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ARTICLE

Sustainable homes, or simply energy-efficient buildings?

Pernilla Hagbert · Paula Femenías

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Abstract Environmental consideration within the Swedish construction sector can no longer be considered marginal. It is here discussed whether the same commitment is extended to facilitate deeper dimensions of sustainability in the provision of housing, beyond simply energy-efficient residential buildings? The paper presents the case of a multi-family 'green' residential area being developed in Göteborg, Sweden. An interview study with the seven housing developers building in the area provides primary empirical insights, further complemented by findings from a workshop with architects involved in the project. Conceptualizations of sustainability in housing are explored, based in discourses among these market actors. Issues identified in the inductive data analysis relate to the ambitions set and measures taken in new 'green' building, as well as market perceptions of housing standards, lifestyles and household configurations that are reproduced in the built environment. The paper shows that interpretations of sustainability in market-led housing development do not radically challenge the normative and resource intense contemporary ideals surrounding the urban home and that the realization of goals undertaken in the case of Kvillebäcken is generally dependent on economic considerations and market assessments. In conclusion, the paper emphasizes the need to formulate an integrative approach to more holistic sustainable residential environments.

Keywords Architecture · Household consumption · Housing development · Sustainability

P. Hagbert (✉) · P. Femenías
Department of Architecture, Chalmers University of Technology, Sven Hultins gata 6, 412 96 Göteborg, Sweden
e-mail: hagbert@chalmers.se

P. Femenías
e-mail: femenias@chalmers.se

1 Introduction

Issues of escalated resource depletion, inequity, economic and political turbulence, and global urban population growth, are increasingly recognized as interlinked global and local challenges. A systemic understanding of these problems furthermore outlines their 'wicked' character (Rittel and Webber 1973). With the establishment of incentives and regulations aiming at a more sustainable built environment, along with sector-initiated reforms and innovations, new policies and practices are adopted. On the whole, environmental consideration in the building sector can no longer be seen as marginal (Gluch et al. 2013), with a particular push for low-energy buildings. Of interest in this paper is whether this development is sufficient, and if the notion of 'sustainable homes' receives similar attention by the sector, in order to facilitate the large-scale societal transitions needed in how we live and build, linking lifestyles and material representations within finite ecological limits. Illustrated in the case of a new Swedish area branded as the frontline of sustainable building and planning, conceptualizations of the sustainable home in contemporary 'green' housing development are here explored.

Conflicts between different interpretations of sustainability among different actors (within market, academia, government or among the general public) are evident and often illustrated in urban and residential developments (Campbell 1996; Godschalk 2004). In operationalization of the sustainable development concept, a breakdown into and focus on certain facets, such as separation of environmental impacts from social considerations, or difficulties in allocating responsibility or merging varying sectorial time and budget perspectives can be found.

While environmental and technical dimensions of sustainable building have largely predominated the agenda, social and cultural dimensions have had more of a recent focus (Vallance et al. 2011; Jensen et al. 2012). The need to go beyond technical solutions to solve environmental problems related to the built environment is increasingly recognized (Worldwatch Institute 2010; Schweber and Leiringer 2012). In this perspective, major behavioral changes are needed, supported by a provision of environments that enable more sustainable ways of living. While the general impact of all household-related consumption, including major consumption clusters such as transport/mobility and food, is significant to address (Lorek and Spangenberg 2001; Holden 2004); here emphasis is put on the housing sector. Several studies have related home-based or home-related practices and lifestyles to a resource use dimension (Hoyer and Holden 2001; Gatersleben et al. 2010). By acknowledging the role of residents and emphasizing awareness of end-user practices, focus also needs to be broadened from efficient design and construction solutions to understanding interactions between people and their environment (Vale and Vale 2010; Janda 2011).

By exploring conceptualizations of sustainability in housing, based in discourses among market actors, the ambitions set and measures taken in new 'green' housing are here addressed. It further investigates whether and how normative assumptions and conventions regarding, for example, housing standards, lifestyles and household configurations are challenged. A qualitative study of a new multi-family residential area called Kvillebäcken, in Göteborg, Sweden, poses a relevant example of a contemporary urban redevelopment project with high initial objectives to among other things mitigate environmental impact and ensure residential 'quality of life.' The paper discusses the question of how goals for sustainability in the provision of housing, relating to design and concept development of dwellings, are interpreted and realized in Kvillebäcken, focusing primarily on the accounts of developers, but also incorporating perspectives from the architects involved. As housing

provision in Sweden relies on a commercially driven market (Hedin et al. 2011), it is of interest to explore perceptions of sustainable housing specifically from a market perspective.

