

## **LUCA ROZÁLIA SZÁRAZ**

*MSc, Expert in Human Ecology*

*Environmental researcher at Metropolitan Research Institute, Budapest*

*szaraz.luca@gmail.com*

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# **Pro-environmental characteristics of urban co-housing communities**

## **Abstract**

*A great part of the current ecological and social crisis is caused by the socio-economic structure of the mainstream urban society in industrialised countries. This crisis has to be faced with, thus solutions on how we should change this society should be searched for. Alternatively, more ecological, healthy behaviour and lifestyles are offered for urban residents by intentional small communities. Thus, some potential solutions that lead to decreased negative environmental impact of cities might be included.*

*This article investigates the environmental impact of urban cohousing communities. Pro-environmental characteristics that reduce the negative environmental impact of cohousing communities are also examined. The article also explores the factors and processes these pro-environmental characteristics are created by. According to the findings of this study, urban cohousing communities tend to have less negative environmental impact than conventional urban housing options. All of the indicators for ecological footprint calculations show reduced need for energy and material consumption. Many of these pro-environmental characteristics are derived from four out of the six common characteristics of cohousing communities. Thus, they might be less harmful than conventional urban lifestyle even without strong ecological consciousness of residents.*

## **Key words**

*Cohousing community; Pro-environmental characteristics; Ecological urban society; Ecological lifestyle; Intentional small community*

## 1. Introduction

By 2030, more than 60% of the world population is expected to live in cities (ALBERTI, M. 2005). With our conventional and industrialised socio-economic system, these rapidly growing cities cause many challenges and much harm to both human and non-human lives on *Earth* (GRIMM, N. B. *et al.* 2008). The material demand to satisfy the ever-growing need of mainstream socio-economic systems for increasing production and consumption is the most powerful demand in urban environments (ALBERTI, M. 2005; SEYFANG, G. 2005).

Urban societies and urban economic activities that transform and transfer food, goods, energy and services are highly dependent on large input of energy and materials, and to absorb emission and waste, a vast capacity is required (DECKER, E. H. *et al.* 2000; ALBERTI, M. 2005). This need for productive and assimilative capacities of ecosystems is met from well beyond the city boundaries (GRIMM, N. B. *et al.* 2008). Thus, ecosystems are altered both locally and globally by our globalised socio-economic processes in urban areas, and became fragmented, isolated, and degraded by them. These processes also decrease biodiversity, disrupt hydrological systems and modify energy flows (ALBERTI, M. 2005; GRIMM, N. B. *et al.* 2008), biogeochemical cycles and climate (DECKER, E. H. *et al.* 2000; GRIMM, N. B. *et al.* 2008). Furthermore, living in urban environment affects the dwellers' well-being, as well. Many health problems are caused by unhealthy environmental conditions such as air pollution, and the atomised social structure of cities might lead to mental disturbances (NEWMAN, P. 2006).

These impacts are results solely of human decisions and actions. Thus, our lifestyle and its material basis determine our environmental effects (ALBERTI, M. 2005). The mainstream society and lifestyle today is based on consuming material goods. However, simply consuming more in most cases will not lead to increased well-being. Thus, we should search for solutions in our society that lead to lifestyles based on values other than material consumption. It seems that an economy that is founded by social processes of *care and connection* and where non-commodity goods are dominant would be more favourable. These goods and

services are mostly produced and exchanged locally and depend on social relationships (SEYFANG, G. 2005).

In the last few decades many different kinds of intentional communities have come to life in cities, and different studies indicated that they might be somewhat less harmful on the environment than conventional or mainstream urban lifestyle (GIRATALLA, W. 2010). According to Meltzer's definition, "an intentional community is a group of mostly unrelated people living together and dedicated by intent to specific common values or goals" (MELTZER, G. 2005). One of these intentional communities is called collaborative housing, or cohousing (MELTZER, G. 2005). These groups are formed with the intention of creating social cohesion and a mutually supportive community (MELTZER, G. 2005). Members are living together at a site which consists of both private and common spaces, explicitly designed to help create collaboration among residents (STRATMANN, J. *et al.* 2013). These urban communities could offer a solution to escape alienation and social isolation of conventional urban housing solutions and lifestyles, and they might create a way to live with a great sense of well-being and lower environmental impact at the same time (KROKFORS, K. 2012).

The following sections of this paper present the methods and the results of a research that examines the environmental impact and pro-environmental characteristics of urban cohousing communities. Based on literature about ecological footprint and pro-environmental behaviour (GIRATALLA, W. 2010; STERN, P. C. 2000) the *pro-environmental characteristics* here are defined as ones that affect the lifestyle of a community to reduce their negative environmental impact. These characteristics can be both physical and socio-cultural.

## **2. Aims of the study**

The aim of this research is to determine the most significant physical and socio-cultural pro-environmental characteristics and the factors and processes that create these in cohousing communities. Currently active, developing or future cohousing might find these lessons useful when they decide to make some changes to live their everyday lives

more ecologically. The study might also be instructive for further research on how small communities could help change the conventional socio-economic system to one which is based on collaboration instead of competition, and which is driven by social and environmental needs rather than financial ones.

### **3. Research methods**

#### *3.1. Questions*

During this study the following research questions were asked:

- 1) Do urban cohousing communities have lower environmental impact than conventional or mainstream urban lifestyle?
- 2) What kind of physical and socio-cultural pro-environmental characteristics cohousing communities have?
- 3) What factors and processes create these characteristics in cohousing communities?
- 4) Is there any significant pro-environmental characteristic which is generally missing from the cohousing communities?

#### *3.2. Methods and answers*

To answer the research questions, qualitative data collection and analysis were done. First a desk study was carried out on environmental impacts of cohousing communities. The relevant literature on factors and processes that might create pro-environmental characteristics in these types of communities was also examined. The desk study was done through an extensive literature review of papers that presented findings of research on environmental effects of cohousing (BABBIE, E. 2007). Unfortunately not much academic attention has been paid to this subject so far (BAMFORD, G. 2001; GIRATALLA, W. 2010).

To further support or disprove the answers found during desk study, some cohousing communities were visited *in situ*. At these research sites, besides field observation, semi-structured interviews were carried out with at least one member of each visited community. The inter-

views were semi-structured because of the diversity of cohousing communities. Regardless the six common characteristics of cohousing (see later) each community is unique. Having structured interviews with fixed questions written in advance would have led to loss of unforeseeable information. Semi-structured interviews are flexible which means that the questioning is redesigned throughout the project (BABBIE, E. 2007). In this case it means that the prewritten interview questions were somewhat changed and they were asked in different order at each site. These changes were implemented to gain the information to answer the research questions, and data collected at the sites remained comparable for cross-case analysis at the same time (BABBIE, E. 2007). The interview questions can be found in the *Appendix*.

In all communities, members were generally friendly and excited about the visit. The interviewees were genuinely honest, interested in the research and they seemed to be trying to answer all questions according to the best of their knowledge.

