconies.
PHOTO: P. FEMENÍAS.

4.3.2 Approach and working methods

Architect A5 says that she works a lot with photos during her the early inventory of the site. She does not work with any specific method or tool for sustainability. Instead she uses simple guidebooks for accessibility. The CEO had told her to use the company's own method for renovation, called "renewal planning". This checklist method defines steps in the renovation process and four questions to investigate in the early phases: What are the specific qualities of the site? What is the soul of the area? What could be improved? How should we work to preserve and enhance these qualities and remedy the flaws?

Architect A6 finds that descriptions, characterisations and photos of qualities are important tools. She makes thorough inventories on the site, noting wind, sunlight, greenery, water, traffic etc. Characterisation of the site can also be a good way to communicate with the other actors involved:

> *I remember a very early meeting when I first had this idea with colours and entrances. I made some sort of characterisation of the existing buildings talking about horizontal and vertical aspects. The [contractor] said they had never thought about that, and would try to fulfil what I'd said. That was very interesting to hear. […] So how the building is treated at the ground and at the roof, that you can see as an architect.*

Architect A6 welcomes communication with the tenants but thinks that they can't always be involved directly in the design: "We must have quite

strict procedures, so we don't get everyone calling to say, 'I don't like those balconies'".

4.4 Case D: Caring for existing qualities

Case D is the most recent in the study. It is located in a smaller municipality outside a larger city. The municipal owner decided to focus on an external renovation with very limited rent increases. The energy-saving measures were limited to a partial insulation of the facades, new insulated roofs and photovoltaic panels installed on the roofs. A first phase was carried out around 2010 and a second is under development now. Since the renovation, the owner has noted increased demand for rental contracts in the area.

Early on the owner developed a vision for the area that specifically stated the ambition to safeguard its architectural and historical qualities. Architect A7, who was contracted for both phases of the renovation, has worked carefully to replace some parts of the façade and repair and preserve others such as the Danish sea-stone elements. The first phase of the project was nominated for a prestigious heritage prize, which is exceptional for a renovation of one of these mass-produced housing projects.

4.4.1 The architect's role and influence

Architect A7 says that he and his colleagues would not take on a project if the client did not accept their way of working. In their office, the working method is based on inclusion – everybody is involved in all kinds of projects, rather than having specialists in certain areas. In the case of renovation, they want people with local knowledge to be included in the project as a kind of a reference group:

> *In the first phase, we try together to see what we have, what are the qualities, the landscape, the geography, the public space, the yards, the semi-public space, and also try to tell a story about this area, how it is situated, what we see together with the users. […] So the first phase is really to engage people in the process, and inform everybody how it should progress.*

In the dialogue with this reference group, the architect does not show any designs. Instead they initiate a dialogue about qualities and problems. Their idea is that if people can relate a discussion to a final result, "they can feel that they are part of the process. They think, 'I made this'". It can be an entrance, an opening or some outdoor lightning. The architects' impression is that people respond more positively to the result if they have been part of the process. Not all residents can be part of the process directly. The architects, however, perceive that those who do get involved usually channel views that are widely held among a larger population, and that the process produces solutions that work even

for those not directly involved. In this specific case, the original metal fronts on the balconies, which were painted in varying pastel colours, were not appreciated by the residents. In the renovation, some façade panels have been replaced by black boards, and this is repeated throughout the area. At a larger feedback meeting with the residents following phase one, the owner recalls that nobody complained about this colour or wanted it to be made different.