The paper begins with a general outline of challenges for sustainability and a normative housing development. This is followed by an overview of the study research design and a description of the case. Empirical findings are then presented, revolving around the conceptualizations and design of sustainable housing in Kvillebäcken. Implications in relation to norms regarding housing standards and the ideals perpetuated in contemporary housing development and in the creation of sustainable home environments are discussed, and finally, areas for further research and future potential are offered.

2 Challenges for a sustainable housing development

2.1 Sustainable development and the housing sector

Domestic energy use accounts for nearly a fourth of the total energy use in Sweden and has been pointed out as a main area for action in order to reach the national goals for energy saving set for 2020 and 2050 by the Swedish Environmental Protection Agency. As energy-efficient building strategies are incorporated on a broader scale in Sweden (Wahlström et al. 2011), the absolute household-related demand for energy remains a challenge. In Denmark, it has been noted that while significant improvements in the building stock have reduced energy demand for residential space heating, electricity use has increased in relation to growing floor area (Marsh et al. 2009).

Recent studies underline the role of spatial standards as an indicator of household energy use (Vale and Vale 2010; Hille et al. 2011). It is furthermore acknowledged that rebound effects suggest general limitations for measures of improved energy or material efficiency (Nässén and Holmberg 2009; Sorrell 2009; van den Bergh 2011). In addition to potential spillovers to other sectors in society, the failure to bring more radical synergetic transitions into the mainstream raises the question of how adequate energy efficiency measures are in addressing issues of growing housing consumption and demand, and further points to the challenge and necessity to gain a more holistic perspective of sustainable housing development (Vale and Vale 2010).

Regarding notions of 'sustainable homes,' it must be noted that the concept itself encompasses more than simply energy-efficient buildings. It implies a holistic view on environmental preservation in relation to social development within the political idea of sustainable development (Kates et al. 2005) and suggests that a *home* is more than a *building* (Mallett 2004). In addition to the continued alteration and amelioration of current systems, aims relating to deeper dimensions of sustainability concern a 'deep green' understanding of the large-scale societal transitions needed (Merchant 2005). This goes beyond parametric improvements within current systems to find more or less radically different forms of living within finite ecological limits, including the exploration of social dimensions linking aspects such as lifestyles and material representations of sociocultural norms.

A social development dimension of sustainability is commonly conceived in terms of equity, participation and social cohesion, as well as awareness of sustainability as a whole (Murphy 2012). Mixing housing of various types, sizes and forms of tenure, as well as residential and commercial functions is a widespread goal for policy and planning in contemporary urban development (Dempsey et al. 2011). However, the success of

deliberate planning and design for social mixing, and the intended outcome of increased social capital, remains a point of debate (Buys et al. 2007).

By bridging social and ecological sustainability, the importance of community and anchoring in the neighboring residential environment is often upheld (Dempsey et al. 2011; Vallance et al. 2011), as well as supporting strategies among residents for engaging in more sustainable practices. With an increase in energy-efficient construction and development of 'green' urban areas (or 'eco-cities') for 'pro-environmental' lifestyles, the limitations of these types of housing developments and/or households to reduce absolute consumption or contribute to an overall sustainable societal development have been stated (Holden and Linnerud 2010; Wangel 2013; Rapoport 2014). As residents are offered 'empowerment' in the role as rational consumers, household-related consumption and the reduction in or redirection of the same is framed in market terms (Jackson 2005). However, beyond the notion of consumers making deliberate individual choices, households can also be locked in by restrictive organizational or physical structures (Sanne 2002).

2.2 Changing circumstances for housing development

There are several sociocultural, sectorial and regulatory norms and trends influencing the conception and production of housing. In order to position the case presented in this paper, the focus is here on the Swedish context, although similar patterns can be observed across a European or global scale.

2.2.1 Government versus market development

With a relatively young housing stock—about 60 % built after 1960 (SCB 2012)—the Swedish postwar development was based on early twentieth-century social visions, promoting good housing for all under the notion of the 'People's home.' Funded through grants, housing development was linked to national requirements for spatial standards as well as norms regarding conveniences such as central heating, kitchen equipment and bathroom facilities, providing 'good housing for all.' Swedish postwar housing has often also been characterized by communal use; in, for example, local centers providing services, district heating and shared facilities for washing and recreation (Boverket 2008).

As Swedish housing policy has changed considerably with a general shift in political rhetoric, current development entails a significantly lower state involvement in housing provision (Hedin et al. 2011). Previously driven primarily by state regulated ambitions, publicly funded research and subsequent formulation and operationalization into established building norms, today the market itself plays a bigger role in identifying and catering to select target groups and housing preferences, including for example normative practices and requirements regarding living space and standards offered. The changing circumstances for housing must however also be understood in the perspective of a relatively conservative sector. While other industrial sectors have seen a rapid adoption of new technologies, processes and services, the construction industry in general is found to have lower rates of innovation (Bröchner 2010).