Five different cohousing communities were visited during this research: *Æblevangen*<sup>7</sup>, *Jernstøberiet*<sup>8</sup>, *Ibsgården*<sup>9</sup>, *Lange Eng*<sup>10</sup> and *Wohnprojekt Wien*<sup>11</sup>. The five visited sites are presented on *Figure 1*.

The first four communities are located in *Denmark*, the fifth is in *Vienna, Austria*. The two countries create two different contexts for the researched communities. However, in comparison with other countries, both of them have high average extensive welfare benefits and income per capita (OECD DENMARK, 2007; OECD AUSTRIA, 2013) and they both have high ecological footprint values, as well. Among countries with populations greater than 1 million—where complete data is available—*Denmark* has the 4<sup>th</sup> and *Austria* has the 17<sup>th</sup> highest ecological footprint per capita (WWF, 2014). Meanwhile, both countries have numerous policies and economic initiatives to reduce environmental impact, and their

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<sup>7</sup> [www.aeblevangen.dk](http://www.aeblevangen.dk)

<sup>8</sup> [www.jernstoberiet.dk](http://www.jernstoberiet.dk)

<sup>9</sup> [www.ibsgaarden.dk](http://www.ibsgaarden.dk)

<sup>10</sup> [www.langeeng.dk](http://www.langeeng.dk)

<sup>11</sup> [www.wohnprojekt-wien.at](http://www.wohnprojekt-wien.at)

societies have high average environmental awareness (OECD DENMARK, 2007; OECD AUSTRIA, 2013).



Æblevangen



Jernstøberiet



Ibsgården



Lange Eng



Wohnprojekt  
Wien

**Figure 1 – The five visited cohousing sites**

*Image sources: GOOGLE MAPS (2015)*

As it was mentioned in the *Introduction*, pro-environmental characteristics are defined as ones that affect the lifestyle of a community to reduce their negative environmental impact. This specification is based on *Stern's* definition of impact-oriented and intent-oriented environmentally significant behaviour: “*Environmentally significant behavior can reasonably be defined by its impact: the extent to which it changes the*

*availability of materials or energy from the environment or alters the structure and dynamics of ecosystems or the biosphere itself. [...] Other behavior is environmentally significant indirectly, by shaping the context in which choices are made that directly cause environmental change. It can now be defined from the actor's standpoint as behavior that is undertaken with the intention to change (normally, to benefit) the environment. This intent-oriented definition is not the same as the impact-oriented one in two important ways: It highlights environmental intent as an independent cause of behavior, and it highlights the possibility that environmental intent may fail to result in environmental impact"* (STERN, P. C. 2000).

Accordingly, pro-environmental characteristics are those that are caused by these two environmentally significant behaviours. In this study the intent-oriented behaviour is called pro-environmental behaviour. The differentiation between impact and intent is important because environmentalist intent is only one of the many factors that affect pro-environmental characteristics of communities, and it is often not particularly important. There are many other pro-environmental characteristics that can be derived entirely from non-environmental motives, such as personal habits and household routines (STERN, P. C. 2000). Furthermore, in most cases environmental awareness does not imply pro-environmental behaviour (MELTZER, G. 2005; STERN, P. C. 2000). In fact it seems like the more important behaviour is in terms of its environmental impact, the less it depends on environmental awareness and concerns (STERN, P. C. 2000).

To identify pro-environmental characteristics in cohousing communities, the components of ecological footprint calculation supplemented by water management were used. According to this calculation, the following attributes have the most significant environmental impacts within our lifestyle (GIRATALLA, W. 2010):

- *Built-up land*: the physical land area of a space altered for human usage.
- *Household energy consumption*: attributes of electrical and heating systems.

- *Consumption*: characteristics of buying, using and reusing products.
- *Food*: characteristics of purchasing, storing, and consuming food.
- *Waste management*: habits of disposing and recycling materials.
- *Water management*: attributes of the water-systems and water usage.
- *Transportation*: different means of transportation usage (GIRATALLA, W. 2010).

The analysis was done with the aid of spreadsheets that collect pro-environmental characteristics based on the ecological footprint component and relevant findings of other studies. During the analysis of the pro-environmental characteristics, those impact-oriented and intent-oriented environmentally significant behaviours that implied these characteristics in the communities were specifically searched.

### *3.3. Limits of this research*

Mainly qualitative data based on interviews, literature, and personal observations are presented in this research. For determining environmental impacts of the studied cohousing communities more precisely, quantitative data collection and analysis would be required. Furthermore, during this research only five cohousing communities were studied, therefore, my conclusions might not reflect cohousing communities in general.

## **4. General characteristics of the visited cohousing communities**

Although the visited sites are unique in many ways, they all possess the six general characteristics of cohousing communities (see later) (MELTZER, G. 2005). All of them are average cohousing sites that do not differ much from those researched in other studies (MELTZER, G. 2000; MELTZER, G. 2005; WILLIAMS, J. 2005; POLEY, L. D. 2007; GIRATALLA, W. 2010;



MELTZER, G. 2010; JARVIS, H. 2011; MARCKMANN, B. M. M. *et al.* 2012; VESTBRO, D. U. 2012; STRATMANN, J. 2013). The most important demographic and other general information is presented in *Table 1*.

**Table 1 – General information on visited cohousing communities**

*Edited by SZÁRAZ, L. R. (2015) (~ = Approximately)*

Name		Æblevangen		Ibsgården		Wohnprojekt Wien
		Jernstøberiet		Lange Eng		
Location		Egedal, Copenhagen	Roskilde		Albertslund, Copenhagen	Vienna
		Denmark				Austria
Date of	first meeting	1977	1970s	1981	2004	2009
	moving in	1980	1982	1983	2008	2013
Number of	residents	120	43	~40	200	~100
	adults	~60	31	~30	~100	~70
	children	~60	12	~10	~100	~30
Average level of	education	Higher education				
	salary	Above country average				
Type of ownership <sup>12</sup>		Private ownership		Common ownership	Private ownership	Common ownership
Site plan <sup>13</sup>		Between the pedestrian street and courtyard types	Hybrid of the 'street' and courtyard type	Courtyard site arrangement		Single, multi-store building

<sup>12</sup> See in General characteristics of cohousing communities.

<sup>13</sup> See in General characteristics of cohousing communities.

## 5. General characteristics of the cohousing communities

*“The whole site is our home.”*

According to their social context, cohousing groups tend to fall into three categories: There are *building together* type of sites where residents have interest only in pooling assets and joining efforts to gain economic and practical benefits. The second type is *sharing everyday life* in which the members do not only develop their site together but also share everyday activities. The last type is *servicing a common idea* where residents do not only develop the site and live together, but they also serve an ideology, religious commitment or specific lifestyle. In the last two types, social interactions are dominant and create social capital, which means that these are living small communities (KROKFORS, K. 2012; STRATMANN, J. *et al.* 2013). During this research *sharing everyday life* type of communities were studied purposefully since these seemed to be the most attractive for urban residents, and therefore this is also the most common type (KROKFORS, K. 2012).

