



LUND UNIVERSITY
School of Economics and Management

Department of Business Administration
FEKN90, Business Administration
Examensarbete på Civilekonomprogrammet
Spring 2015

The decision-making process and willingness to pay for green dwelling

Authors

Emil Rydén
870125

Robert Waszkiewicz
910912

Supervisor

Matts Kärreman

Acknowledgments

There are many persons who have had a great contribution to the successful completion of this thesis. It has been an exciting journey, a journey that will soon come to an end.

First and foremost, we would like to thank our supervisor Matts Kärreman for challenging and guiding us upon the ocean knowledge. We've learnt a great deal from your guidance. Together with Matts we would also like to thank Thomas Kalling for giving us the opportunity to be a part of the research program Sustainable Society.

We would also like to thank the representatives at Familjebostäder, Nora Smedby and all of our respondents who made this thesis possible.

Last but not least, we would also like to thank all friends and family for the support, opinions and late night discussion.

Robert Waszkiewicz



Emil Rydén



Abstract

Title

The decision-making process and willingness to pay for green dwelling

Seminar date

2015-05-26

Course

FEKN90 Master Thesis in Business Administration (Level D), 30 ECTS

Authors

Emil Rydén and Robert Waszkiewicz

Supervisor

Matts Kärreman

Key words

Consumer behavior, willingness to pay, green dwelling, energy efficiency gap, sustainability, sustainable development

Purpose

The purpose of this study is to add insight into the decision process of consumers who have bought a green dwelling and what factors affected their willingness to pay. This insight can be used by decision makers, developers, real estate agents, policy makers, and other affected parties to make better informed decision in order to spur the development of green dwelling.

Theoretical perspective

The theoretical framework builds on previous literature about individual values, willingness to pay, bounded rationality, the energy efficiency gap, and consumer behavior.

Methodology

The study is a qualitative study with mostly an inductive approach. The aim of the research has been to study a social phenomenon and thus constructivism has been adopted. The empirical data has been gathered through semi-structured interviews and semi-structured telephone interviews and analyzed in a thematic way.

Empirical foundations

From the empirical findings of consumers' post hoc purchase/rent of green dwelling, we develop a new and improved framework that can be used as an explanation model for consumers' slow adoption of green dwelling.

Conclusions

We conclude that even consumers who have purchased a green dwelling still value regular aspects such as accessibility and apartment size higher than green attributes. Furthermore, we conclude that bounded rationality, externalities, and contextual factors all have big parts as explanatory variables for the low adoption of green dwelling.

Sammanfattning

Titel

The decision-making process and willingness to pay for green dwelling

Seminariedatum

2015-05-26

Ämne/kurs

FEKN90. Magisteruppsats på Civilekonomprogrammet (D-nivå), 30 HP (ECTS)

Författare

Emil Rydén and Robert Waszkiewicz

Handledare

Matts Kärreman

Nyckelord

Konsumentbeteende, betalningsvilja, gröna bostäder, energy efficiency gap, hållbarhet, hållbar utveckling

Syfte

Syftet med denna studie är att ge insikt i beslutsprocessen för konsumenter som har köpt grön bostad och vilka faktorer som påverkade deras betalningsvilja. Denna insikt kan användas av beslutsfattare, bostadsutvecklare, mäklare, politiker och andra påverkade parter i syfte att kunna göra mer välinformerade beslut och stimulera utvecklingen av gröna bostäder.

Teoretiska perspektiv

Det teoretiska ramverket bygger på tidigare litteratur om individuella värden, betalningsvilja, bounded rationality, the energy efficiency gap och konsumentbeteende.

Metod

Studien har huvudsakligen använt en induktiv ansats. Målet med forskningen har varit att studera ett socialt fenomen och därför har konstruktionism använts. Studiens empiriska data har samlats in genom semi-strukturerade intervjuer och semi-strukturerade telefonintervjuer och har sedan analyserats tematiskt.

Empiri och analys

Utifrån den insamlade empirin av konsumenters post hoc beslut att köpa eller hyra gröna bostäder utvecklar vi ett nytt och förbättrat ramverk som kan användas som förklaringsmodell till varför konsumenters anammande av gröna bostäder är långsam.

Slutsatser

Vi drar slutsatsen att konsumenter som köpt gröna bostäder fortfarande värderar vanliga hus aspekter som tillgång tillgänglighet och lägenhetens storlek före gröna husattribut. Vidare drar vi slutsatsen att bounded rationality, externaliteter och kontextuella faktorer alla är stora förklaringsvariabler till varför anammandet av gröna bostäder är lågt.

Table of Content

1. INTRODUCTION.....	1
1.1 BACKGROUND AND PROBLEMATIZATION.....	1
1.2 PURPOSE.....	4
1.3 RESEARCH PROGRAM.....	4
2. THEORY AND CONCEPTS.....	5
2.1 SUSTAINABILITY.....	5
2.1.1 <i>Definition</i>	5
2.1.2 <i>Environmental Sustainability</i>	5
2.1.3 <i>Social Sustainability</i>	7
2.1.4 <i>Economic Sustainability</i>	8
2.2 WILLINGNESS TO PAY.....	9
2.2.1 <i>Definition</i>	9
2.2.2 <i>Rationality</i>	9
2.2.3 <i>Bounded Rationality</i>	10
2.2.4 <i>Judgment Heuristics and Uncertainty</i>	11
2.2.5 <i>Prospect Theory</i>	11
2.2.6 <i>Externalities</i>	13
2.2.7 <i>Willingness to Pay vs. Willingness to Accept</i>	15
2.3 THE ENERGY EFFICIENCY GAP.....	16
2.3.1 <i>Market Failures</i>	17
2.3.2 <i>Market Barriers</i>	19
2.3.3 <i>Ways to Reduce the Energy Efficiency Gap</i>	20
2.3.4 <i>Barriers to Green Attribute Implementation in Other Literature</i>	21
2.5 THE COST OF PRODUCING GREEN BUILDINGS AND ITS PRICE PREMIUM.....	21
2.6 FACTORS AFFECTING WILLINGNESS TO PAY FOR GREEN DWELLING.....	24
2.6.1 <i>Definition of Features and Attributes</i>	25
2.6.2 <i>Review of Previous Articles Concerning Willingness to Pay in a Residential Context</i>	25

2.6.3 Values.....	28
2.6.4 A Value Type Framework	29
2.6.5 The Structure of Value Relations	32
2.7 PRELIMINARY THEORETICAL AND CONCEPTUAL FRAMEWORK.....	33
3. METHODOLOGY	35
3.1 RESEARCH APPROACH	35
3.2 RESEARCH STRATEGY.....	35
3.2.1 Influences on the Conduct of the Research	36
3.2.2 Research Design.....	36
3.2.3 Research Method	37
3.3 SAMPLING	38
3.3.1 Selection of Cases.....	38
3.3.2 Selection of Interviewees	38
3.3.3 Selection of Theory	39
3.4 DATA COLLECTION.....	39
3.4.1 Primary Data.....	39
3.4.2 Secondary Data.....	41
3.5 METHOD FOR PRESENTATION OF EMPIRICAL FINDINGS	41
3.6 METHOD FOR ANALYSIS.....	41
3.7 PRACTICAL PROCEDURE	42
3.8 RELIABILITY, REPLICABILITY AND VALIDITY	44
3.9 CRITICISM OF THE SOURCES	45
4. CONTEXTUAL FACTORS	47
4.1 GREEN BUILDING CERTIFICATIONS	47
4.1.1 LEED	47
4.1.2 Nordic Ecolabelling.....	49
4.2 CASE DESCRIPTIONS	50
4.2.1 Jublet & Vålbehaget	50
4.2.2 Solallén	51

4.2.3 HAMMARBY SJÖSTAD	51
4.3 THE HOUSING MARKET	53
4.3.1 Stockholm	53
4.3.2 VÄXJÖ.....	54
4.4 RELATIONSHIP BETWEEN CO ₂ EMISSIONS AND ENERGY CONSUMPTION IN SWEDEN	54
5. EMPIRICAL FINDINGS	57
5.1 CONSCIOUSNESS AND THE KNOWLEDGE ABOUT SUSTAINABILITY.....	57
5.1.1 Definition of Sustainability	57
5.1.2 Energy Consumption Related to CO ₂ Emissions.....	58
5.1.3 Global Warming	58
5.2. LIST ONE - THE RELATIVE IMPORTANCE OF GENERAL HOUSING ASPECTS	59
5.2.1 The Decision Making Process	59
5.2.2 Open Question - What Aspects and Parameters Were Taken Into Consideration When Making the Purchase.....	60
5.2.3 The Ranking of Aspects.....	62
5.2.4 Neighborhood Physical Qualities.....	62
5.2.4 Neighborhood Social Qualities.....	63
5.2.6 Accessibility.....	64
5.2.7 Regular Dwelling Attributes	65
5.2.8 Green Dwelling Attributes.....	65
5.3. LIST TWO - THE RELATIVE IMPORTANCE OF VARIOUS GREEN ATTRIBUTES.....	68
5.3.1 Did it Matter That the Dwelling Had Green Attributes?	68
5.3.2 Trust in the Certification.....	70
5.3.3 Low Energy Consumption.....	72
5.3.4 Low Water Consumption.....	73
5.3.5 Non-Toxic Building Material	73
5.3.6 Heat Isolation	74
5.3.7 Sound Isolation.....	75
5.3.8 Ventilation	76

5.4. STATED WILLINGNESS TO PAY FOR GREEN ATTRIBUTES AND HOW IT AFFECTS RESALE VALUE	76
5.5 ENERGY EFFICIENCY GAP	79
6. ANALYSIS & DISCUSSION	83
6.1 DIFFERENCE BETWEEN THE WILLINGNESS TO PAY AND WHAT AFFECTS ONE'S CHOICE	83
6.2 WHAT FACTORS AFFECT WILLINGNESS TO PAY	85
6.3 ENERGY EFFICIENCY GAP	87
6.3.1 <i>Asymmetric Information</i>	87
6.3.2 <i>Externalities</i>	88
6.3.3 <i>Misplaced Incentives</i>	89
6.4 THE DECISION MAKING PROCESS AND BOUNDED RATIONALITY	91
6.5 THE FRAMING OF MARKETING OF GREEN DWELLING PROJECTS	92
6.6 VALUES AFFECTING CHOICES	93
6.7 REVISED THEORETICAL AND CONCEPTUAL FRAMEWORK	95
8. CONCLUSION	97
8.1 THEORETICAL IMPLICATIONS AND APPLICABILITY	98
8.2 MANAGERIAL IMPLICATIONS	98
8.3 METHODOLOGICAL IMPLICATIONS	100
8.4 SUGGESTIONS FOR FUTURE RESEARCH	101
REFERENCES	102
APPENDIX 1. RESPONDENT DEMOGRAPHICS	112
APPENDIX 2. INFORMATION LETTER	113
APPENDIX 3. INTERVIEW GUIDE: JUBLET & VÄLBEHAGET AND SOLALLÉN	114
APPENDIX 4. INTERVIEW GUIDE: HAMMARBY SJÖSTAD	116
APPENDIX 5. AGGREGATED INDIVIDUAL RANKING	118
APPENDIX 6. ARTICLE	119