In line with political movements to mirror the large social ambitions of the past, more recent policy for *greening* the People's home has built upon an ecological modernization paradigm (Lundqvist 2004)—a prevalent component in the development of the built environment in several Nordic countries (see, for example, Jensen and Gram-Hanssen 2008 for a Danish context). By working together with Swedish industry in a tradition of government–industry cooperation, development of new efficient technologies has been a key

focus for the greening of housing (Lundqvist 2004). The housing sector has also created a narrative surrounding the perceived conflict between ecological preservation and continued expansion of residential comfort and well-being, in the development of "attractive new flats that require no lifestyle changes or participation from the residents" (Gram-Hanssen and Jensen 2005).

2.2.2 *Changes in household demand*

The influence of growing individualism and an increasing number of small households can be noted across Europe (Clarke 2004; Kabisch and Haase 2011). This has implications for housing and absolute resource demand, both directly and indirectly (Liu et al. 2003). The number of one-person households continues to increase and today accounts for about half of all Swedish households (SCB 2012). Changing household configurations and the flux of urban inhabitants puts pressure on housing provision and thus also land (Haase et al. 2013).

Smaller rental apartments of 1–2 rooms plus a kitchen, along with larger apartments (4 or 5 rooms), are reported to be in acute shortage in Swedish metropolitan areas (Boverket 2012). The nature of the shortage suggests that neither the existing stock nor contemporary development sufficiently meets the population's housing needs. There is also a growing interest from residents to join in various forms of intentional communities, engaging in development processes, collaborative practices or voluntary simplicity (Håkansson and Sengers 2013). These groups are however not yet visible in market assessments of the potential to build for these households, and although municipalities in Sweden are opening up for citizen-driven initiatives, established routines for working with such projects are lacking.

Housing affordability continues to be a contested issue in the commercial housing market. The amount Swedish households spent on housing relative to disposable income is high in a European comparison, yet should also be discussed in terms of the acquired quality (Boverket 2010). Following the widespread political ambitions described above and a general economic 'boom' in relation to these, Swedish residents on average experienced an increase in spatial standard during the second half of the twentieth century. Whereas over 40 % of Swedish households lived in overcrowded conditions[1] at the beginning of the 1960s, this shifted to <10 % in the late 1970s (SCB 2012). The percentage of residents living in what is considered a high standard of space[2] has increased significantly. While less than a tenth of the population lived in a high spatial standard in the mid-1960s, today around 40 % of Swedes have rooms to spare (SCB 2012). Although statistical averages of living space per capita must be understood precisely in the context of a high share of one-person households, along with contingencies of some individuals occupying larger floor areas, issues surrounding the standards and household consumption levels that are perpetuated in current housing development are important to explore further.

2.2.3 *Influence of changing norms on design and development*

Along with decreasing household size, resource and energy demands are individualized (Carlsson-Kanyama and Lindén 2002). Developments of housing-related infrastructures

[1] According to the Swedish norm 2 for overcrowding: more than two residents per room, kitchen and living room excluded.

[2] A dwelling is considered to be of high standard of space if there is more than one room per resident, kitchen and living room excluded.

for electricity, water and mobility are also increasingly based in associating individual consumption with a price to reduce household resource use (Spaargaren 2000).

Expectations for housing standards remain normative in a sociocultural sense and in a regulatory capacity, as well as among the sectorial actors that find a market willing to pay. Norms for the functions expected within each dwelling unit give a subsequent need for facilities such as a bathroom and kitchen in each apartment regardless of household size. Regulations regarding, for example, accessibility also set spatial demands. Social norms and shifting perceptions in regard to household configuration (Clarke 2004), and the construction of the 'ideal' home, influence housing demand and consumption (Gram-Hanssen and Bech-Danielsen 2004; Leonard et al. 2004; Aune 2007). A trend of open floor plans also emphasizes prevalent ideals of home life (Willén 2012).

A main influence on the energy and resource intensity of housing should further be connected to notions of residential comfort and material standard within a normative social or structural context (Wilhite et al. 1996; Shove et al. 2008). The implications of household size can be debated in light of such norms, as explored by Klocker et al. (2012), indicating that an interplay of factors determine overall impact on household energy and resource use. As socio-technical transitions and efficient manufacturing of household products have affected the rate and scale of household consumption, the housing sector offers dwellings, products and services that simplify home life for residents. Facilities or technologies that were previously shared are now readily available to individual households.