Although cohousing communities have a wide diversity regarding their site planning strategy, design, size, and the organisation of their community life (BAMFORD, G. 2001; MELTZER, G. 2005), according to MCCAMANT, K. – DURRETT, C. (2011) they have *six common properties*:

- 1) participatory process,
- 2) intentional neighbourhood design,
- 3) common facilities,
- 4) self-management,
- 5) absence of hierarchy and consensual decision-making,
- 6) separate incomes.

1) *Participatory process* means that residents organise and participate in the design and development of their community, usually with the aid of experts (e.g. architects). For example in *Wohnprojekt Wien* most of the residents wanted to move on the top floor so they decided to create

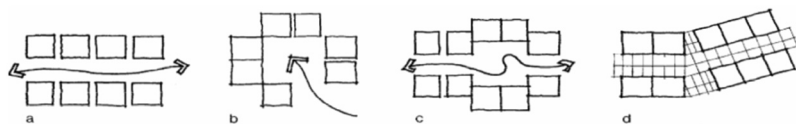
only common areas there, this way everyone lives on the top floor a little bit.

This development process usually takes a few years (SCOTTHANSON, C. – SCOTTHANSON, K. 2005; STRATMANN, J. *et al.* 2013). In this period an initial core group meets regularly to find a proper location, acquire finance, face challenges together, plan and design the site and an architectural form that meets the requirements of members (GARCIANO, J. L. 2011; JARVIS, H. 2011). During this phase the most common challenges are finding the appropriate land, and making it affordable for themselves and for their future members as well (GIRATALLA, W. 2010). Although no interviewee mentioned it during this research, enhancing social cohesion among residents, thus creating a real community from people who are mostly strangers to each other might be another significant challenge during the development phase of cohousings.

2) *Intentional neighbourhood design* means that the physical design of the site intentionally encourages and facilitates social interactions between residents. It is also constructed to provide a balance between personal and community life (STRATMANN, J. *et al.* 2013; WILLIAMS, J. 2005). For example in *Wohnprojekt Wien* the private apartments were opening from a bright and roomy staircase, which was designed to allow residents to speak with each other even when they are on different floors.

Many sites are built according to one of the four generic site plans illustrated in *Figure 2*.

These sites have private houses, semi-private spaces (e.g. balcony, private garden attached to the private unit), indoor and in most of the cases outdoor common spaces (WILLIAMS, J. 2005). Private houses contain all the features of conventional houses with kitchens, bathrooms, bedrooms, and living rooms. However, they are usually smaller in size than conventional ones (GARCIANO, J. L. 2011; POLEY, L. D. 2007; WILLIAMS, J. 2008). Semi-private spaces are borderlands between private and public spaces, thus, they create possibility for both social interaction and private life (WILLIAMS, J. 2005).



**Figure 2 – Generic cohousing site plans: a) the pedestrian ‘street’; b) the courtyard; c) a hybrid of the ‘street’ and courtyard types; d) a single building with an internal atrium that functions as a street but roofed**

Source: MELTZER, G. (2005)

3) In these communities there are many *common facilities*, such as the common house or the common outdoor spaces. The common house is usually the most important place of community life. In most of the cases it is a centrally located building that contains many different shared facilities and common recreational areas (MELTZER, G. 2005).

A wide variety of common facilities can be found in cohousing communities: meeting rooms, libraries, rooms for children and teenagers, guest rooms, well-equipped workshops for carpentry and heavy DIY, laundry rooms, freezer or bulk storage, re-use and recycling facilities (e.g. for old clothes, toys) or exercise areas. Furthermore, several different kinds of outdoor common spaces can be found, such as vegetable gardens, hen yards or other productive ventures, playgrounds and outdoor recreational spaces. The possibilities of common facilities are limited mostly by creativity, communities can create any kind of common areas they choose and have resources for (BAMFORD, G. 2001; MELTZER, G. 2005; GARCIANO, J. L. 2011; JARVIS, H. 2011). These common facilities have an important role in creating and maintaining community life, but they have many practical values as well (STRATMANN, J. *et al.* 2013).

4) Cohousing communities are *self-managed*, which means that residents take responsibilities for the management and further development of the community. All the decision-making of everyday community life and the maintenance and management of common spaces are done

by adult members. They also organise regular and occasional social activities, such as daily community meals at the common house or parties and celebrations.

The maintenance and management tasks along with everyday life are somehow regulated and aided by sets of house rules or agreements. These are not legally binding, unique social contracts between the members of the community, and they are not necessarily in a written form (MELTZER, G. 2005).

The maintenance and management tasks are done by different kinds of working groups of the community (LIETAERT, M. 2010). These groups are usually permanent, but there are also temporary ones that only exist whilst there is only one task to deal with. The members or at least the leaders of the most important decision-making groups are elected regularly (MELTZER, G. 2005; POLEY, L. D. 2007; WILLIAMS, J. 2005). However, in three communities the interviewees mentioned that in practice it is more like they ask 'whose turn is it' to become a leader in a group.

To illustrate this kind of working structure *Table 2* presents the main working groups of a cohousing community<sup>14</sup>.

Working groups were found in every visited community during this research. Members could freely choose the group they would have liked to work in. In four out of the five cases, adult (in *Jernstøberiet* above 14 years old) members had to join and work in at least one working group. In *Wohnprojekt Wien* members were not obligated to join a group, but they were obligated to do at least 11 hours of community work (e.g. site maintenance, cleaning common areas, organise common events etc.) within a month.

Many different kinds of recreational groups (e.g. sport groups, knitting group, theatre group, singing group, etc.) can be found besides working groups. Thus, community members also spend their free time with each other several ways. The groups develop according to the interests and hobbies of members, therefore they have immense diversity (POLEY, L. D. 2007). Besides these activities there is a lively community

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<sup>14</sup> These descriptions were written by one of their members.

life, which is not organised so directly. These activities are derived from a strong support system based on caring and interdependence of residents (MELTZER, G. 2005). For example collective and reciprocal child-care occurs in many if not all of the communities (MELTZER, G. 2005).

**Table 2 – The six main working group of Wohnprojekt Wien**

*Edited by SZÁRAZ, L. R. (2015)*

Working group	Tasks of the group
Social Sustainability (Soziale Nachhaltigkeit)	In charge of the 'human' side of the project, takes care of the social glue that holds them together. They keep an eye on the community and organise events in the house (parties, outings, and community weekends).
Ecological Sustainability (Ökologische Nachhaltigkeit)	In charge of keeping an eye on our efforts to live a more sustainable life by organising a Food Group, taking care of the garden, or managing the carpool.
Economic Sustainability (Ökonomische Nachhaltigkeit)	More often referred to as 'FinRecht' (finance and legal), this working group takes care of all financial and legal issues that arise and work with their housekeeping to make sure the bills are paid on time and they have enough money to pay back mortgages.
Communication (Kommunikation)	In charge of keeping an eye on the communication channels inside and outside the house (both digital and analogue). Manages relations to outside (the community in the house) and provides and manages communication infrastructure in the house.
Organisation (Organisation)	Organises the general assembly meetings, takes care of the office.
Sustainable Building (Bauliche Nachhaltigkeit)	One of the most important groups, this group takes care of the house(s): making sure maintenance is performed, performing repairs and improvements, monitoring power and water usage, etc.