List of tables

Table 2.1. Environmental sustainability goals.....	7
Table 2.2. Social sustainability goals.....	8
Table 2.3. Environmental sustainability goals.....	9
Table 2.4. Framing and editing phase: four major operations.....	12
Table 2.5. Classification of market failure terms.....	18
Table 2.6. Used definition of market barriers in this study.....	20
Table 2.7. Motivational types of values.....	31
Table 4.1. Score of Jublet and Vålbehaget in the LEED certification process.....	50
Table 5.1; 5.2; 5.3. The local average ranking in all three cases for list one.....	62
Table 5.4; 5.5; 5.6. The local average ranking in all three cases for list two.....	68
Table 6:1, 6:2. The summarized average scoring for all cases.....	83
Table 6.3. Summary of the four causal variables.....	84

List of figures

Figure 2.1. Illustration of the energy efficiency gap.....	17
Figure 2.2: Global GHG abatement cost curve for the buildings sector.....	23
Figure 2.3. Increasing capital costs against environmental performance for three building types.....	24
Figure 2.4. Theoretical model of relations among motivation types of values, higher order value types and bipolar value dimensions.....	33
Figure 2.5. Preliminary theoretical framework.....	34
Figure 4.1. The price increase (SEK/m ² /year) for apartments in central Stockholm between February 2012-February 2015.....	53
Figure 6.1. Illustration of the ABC-theory.....	84
Figure 6.2. Revised theoretical framework.....	95

1. Introduction

1.1 Background and Problematization

Global warming is a growing concern that is getting more and more attention in today's society. Extreme weather phenomena including hurricanes, floods, and other natural disasters being constantly reported throughout the world has increased the awareness regarding the impacts that we, as humans, have on the environment (IPCC, 2014). This has created a growing consciousness about what will happen if we do not manage to change our destructive behavior (Donald & Atul, 2001).

According to The Greenhouse Gas Protocol (2012), 70 percent of the total energy-related greenhouse gas emissions stem from cities. According to the same organization, cities possess the greatest potential to reduce CO₂ emissions. Simultaneously, the United Nations (UN) expect that there will be an increase in the world's urban population from a 2014 level of 54 percent of the world's total population to a total of 66 percent in 2050, meaning that 2,5 billion people will be added to the urban areas of the world (UN, 2014). It is also estimated that the total floor space will increase by 75 percent (Nauc ler & Enkvist, 2009). This continued urbanization will provide challenges to sustainable development, especially in low to middle income countries where the urbanization is the quickest (UN, 2014). Thus, there are both great opportunities, but also challenges for cities in the coming decades.

According to the United Nations Environment Programme the building sector accounts for 30 percent of all the greenhouse gas emissions in the world and 40 percent of the energy usage (UN, 2009). IPCC (2014) on the other hand states that it is 19 percent of the greenhouse gas emissions that stem from the building sector. No matter which holds true, it is clear that there is great potential in reducing both the energy usage and negative environmental effects that construction causes. According to Nauc ler and Enkvist (2009) residential dwelling is responsible for 62 percent of the building sectors total emissions, which they argue can be significantly reduced with positive long-term economic benefits or at a very low cost. This is mainly due to long lifespan of buildings and thus payback time, which is assessed to be between 65-70 years in developed countries. Furthermore, as long as the dwelling is occupied, the energy consumption continues. Nauc ler and Enkvist (2009) found that about 8 percent of all greenhouse gas emissions were due to direct emission from energy usage in buildings, while 10 percent of all emissions were due to indirect building emissions such as district

heating and power usage which in total sums up to 18 percent. A UN report shows that the average energy usage in households, with exception of transport, is in total 27.5 percent globally and 27 percent in Europe of the total energy usage (UN, 2009).

To tackle the aforementioned problem of buildings' effect on sustainable development, today there exist several green¹ building certifications, where BREEAM and LEED are the most well known with international presence (SGBC, 2015). Since 2009, the Nordic Ecolabelling also offer a certification in the Nordic countries that applies to small houses, multi family homes, and pre-school building (NCC, 2015; Svanen, n.d.a). The majority of the certifications were developed to stimulate market demands while lowering search costs for consumers who sought after buildings with better environmental performance (Crawley, Aho, Hinks & Cook, 1999). These certifications have been well adopted in the commercial sector and there is a large number of studies that show that companies are willing to pay both rent- and price-premiums for certified buildings (Eichholtz, Kok & Quigley, 2010; Fuerst & McAllister, 2011; Chegut, Eichholtz & Kok, 2014). However, the adaptation among regular citizens has been limited and much less research has been done in this context. Our literature review has shown that some consumers are willing to pay extra to live in a green building while others put little emphasis on the matter (Banfi, Farsi, Filippini, & Jakob, 2008; Yau, Chiu & Lau, 2014; Chau, Tse & Chung, 2010; Hu, Geertman & Hooimeijer, 2014). At the same time, environmental awareness has increased among individuals during the last years and there has been a significant increase of consumption and interest in eco-friendly products, recycling, and protection of the environment. This suggests that at least some individuals actually care about the environment and try to act in its best interest (Miller, Buys, Barnett, & Bailey, 2005).

A green building certification means that the consumer can have a higher living standard which can, for example, include better daylight exposure or indoor air quality while at the same time contribute to a lower energy consumption and therefore incur a lower economical cost. This means that there are potential win-win situations but, as mentioned above, many do not consider these future gains when considering renting or buying their dwelling. In different

¹ Henceforth, green building/dwelling and sustainable building/dwelling will be used interchangeably.

contexts, such as home appliances and cars, researchers have tried to explain this phenomenon that is often called the energy efficiency paradox (Bonde, 2012; Brown, 2001).

In order to spur the development of green dwelling it is not only important to understand the motives for creating a supply of green dwelling, which ought to be financial or policy-driven, but also what affects demand and the willingness to pay (Yau et al., 2014). This is important in the sense that developers and planners will better understand what to focus on.

What factors affect willingness to pay is also important to understand out of a policy-making perspective. According to some previous literature (Casals, 2006; Yau et al. 2014), the biggest obstacle of an increased supply is the price premium associated with developing sustainable buildings. One way to minimize this barrier is to increase sustainable building production through policies created by the government that either demand a certain standard of sustainability or subsidize green attributes (Yau et al., 2014). However, having a compulsory policy can create market inefficiencies and can also be costly to enforce (Karp & Gaulding, 1995). Subsidies on the other hand can be publically controversial and financially strenuous on the government (Yau et al., 2014). Therefore a market-driven approach should be the most efficient way to increase the supply of green dwelling. However, this rests on the assumption that additional value exists for which the consumer is willing to pay. If it is only some green building attributes or intrinsic values that affect the demand, it is logical to argue that those attributes that who do not should either be subsidized or compulsory to include in construction projects (Yau et al., 2014).

Until today, the existing research on what affects consumers' willingness to pay for green dwelling is scarce and therefor we know little about it (Hu et al., 2014). Even less research is done among consumers who have actually moved from a non-certified to certified building. What is it that drives these people to invest in green housing in spite of the market barriers and failures that exist?

1.2 Purpose

The purpose of this study is to add insight into the decision process of consumers who have bought a green dwelling and what factors affected their willingness to pay. This insight can be used by developers, real estate agents, policy makers, and other affected parties to make better informed decision in order to spur the development of green dwelling.

1.3 Research Program

This study has been performed within a research project at the Lund University School of Economics and Management. The research project is called Sustainable Society (SuS) and was established to increase understanding of the processes that lead to ecological, economical, and social sustainability.

2. Theory and Concepts

2.1 Sustainability

2.1.1 Definition

In 1987 the World Commission on Environment and Development released a report commonly referred to as the Brundtland report (UN, 1987). The report gave rise to the concept of *sustainable development*, which in turn widely spurred a discussion in various academic disciplines and has been a popularly discussed concern ever since. The concept is defined as the:

“[...] development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” (UN, 1987)

The sustainable development concept in the Brundtland report mainly focused on improving the living conditions of the poor and less fortunate in the world, as well as meeting overall human needs. An environmental aspect is also discussed where it is stated that social and economic goals cannot be met on behalf of the environment. The report state that in order for future needs to be met, non-renewable energy sources can only be used to the extension that can be justified because of lack of substitutes, and in a way that does not threaten the overall health of the world. The definition has since been redefined several times (Redclift, 1992; Redclift 2007).

Johnston, Everard, Santillo & Robert (2007) argue that the concept has been modified as many as 300 times, often in order to involve self-interest oriented goals or in ways that does not involve any real change (Johnston et al., 2007; Redclift, 2007). However, most redefinitions still remain similar to the original (Glavic & Lukman, 2007). The three parts of sustainability; environmental, social and economic, can also be described in the popular light of the *triple bottom line*, which was essentially coined to make the concept more integrated and implementable in business practices (Elkginton, 2004).

2.1.2 Environmental Sustainability

Environmental sustainability can be described as improving human welfare by protecting the sources of raw material that are used to cater to human needs (Goodland, 1995). What this

means in practice is that we can only develop at a rate that allows the Earth to regenerate and living within the limits of our *biophysical environment* (Goodland, 1995; Pope, Annandale & Morrison-Saunders, 2004) or in other words, sustaining the natural resource base (Redclift, 1992). Waste must then be lower than the environment can accrete, implying that renewable resources can only be used to the same extent as they can regenerate. Non-renewable resources, on the other hand, should only be used to the extent that renewable substitutes can be created (Goodland, 1995). Redclift (1992) argues that since most resources are under someone's direct or indirect ownership and control, it is important to know who and how they are managed.

One of the skeptical arguments against the term *sustainable development* is how much the environmental aspect has been stressed in its relation to the two other pillars of social and economic sustainability. It is also argued that the term does not really contain guidance of how to conciliate between the objectives of economic development on one hand and environmental and social development on the other (UNECE, 2005).

A popular and growing way to measure environmental sustainability is to apply an economic cost of ignoring the impact our actions have on the environment (Redclift, 1992). This implies that improving the environment per se will improve the economy. A problem with this view is that it works better in the developed part of the world where the environment is often prioritized before economic growth. In poorer parts of the world, this economic cost of a deterred environment is ignored, as will be further explained in the next section (Redclift, 1992).

A report was created by Queensland Department of Public Works (QDPW, 2008) to outline good sustainability practice in a housing context. The goal of the report was to create more sustainable residential housing. In this report they identified several general sustainability goals for sustainable homes. The goals associated with the environmental pillar were:

Environmental sustainability goals	Explanation
Energy	Minimize the need for non-renewable energy through use of solar energy, ventilation, insulation and shading, use of appropriate building materials etc. in order to ensure high energy efficiency.
Water	Low water usage through smart features and appliances
Materials and Waste	Minimize waste through efficient use of non-toxic building material
Site impact and biodiversity	The natural features of the site: local climate, natural and cultural features, retaining existing vegetation etc.