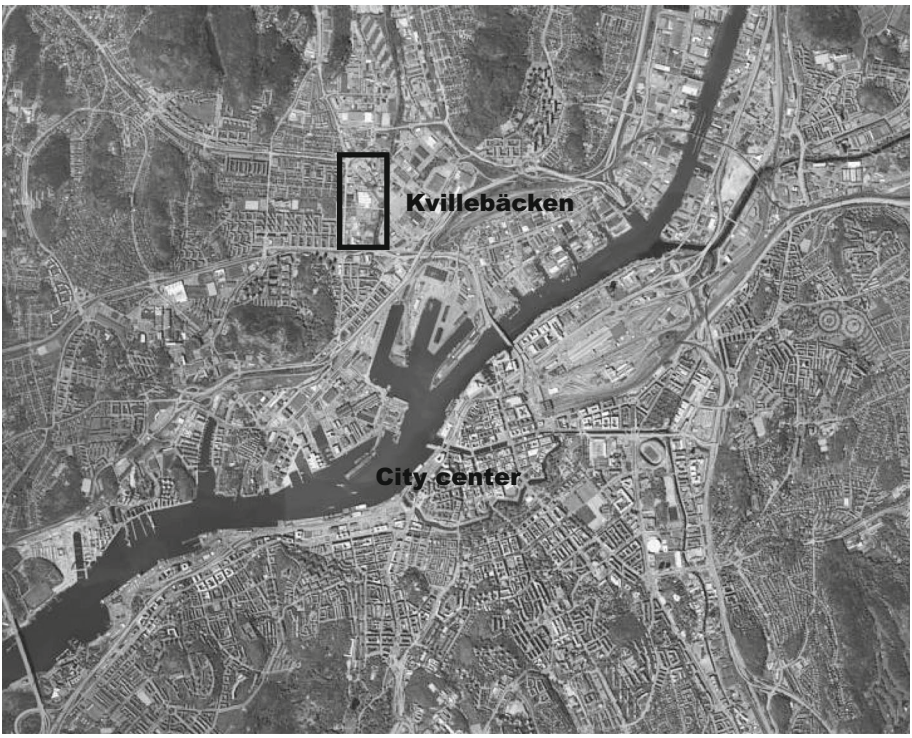

Fig. 1 Kvillebäcken in relation to Göteborg city center

3 Research design and method

The material presented here is part of a larger research project, with the aim to study potential pathways for reducing residential energy and resource use. A case study has been made of a new housing area, and although the case is limited to a Swedish context, parallels can be made to similar urban projects around Europe.

The Kvillebäcken case area is a redeveloped commercial brownfield site in Göteborg, marketed as a model for sustainable urban development. This 'green district' approximately 3.5 km or 'just 6 min' from the city center (see Fig. 1) will upon completion provide around 2000 new rental and tenant-owned apartments. A consortium was established comprising the Municipal Development Company Älvstranden Utveckling and seven companies acting as construction clients leading the development of Kvillebäcken, together with the municipal planning office. The project is split into three phases, and the first residents moved in during spring 2013.

The empirical material consists of: interviews with key actors; documents including the design and layout of the planned housing; visits to the area under construction; documentation from a workshop with eight architects from five firms involved in the design of the area; and documentation and observations from a feedback meeting after phase 1 with the seven client companies, held by the municipal development company.

The analysis in this paper is mainly based on the documentation from the architect workshop and the seven qualitative interviews with representatives from the marketing or development departments, identified by the companies as those working with design and concept development of the dwellings offered. Additional interviews, and several informal meetings, were held with two project leaders at the municipal development company, and one interview with two civil servants from the planning office in charge of the development, providing a background for the Kvillebäcken development and process.

Each of the seven semi-structured interviews (see Table 1) took about an hour. Six of the interviews were held in English (due to the research team configuration), and one in Swedish. This has been taken into consideration when comparing the responses, as all interviewees were native Swedish speakers. The transcribed interviews were coded, and main themes that emerged during the inductive data analysis were noted and further analyzed (Alvesson and Sköldberg 2009).

The architect workshop was conducted for 2 h and structured in two parts. First, participants were divided into smaller groups to discuss a series of questions regarding the perception of sustainable housing development; significant components or aspects of

Table 1 Type of company interviewed and the type of dwellings built in Kvillebäcken

	Type of company	Type of dwellings built
C1	National private construction, forestry and property group	Tenant-owned and rental
C2	Municipal public housing company	Rental
C3	National cooperative housing organization	Tenant-owned
C4	International private construction and property dev. group	Tenant-owned
C5	International private construction and property dev. group	Tenant-owned
C6	National private real estate company	Tenant-owned and rental
C7	Local private real estate company	Tenant-owned and rental

sustainability identified; and norms and alternative housing concepts. The second part took the form as an open focus group addressing the role of the architectural profession in a sustainable housing development. The architect workshop was documented in parallel by three researchers, including the transcription of direct quotes.