5) The working groups for maintenance and management usually hold regular *meetings* where they identify tasks and develop working strategies (LIETAERT, M. 2010). Besides these meetings there are general meetings for the entire community, where they discuss and solve the most important issues. Exceptional meetings are held, if a task or challenge requires it.

In these meetings the *consensus model*, a democratic, non-hierarchical process is used in the decision-making process of the group (MELTZER, G. 2005; SCOTTHANSON, C. – SCOTTHANSON, K. 2005): “*Consensus decision making is a group decision making process that seeks the agreement of all or most of the participants, and the resolution or mitigation of any objections from community residents*” (GARCIANO, J. L. 2011).

The consensus model helps to give everyone a fair opportunity to express their ideas and opinions during meetings (LIETAERT, M. 2010). According to different interviewees, this decision-making process proved to be effective, but relatively slow.

6) Cohousing members have *separate incomes*. They do not have a shared economy, employments are individually organised (MELTZER, G. 2005; SCOTTHANSON, C. – SCOTTHANSON, K. 2005). Members generally own or rent their homes and have a diversity in occupations and incomes. This inequality might create challenges when deciding the amount of common fees (MELTZER, G. 2005; LIETAERT, M. 2010; MELTZER, G. 2010).

In four of the visited communities every member older than 18 years had to pay a fix amount of common fee besides the overhead expenses of their private homes. The common fee covers expenses of the cost of maintenance, common parties, renovations, and the common everyday costs (water, heat and electricity consumption of the common areas). Every visited community had a common bank account where they kept the fund of the community.

Some of the members in *Wohnprojekt Wien* have at least part of their income from the café they created in the building, and the architect from the initial core group has his office in the building, as well. However, these are still individually organised employments with workplaces located in the cohousing site.

Cohousing communities typically consist of 50 to 100 residents or 12 to 40 households (SCOTTHANSON, C. – SCOTTHANSON, K. 2005; POLEY, L. D. 2007; LIETAERT, M. 2010; MELTZER, G. 2010). Significantly smaller or

larger groups are rare because they seem to have special challenges derived from their size. Too small communities might become too intimate, the balance between personal and community life shifts towards community life, which often leads to conflicts between members. While too big communities do not allow residents to get to know everybody, thus the social capital that creates community gets weakened (SCOTTHANSON, C. – SCOTTHANSON, K. 2005; WILLIAMS, J. 2005). Although the community *Lange Eng* has 200 members, it has not caused any special challenges yet, because half of them are children and toddlers.

During this research two types of ownership were found: private and common. The type of the ownership also determines the leaving and entering policy of the community. In case of *private ownership*, members can freely sell their house, because they bought it as their own property. *Common ownership* means that besides the common areas, the private homes are common properties, as well. Members can buy and sell their share of the site to the community itself.

In case of privately owned homes, residents can decide to whom they sell them, therefore the community has at best indirect influence on selecting new members. When the site is entirely common, a working group or a delegation of members are chosen to select the new residents from the candidates.

The *social and cultural features* of cohousing communities are very similar to those of the wider society (BAMFORD, G. 2001; MELTZER, G. 2005). As one of the interviewees said, cohousing residents are simple city dwellers who choose to share their lives.

Cohousing residents are *diverse* in terms of their interests, age and religion, but they are relatively *homogeneous* in terms of socio-economic class, race, education, values and attitudes (WILLIAMS, J. 2005; MELTZER, G. 2010; GARCIANO, J. L. 2011).

There are several studies that indicate a greater sense of *well-being* among cohousing residents (WILLIAMS, J. 2008). The feeling of belonging, the mutual care and the involvement in the decision-making process create a feeling in cohousing members that they are valued members of their community (WILLIAMS, J. 2008).



Cohousing communities also provide *security*. In *Lange Eng I* was told that the absence of fence around the site was not a problem because residents notice strangers in an instance.

Cohousing members tend to look after the children of fellow members and it often can be a great deal of help for parents. Furthermore, cohousing communities seem to be especially beneficial for children and seniors. Children are literally living together with their friends. In comparison with children who live in conventional housing forms, they spend more time playing with their fellow kids than in front of the television (MELTZER, G. 2000). According to *Meltzer*, these children also tend to become highly environmentally aware and socially sensitive adults (MELTZER, G. 2000). In the community, children have an extended family with many 'uncles', 'cousins', and 'grandparents'. Therefore, this is a very healthy environment for the elderly, as well. They can provide help with many different tasks during decision-making and everyday life. Cohousing elders can never be bored and they are always valued (BAMFORD, G. 2001). These benefits for children, adults and seniors were mentioned during every interview.

## **6. Environmental impact and pro-environmental characteristics of cohousing communities**

*"The most important advantages of living in a cohousing are the practical ones."*

Several studies suggest that *ceteris paribus*<sup>15</sup>, cohousing lifestyle has less negative environmental impact per capita compared to conventional urban lifestyle (BAMFORD, G. 2001; MELTZER, G. 2005; GIRATALLA, W. 2010; LIETAERT, M. 2010; MARCKMANN, B. M. M. *et al.* 2012; VESTBRO, D. U. 2012). It seems that living together is more energy and resource efficient (GIRATALLA, W. 2010). However, to live with lower environmental impact, everyday household routines are much more important than the

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<sup>15</sup> Meaning 'all else being equal' (HANSSON, S. O. 1996).

physical and technical design of the building (KROKFORS, K. 2012; MARCKMANN, B. M. M. *et al.* 2012). Cohousing communities are also suspected to be more sustainable because environmentally conscious people are overrepresented in these (MARCKMANN, B. M. M. *et al.* 2012).

Pro-environmental characteristics of cohousing communities found in the literature and at the visited sites are presented in the following and are structured according to the ecological footprint components. The environmental impact of cohousing lifestyle and that of conventional urban lifestyle have been compared in the studies examined.

### 6.1. Built-up land

Even with common areas included, cohousing members occupy less than average built land per capita, and thus, they have a higher population density as well (MELTZER, G. 2000; STRATMANN, J. *et al.* 2013; WILLIAMS, J. 2005). Socio-cultural factors such as frequent social interactions, sharing and trust are reducing perceived density. The smaller than average private houses are complemented by common areas, this way residents do not lack the facilities missing from their private units (e.g. laundry room, guest room, storage room) (MELTZER, G. 2005; WILLIAMS, J. 2005; MARCKMANN, B. M. M. *et al.* 2012). Therefore, higher density is not experienced as an inconvenience by residents (MELTZER, G. 2005). Smaller buildings in general also imply that fewer resources are required for the building process (MARCKMANN, B. M. M. *et al.* 2012).