Table 2.1. Environmental sustainability goals. (QDPW, 2008)

2.1.3 Social Sustainability

The social dimension of sustainable development is a relatively unexplored area academically and therefore its meaning is not clearly defined (Dempsey, Bramley, Power & Brown, 2011; Murphy, 2012; McKenzie, 2004). The earlier discussion around the topic seems to relate to increasing the materialistic standards of poor inhabitants of the world. The main emphasis in the Brundtland report was on social sustainability, in other words, the reduction of poverty (UN, 1987).

Later literature reviews of the definition of the social sustainability seem to differ in their conclusions. In a policy context, Murphy (2012) identifies four organizing dimensions of social sustainability; equity, awareness for sustainability, participation, and social cohesion. Dempsey et al. (2009) conclude that the dimension of urban social sustainability are social equity and the sustainability of community, where the first is associated with politics and policy and the second is related to the continued "*viability, health and functioning of society itself as a collective entity*" (Dempsey et al., 2011:297).

In a housing context, social sustainability efforts vary significantly between countries due to their significant differences in wealth. For example countries like Romania, where about 40 percent of the population does not have a flushing toilet, bath or shower in their homes will

have different sustainable challenges than for example Sweden (Strandbakken & Heidenström, 2011). The social sustainability goals that identified QDPW (2008) were:

Social sustainability goals	Explanation
Human comfort	Provide an internal environment that is thermally, visually and acoustically comfortable
Human health	Reduce hazards to human health within the home (e.g. the presence of toxic chemicals) and promotes natural lighting and ventilation
Safety	Minimize the risk for injuries
Security	Live in a environment safe from crime
Universal design	A comfortable home for various types of people of different ages e.g. easy accessibility.
Sense of community	Promoting opportunities for neighborhood interaction etc.

Table 2.2. Social sustainability goals. (QDPW, 2008)

2.1.4 Economic Sustainability

Most definitions of economic development give primacy to present and future levels of consumption with the environment being the limiting factor (Redclift, 1992). The original definition of income “*the amount one can consume during a period and still be as well of at the end of the period*” (Hicks, 1946) can define economic sustainability (Goodland, 1995). Goodland (1995) further argues that we need to move and embrace other forms of capital in economic sustainability, meaning natural, human, and social capital in order to reach a sustainable development. Jackson (2007) builds on that definition and argues that in order to become economically sustainable, we must consume in a way that allows future generations to have at least the same amount of consumption as we do today.

The economic sustainability goals of QDPW's report (2008) were concerned with the dwelling being more cost-efficient over time:

Economic sustainability goals	Explanation
Initial cost	Reduce the construction cost, calculate the use of material in capital cost as well as their contribution to potential future savings. Consider using standard sized and recycled products if possible.
Maintenance costs	Considering the long term economic implications and maintenance cost when choosing material.
Operating costs	Use alternative energy sources as well as energy and water efficient solutions.
Future Modification costs	Minimize the need for future modifications by considering the changing needs of the consumer.
Community costs	Minimize the cost of being part of a wider community, for example utility and transport costs.

Table 2.3. Environmental sustainability goals. (QDPW, 2008)

2.2 Willingness to Pay

In order to fulfill the purpose of this research, it is important to fully understand the concept of willingness to pay and its complexity. Therefore, we provide a short summary of the concept, assumptions about rational choice and the importance of externalities when talking about environmental issues and sustainability.

2.2.1 Definition

In neoclassic economics, the price of goods and services in a market can be understood as the equilibrium between supply and demand. However, as different consumers are assumed to have different preferences and incomes there are differences in how much consumers are willing to pay for a good or service at the equilibrium (Bergh & Jacobsson, 2010).

2.2.2 Rationality

In economics it is assumed that people have rational preferences and that these lead to rational choices, which in turn maximize their utility (Bergh & Jacobsson, 2010; Katona, 1953; Arrow, 1951 in D. Lerner & H.D. Lasswell). These rational preferences have to fulfill two criteria: first they have to be complete and secondly they have to be transitive. A complete

preference means that the consumer is able to evaluate all the alternatives against each other. A transitive preference means that, if the customer values A over B and B over C, the customer must also value A over C (Bergh & Jacobsson, 2010; Katona, 1953; Sugden, 1991; Ayres & Kneese, 1969).

Moreover, the economic, or rational, man is also able to have complete information and foresight which means that there is no uncertainty about present or future conditions such as price, demand and supply. There are also no other factors that make the rational choice slow, hard, or impossible to do, and there is complete competition in the market (Katona, 1953).

This utility maximization of consumers leads to a function that is useful to analyze and describe people's rational choices and to understand the demand-curve of a good or service. The demand-curve is thus a function that describes the willingness to pay of a good or service based on consumers rational preferences that maximize their utility (Bergh & Jacobsson, 2010).

In economics there are two explanations why consumers change their consumer behavior: the income effect and the substitution effect. The income effect is changes in what we can afford to consume and the substitute effect reflects relative price changes between alternatives (Bergh & Jacobsson, 2010; Katona, 1953; Ayres & Kneese, 1969).

2.2.3 Bounded Rationality

In contrast to the economic theories presented above, Herbert Simon (1955) criticized the economic man of economics. He suggested that it is unsuitable to base theory on assumptions such as perfect information, stable and consistent preferences, and mans ability to compute which option that maximizes individual utility (Simon, 1955). Instead he argues that business researchers have to incorporate psychology into their assumptions about rational behavior. Simon (1955) states that, in order to make a choice, people simplify decisions deliberately in order to get in range of that persons computational capacity. He states that there are common constrains to rational choice and mention three examples (Simon, 1955):

- 🍃 The set of alternatives open to choice.
- 🍃 The relationships that determine the pay-offs as a function of the alternative that is chosen.
- 🍃 The preference-orderings among pay-offs.

Simon (1955) further argues that cognitive constraints imply that actual human behavior, in contrast to rational decisions, are extremely crude and simplified to make approximations of utility. Therefore he suggests that economic models of rational choice put too much emphasis on peoples ability to correctly calculate the pay-offs of alternatives and that there is no evidence of this actually happening in complex situations. The constraints also mean that the assumption of transitive preferences vanishes because most people have a satisfactory pay-off and that once this pay-off is found there will be no more search for a better alternative (Simon, 1955).

In the end, the author concludes that the economic man actually is a choosing organism of limited ability and information and that the simplifications this leads to introduce discrepancies that explain much of the behavior of humans (Simon, 1955).

2.2.4 Judgment Heuristics and Uncertainty

In 1974, Amos Tversky & Daniel Kahneman showed that Simon (1955) was right in his predictions concerning the simplification of complex decisions. Their article conclude that people rely on a few heuristic principles that reduce complex tasks of assessing probabilities and predicting values in order to make it into a simpler judgmental operation. Tversky & Kahneman (1974) argues that these heuristics can lead to grave and systematic errors.

2.2.5 Prospect Theory

Based on their findings in 1974, Kahneman & Tversky (1979) developed a theory they called *prospect theory* where they questioned the longstanding economics theory *expected utility theory* that had lead much of the analysis of decisions under risk (Kahneman & Tversky, 1979). *Expected utility theory* is based on four major axioms of rational choice – cancellation, transitivity, dominance, and invariance but also on the assumptions of comparability and continuity (Tversky & Kahneman, 1986).

Cancellation refers to the elimination of any state of the world where the outcome is independent of one's choice. Transitivity is where preference of A over B and B over C also mean a preference of A over C. Dominance is when a choice is better in one state, and not worse in all the other states, it should always be chosen. Lastly, invariance assumes that, when presented with different representations of the same option the outcome should always be the same, meaning that preferences should be independent of their description.

However, the authors argue that transitivity can be questioned and that many authors have rejected cancellation (see for example Sugden, 1991). Furthermore, they show that invariance does not hold true and that violation of invariance also creates violation of stochastic dominance and vice versa (Tversky & Kahneman, 1986).

In 1986, Tversky & Kahneman further develop their theory. According to their theory there are two phases in the risky choice process: a framing and editing phase, which is followed by an evaluation phase. The framing and editing phase is a preliminary analysis that frames contingencies, outcomes, and effective acts. The framing is controlled by norms, habits, expectancies, and also by how the choice problem is presented. In the evaluation phase, the edited offers are chosen based on which has the highest value (Kahneman & Tversky, 1979; Tversky & Kahneman, 1986). The framing and editing phase consists of four major operations (Kahneman & Tversky, 1979):

Major operation	Explanation
Coding	When people refer to offers as gains or losses based on a reference point. The reference point is important because people tend to be risk averse when they see an offer as a gain and risk seeking when they see the offer as a loss.
Combination	Offers can sometimes be combined and simplified when associated with identical outcomes.
Segregation	Happens when a prospect contains a riskless choice that can be segregated from the risky one in the editing phase.
Cancellation	The foundation of the isolation effect, that is, the disregard of things that are shared between alternatives.

Table 2.4. Framing and editing phase: four major operations (Kahneman & Tversky, 1979)

There are many anomalies in preferences that stem from the editing phase such as inconsistencies in the isolation effect or intransitive choice based on simplifications (Kahneman & Tversky, 1979).

In the second phase, the decision maker is assumed to choose the prospect with the highest value following the editing phase. Kahneman & Tversky (1979) argue that the carrier of value is the change of value rather than final states. They argue that value is based on two things. First, it is the reference point that the decision maker has, and second, it is the magnitude of change from that reference point. They also take into account that there is a marginal value of gains and losses that is reduced with the magnitude of the change and that losses incur greater impact than gains, what is called loss aversion.

2.2.6 Externalities

When transactions are made on a free market, it means that the two partners who have made the transaction are indifferent, or better off than before at the new equilibrium. However, this transaction can lead to a third party being affected. This is called an externality. There are two types of externalities, positive and negative (Bergh & Jacobsson, 2010). For a long time, economists have recognized that these externalities can cause market failures (Gillingham & Palmer, 2013).

Externalities emerge when there is no market for the participants to negotiate a price for the externality and thereby reach an effective solution. One such externality is pollution. The lack of solution mean that companies will produce more than what is good for society and will not take into account the costs for e.g. pollution even though there might be a willingness to pay to among consumers to reduce it. This problem stems from the difficulty to name who is liable for the pollution or other damage to a third party (Bergh & Jacobsson, 2010; Pigou, 1932; Coase, 1960; Aryes & Kneese, 1969).

Pigou (1932) argued that it is the company that is liable, but Coase (1960) challenged this assumption. Coase (1960) mean that, if there is a willingness to pay for negative externalities to stop, then there must also be a willingness to accept. This is often referred to as the Coase-theorem. In other words, the willingness to accept is the amount of money that one is willing

to accept to give something up, or in the pollution case, how much fresh air one is willing to give up. Coase (1960) argue that the party with the highest utility of the externality is the one who will pay for it, either in monetary terms or in acceptance of damage from the externality.