4 Objectives for the Kvillebäcken area

A brief overview of the measures undertaken in the design and development process of Kvillebäcken is presented, as a basis for assessing the ambitions set in this type of new 'green' building. The Kvillebäcken development was carried out in a client partnership model, developed by the city of Göteborg as a commercial model for urban regeneration. The consortium developed a common detailed urban master plan in collaboration with the city planning office, before splitting the plan into separate plots. Costs for infrastructure and green spaces are shared among the companies.

The city had at an early stage defined visions for a sustainable development of the area. Objectives outlined in the urban design program established by the city planning office (2008) however do not make any references to sustainability, focusing on urban design features of social and aesthetical character. The consortium established several working groups, one revolving around the design, where continuous updates about the separate plots were discussed.

As a commitment for sustainable development, the consortium signed a mutual agreement, the 'Kvillebäcken treaty.' In order to concretize these ambitions, a program for sustainable development in Kvillebäcken (Kvillebäckskonsortiet 2011) was also created. The program emphasizes the creation of an 'urban atmosphere' that connects to the existing urban structure, and that offers an attractive and vibrant mixed-use environment. Although design directives for the area are not explicit, the program outlines certain key aspects that provide some considerations for planning, of a rather vague level of detail. Accessibility to and within the area is highlighted, with a focus on pedestrian traffic, limitation of car dependency, for example, through a lower parking norm than in similar new urban areas, in turn permitting higher exploitation, and 'environmentally friendly' forms of transportation such as biking or public transportation, as well as the creation of a car pool. Objectives of a social and economic nature include goals for security and diversity, defined as social interaction, qualitative public spaces that can be appropriated by the inhabitants, and a mix of forms of tenure and apartment sizes. Originally around 25 % of the apartments in the area were planned to be rental units. This has since increased to about 30 %, as two companies decided to redirect some of the apartments initially designated as tenant-owned to become rentals instead.

An environmental plan was set up by the municipal development company, defining explicit targets for building performance and directives for the construction process. The environmental plan combines the local environmental policy for construction with targets according to the Swedish Green Building certification—level silver for all except objectives for delivered energy, which is level gold, requiring a maximum of 60 kWh/m^2 and year (going beyond the Swedish building regulation dictating 90 kWh/m^2 and year). The consortium also applied for and was granted 3.5 M€ for six environmental technology innovations, including recycling of household bio-waste for fuel production, smart energy construction and bicycle storage closets.

Relating to the individual household, consumer impact is emphasized by means of technology aiming to minimize consumption, individual billing of energy and water, and

information provided to residents. When it comes to the apartments, little is explicitly mentioned in the mutual agreement or program regarding the internal layout or design, and it is not touched upon in the environmental plan. There has been no direct involvement of resident groups in the design of the area, although broader 'citizen dialogs' have proceeded the general development of the larger urban area. These dialogs have been criticized for having little impact on the commercial development (Granberg and Åström 2007).

5 Market conceptualizations of sustainable housing

Following the above background of the planning prerequisites for the Kvillebäcken case, insights from the interviews with representatives from the seven companies and the architect workshop are presented and illustrated by select quotes in order to provide deeper understanding of the conceptualizations of sustainable housing development and the form this takes in the housing built. Findings are structured according to reported aspects, beginning with observed household trends, demands and the market actors' positioning in relation to these, followed by a review of what this entails in the standards offered, as well as the spatial and material norms that are reproduced. Finally, insights into what aspects of the development remain problematic and where ambitions in the case of Kvillebäcken (as outlined in the previous section) were inadequately formulated or misdirected are discussed.

5.1 Market assessments, trends and household demands

5.1.1 A market-driven development

In line with a market assessment of viable household trends, the Kvillebäcken case underlines a trend to attract smaller households in order to stay competitive. The result of this is in part evident in that two rooms (one bedroom), and a kitchen is the most predominant type of apartments being built in the area, followed by three-room (two bedrooms) units. Findings from the interviews and observations of the built area further point to a 'streamlining' of apartment types in Kvillebäcken. The limited market scope pursued, especially by the companies developing solely or mostly tenant-owned apartments, means limitations in what is built:

> We see that in our first buildings, we have rather many large apartments, compared to our competitors/…/the smaller apartments have been more popular in Kvillebäcken. So now when we are planning for the next phase, we also will build more smaller apartments. That's an example of a market-driven development.
>
> (Marketing manager, C4)

> …we look at the companies building before us./…/And they sold not so many of 4-rooms, but they sold a lot of these smaller/…/So we put our architects on that to change it.
>
> (Project development manager, C1)