To determine whether the researched communities occupy less than average built land, dwelling areas per capita—community areas included—the four Danish communities were compared to the country average number of square meters per occupant. This value in *Denmark* was 52.0m<sup>2</sup> in 2013 (STATISTICAL YEARBOOK, 2015). The data and results are presented in *Table 3*.

**Table 3 – Dwelling sizes (community areas included) in square meters, members of residents and dwelling size per capita in the researched cohousing communities**

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Community	Dwelling size of the community (m <sup>2</sup> )	Number of residents	Dwelling size per capita (m <sup>2</sup> /person)
Æblevangen	4,643	120	38.7
Jernstøberiet	2,070	43	48.1
Ibsgården	2,033	40	50.8
Lange Eng	6,293	200	31.4

As it can be seen in *Table 3*, three out of four communities have smaller than country average dwelling sizes. In the case of the fourth community, this value is close to the national average, but it is still below it. However, the environmental impact of built-up land coverage is only partly indicated by this calculation, because only dwelling sizes are included. For better evaluation, this calculation should be done with values of total property area. Unfortunately, the national average value to compare it with was not available.

Environmental impacts of buildings also depend on whether these are existing retrofitted buildings or newly built ones (MARCKMANN, B. M. M. *et al.* 2012). For example, the common house of *Ibsgården* was formerly a farmhouse and the building of *Jernstøberiet* is a redesigned iron foundry.

## 6.2. Household energy consumption

Cohousing communities consume less energy because their residents tend to save energy by pro-environmental behaviour and choices, and because of their reduced dwelling sizes and building arrangements (GARCIANO, J. L. 2011; MARCKMANN, B. M. M. *et al.* 2012; STRATMANN, J. *et al.* 2013). None of the visited sites had individual, detached private homes. *Æblevangen* had semi-detached houses with a detached common house. At the other sites the homes were in the same building, and in three cases (*Lange Eng*, *Jernstøberiet*, *Wohnprojekt Wien*) even the

common house was in the same building as the private ones. These site arrangements are reducing heat loss, thus, increasing energy efficiency (GARCIANO, J. L. 2011).

During the development phase many communities decided to create a low-impact architecture, and many groups selected their construction materials based on their environmental impact. However, the building regulations in many countries make it difficult or even impossible to choose low-impact options such as recycled building materials (MELTZER, G. 2000). In *Wohnprojekt Wien* when the building was planned, the most important aspect was to make it as low-impact as possible. In older cohousing communities such as *Æblevangen* and *Jernstøberiet*, the energy efficiency of their buildings was mentioned as a major challenge. In *Æblevangen* the buildings were built based on at least a 35-year-old technology and they needed to be upgraded to reduce their energy consumption. It was mentioned as a challenge because this would have been a resource-intensive task and most of its costs would have had to be payed privately. However, not every member could afford this renewal and they have not been able to decide how these should be financed. At *Jernstøberiet* it was mentioned that their building is old and not properly insulated, therefore it was consuming an undesirable amount of energy. Although, the windows were replaced with better insulating ones recently, they had no solution yet to insulate the walls properly due to lack of financing.

This housing model also offers an intermediate scale of social organisation between the levels of the single family and the town or district, thus they can use certain technologies that would not be viable options for individual households (MARCKMANN, B. M. M. *et al.* 2012). At this scale, for example, central heating systems can operate very efficiently (MELTZER, G. 2005). In *Lange Eng* and in *Jernstøberiet* water is heated locally with one central water heater. According to the interviewees, the multi-store building of *Wohnprojekt Wien* uses a reduced amount of energy for heating because it has a heat recovery ventilation. The central equipment heats or cools the air to a given temperature and circulates

it throughout the building. Therefore indoor air has a constant temperature all year long.

Many communities use renewable energy sources and devices that imply energy efficiency, such as solar cells and panels, programmable thermostats and heat exchangers (MELTZER, G. 2000; MARCKMANN, B. M. M. *et al.* 2012; STRATMANN, J. *et al.* 2013). In *Jernstøberiet* and *Wohnprojekt Wien* residents decided to install some solar cells on the roof but, according to them, these did not cover their entire electricity consumption. In *Æblevangen* one family installed solar cells to their own roof, though it was their individual decision. In *Lange Eng* members have been trying to find a way to install solar cells, but unfortunately the roofs seemed to be inadequate for this purpose.

### 6.3. Consumption

Cohousing residents share many spaces, facilities, tools and equipment, and this has environmental benefits. Sharing can be informal which occurs between the residents of their private possessions, or it can be formal like the common indoor and outdoor facilities and amenities (MELTZER, G. 2005). Sharing leads to reduced consumption, thus, less raw material, less energy consumption and less transport is required; and less waste and pollution is being produced (ASSADOURIAN, E. 2008; GIRATALLA, W. 2010; STRATMANN, J. *et al.* 2013).

There are many common facilities that reduce the need for having functionally similar facilities in every single private home. A common laundry room reduces the number of washing and drying machines per household, a workshop reduces the number of many kinds of tools and equipment (BAMFORD, G. 2001). Having recreational facilities such as a gym or a cinema implies that residents do not need to leave their home as frequently, thus, reducing the energy consumption and pollution of travel (GARCIANO, J. L. 2011; WILLIAMS, J. 2008). Every visited community had a fully equipped common kitchen and workshop. In the common kitchens the equipment (e.g. ovens, refrigerators, freezers, dishwashers, etc.) is made to work with greater amounts, thus allowing to cook bigger portions at once which saves resources.

They also had a common laundry room in all cases except for *Lange Eng*. In these there were 2–3 washing machines and 1–2 driers. In some cases (e.g. in *Æblevangen*) industrial types of these machines were bought.

All visited sites had several different kinds of recreational areas, usually different ones for different age-groups in the community. There were outdoor playgrounds, playrooms for children and rooms for adults. Sometimes there were also rooms for teenagers. In *Lange Eng* and *Æblevangen* they also had an indoor gym. *Lange Eng* and *Ibsgård* had a common cinema as well, and all of the visited sites had space and equipment for outdoor barbecue.

Members also share small items such as tools for gardening, cleaning, camping and cooking, and small furniture (VESTBRO, D. U. 2012). They also exchange items like clothes, shoes, games and books, so these are reused several times. Even if they do not have a special storage room or shelves for this purpose, before they throw something away, they at least ask around whether someone else needs it (LIETAERT, M. 2010). In every researched community, members told me that they shared and exchanged many items with each other. All sites had a storage room or at least shelves for items that the former owner did not need anymore, but for others these could still be useful: children clothes, toys, books, DVDs, household equipment, etc. In *Lange Eng*, I was told that they did not really need to buy any clothes for their children until they were about five years old.