Ayres & Kneese (1969) argue that, if the environments absorption capacity is scarce, there has to be a compensation for the external diseconomies. However, in order for this to happen, two criteria have to be met. First, all input has to be converted into output without any residuals and secondly; there has to be property rights so that all environmental attributes are in private ownership and that they are tradable on a competitive market. None of these conditions are met in an actual economy (Ayres & Kneese, 1969).

Traditionally, public goods such as water and air has been treated as free goods in economics. In developed countries, this is no longer true because they represent a property resource of great value that the private market has difficulties to allocate. There is a growing problem that externalities create increasing pressure on the environments ability to dilute and degrade the waste products (Ayres & Kneese, 1969).

With all production and consumption there are externalities, all of which seem to disappear into a void of nothingness, however; they often cause disservices to society (Ayres & Kneese, 1969). One example of this void could be fuel combustion, which turn visible carbon, like petrol or coal, into invisible CO₂ and other gases that are considered as externalities. It is often, in an attempt to reduce or eliminate these disservices, devised control efforts because they cannot be controlled by individual exchanges. The authors argue that taxes or restrictions in order to internalize externalities cannot by themselves guarantee success, instead, public goods has to enter into the optimal solution (Ayres & Kneese, 1969).

As an example, in 2005 the European Union initiated the EU Emission Trading System (EU ETS) to combat externalities caused by the CO₂ emissions and to keep its obligations toward the Kyoto protocol. The aim is to combat climate change and reduce CO₂ emissions from the sectors covered by the policy with 21 percent by 2020 and 43 percent by 2030 from a 2005

base line. The policy allows companies to trade CO₂ emissions and thereby help to put a price on an earlier unpriced good - air (EU, 2015; Energimyndigheten, 2012).

Ayres & Kneese writes: "Some experts believe that the latter is likely to show a large relative increase, as much as 50 per cent by the end of the century, possibly giving rise to significant - and probably, on balance, adverse - weather changes. Thus continued combustion of fossil fuels at a high rate could produce externalities affecting the entire world" (Ayres & Kneese, 1969: 286).

Today, almost 50 years later, we know this to be a fact. Despite the Emission Trading System, a report by the World Health Organization (WHO) estimate that the cost of air pollution in EU alone amount for \$1.6 trillion per year. This equals 10 percent of the regions GDP (WHO, 2015) or roughly 3,4 times the 2014 GDP of Sweden² (SCB, 2015; Oanda, 2015). This is not a real cost but rather the cost of lives and decease caused by externalities. The report estimates that 600,000 people in Europe die prematurely due to air pollution every year (WHO, 2015).

2.2.7 Willingness to Pay vs. Willingness to Accept

Horowitz & McConnell (2002) made a review of willingness to pay/willingness to accept studies up to date and drew some general conclusions. First of all, they state that willingness to accept usually is substantially higher than willingness to pay, however, it should be emphasized that this is measured when the same person is both paying and then accepting money in the same situation. Furthermore they find that the willingness to pay/willingness to accept ratio is higher the less common or regular the good is.

They also argue that there are two reasons for why these findings do not find their way to economic models (Horowitz & McConnell, 2002). First, because the experimental features are deemed weak and secondly, because there is an absence of the application of behavioral models. Furthermore, they find that real experiments are not significantly different from hypothetical experiments, which is not in line with most other authors on the subject. Also,

² \$ 1,6 trillion / $\left(\frac{\text{Sweden's GDP in SEK}}{\text{USD exchange rate}}\right)$

the situations that are 'real' are deemed so if real money was used in an experimental setting, not necessarily post hoc measurement of real trade situations.

The authors also state that several other authors suggest that if an experiment is repeated with the same subject, the willingness to pay/willingness to accept ratio will decline. The argument behind this is that the willingness to accept would be reduced as the subjects realizes that they would be content to take home a smaller amount of money than they first thought, if their initial asking price is not met. Even though the evidence for this phenomenon is mixed, it seems to indicate irrational behavior (Horowitz & McConnell, 2002).

2.3 The Energy Efficiency Gap

The energy efficiency gap or energy paradox is the difference between the actual investment made and a higher priced, more energy efficient, alternative that would be the most cost-beneficial from the consumers' point of view (Brown, 2001). There are many studies that have shown the existence of this gap and it has been explained to exist because of market failures and market barriers (Brown, 2001; Jaffe & Stavins, 1994; Gillingham & Palmer, 2013). This gap leads to failures where the energy efficient investments have a hard time to penetrate the market and also leads to a slower adoption. This is because the consumers fail to do a proper net present value (NPV) calculation, taking consideration to the economic benefits from the energy savings (Gillingham & Palmer, 2013). However, there are inconsistencies between researchers about how big this gap is (Brown, 2011; Jaffe & Stavins, 1994; Bonde, 2012; Högberg, 2011; Allcott & Greenstone, 2012; Gillingham & Palmer, 2013).

The figure below is an illustration of how big the energy efficiency gap is and how it can be assessed according to Jaffe & Stavins (1994).

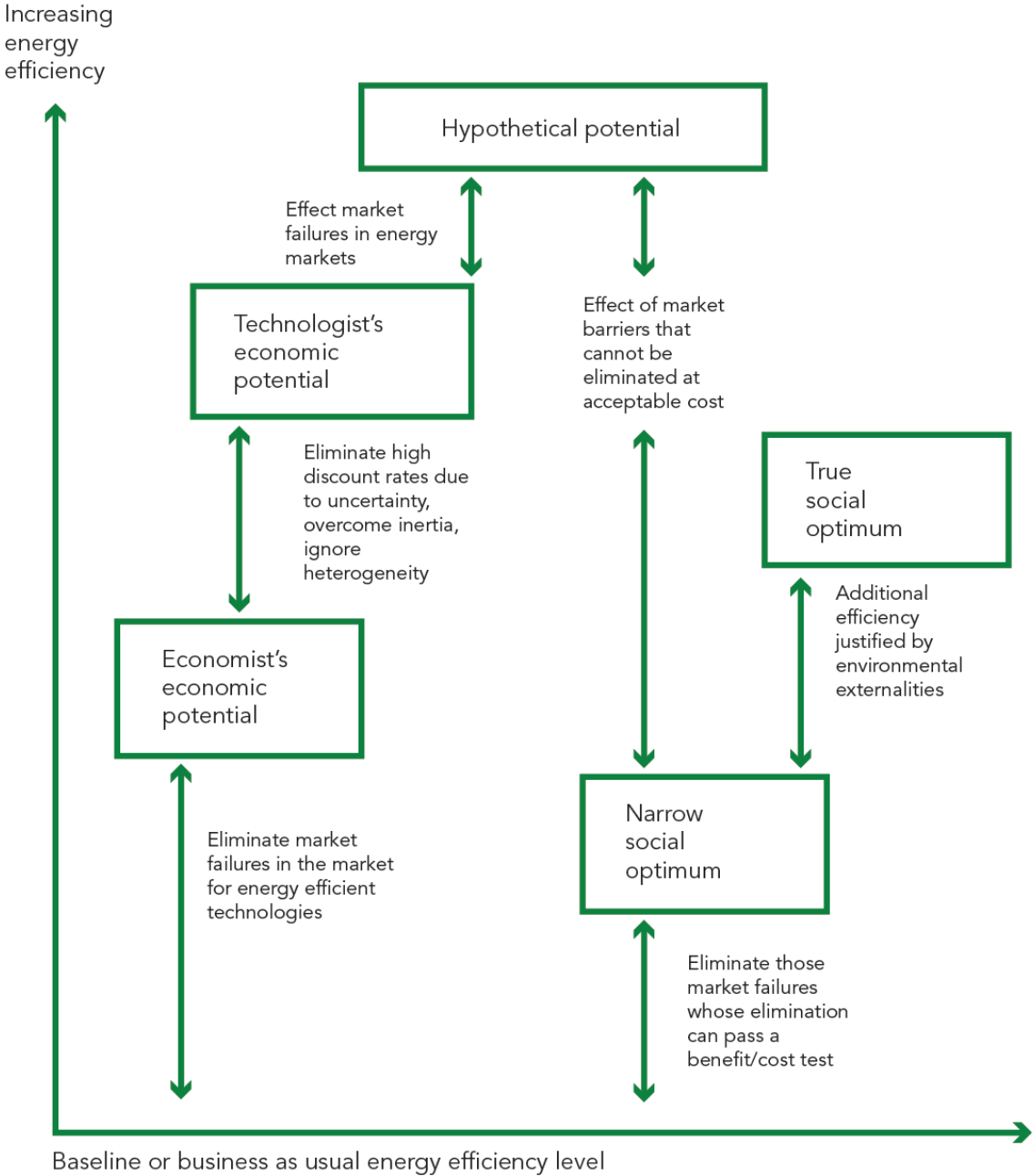


Figure 2.1. Illustration of the energy efficiency gap (Jaffe & Stavins, 1994)

2.3.1 Market Failures

The explanations for the market failures vary between researchers. Brown (2001) mentions misplaced incentives, distortionary fiscal and regulatory policies, unpriced costs, unpriced benefits, and insufficient and inaccurate information as variables. Golove & Eto (1996) also

mention credit constraints, where borrowers are not able to borrow enough money due to credit ratings and lack of knowledge on the lenders' part. Bonde (2012) use three explanations for the market failures; asymmetric information, externalities, and split incentives. Asymmetric information is when one party holds more information than the other. Externalities are explained in 2.2.6. The split incentive is that, if the potential adopter of an energy efficient product does not pay for his or her utility bill, the incentives may not be enough to encourage optimal usage. Allcott & Greenstone (2012) use the terms imperfect information and inattention as explanations and Jaffe & Stavins (1994) says it is due to three types of unavailable information. However, all the terms used are similar in their content, which is why we have chosen to summarize them.

We have decided to use Bonde's (2012) terms - asymmetric information and externalities, and Brown's (2001) misplaced incentives under which we have categorized the other terms. A table of this is presented below.