The participants at the architect workshop also attest to a shift during the process toward more similar types of apartments. The original ambitions of diversity in apartment types (corresponding to the official planning documents and consortia agreement outlining quite vaguely to provide a basis for a mixed population and household configurations within the

area) appear to be dismissed as the reality of the housing market, and the lack of households willing or able to pay the cost of larger apartments is assessed. Keeping costs down on all ends, to reach an affordable level for small or one-person households, is a challenge. The interviews generally point toward the decreasing overall size of apartments in terms of floor area as an economic necessity. This is reported as occurring both in Kvillebäcken and within the industry at large. The situation is summarized:

> The cost is increasing, and to make it available, or affordable for people, you have to downsize.
>
> (Regional manager, C5)

5.1.2 Catering to demands for dwelling functions and space

The companies appear to try to balance the assessment of the market (willingness to pay for what is offered), an economic necessity of downscaling in light of these trends, as well as various social normative and regulatory demands. This also includes household demands on dwelling functions and spatial standards. While size might be decreasing, it is underlined that developers seek to keep the number of rooms the same within a smaller footprint. Especially, the bedroom is pointed out as a room with a potential to save space. A majority of the interviewees also point toward a general trend of open space floor plans, combining living room and kitchen. Besides allowing the use of "each m^2 for more purposes than before" (communication and marketing manager, C2), it adds to a perceived spaciousness. The question of functionality in relation to space is however reflected upon, as one interviewee adds that this type of layout is not as popular among all resident groups, for example, in the case of elderly or immigrant families. Figure 2 shows an example apartment from one of the private companies building tenant-owned apartments, with a fairly conventional layout. The second bedroom is, for example, only accessible through the semi-open living room/kitchen area, limiting the type of household targeted (and occupancy rate in relation to apartment size).

Difficulties also persist as the individual demand for more costly facilities are present regardless of household size. Some of the companies indicate that they are trying to find ways to address this dilemma. Especially looking at the 'functional cores' of the

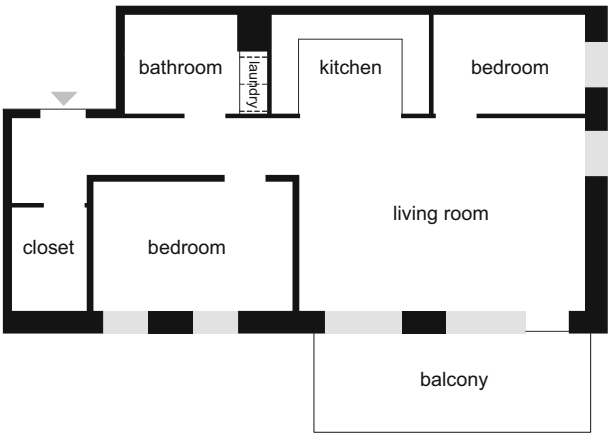

Fig. 2 Layout of a three-room apartment, 78 m^2, built by one of the private build-for-sale companies

apartments and improvements in terms of standardized solutions or optimized building processes are of interest. Terms such as 'compact,' 'surface efficient,' 'functional' and 'smart' are used:

> We try to think smart, to use the space in a very good way, so it is not so expensive.
> (Project and local market manager, C3)

Attempts to reduce floor area in these spaces are however oftentimes perceived as incompatible with regulatory demands, for example, regarding accessibility:

> The bathroom, we try to minimize, but it is always pretty big, because of the laws and regulations./…/it can't be smaller than it is today…
> (Project development manager, C1)

It is stated that opposition can be found not only in established regulations, but also in issues pursued by the Swedish Tenants' Association, which has worked hard for the functional standards that are commonplace today, along with the general perpetuated notion of quality in residential development.

Dwellings that accommodate the preferences, spatial and functional requirements of a rather general target group remain a main interest in a case like Kvillebäcken. This means that concepts challenging the individualized demand, such as living even smaller or together or by sharing housing-related functions (for example, appliances, storage, etc.) to save resources (minimizing per capita space heating, electricity use and consumption of household goods by collaborative use) and increase social interaction (reducing negative aspects of isolation and loneliness among one-person households), are less common in market-driven developments. Endeavors of radical optimization or reconfiguration of individual household resource use are also dependent on salient societal norms, which the market enforces as well as reproduces.

5.2 Norms regarding comfort and housing standards

5.2.1 Material standards and appliances

Normative assumptions associated with modern lifestyles are evident in the findings from the interviews as well as the architect workshop. The direct implications on housing are reflected particularly in the material standards or appliances offered in new dwellings, pursued in relation to what is perceived as market trends and preferences among residents as customers. The trend today is depicted as one of 'wear and tear,' where the wear is usually shorter than the life cycle of the material, appliances or apartment. One of the architects expresses criticism toward such short-term perspectives and perceives it as though it encourages to "throw your old kitchen out and buy a new one" on a regular basis. When it comes to rental apartments, one interviewee emphasizes that allowing the tenants to decide too much regarding the kitchen can be problematic. Current fashion in kitchen interiors might quickly become obsolete, leaving the property manager with an outdated apartment they cannot afford to renovate again so soon. This type of consideration is however not reflected to the same extent among the build-for-sale companies, with less incentive to care for long-term fluctuations in preferences (as long as current market surveys are up to date at the moment of construction completion and sale).