Members also share their skills, for example during home repairs, assistance with computers and automobile repair (JARVIS, H. 2011; MELTZER, G. 2005; POLEY, L. D. 2007). The visited sites all had bicycle storage rooms.

Cohousing residents usually tend to choose products that have lower environmental impact such as energy saving equipment or organic food (STRATMANN, J. *et al.* 2013).

#### 6.4. Food

Every interviewed member claimed to have tried to buy ecological or organic food both for private and common consumption as often as possible. They also said that the only factor that influenced their food choices between ecological and non-ecological is the price of the products.

Every visited site had vegetable gardens and in three of them they also had some hens (*Lange Eng, Æblevangen, Jernstøberiet*). In *Jernstøberiet* they had many fruit trees as well. The amount of apples grown was enough to store part of the fruits for winter.

These gardens were semi-private properties, because they did not do gardening or take care of the animals as a community, but it was done by members who enjoy doing it. In some cases, a working group has been formed for these tasks.

The products of the vegetable gardens and the eggs were mostly consumed by the residents who took care of the garden and the hens. Occasionally they brought ingredients for the common meals as well, but they did not produce enough food to cook common meals entirely from these. Gardening and keeping hens were more like a recreational activity than food production. Therefore these activities only exist in a community while they have residents interested in doing them.

Residents also tend to exchange food with each other. One can always ask a little salt from the neighbour, so they do not have to go out shopping right away when they realise during cooking that some ingredients are missing. In *Æblevangen* they used to organise the shopping of basic food and basic household products. They stopped it because the organisation was too difficult. Some of the residents in *Wohnprojekt Wien* joined a community supported agriculture (CSA) programme and order their vegetables from a local farmer. The members of this community also tend to shop at farmers' markets. Unfortunately, this option is not really available for Danish cohousing members, because farmers' markets are very rare and very expensive in *Denmark*.

There were several vegetarian members in every community, but there were no vegans. However, I have not got data on the exact number

of vegetarian residents at the visited sites. In *Lange Eng*, *Ibsgård* and *Wohnprojekt Wien* it was mentioned that some of these members had chosen to be vegetarian out of environmental consciousness. Unfortunately, there is a lack of data on eating habits of vegetarian residents, for example, on the extent of their milk product consumption. Therefore, the extent of this pro-environmental characteristic cannot be estimated.

Most of the cohousing communities share meals regularly. This either means that they eat the same food jointly at the common dining room, or they eat it individually at their private homes. These shared meals provide a sense of community, save time for residents, provide more efficient use of space and they are generally assumed to reduce consumption and waste. Unfortunately, the amount of resources saved by sharing meals in cohousing communities has not yet been studied (VESTBRO, D. U. 2012).

There were common meals in every visited community, though they had different strategies for it. In *Lange Eng*, *Æblevangen*, *Ibsgård* and *Jernstøberiet* they ate dinner, in *Wohnprojekt Wien* they had lunch together. In *Æblevangen* there were different dining groups, at least one every day. These were open for all residents, for example my main interviewee had been eating with the Wednesday and Friday dining groups. In *Lange Eng* and *Ibsgård* residents were eating together six times a week, and they organised the meals more jointly. Members had to cook common dinner twice in every five weeks in *Lange Eng*, and three times a month in *Ibsgård*. *Jernstøberiet* had a similar custom, but they only ate together three times a week. In *Wohnprojekt Wien* some members and the employees of the architect office ate lunch together from Monday to Friday. Every community had at least one vegetarian meal a week. In *Ibsgård* it was highlighted that they tried to exclude meat from common meals, and when they had meat, they ate only 75–100 grams per person per occasion. They also bought most of their meat from a local organic farm. They reduced their meat consumption partly due to high price of organic meat.



### 6.5. Waste management

There seems to be an increased attention towards recycling and composting waste in cohousing communities compared to conventional housing residents (MELTZER, G. 2000; BAMFORD, G. 2001). The residents of the visited communities were recycling waste to the extent of the possibilities provided by the local municipality. For example, in *Æblevangen* they could recycle organic waste as well because the municipality (*Egedal Kommune*) collected it. This municipality was able to operate the central heating system of the district with the organic waste of its dwellers.

Members of the visited sites collected their waste individually then brought it to the closest recycling island or to the common collector bins of their own.

In *Æblevangen*, *Ibsgården* and *Jernstøberiet* they also did composting and they used the compost in their vegetable gardens as fertiliser.

In *Lange Eng* it was mentioned that they had a group to solve the problem of too much food waste at the common meals.

### 6.6. Water management

Cohousing communities are more likely to have more effective water usage than conventional urban housing options (BAMFORD, G. 2001). According to two of the interviewees in *Lange Eng*, their municipality (*Albertslund Kommune*), and within that their community used the less amount of water per capita in *Denmark* in 2013 (100 litres/person/month).

In *Denmark*, average precipitation is high, therefore it is seldom needed to collect rainwater individually because they cannot really use it afterwards. There were no visited communities that collected rainwater for usage, though the members of *Wohnprojekt Wien* might start to do so. (They have not started it yet because there was not much rainfall during their first year.) *Æblevangen* collected rainwater in a unique way. They had a system that collects rainwater separately from waste water and transfers it to their pond. This is a natural pond in their garden, which is primarily used for recreation such as swimming or boating, and

children also like to catch fish, though, they do not eat them. There used to be lobsters living in it as well. Unfortunately, they had become almost extinct because the pond had become too polluted with agricultural pesticides for them, though not for swimming. The pollution came from agricultural areas delivered by the natural torrent that feeds the pond.

### 6.7. Transportation

The location of the site determines proximity to commercial and service facilities, schools, and places of employment, thus it influences the vehicle dependency of residents (MELTZER, G. 2005). In the visited communities, members said that they rarely needed their cars for everyday transportation. All the facilities, schools and workplaces could be reached on foot, by bike, or by public transportation.

Thus, residents of cohousing communities own fewer cars than residents living in conventional housing options (GARCIANO, J. L. 2011; STRATMANN, J. *et al.* 2013). Not all families owned cars at the visited communities except at *Æblevangen*. There every family owned at least one car, though, they did not use them every day. In *Lange Eng* approximately half of the families owned cars and they also used it rarely. Some of their residents joined a car-sharing system in the municipality. They also shared their private cars, which is common in all the visited communities. *Wohnprojekt Wien* had a carpooling system of their own. Most members who owned a car gave it to the carpool for common usage. They had six cars in the carpool and there were two more cars that were not included.

It was highlighted in every community that instead of cars, bicycles are mostly used, combined with public transportation if required. Every interviewee said that they generally tried not to use their cars whenever possible. They also claimed that this was a typical attitude of all their members. Most of the children who lived in cohousing travelled to their school, which was in the neighbourhood, by bike.