Used definition	Other Descriptions Categorized in the Definition
Asymmetric information (Bonde, 2012)	<ul style="list-style-type: none"> • Insufficient and inaccurate information (Brown, 2001; Golove & Eto, 1996) • Insufficient information creation (Jaffe & Stavins, 1994), • Imperfect information and inattention (Alcott & Greenstone, 2012)
Externalities (Bonde, 2012)	<ul style="list-style-type: none"> • Unpriced costs and unpriced benefits (Brown, 2001; Golove & Eto, 1996), • Positive externalities that are uncompensated (Jaffe & Stavins, 1994)
Misplaced incentives (Brown, 2001)	<ul style="list-style-type: none"> • Misplaced incentives, distortionary fiscal & regulatory policy (Brown, 2001; Golove & Eto, 1996) • Split incentive (Jaffe & Stavins, 1994; Bonde, 2012)

Table 2.5. Classification of market failure terms

Gillingham & Palmer (2013) also mention many of the above reasons as possible causes for the market failures. However, they go further in trying to explain the reasons behind the gap with behavioral economics. As mentioned earlier in this literature review, there is lots of evidence that people are not rational. Gillingham & Palmer (2013) state that nonstandard

preferences, nonstandard beliefs, and nonstandard decision-making can help to explain market failures. Nonstandard preferences refer to what was mentioned earlier about loss aversion. If people have preferences based on a reference point as suggested by Tversky & Kahneman (1979) then the loss of the initial investment might prevent the energy efficient investment (Gillingham & Palmer, 2013). Nonstandard beliefs mean that people have difficulty in predicting the future; the authors refer to a study (Alcott & Wozny, 2012), which suggest that consumers cannot accurately predict the future savings from fuel consumption (Gillingham & Palmer, 2013). Lastly, nonstandard decision making refer to Simon (1955) about bounded rationality as well as Tversky & Kahneman (1974; 1979; 1986) and their findings about framing and decision heuristics used when evaluating an investment (Gillingham & Palmer, 2013).

2.3.2 Market Barriers

As with the market failure there are variations in description when it comes to defining the content of market barriers. Brown (2001) classifies the barriers by mentioning three reasons, (1) low priority of energy issues, which is due to the relatively low energy cost compared to other goods and services. (2) Capital market barriers, meaning that consumers are not able to lend money for energy efficient investments. The third reason (3) is incomplete markets for energy efficiency. This means that you normally do not buy a product to be more energy efficient, instead you buy a product for another reason where the energy efficiency is just a feature. One example is the fuel efficiency of cars; you buy a car to get from A to B and the fuel efficiency is secondary.

Other market barriers are defined uncertainty about future energy prices combined with the irreversibility of the investment, which implies an uncertainty about the future payback; that uncertainty about quality make the investments less desirable; adaptation cost, and lastly, heterogeneity among the population which implies that preference varies among different consumers and thus might affect the adoption (Jaffe & Stavins, 1994). Finally Bonde (2012) mentions transaction costs and uncertainty.

It is harder to categorize the market barriers. Thus we will use definitions from more than one author as presented in the table below.

Author	Used definition
Brown (2001):	<ul style="list-style-type: none"> • Low priority of energy issues • Capital market barriers • Incomplete markets for energy efficiency
Jaffe & Stavins (1994):	<ul style="list-style-type: none"> • Uncertainty about future energy prices combined with irreversibility of the investment • Uncertainty about quality • Heterogeneity of the population
Bonde (2012):	<ul style="list-style-type: none"> • Transaction costs • Uncertainty

Table 2.6. Used definition of market barriers in this study

2.3.3 Ways to Reduce the Energy Efficiency Gap

Gillingham & Palmer (2013) mention three ways to reduce the energy efficiency gap; economic incentives, information strategies, and energy efficiency standards. They suggest that economic incentives is the most straightforward approach where policymakers can put taxes on energy, subsidize energy efficient investments, or use a feebate policy where non-energy efficient products pay extra tax. However, the authors argue that this can lead both to rebound effects and to economic inefficiencies. The rebound effect implies that when technology is developed and becomes more energy efficient, the consumer will tend to care less about conserving energy (Gillingham & Palmer, 2013).

Information strategies have a goal of educating the consumer about the energy efficient product but have been proven to have limited success. One way is product labeling, which is also used to make it easier for consumers when making their decision (Gillingham & Palmer, 2013).

Finally, energy efficiency standards aim to set a minimum level of energy efficiency for products. However, this is a blunt instrument because one standard cannot comprehend with the heterogeneity of the market. Some research on building codes effect on energy consumption show ambiguous results where some research suggest no significant effect and others 3 to 5 percent less energy consumption (Gillingham & Palmer, 2013).

2.3.4 Barriers to Green Attribute Implementation in Other Literature

Nauc ler & Enkvist (2009) pinpoint three general barriers to implementation for green attributes. These partly depend on the fact that much of the improvement relies on many small emitters, which are harder to affect than big groups of companies. The barriers are payback time, agency problems, and visibility.

If the payback time is over 2 years, consumers are generally impervious to upfront investments, even if they are not large. Agency problems refer to a misalignment in the incentive structure. Since the consumer generally pays the operating costs of the building, such as energy and water usage, construction companies and others involved generally have no incentive to build energy-efficient features into housing since these costs do not affect them. They also state that it is hard for landlords to increase living costs for energy-efficiency tenants. Lastly, visibility means that consumers oftentimes do not see the cost of power that is used for heating and cooling, and also do not see their own energy and water usage, a change in usage and price has limited effect on individual behavior (Nauc ler & Enkvist, 2009).

Although this is not part of the energy efficiency literature, the three barriers that Nauc ler & Enkvist (2009) use can be explained by that literature. Payback time can refer to loss aversion (Kahneman & Tversky, 1979), agency problems to misplaced incentives (Brown, 2001), and visibility to both misplaced incentives and asymmetric information (Bonde, 2012).

2.5 The Cost of Producing Green Buildings and Its Price Premium

Even though a financial analysis of the cost, return, and benefits is not central to our purpose or analysis, we believe a discussion about the topic is necessary to understand the macro aspects of green building

Since each building that is produced is different from the other, the additional cost for including green features will naturally differ (Kats, 2003). However, there are estimations done in several studies of the additional cost of building green and the saving associated with it. Kats (2003) did a cost-benefit analysis for LEED-certified commercial and public buildings. He concluded that there is an average 2 percent increase in the initial investment, which during a lifecycle of humbly estimated 20 years resulted in a 20 percent saving on the

total construction cost. The 2 percent average premium was mainly associated with increased architectural and engineering time, and cost, which can be lowered if the green attributes are included early.

It should be noted that beyond lower operating costs, savings from increased productivity and health were included in the calculation. It was also increased productivity and health that were the most contributing factor to the positive NPV calculation. Productivity and health was the hardest to calculate precisely because of the many estimations that had to be made while operating cost was much easier to assess. However, if the health and productivity factor was excluded, the NPV was still positive (Kats, 2003). Even though the cost and saving of green commercial and public buildings cannot be directly translated to residential buildings, we believe that it still has bearing to our argument that, even though the NPV for residential buildings could be negative, it would not be substantial. This probably holds true because of the household energy usage, which is somewhere around 27 percent of the total energy usage in the world, as stated in the introduction.

According to a McKinsey & Company study, most opportunities of reducing emission from buildings can be done at negative or low lifecycle costs due to the buildings long lifespan that on average is between 65-70 years in developed countries (Nauc ler & Enkvist, 2009). They also conclude that if aggressive global action is taken, versus a business as usual approach, the biggest impact on global CO₂ emissions will be through building environmentally friendly new buildings, compared to for example retrofitting old ones. Interesting is that the abatement measure does not imply any lifestyle or behavior changes in people. The abatement cost curve below shows the cost and the yearly abatement potential for various green building investments.



Figure 2.3. Increasing capital costs against environmental performance for three building types (Ellis, 2009).
Data from BRE and Cyril Sweett information paper (2005).

2.6 Factors Affecting Willingness to Pay for Green Dwelling

Purchasing dwelling generally implies a big decision affected by a wide spectrum of values and thoughts while at the same time considering a range of attributes and specifics in the purchasing process (Hu, Geertman, Hooimeijer 2015). In previous studies of consumers' preferences when purchasing housing, the attributes used to assess this can generally be divided in to four categories (Wang & Li, 2006; Pan & Zhang, 2008; Jiao & Liu, 2010; Howie, Murphy & Wicks 2010; Visser, van Dam & Hooimeijer 2008):

- 🌿 Neighborhood social quality (e.g. safety from crime),
- 🌿 Neighborhood physical quality (e.g. outdoor air quality, access to parks in the neighborhood)
- 🌿 Accessibility (e.g. to work, metro),
- 🌿 And regular dwelling attributes (e.g. number of bedrooms and bathrooms).

2.6.1 Definition of Features and Attributes

When looking at preference studies on green housing and attributes, a fifth category is added that involves green dwelling attributes to the aforementioned four. These are generally expressed in concrete features, such as enhanced insulation, ventilation, LED lighting, photovoltaic panels (Banfi et al., 2014; Yau et al., 2014) or as the effect that these attributes contribute to e.g. lowered water consumption, lowered energy consumption and indoor air quality (Chau et al., 2010; Hu et al., 2014). For the sake of simplicity and having a way to differ between the two, we will hereafter refer to them as above. That is; *features* are such parts as enhanced insulation and *attributes* are the effect of the features e.g. lowered energy consumption. Another identified factor are personal or intrinsic values, which will be presented under 2.6.3.

2.6.2 Review of Previous Articles Concerning Willingness to Pay in a Residential Context

As stated in the introduction there are several reasons why it is crucial to understand end-user preferences when it comes to green housing and the intrinsic values that affects them. However, our understanding about this and the amount of research on the subject is limited (Chau et al. 2010; Banfi et al. 2006; Yau et al. 2014; Hu et al. 2013). The reason for buying a green dwelling also varies between end-users (Kriese & Scholz, 2011). Furthermore, most previous research touches, or in some way reflects, our purpose but does not answer it or present a coherent picture, which is probably due to the strongly limited research. Moreover, besides one articles (Hu et al. 2015), it is to our knowledge all research concerned with the willingness to pay for green dwelling compares different features or attributes to see which are preferred, not why and what affects such an preference. Furthermore, we argue that because one state a certain preference between different features or attributes, it does not imply that it is the reason why one chooses green housing over its general ditto.

Some research find that consumers' willingness to pay is higher for the attributes that directly affect their water and energy consumption due to the direct economic incentives and that the willingness to pay is lower for attributes with a high upfront investment and longer payback time. This is true even if the NPV can be assumed to be positive (Chau et al. 2010; Yau et al. 2014). Yau et al. (2014) also noticed that there was a lower willingness to pay for investments

that were used collectively to decrease the water or energy usage, such as installation of grey-water recycling systems, which they speculated was due to two reasons. First, these investments usually imply a high initial cost. Furthermore, since these investments are shared, the prospective homebuyers might not perceive the investments as individually economically beneficial. Yau et al (2014) suggest that their quantitative research implies that it is not altruistic values that affected the willingness to pay for green attributes but more so economic incentives. However, this should be interpreted with caution since it is only their personal speculation and not empirically observed.

Other findings indicate that one of the reasons why sustainable housing has not grown popular is because it is perceived as less aesthetically pleasing, which consumers perceive implying a lower resale value than regular housing (Minnery, McFallan, Mead & Fedrick, 2003 in Miller et al. 2005). From a single family experiment, Miller et al. (2005) also concluded that features that improve safety, comfort, and livability should be communicated to the customer i.e. social living conditions, not necessarily lower energy usage and economic savings.