A majority of the companies offer appliances such as a dishwasher, and sometimes also a microwave, in addition to the regular all-inclusive kitchen arrangement you find in Swedish housing. The interviews reveal that laundry appliances (usually a washing

machine and tumble dryer set in the bathroom) are provided in each apartment and also in the municipal rental units. Shared laundry facilities are becoming less common—a feature that used to be a staple in Swedish multi-family housing (and still remains the norm in the older stock). When looking at other common facilities compared to the laundry room, the interviews do not convey any particular trend. A few of the interviewees conclude that they are not building any additional formal shared spaces in Kvillebäcken besides the overall aim within the consortium to have a proportionally large amount of green space in the area for leisure and socializing.

5.2.2 Perceptions of a good home life

In addition to considering improved energy or material efficiency, customers' perceptions of the comforts and conveniences of home are given as the main reasons for the continuous changes in quality and standards offered in new housing. One interviewee admits:

> We put as many things in the apartment as possible, so it's easy for the people/…/ people appreciate it actually, that you can do it [laundry] whenever you want.
>
> (Development manager, C6)

There is an image of convenience, comfort and high spatial standard conveyed in home improvement shows, through food and interior design magazines, real estate promotions or advertising from housing developers that operate mainly on a speculative market. As one interviewee explains it, the results of a target group survey they did for the Kvillebäcken project show that:

> …It's very important with kitchen and bathroom. Environmental stuff is good, but people aren't willing to pay for it. Really, it's rather obvious stuff. It's pretty much what you see on TV and what's modern. People want a good life.
>
> (Chief Executive Manager, C7)

One of the architects at the workshop questions whether this 'ideal' home or lifestyle becomes something that is intended primarily to be showcased, rather than the place for restoration the home might signify in an age of stress-related disorders.

The architects also convey their experience that there are few opportunities to challenge what is built today. They perceive that much is still traditionally designed for a 'nuclear family' view of society that no longer is a given. Alternatives, such as cohousing, 'every-other-week-dwellings' for divorced families, or voluntary simplicity, that support other household configurations or interpretations of residential standards and comfort, as well as issues of affordability, are not typically on the agenda. Such potential aspects for innovation in the housing market would explore a reduced per capita energy and resource use by reassessing household spatial needs and consumption levels, as well as provide a relevant exploration of alternative forms of social engagement, community building and bridging sustainability. However, these types of movements and realized projects are so far limited and have had little overall effect on mainstream building.

5.3 Implications

The long-term implications for sustainable development in the case of Kvillebäcken are not yet possible to evaluate, as the area is still under completion. The intentions of the project as a whole, and the residential developments pursued among the companies involved, however serve as a basis for discussion.

Several of the architects who participated in the workshop experienced that in projects like Kvillebäcken, easily measurable environmental aspects are often favored (for example, energy performance), apparent also in the official documents such as the environmental plan. More 'immeasurable' qualities and solutions, as the architects expressed it, are overlooked. The architectural design reveals little of residential form that aims at reducing environmental impact. That the dwelling units in themselves enable or stimulate larger changes in how we view the sustainable home and household-related consumption is not apparent.

The social goals as stated in the program for sustainable development were to be concretized in a dense urban form, courtyards with ample meeting places and a mix of apartments in regard to forms of tenure and size. The move toward smaller, homogenous apartments can however be argued to limit opportunities to, for example, move within the area as household situations change. This is similar for rental and tenant-owned apartments, among private as well as municipal companies. Financial rather than environmental concerns appear motivational for reducing overall floor area. It remains to see what, if any, notable effect this development will have on the continued expansion of per capita living space in general. This development further highlights a conventional approach to issues of housing costs in relation to viable household trends identified. The lack of direct resident involvement also means that assumptions are based on assessments of a general interest through market surveys rather than more explicit contextual consideration, emphasizing the invisibility of the user beyond the statistics.

It would seem that a trend toward individualized use of resources (as opposed to sharing functions and spaces on a larger scale) and one-person households (as opposed to various forms of multi-person configurations sharing facilities within the dwelling), connected to a normative demand for living space, has significant implications on the goal of reducing residential energy and resource use as well as the provision of socioeconomic diversity. In line with a normative understanding of 'good housing standards,' settling with or seeking a lower spatial standard or material comfort is not seen as a mainstream option.