According to the interviewees their airplane usage did not differ much from the country average. However, in *Ibsgård* it was mentioned that their members travelled a lot by plane. This was not caused

by living in a cohousing, but because most of their residents were researchers who generally often travel by plane.

## **7. Missing pro-environmental characteristics**

In most *sharing everyday life* type of cohousing communities the possibilities of eco-friendly technological infrastructure have not been sufficiently recognised (MELTZER, G. 2000). It is especially true in the case of heating and water management. On this scale it would be quite easy to adopt many different kinds of technological solutions such as an ecological sewage system. The possibilities for ecological solutions are mostly limited by the resources and the commitment of communities (ASSADOURIAN, E. 2008).

## **8. Factors and processes that create pro-environmental characteristics**

According to some studies, there is a missing link between recognising the negative environmental effects of our mainstream lifestyle and changing our everyday decisions accordingly. Therefore, it seems that there is little connection between environmental awareness and the lifestyle and consumer behaviour of citizens (KOLLMUSS, A. – AGYEMAN, J. 2002; MELTZER, G. 2005). However, according to *Meltzer*, the quality of our social relationships and our ‘sense of community’ are major determinants of the pro-environmental behaviour of individuals.

Based on the pro-environmental characteristics of cohousing communities this study presents, it seems that those reducing the impact the most are derived from four of the common characteristics of cohousing. These pro-environmental effects of the common characteristics are strengthened by a higher than average environmental consciousness among cohousing residents. In cohousing communities higher environmental awareness leads to a higher level of pro-environmental behaviour as well (MELTZER, G. 2005; WILLIAMS, J. 2008). Therefore, many of the pro-environmental characteristics are created simply because “*it just makes sense this way in a community like this*”, and not because of

environmental consciousness (WILLIAMS, J. 2005). Thus, pro-environmental characteristics derived from the four common characteristics might somewhat fill the gap between environmental awareness and pro-environmental behaviour (STRATMANN, J. *et al.* 2013; MELTZER, G. 2010).

The *participatory development process* enables environmentally conscious members to affect those with lower environmental awareness (MELTZER, G. 2010). Furthermore, since it is a slow process, it allows to think through decisions having effects lasting for decades thoroughly. Cohousing residents act on community scale during this period as well, thus, they theoretically can implement technologies with significant pro-environmental characteristics that would not be feasible on the scale of a single household (MELTZER, G. 2007). For example, in *Wohnprojekt Wien* they carefully selected their heating system with the aid of their expert members during the development period. They also decided to have solar cells at this phase.

Physical design and personal consumption choices affect each other (ASSADOURIAN, E. 2008; GIRATALLA, W. 2010). The goals of *intentional neighbourhood design* are to increase social interactions among cohousing members and to keep a balance between private and community life. Increased social interactions lead to increased trust and connectedness, therefore, it also increases sharing, thus reduces consumption, waste production and energy consumption. The balance between private and community life also ensures sufficient level of interactions while serving privacy as well. These attributes and effects of neighbourhood design were observed in every visited community.

*Common facilities* enable residents to live in smaller households because they do not need many private facilities and rooms, since these are available for them as common properties. Common facilities also create possibilities to share time, equipment, tools, vehicles and many other things, thus, increase well-being and reduce consumption. These effects are strengthened by pro-environmental behaviours, such as conscious consumers choosing, for example, organic food or energy saving equipment (STRATMANN, J. *et al.* 2013). Basically all of the visited sites

had the most common community facilities, such as laundry room, workshop, kitchen, gym, etc. These common areas were well equipped facilities in all cases. Furthermore, several interviewees told me that they paid attention to buy ecological products. Although, when buying something for common usage the price was also an important factor.

Environmental awareness is also spreading among residents during *self-management*. Self-management also gives power to members to decide about their direct environment, thus acting locally is highly enabled (SCOTTHANSON, C. – SCOTTHANSON, K. 2005). Direct involvement of residents in management and maintenance, similarly to the participatory process, also enables environmentally conscious members to affect the less aware residents. This could result more easily in the adoption of renewable energy sources and energy-efficient systems (MELTZER, G. 2005; GARCIANO, J. L. 2011; MARCKMANN, B. M. M. *et al.* 2012). Moreover, several interviewees emphasised that doing the decision making task was easier and more joyful when done together, thus, self-management also increased well-being.

The basis of the pro-environmental characteristics is social interaction, which enables residents to get to know each other better (WILLIAMS, J. 2005; BOUMA, J. – VOORBIJ, L. 2009). This process also has a positive feedback because social interactions promote choices and design that opens up further possibilities for social interactions (WILLIAMS, J. 2005).

Social interactions help to create trust between residents (WILLIAMS, J. 2005), and trust creates co-operation (PRETTY, J. – WARD, H. 2001) and connectedness among them (WILLIAMS, J. 2005). Thus, trust facilitates sharing and collaboration that leads to practical savings and many environmental consequences (MELTZER, G. 2005). Furthermore, sharing also has a positive feedback in cohousing communities. Communities are structured in a way that makes sharing easier, therefore sharing increases and shapes the structure to create even more possibilities (LIETAERT, M. 2010). Thus, sharing based on trust that creates co-operation and more sharing is one of the most important processes that cre-

ates pro-environmental characteristics in cohousing communities. During the interviews, it was revealed that most cohousing residents had chosen this lifestyle because they would have liked to share their everyday life with many other people instead of living individually or as an individual family. The possibility of sharing everyday life is the most attractive attribute of cohousing according to the interviewees. Furthermore, according to them, sharing facilities and smaller or bigger items and supporting the fellow residents in many ways are derived from knowing and caring for each other, thus, it ultimately derives from trusting each other.

## **9. Conclusion**

According to the data found in the literature and during the interviews, the members of cohousing communities exert lower negative environmental impact than the residents of conventional housing options. Cohousing residents have a greater sense of well-being.

Cohousing sites usually occupy less than average built land per capita and they have low-impact architecture in many cases. Some sites are created from existing buildings that are retrofitted. Cohousing communities also consume less energy, residents tend to buy less household equipment and other consumer goods. They are also characterised by reduced car usage and increased bicycle usage for transportation. The possibilities of adopting eco-friendly technological infrastructure is wider for these communities than for individual households, however, these have not been realised sufficiently by most cohousing communities.

These pro-environmental characteristics are derived from four out of the six common characteristics of cohousing communities and they are strengthened by a higher level of pro-environmental behaviour among cohousing members. The basis of these pro-environmental characteristics is social interaction, thus it might be a useful process to increase the ratio of pro-environmental characteristics of urban societies.