Moreover, green dwelling does not attract environmentally savvy residents (Hostetler & Noiseux, 2010) while others find a general high willingness to pay for green attributes (Banfi et al. 2006). A study executed in Sweden by Zalejska-Johansson (2012) whose main purpose was to compare perceived comfort and satisfaction with indoor elements between conventional and low-energy housing included a questionnaire for the preferences when choosing an apartment. The most influential factors were a central location, good surroundings, neighborhood safety, and sufficient apartment size. Furthermore, people living in low-energy houses took a significant deference to lower energy usage/cost and environmental factors while people living in regular housing deemed it considerably less important (Zalejska-Johansson, 2012). She further speculates that lack of information may be the reason. However, in the same survey, 75 percent of people living in low-energy buildings said it had no impact in their decision to move to their apartment. In other words, had the apartment not been low-energy, they would have rented it anyway. At the same time, the same respondents stated that they were proud to live in the green buildings and the fact that they did so increased their environmental awareness and affected their behavior to be more

environmentally friendly. We find these findings somewhat contradicting and have therefore explored this phenomenon in our empirical findings.

In other words and as mentioned previously, preceding studies do not paint a coherent picture and generally does not argue for why that is the case. We believe that an explanation for this could be that the differing research methods being used. Banfi et al. (2006) for example used a stated preference method when conducting their research (see below) and told the respondents about the pros and function of each feature before asking about their willingness to pay for it.

Some studies also draw questionable conclusions. As an example, a study made in China by Hu et al. (2014) Concluded that paying for green dwelling is a rich mans problem, while the green dwelling sampled in the study only existed in the most expensive and luxurious part of town.

Beyond the factors affecting one's preferences stated above, it is logical to assume that the choice of housing is limited by one's financial standing or the so-called income effect (2.2.2). In the case of purchasing housing, the upper limit is generally set by a person's credit rating and therefore how much loan the person can get. In cases where someone has a lower income and can not afford all attributes she or he wishes to have, such as number of bedrooms or safety from crime in the neighborhood, the authors speculate that the values motivating purchase of green dwelling attributes will be secondary to e.g. one extra bedroom.

Regarding research method, most studies use a stated preference method to measure the actual willingness to pay, which implies two things. First, a stated preference means that the respondents are asked to state their preference and how much they would be willing to pay in a hypothetical situation. In other words it is an expressed attitude towards a certain object and not a measurement of post hoc behavior. This does not necessarily reflect how the respondent would act if they were asked to make the same choice in real life. There could be several reasons for this, e.g. pleasing the interviewer (yea saying) or signaling their support (strategic bias) to effect policy and other consequences of the study (Whitehead & Cherry, 2006). Second, the stated preference method is generally used to measure the willingness to pay for

certain characteristics or attributes against each other (Yau et al. 2014, Chau et al. 2014, Hu et al. 2014, Tan, 2014; Banfi et al. 2006). In the case of green dwelling it could be the willingness to pay for a ventilation system or certain insulation standard (Banfi et al. 2006), which logically implies that the consumer has knowledge about the pros of the attributes. Third, the stated preferences are often performed by survey, meaning that any variation, exploration, or reading between the lines is not possible as in an interview environment. Studies using a revealed preference method, meaning assessing the willingness to pay based on data gathered post hoc the actual purchase decision does not exist to our knowledge. The argument for this is usually due to lack of access to data and respondents (Banfi et al., 2006).

2.6.3 Values

To the authors knowledge, there is only one article that studies the intrinsic values of what affects the willingness to pay for green housing (Hu et al., 2015). By asking the question whether *"environmental awareness stimulated pro-environmental behavior"* (Hu et al., 2015:1) she tried to identify the motivational values for purchasing green dwelling by interviewing people living in green housing and having a control group living in a regular building. She concluded that the value of environmental awareness and protection was not a motivational factor, which generally is assumed (Hu et al., 2015). The conventional residents main value behind their choice of housing was pleasure and were willing to trade a clean environment for good accessibility to work, transport etc. from the apartment. The individuals living in green buildings main motivating values were pleasure and health, and they cared both for indoor and outdoor environmental quality. It should also be noticed that people living in green buildings had a better understanding and information about green attributes.

Two proceeding master students also writing for Sustainable Societies, Huynh & Larsson (2014) tried to identify patterns in behavior and lifestyle in two sustainable neighborhoods in Malmö, Sweden. The authors found that openness to change, self-transcendence and self-enhancement, classified according to Schwartz (1994), was the driving motivations for people to make sustainable choices. They identify openness to change as the biggest reason, as this led people to search for information about how to live more sustainable. Self-transcendence was that the inhabitants valued social good over personal good, something the authors argued

might be because the basic needs were already fulfilled. Lastly, self-enhancement was that the inhabitants got a good feeling of doing something that they thought benefited others.

2.6.4 A Value Type Framework

Huynh & Larsson (2014) and Hu (2015) use Schwartz (1994) framework to analyze their data and build their conclusions. Thus we will give a summarized presentation of the article. Schwartz's (1994) framework has been shown to be applicable to explain environmental behavior in multiple studies (Karp, 1996; Schultz & Zelezny, 1999). In his article, Schwartz (1994) presents ten potentially universal values types, which are distinguished by their motivational goals of which he also assesses the structure and relationship between them and if they are in conflict or compatible. According to Schwartz (1994) there is a general agreement in research regarding the conceptual definition of values. Thus the conceptual definition of a value is that it is a (Directly quoted from Schwartz, 1994, references: Schwartz, 1992; Schwartz & Bilsky, 1987; 1990):

- Belief,
- pertaining to desirable end states or modes of conduct, that transcends specific situations,
- guides selection or evaluation of behavior, people, and events, and
- is ordered by importance relative to other values to form a system of value priorities.

Furthermore, he argues that the aforementioned definition also is a way to distinguish a value from such concepts as attitudes and needs. The example given is "*that security and independence are values, whereas thirst and a preference for blue ties are not*" (Schwartz, 1994:20). This is interesting to notice out of our research context since we aim to distinguish motivational choices for one's values when purchasing housing and not just a stated preference between various options.

Schwartz's (1994) own definition of values: "*desirable transsituational goals, varying in importance, that serve as guiding principles in the life of a person or other social entity.*"

(Schwartz, 1994:21). In this definition there are several implications being made (Directly quoted from Schwartz, 1994:21):

- They serve the interests of some social entity,
- they can motivate action-giving it direction and emotional intensity,
- they function as standards for judging and justifying action, and
- they are acquired both through socialization to dominant group values and through the unique learning experiences of individuals.

However, the above definition does not say anything about the content of specific values (Schwartz, 1994). Values represent responses to three so called universal requirements that each, single individual must deal with; the basic needs of individuals as biological organisms, the requirements of coordinated group interaction, and the requirements for smooth functioning and survival of groups (Schwartz, 1994). Out of these universal requirements, he derived 10 value types, which are assessed to be universal and are presented in the table below.

Definition	Exemplary values	Sources
Power: Social status and prestige, control or dominance over people and resources	Social power, authority, wealth	Interaction, group
Achievement: Personal success through demonstrating competence according to social standards.	Successful, capable, ambitious	Interaction, group
Hedonism: Pleasure and sensuous gratification for oneself.	Pleasure, enjoying life	Organism
Stimulation: Excitement, novelty, and challenge in life.	Daring, varied life, exciting life	Organism
Self-direction: Independent thought and action- choosing, creating, exploring.	Creativity, curious freedom	Organism, interaction
Universalism: Understanding, appreciation, tolerance, and protection for the welfare of all people and for nature.	Broad-minded, social justice, equality, protecting the environment	Group, organism
Benevolence: Preservation and enhancement of the welfare of people with whom one is in frequent personal contact.	Helpful, honest, forgiving	Organism, interaction, group
Tradition: Respect, commitment, and acceptance of the customs and ideas that traditional culture or religion provide.	Humble, devout, accepting my portion in life	Group
Conformity: Restraint of actions, inclinations, and impulses likely to upset or harm others and violate social expectations or norms.	Politeness, obedient, honoring parents and elders	Interaction Group
Security: Safety, harmony, and stability of society, of relationships, and of self.	National security, social order, clean	Organism, interaction, group

Sources:

Organism – universal needs of individuals as biological organisms.

Interaction – universal requisites of coordinated social interaction.

Group – universal requirements for smooth functioning and survival of groups.

Table 2.7. Motivational types of values (Schwartz, 1994)

Each value is defined in terms of what its central goal is, as seen in column one, while the second column gives specific, representative examples of each type. For example, the value of pleasure's goal is hedonism. The third column shows which of the three universal requirements of human existence that the each value type was derived from. Schwartz (1994) further states that it cannot be said definitely that the ten types of values are exhaustive, however it is possible to classify almost all specific values identified in different cultures into one of these ten types.

2.6.5 The Structure of Value Relations

Previous research has treated identified values as independent of each other and thus not being able to present a value system with cohesive structure (Schwartz, 1994). Schwartz (1994) argues that the structure among the various value types is based on the assumption that the chase for one value type may either be in conflict or compatible with other value types. This relationship is probable to arise when people simultaneously try to pursue more than one value type. Figure 2.4 below illustrates the relationship between the 10 value types, where the value types that are close to each other are viewed as compatible while those on opposing sides are competing and in conflict. For example, the value types of achievement and power are individualistic, related to personal success and acquiring personal power, while universalism and benevolence are altruistic value types where the goal is to help all people, not just yourself.

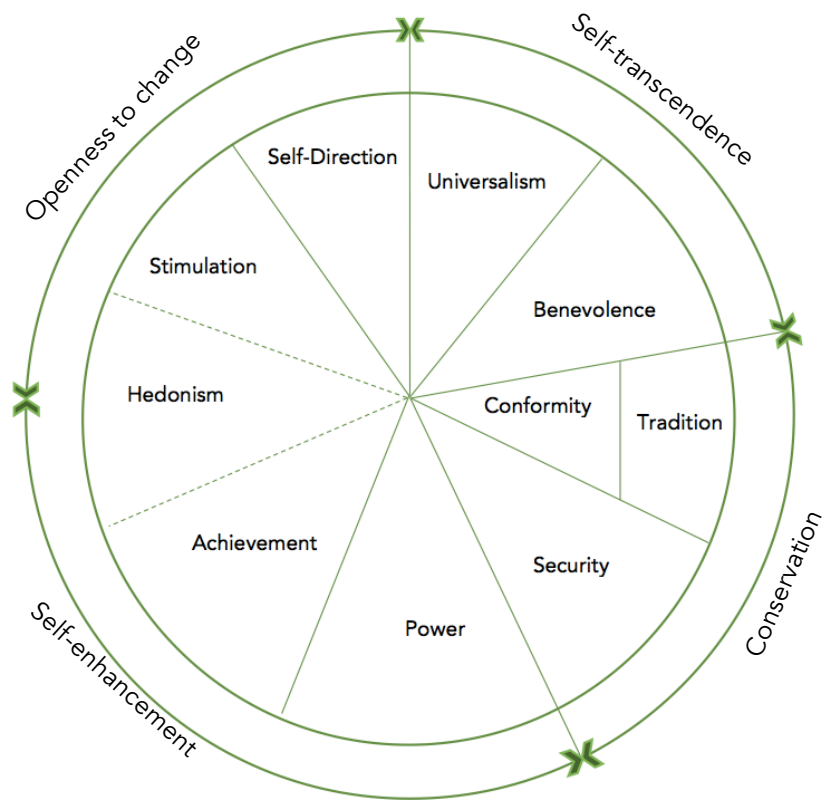


Figure 2.4. Theoretical model of relations among motivation types of values, higher order value types and bipolar value dimensions (Schwartz, 1994)

It should also be noted that the figure is made for an illustrative purpose, thus the motivational differences between the value types next to each other should be viewed as continuous and overlapping rather than discrete, with clearly cut lines between them (Schwartz, 1994).