Offering services and facilities in addition to the private dwelling gives the possibility of attracting residents wishing to expand their living space by gaining access to certain functions in the vicinity. Shared facilities could thereby alleviate the need for private and individualized spaces or equipment/appliances and to some extent challenge unsustainable consumption patterns (Mont 2004). The overall implications of such solutions are however equivocal, as potential rebound effects of residents 'doubling up' rather than giving up personal space or consumption in favor of the shared must be considered. Possible social benefits are perhaps more relevant to discuss.

The architects are fairly unanimous in their belief that social aspects should be given more attention. In reality they, in line with what is implied in the interviews, feel that economy governs most decisions. An interviewee from the smaller family-owned property developer (building both rental and tenant-owned apartments) stresses the different prerequisites in being able to consider these 'softer' values:

> /…/most just want the cheapest of the cheapest to keep costs down, we think it's better to take the cost now, and then in a longer perspective it's probably a better holistic solution. But we can do that, as a long-term property owner. There aren't many like us, most are'quarter capitalists' and are registered on the stock market…
>
> (Chief Executive Manager, C7)

It is emphasized that although ambitions for the Kvillebäcken project were there at an early stage, the architects participating in the workshop only took over where the general design and planning prerequisites left of, limiting their influence in the previous stages of the process, including the creation of the city planning office urban design program and the program for sustainable development. The architects also feel like there is a general misconception that long-term quality and overall well-considered residential environments are expensive. As a result, these aspects are often the first to be cut. Overall, an improved focus on understanding the relation between design and prevalent norms, home-related practices, lifestyles and subsequent resource use appears to currently fall between responsibilities in the measures applied in the case of Kvillebäcken.

6 Conclusion

As the production of environmentally responsible and energy-efficient residential buildings continues to expand, this paper investigates whether the same effort is made to facilitate a holistic approach to the development of 'sustainable homes.' The case of Kvillebäcken illustrates how the market interprets and realizes sustainable residential solutions. The need to understand not only how a sustainable housing development is envisioned and manifested in the built environment, but also why, what is to be developed and for whom, is here emphasized.

The reviewed material suggests intent in contemporary planning and construction to enable a lifestyle change among residents. While addressing parameters of the energy and resource intense modern home, the efforts made to frame sustainable housing in the Kvillebäcken case however do not offer more radical solutions or strategies challenging current ways of dwelling, but rather reproduce a normative conceptualization in line with conventions, merely meeting residential norms with efficiency measures.

In relation to deeper dimensions of sustainability, it appears that developments such as Kvillebäcken do not adequately reach a holistic consideration of social or environmental aspects related to what is built. Despite initial ambitions of diversity as an aspect of sustainability, a streamlining of apartment types and sizes in Kvillebäcken would suggest that individual property developers (unsurprisingly) are ultimately driven by market assessments. It remains to be seen whether the development of this kind of residential area adds to an overall urban social development, in, for example, meeting present and future demands for affordable apartments or dwellings for different households.

It is here suggested that without an anchored systems approach, exploring the actors, connections and influences of norms and practices surrounding the dwellings created, eco-efficient measures on their own do not radically challenge the resource and energy intensity or social concerns surrounding current housing development. Contemporary ideals and market perspectives in housing development remain crucial topics to tackle in order to adapt and drive solutions that more adequately consider a holistic perspective of sustainability, as well as address implications for the physical environment. As shown in this paper, market-led development is not likely to come up with such definitions, and a call for local and national policy makers to take actions is here made. In an expansive housing market, measures for sustainable homes, when incorporated in local requirements for housing development, have a potential for implementation in the same way as environmental adjustments have successfully been implemented during the last years.

However, there is also a need for a shift in the way the building sector develops market niches. What is needed are developers competent and daring enough to be visionary and

challenge contemporary normative housing design, and thus meet new demands not only from policy but from proactive residents. The ambitions seem to be there, yet establishing processes for how to actually achieve such a development remains an essential task within the sector. One important issue is in regard to innovation and the integration of knowledge among consultants, architects and the residents—the end users in housing development processes. The paradigmatic changes needed are not addressed explicitly in this study, but a basis for further discussions on the role of architectural knowledge in informing a market perspective is provided. Extended collaboration between different actors could foster more innovative solutions, yet provides no guarantee, and the forms for such collaborations are yet to be established.

Incorporating an integrative approach, merging architectural knowledge on residential quality (Nylander 2011) and housing design with objectives to radically reduce the resource and energy intensity of new (and existing) residential environments seem important to bring sustainable housing development forward, and are so far a fairly under-researched area. Exploring how resident groups interested in alternatives to current processes can influence the development, and further insight studies among households engaging in different forms of low-impact practices, is of value for developing a norm critical view on contemporary sustainable housing, beyond market interpretations or simply efficient buildings.

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