Today only an extremely small part of urban residents is living in cohousing communities, but it does not necessarily mean that it will only

appeal to a small minority in the future<sup>16</sup>. There are about 1000 cohousing communities around the world (LIETAERT, M. 2010), nearly 300 of them are located in *Denmark* (SCOTTHANSON, C. – SCOTTHANSON, K. 2005) and about 100 can be found in the USA (POLEY, L. D. 2007). Although in most countries the political, economic or other contexts have not given any aid for this specific housing concept yet, it has become well-known in many of them. Furthermore, their popularity does not seem to decline: several new communities are currently under development (WILLIAMS, J. 2005). However, the spreading of this lifestyle might be limited. One needs some determination, ability to compromise and a tolerant personality to be able to fit in and live happily in a cohousing community<sup>17</sup>.

According to this study cohousing lifestyle might be a good way towards sustainable living for people who would like to live in a small community as well. However, its real potential in creating a sustainable society is undetermined and needs further examination.

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<sup>16</sup> There were no open spaces left at any of the visited sites and many interviewees said that they have a long waiting list and there are new applicants every month.

<sup>17</sup> According to several interviewees, to be able to cope with the rules and with the somewhat reduced private life one has to want to live in a community. It is not for people who cannot tolerate each other, or who cannot make compromises.

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## **Appendix: Interview questions**

### **1. About the past**

- When was this cohousing community established?
- Please tell me the main events in your community's history.
- What were the main motivations of creating this community?
- What were the greatest challenges during the creation of the community and the cohousing living space?
- Did you have any common goal in the beginning? Did you reach it?
- What were your financial sources for the creation of the cohousing site?
- Did you get any expert help from outside or did you build everything on your own?
- Were there any significant changes inside or outside the community since the establishment?

### **2. General information**

- How many members does this community have? How did this number change since the beginning?
- How many children and adults live here?
- What is the ratio between men and women?
- How many members have lived here from the beginning?
- How many residents have arrived after the cohousing creation?
- Were there any members who left the community?
- What kind of policies do you have for entering and leaving the community?
- What kind of occupations do your members have? What is the average salary category?
- Where do your children go to school?
- Do children remain with the community when they grow up?

### **3. Physical characteristics**

#### *3.1. Housing types and technology*

- What types of housing do you have here?
- How are your buildings arranged? I would like to ask a layout plan marked with the private and community spaces.
- What is the exact size of the dwelling and common areas?

- What were the main reasons of arranging the site this way? What was the goal and did you reach it?
- What kind of purposes do your buildings and sites have? E.g. private homes, community buildings, storage buildings, community gardens, playgrounds, etc.
- What is the average size of the private areas?
- What kind of private spaces do the residents have?
- What is the average size of the community areas?
- What kind of community facilities do you have? E.g. laundry-room.
- What kind of technological gadgets are owned by at least every family or every person?
- What kind of technological gadgets do you own together as a community?

### *3.2. Housing materials and energy usage*

- What kind of materials are buildings made of?
- Do you have any kind of renewable energy source?
- What is the energy source for the heating?
- Do you use air conditioners in the summer?
- What is the energy source for the electricity?
- Do you have any special ecological sewage system? E.g. Constructed wetland
- Do you collect and use gray water and rainwater? Do you have a gray water system?
- What do you use the gray water and rainwater for?
- Have you done any renovation since the beginning? If you have, what kind of renovation were these? What were the main reasons to do these renewals?

### *3.3. Transportation*

- How often do you leave the site of the community?
- What kind of transportation do you use?
- How far do you go with the different types of transportation?
- How many cars does this community possess?
- Do you have co-owned vehicles, bicycles?
- What kind of parking spaces do you have? Where are these located?

- Do you do social and recreational activities only inside the community or do you go outside as well?
- How far and with what means of transportation do you go for recreation?
- Are local trips (like to the local store or post office) coordinated?
- Where and by what kinds of transportation do members usually go on vacation?
- How often do your members use airplanes?

#### *3.4. Food*

- Do you produce your own food at any level? What kind of food do you produce?
- Do you have any communal gardens for this or do residents produce food in their own private gardens?
- What kind of food products do you buy outside the community?
- Where do you buy your food (directly from farmers, farmer's market, mall, etc.)?
- Does the community shop together (only some members go shopping) or everyone goes individually?
- Do you store food up together for example for winter? Do you have a common building or room for this purpose?
- Do you have any members who do not eat meat (vegetarianism)?
- Do you have any members who do not eat any animal products (veganism)?
- Do you have any other members with other special diet? What kind of diets are these?
- How much meat do you eat in a day/a week/a month/a year (as you have the data)?
- Do your residents exchange food with each other?

#### *3.5. Waste management*

- Do you recycle your waste? Do you do composting?
- What protocol do you use for these? (e.g. residents separate their waste and take the material to the centralise depot outside the community individually or do you have another system for this?)
- What do you use the compost for?

- Do you take efforts to reduce the quantity of your waste? Less shopping, to buy less packaged products, repair the broken equipment?
- Do you reuse items you can?
- Do you share your tools and equipment?
- Do you have some kind of 'garage sale' events where residents can exchange items or is this happening spontaneously?

#### **4. Socio-cultural characteristics**

##### *4.1. Community principles, structure, rules*

- Have you got any common principles you live by? Are these principles written?
- Do you have any common principles in parenting your youngsters?
- What is the structure of your community?
- Do you have any tasks that have a committee? Or a designated individual? Or working group? What kind of tasks are these?
- What kind of common rules, regulations, and agreements do you have? Are these written?
- Are these house rules, therefore not legally binding or these are regulations that legally bind the members?
- How do you enforce these rules?
- How do you finance your common expenses?

##### *4.2. Decision making and meetings*

- Please describe in detail your community's decision making process.
- How do you implement (major) changes?
- Do you have regular meetings?
- How often do these meetings occur and who attends these?
- What kind of questions do you discuss on these meetings?
- When do you have meetings besides these regular ones?

##### *4.3. Social activities*

- What kind of regular social activities do you have inside the community?
- Do you have common meals? How frequent are these meals? How many residents attend on these usually?
- Do you have different types of activities for different age-groups?

- Do you organise activities as a community for others as well? If you do, for whom?
- Do you go to recreate outside as a community or only by yourself/with some other residents/with people outside the community?
- Do you have any contact with other cohousing or other kinds of communities? What is the nature of this relationship?

#### *4.4. Challenges*

- What kind of conflicts usually emerge during your everyday life?
- How do you solve these problems? Do you have any specific method for this within the community?
- What are the biggest challenges in your community life?
- Is there any factors (law, stubborn neighbours, disagreements among members, etc.) that hinders any kind of community activity or the creation of some kind of building that the community or any of your members would like to have?

#### *4.5. Environmental consciousness*

- In what way and on what level does your community pay attention to environmental problems during everyday life?
- Have you got any members who are particularly active or have less interest in this topic?
- Do you intentionally teach your youngsters to be environmentally conscious?
- Have you ever organised any activities that were about environment protection?

### **5. Closing questions**

- What is your opinion about Danish/Austrian cohousing communities in general?
- Are you interested in the results of this research?
- Would you like to get them before they are published?