The author further states that the values can be applied to any social issues a researcher wishes to address Schwartz (1994) and therefore should be applicable and suitable to our research. As mentioned, previous and similar research has also used this framework.

2.7 Preliminary Theoretical and Conceptual Framework

The framework is meant as an illustration of the decision process for purchasing green dwelling. The theories and concepts explained in this chapter contain many of the barriers that exist for the adoption of green dwelling and we are therefore interested in what made our consumers purchase their home.

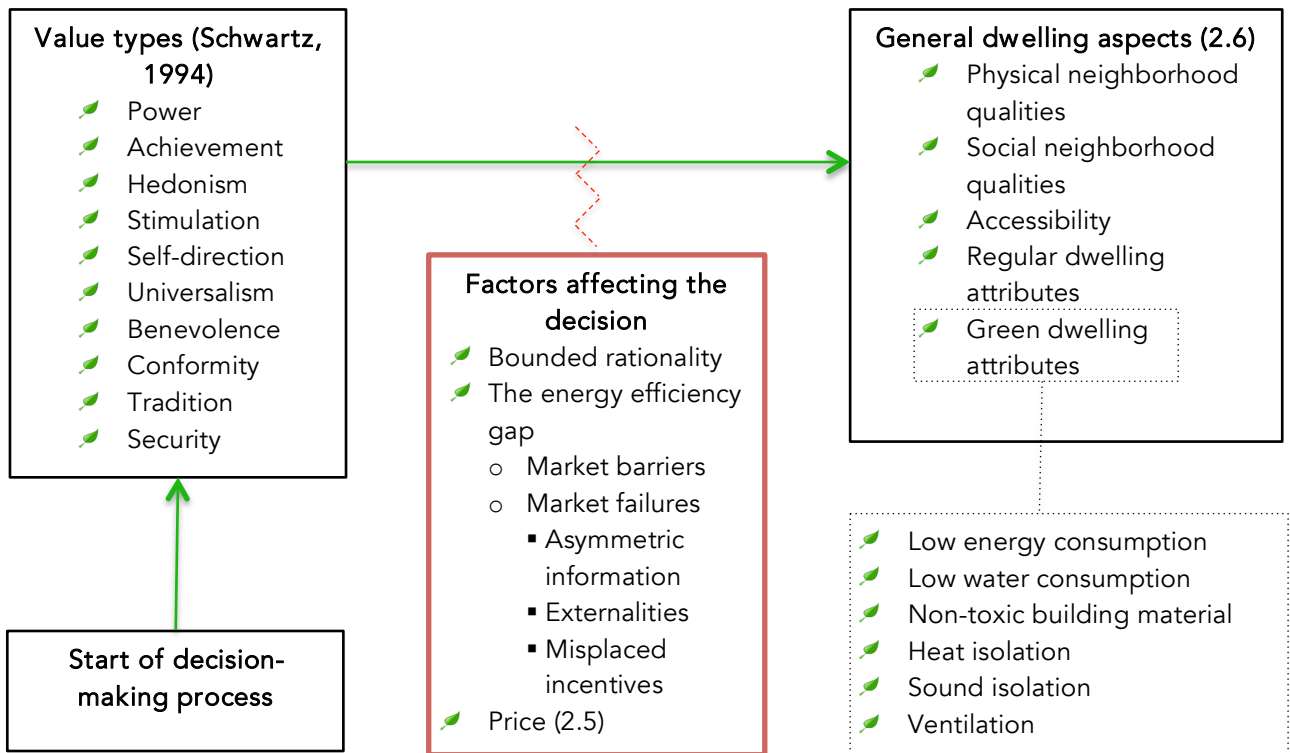


Figure 2.5. Preliminary theoretical framework

The reasoning behind the preliminary framework is that all individual, conscience decisions are determined by the ten value types classified by motivational goals (Schwartz, 1994), as is the decision to purchase green dwelling. The most common dwelling aspects are gathered from previous literature and we assesses that they are used as the information underlying the purchase decision. The box *factors affecting the decision* contain various theories that can explain the slow adoption of green dwelling.

3. Methodology

In this chapter, we will present the research design and approach of the study, and also explain how the selection of case and respondents were conducted. Furthermore, the chapter will present the method for data collection and analysis, and also a discussion about the reliability and validity of the study.

3.1 Research Approach

The purpose of this study is to add insight into the decision process of consumers who have bought a green dwelling and what factors affected their willingness to pay. This insight can be used by developers, real estate agents, policy makers, and other affected parties to make better informed decision in order to spur the development of green dwelling. In order to achieve this purpose we have made a series of methodological choices.

Firstly, our epistemological position is that of interpretivism because we are studying a social phenomenon. Secondly, we have adopted constructionism as our ontological position, meaning that we view the world as something that is formed by those who participate in it rather than being objective regardless of one's choice (Bryman & Bell, 2011; Gioia, Corley & Hamilton, 2012). By studying a social construction, we focus on what individuals do when they construct and understand their experiences and have little interest in measurability (Gioia et al., 2012). These two choices are based on the fact that we are studying people in a social environment, built up by social interaction, which also makes the interpretative paradigm the logical choice (Bryman & Bell, 2011).

3.2 Research Strategy

We have chosen to use a qualitative research strategy for this study. This is first of all because we are mostly concerned with the decision process and what affects willingness to pay, in contrast to measuring how much people are willing to pay, which would typically be a quantitative research strategy. This is also a logical choice based on our epistemological and ontological positions, which also mean that the research will be leaning towards an inductive approach (Bryman & Bell, 2011). However, a theoretical framework was deduced from

theories and earlier research in order for us to develop an understanding of the many difficulties involved in sustainable development and decision-making.

Often, inductive research lacks the rigor that is needed for scientific advancement, which is why we used the approach suggested by Gioia et al. (2012).

3.2.1 Influences on the Conduct of the Research

Bryman & Bell (2011) suggests that there are three types of influences that affect the conduct of business research, these are: personal values, politics of business research, and practical. Personal values are ever present in research because of the subjectivities of the researcher. The authors argue that openness and reflexivity to such bias is one way to mitigate them (Bryman & Bell, 2011). Our empirical findings are filled with quotes from our respondents to increase the openness of this study.

Regarding the politics of business research, we have not found this to have any affect on our research as we are not sponsored and the school is paid for by government funds thus we have experienced no outside pressure on what to write.

There have been a number of practical considerations that we took into account when performing this research, some of which we had to alter as the research progressed. These alterations will be thoroughly discussed in the implementation. The first thing we considered was that a quantitative research approach would be impossible to perform which is why we chose to adopt a qualitative approach instead. Secondly, we knew fairly well what we wanted to talk about in our interviews but were still interested in any deviations from our literature findings which is why we chose to have semi-structured interviews rather than having structured or unstructured. Moreover, we wanted to perform our interviews together so that both had the opportunity to ask follow-up questions. We also wanted to record the interviews in order to transcribe them later.

3.2.2 Research Design

Our research design is a comparative multiple-case study design containing three cases. The first includes two LEED gold certified apartment buildings in Kungsholmen, Stockholm, the

second case is apartment buildings in Hammarby Sjöstad, also in Stockholm, and lastly townhouses certified with Nordic Ecolabelling in Växjö. The level analysis has been placed at the case level (Bryman & Bell, 2011). This is because we were interested in investigating how respondents who have chosen to move into a green building evaluated the prospect before they made their decision and make comparisons between the cases. This has been done in order to try to identify factors that affect willingness to pay, to try to understand the thought process involved, and what values might be present when these decisions were made.

3.2.3 Research Method

To be able to fulfill our purpose we used semi-structured interviews because the interview guide allowed us to ask all participants the same questions within the specific areas that we were interested in. It also allowed us the flexibility of following up on other themes that came up during the interviews (Bryman & Bell, 2011). The choice of semi-structured interviews was also based on the fact that we consider that the respondents are, what Gioia et al. (2012) call *knowledgeable agents*, meaning that they can explain their thoughts, intentions, and actions (Gioia et al., 2012).

In preparing the interview guide we followed the steps in listed in "*Business Research Methods*" by Bryman & Bell (2011:475-476), which is why we opened all our interviews with open questions about why the respondent moved, what they considered when moving etc. This was in order to let the respondents themselves explain their decision process without us imposing constructs, theories, or other, already existing, concepts that might have affected the responses. We also made sure that the interview guide did not contain any leading questions (Gioia et al., 2012). We also made sure to add and remove questions that we deemed relevant or irrelevant to the interview guide as the work progressed, something that Gioia et al. (2012) argue is a must in qualitative research. Furthermore, we asked questions about general dwelling attributes first, followed by green dwelling attributes and lastly about sustainability. This was done because we did not want to give cues to the respondent about what we were interested in, thus mitigating some bias from the respondent in answering the questions.

3.3 Sampling

3.3.1 Selection of Cases

Since we wanted to perform a comparison between cases, they were selected based on the type of certification, if there was an upfront investment or not, and the type of housing. The housing blocks Jublet and Vålbehaget (henceforth called Jublet & Vålbehaget) was chosen based on its LEED gold certification and also that Vålbehaget was the first apartment building in Sweden ever to receive the gold certification that, according to Skanska, probably is the most energy efficient building in central Stockholm as per February 2012 (Köhler, 2012). The neighboring Jublet was also among the first apartment buildings awarded with a LEED gold certification (Skanska, 2015a). They are co-operative apartments, which means that the inhabitants had to make a major investment for their housing.

Hammarby Sjöstad was chosen because of its major marketing as a sustainable neighborhood. However, the apartment buildings that our interviewees live in are not environmentally certified per se. Another difference from Jublet & Vålbehaget is that they are right of tenancy apartments meaning that there are no upfront costs for the inhabitants.

Lastly, we chose Solallén because it is certified with Nordic Ecolabelling and that they are townhouses rather than apartments. However, we only found out after the first interviews that they had only been labeled after most of the sales was already made, which had smaller implications for our empirical gathering. This will be further discussed in our empirical findings and analysis.