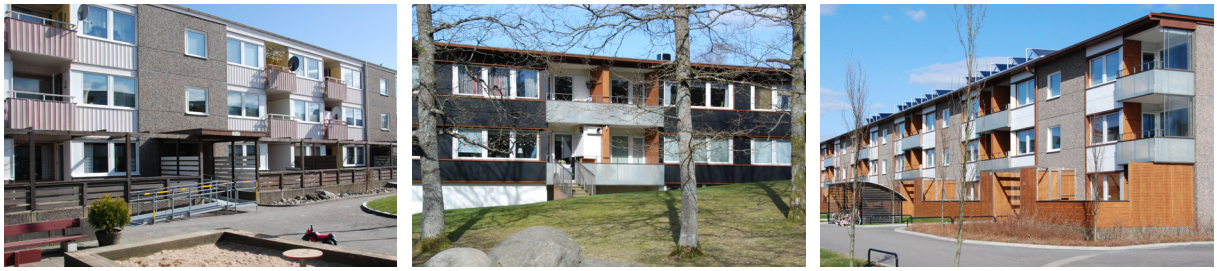

Figure 4
Case D before the renovation (left) and after (middle and right). The sea-stone elements are the same, while the sheet-metal façade elements have been replaced with a new board material. New balcony fronts are in printed glass.
PHOTO: P. FEMENÍAS.

4.4.2 *Approach and working methods*

Architect A7 uses on-site observations as a primary tool for gathering knowledge about the area to be renovated and discussions with a reference group of residents. They use ordinary methods used by architects, such as characterisations of buildings together with the identification of landmarks, pathways etc. as described in work by Alexander, et al. (1977). The architect further highlights the important of language in communication with different stakeholders. When communicating with users and other stakeholders, one must use different, more direct language than when communicating among architects.

5 Discussion

The four cases show a selection of approaches when dealing with sustainable renovation and transformation of public housing. Sometimes different approaches are used within the same housing area. It is possible to discern ambitions for holistic design. In all cases, social and environmental aspects have influenced the renovation strategies. However, with reference to literature in the field of sustainable renovation and transformation that emphasises the participation of residents (Smith, 2006; Turcu, 2012a; Stenberg, 2015), this aspect appears to be weak. Although the transformation processes are encircled by social activities, such as job creation or waste recycling, the renovation projects seem basically driven by technical objectives and energy conservation. Interesting to note from the perspective of environmental sustainability is the decision to paint the original robust sea-stone façade in Case B in order to make it more attractive (Figure 2). After only a few years the painted façade looks rather sad and the sustainability of the choice can be questioned. The approach used in Case D is then interesting as a

comparison from aesthetic, historical and environmental perspectives. Here the original sea-stone façade has been preserved in combination with the addition of new materials and insulation in other parts of the façade (Figure 4).

This limited study does not permit us to draw any broad generalisations. However, some observations have been made regarding the link between an architect's influence and a project's sustainable outcomes. Cases A and D have both been nominated for prizes, which can be seen as indicators for the quality of the outcome. In both projects, the architects seem to have had a larger influence over the process. The architects' leadership can be traced back to technical expertise and to trust in the relationship with the client. In Case A, the architect also successfully managed to influence the process by bringing in funding from a European demonstration programme. Cases A and D stand out as having a more developed design strategy. A balance has been sought between the use of materials resources, energy conservation, social implications and aesthetics. The renovation strategies in Cases A and D can be defined as partial renovation compared to the "stripping" strategies (Van Hal, 2008) used in the energy-efficient projects in Cases B and C. The advantage of the stripping or deep renovation used in Cases B and C is that large energy savings can be achieved, but that savings may come with the social consequences of raised rents as a result of high costs and higher standards.

5.1 The role and influence of the architect

All the architects in the study perceived their clients as committed. The interviews reveal an interest in architecture and design among the clients. In Case B, a design programme was set up for the area. The client in Case C had an in-house architect. In Case D, the vision for the renovation helped safeguard the original architecture. Still, the architects felt they had limited influence over the renovation processes. They often found themselves disconnected from the projects before the final phases, and replaced by competitors.

The transformation of a large housing estate is a long process that can go on for decades. The renovation process is often divided into several phases because the public owners do not have the financial resources to make investments for several years forward. In addition, the public companies have to follow principles for public procurement that limit their ability to choose their consultants and contractors. For the housing companies in Cases A and B, which are located in a larger Swedish city, there are also framework agreements with some consultants that further limit their selection of architects. These principles have been put in place in later years and probably did not affect the earlier phases of Cases A and B. The housing companies that own Cases C and D have more freedom to choose their consultants but still need to follow public procurement principles.

As a result of factors that determine the design process, the authority of the architect to manage sustainable design process (Rekola, Mäkeläinen and Häkkinen, 2012) seem to be limited. The architects' potential to deal with complex issues and whole-system design (Fischer, 2000; Doucet and Janssens, 2011; Janda, 2011) which could benefit sustainability is not sufficiently exploited.

Design-build and other alternative contract forms are not discussed in term of limiting the architect's influence. In several design-build projects, in fact, there seems to have been good collaboration. However, new actors and power balances, as mentioned by Architect A3, will influence the architect's leadership in the process. The project leader has taken over some of the managing role once held by architects.

5.2 Educator of the design team?

The four cases provide some evidence of the emergence of more integrated approaches to design, even if these do not include the end-users. More integrated approaches, notably with collaboration between the design and construction phases, are mentioned in relation to pilot projects – that is, projects with objectives, concepts or technologies that are new and untested for the clients and other actors.

The architects in our study speak in very positive terms about their experience of a creative process by which all actors meet together in the early phases of a project. They especially mention appreciation of the dialogue with the contractor. Through the integrated approach, the architects felt like part of a team, which facilitated the communication with the other actors. The architects express their satisfaction at being able to explain their views and ideas, which made it easier for them to persuade the contractor to their position and thus influence the outcome of the project.

The possibility for architects to take on a role as "educators of the design team" in relation to holistic thinking (Janda, 2011) seems to be greater if the design process is supported from an integrated approach in which all actors meet and discuss from the early phases. A more integrated approach can offer a way to overcome problems with communication, which has been identified as an important barrier for more sustainable building practices (Häkkinen and Belloni, 2011). With respect to earlier studies in which the architect felt overruled by technical and energy-related arguments (Palm and Reindl, 2016), in the integrated approach in our study the architects could make their perspectives understood.

Finally, in order to fully support more sustainable renovation, it might be necessary for the architects to question whether they have the right knowledge and working methods to deal with sustainable renovation. The architects in our study seem to rely on rather ordinary architectural methods to deal with sustainable renovation. They speak warmly about

inventories and the collection of a large body of information before initiating the design. All but Architect A7 express disappointment at not being able to work more closely with the tenants. At the same time, several of the architects seem confident in their own expert views on existing and new qualities in the housing areas, and they note that direct contact with the residents can at times disturb the design process.

6 Concluding remarks

This is a time when holistic knowledge is needed to bridge between a multitude of objectives and perspectives in order to aim for real sustainable outcomes in the built environment. Meanwhile, the role and influence of architect, traditional keeper of the holistic perspective, seems to be waning. Parallels can be drawn to the situation for professional planners, though much needed in contemporary urban development, have lost some of their power as a result of neoliberal planning politics (Grange, 2017).

Given the emerging new power balances in the design process, and the increasing variety of procurement routes and framework agreements, the architectural profession might need to review its practices. New actors are taking over some of the managerial tasks in the design process once held by architects. Architects could develop an alternative position as educators or facilitators of the design team with respect to whole-systems design. The architects might also explore longer collaborations or partnering agreements with clients in order to take more responsibility of the whole process. However, in bargaining for more influence architects might need to revise their expertise and working methods to better align with sustainable development. The profession should probably adopt more participatory and collaborative approaches as well, with greater involvement of end-users and other stakeholders.

Some interesting developments can be noted in architectural practice that point in these directions. Increasing leadership among architectural firms has been observed for research and development projects (Hensel and Nilsson, 2016). Some architects take leadership in participatory processes involving whole communities (Nonconform, 2012).

Finally, the role of architectural knowledge and the architect in contemporary renovation projects has only begun to be explored in this paper, and we call for more research in the field.

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