3.3.2 Selection of Interviewees

Selection of interviewees has been made through a non-probability sampling because it was the only option available to us (Bryman & Bell, 2011). Firstly, because we found it extremely difficult to get in contact with respondents, the time and resources we had at our disposal were not enough. Secondly, the study was performed in Lund and the empirical data had to be collected from Stockholm and Växjö. Lastly, the population size at Solallén was too small for a probability sample. These three reasons restricted from making a probability sample. Instead we made a convenience sample where we first searched for developers, housing societies, and landlord relevant to the cases. Because we were restricted to a convenience sample, this may

have the effect that our result is bias since it does not represent the population in general (Bryman & Bell, 2011) which we are fully aware of.

3.3.3 Selection of Theory

The theory selection of this thesis was initially based on Rydén's earlier knowledge about the big energy consumption in the lifecycle of buildings and in the construction sector as a whole that he gained when writing his bachelor thesis. Rydén's thesis discussed environmental certifications of commercial buildings and if these can imply a competitive advantage.

This lead us to investigate articles related to consumer behavior, sustainability, willingness to pay for green dwelling, and city planning. From these articles we identified several explanations for consumers seemingly irrational choices when it comes to, for example, energy efficient investments. We also read old masters' theses done within the Sustainable Society research project to find inspiration and possible theories that we could use.

3.4 Data collection

3.4.1 Primary Data

The primary data consists of semi-structured interviews and semi-structured telephone interviews with 12 residents of Vålbehaget & Jublet as well as semi-structured telephone interviews with 6 residents in Hammarby Sjöstad and 7 at Solallén. We chose to adopt the semi-structured interviews because this is a good way to capture what the respondents are experiencing, both in retrospect and in real-time, within the scientific area that we are interested in (Gioia et al., 2012). The semi-structured interview also gives the researcher the freedom to explore topics that may emerge during the interview that were not a part of the original transcript (Bryman & Bell, 2011).

The two lists were used in our interviews where the respondents were asked to rank the relative importance of the different aspects and attributes we had identified in our literature review. This was in order to find patterns in the respondents' answers and to use as an indication of the relative importance of an aspect or attribute. List one included the five most commonly used general housing attributes used to assess preference and list two included six common green dwelling attributes.

Initially we had not considered having telephone interviews but we decided to cater to some of the respondents at Jublet & Vålbehaget who were unable to perform the interview when we first approached them. After this decision, we saw no reason not to use telephone interviews in the two other cases.

In order to get in contact with our respondents we started by identifying housing societies, cooperative housing, developers, and other parties we deemed relevant in order to gain access to respondents. The relevance was assessed mainly by certification, if there was an upfront investment or not, and the type of housing. This approach however proved to have little success. Most replies were either *"sorry we cannot help you," "sorry we do not have any contact with the inhabitants anymore"* or there were no replies at all.

At Jublet & Vålbehaget we were not able to get in contact with the housing society but we decided to pursue anyway. During week 15 we put up our information letter (see appendix 2) on the front door in all the stairwells. During the week there was only one person who took contact with us, so we also went from stairwell to stairwell knocking on people's doors to ask them if they were willing to participate. Due to practical reasons, this could only be done from around 3 PM to 7 PM and we were not able to visit all 440 odd apartments in a week's time. Eventually, we were able to get seven respondents whom we had interviews with and another five who we had telephone interviews with at a later stage.

In Hammarby Sjöstad, Familjebostäder helped us to distribute around 280 copies of our information letter to their residents (appendix 2). This resulted in 6 respondents taking contact with us with whom we performed telephone interviews.

We also received help from one of the respondents at Solallén who helped to distribute our information letter (appendix 2) to the residents there. In total there are 21 townhouses in the area and we got one respondent who sent us an email. Since the turnout was so small we decided to call the residents and ask them if they were willing to perform telephone interviews. In total we were able to get 7 respondents from Solallén.

3.4.2 Secondary Data

In order to be able to gain an understanding of sustainable city development, green buildings, the reason why there is such a slow adoption rate among consumers, and to structure our interview guide, we have read books, theses, and articles related to the area of study. We also met with PhD student Nora Smedby at the International Institute of Industrial Environmental Economics at Lund University for feedback on the identified theories in order to further ascertain that relevant theories have been used. We have used LUBSearch, Google Scholar, Web of Science, and business administration curriculum literature in order to find theories used in this study. Furthermore we have used Google in order to find other empirical information.

3.5 Method for Presentation of Empirical Findings

We have chosen to present our empirical findings with both first order and second order analysis. This means that we have used the respondents' own terms and codes, which we then order into our own concepts, themes, and dimensions. This intertwined reporting of both the respondents and our own interpretation of the respondents' answers leads to a high rigor between the links of data and induction of new concepts and sensegiving (Gioia et al., 2012). We had decided not to use the respondents' own names and instead used common Swedish names. Names starting with J for Jublet & Vålbehaget, H for Hammarby Sjöstad, and S for Solallén to make it easier to understand where the respondents reside.

3.6 Method for Analysis

Qualitative data often result in vast quantities of data because it is based upon prose written in interview transcripts, documents, or other media (Gioia et al., 2012; Bryman & Bell, 2011). In order for us to be able to analyze this vast amount of text we started by transcribing after our first interviews in full and later semi-transcribed the latter ones. This was because we felt it unnecessary to fully transcribe all interviews as many of them contained similar answers to what the earlier respondents had already said. By transcribing early on, it helped us to formulate new questions and remove the initial ones we deemed irrelevant (Gioia et al., 2012).

With the transcriptions, we were able to go compare what the respondents had said and go back to individual interviews to review what the respondent had said if our opinion differed on what the respondent had meant about a certain sentence (Bryman & Bell, 2011; Gioia et al., 2012). This is an important feature to raise the validity of the study (Bryman & Bell, 2011).

When we had transcribed the interviews we created three documents, one for each case, where we gathered the respondents answer from the individual case. We categorized the answers under the questions following in the interview guide and color-coded the respondents' answers in order for us to make sure that we had answers from all respondents. The color code was also used to see if one respondent was used in excess, making the analysis bias. This first order analysis of respondents concepts is important in the progress of the research because we can later see similarities among the respondents answers, raising the abstraction level to the second order theme analysis (Gioia et al., 2012).

When the transcription was finished, we decided to organize our empirical findings in a thematic way, in order for us to make direct comparisons and analysis between the cases. We noticed that the differences between the cases in some instances were very small and therefore decided to present these first. This was a way for us to focus attention to the differentiating parts of our empirical findings. It was also a way for us to make it easier for the reader to understand the study and how the theories and concepts relate to our empirical findings. After we had categorized the answers into our thematic groups, we applied our theoretical framework to analyze the empirical findings.

3.7 Practical Procedure

The practical procedure of this paper is thorough because it explains how we approached our research and how we in a systematic way gathered data and structured the analysis. This is, according to Gioia et al. (2012) an important step in inductive research. Much of the practical procedure has already been mentioned under their respective headings and will not be repeated.

We started by performing an extensive literature review based on what we already knew and tried to localize a concrete theory gap where we could make a significant contribution. After discussing with our supervisor we decided that we wanted to investigate consumers' willingness to pay for green buildings.

By mid-March we had completed a preliminary literature review, composed a preliminary theoretical framework, and out of this generated an interview guide that we thought was suited to fulfill our purpose. At this point we started looking at where to gather our empirical data. Initially, in January, we wanted to do this in Tianjin Eco-City in China, and expected to do so based on the communication we had with a city-representative but by mid-March we got the response that we would not receive help to get in contact with respondents. This was when we chose to perform the study in Sweden instead due to lack of resources.

As already mentioned, it was very difficult to get in contact with potential respondents, even in Sweden. We contacted persons we believed would be helpful from every existing BREEAM, LEED and Nordic Ecolabelling buildings in Sweden according to their respective websites as well as parties involved in Hammarby Sjöstad.

Both researchers performed the personal interviews, as well as the telephone interviews, although in the latter case only one of us asked the questions. The interviews lasted between 21 and 45 minutes where the majority of them lasted around 30 minutes.

During the interview process the respondents were asked to rank the two lists that we had in our interview guide. The alternatives in the first list were ranked from 1 to 5 and the alternatives in the second from 1 to 6. We also asked the respondents to rate the alternatives independent from each other and assign points from 1 to 10 on each attribute. This does not force the respondent to choose one over the other between equally important alternatives (Schwartz, 1994). However, we found that the respondents used the independent scoring system in a very varying way. For example, some gave all aspects exceptionally high scores while others used the 1 to 10 scale significantly more drastic. This led to our decision not to use the rating system in this study as we did not think the answers we received presented a coherent picture between the respondents.

3.8 Reliability, Replicability and Validity

Regarding reliability, it can be divided into external and internal reliability. According to Bryman & Bell (2011) it is often hard for qualitative researchers to hold up against the external reliability criterion (Bryman & Bell, 2011). In an attempt to increase the external of our research we have, in great detail, described what we have done throughout the study in order to ensure a high external reliability. However, there are a number of reasons that impact the external reliability that we were unable to influence as we performed the study.

First of all, it was very difficult to get in contact with many of our respondents, which meant that our respondents represent a convenience sample rather than a representative one. Secondly, the external reliability is negatively affected because people, behavior, and culture are in constant change and also that the respondents we used might not be available in the future. Lastly, we acknowledge that the study might experience bias on our part because of personal preferences that we have may or may not have, which in turn can make the study hard to fully replicate by other researchers (Bryman & Bell, 2011).

To ensure a high internal reliability we have both been present and recorded as many interviews as possible. We have also transcribed or semi-transcribed the interviews, making it easier to discuss and review them after, thus increasing the internal reliability (Bryman & Bell, 2011).

External validity is another criterion that is a problem for qualitative researchers because of the lack of generalization (Bryman & Bell, 2011). However, Gioia et al. (2012) disagrees with this stance and say that it is indeed possible to draw conclusions from a small population or even single cases. It is true that this study has a limited population as we only managed to interview 25 respondents in total spread over three cases. These respondents are also not representative of the population in general and in the cases of Solallén and Hammarby Sjöstad rather small, hence the external validity suffers. We did, however, discover that we only needed about 4-5 interviews per case to get a decent saturation and that some of the answers we similar among the three different cases, meaning they may be relevant and representative for a larger population.

Lastly, concerning the internal validity, we have followed the recommendations made by Gioia et al. (2012) in order to show, in a transparent and clear way, how our respondents first order concepts relate to second order themes. This has in turn generated our results, providing a high internal validity.

3.9 Criticism of the Sources

As mentioned in the earlier section (2.7.2) we have been critical toward a few articles concerning their conclusions about the housing market and what affects the willingness to pay for green attributes. We have also tried to use mostly academic papers that have been peer reviewed and cited by many other authors prior to us, leaving as little doubt as possible about their trustiness. We have also gone to the original sources when it is been possible to get information about various facts, for example pollution, in order to increase the validity of the sources.

Regarding the interviews we have generally felt them to be honest, many have also explicitly expressed that they wanted to have answered in another way but that they had to be honest about their choices. We also structured the interview guide in a way to reduce the bias toward the sustainability aspect of our study.

4. Contextual Factors

This chapter will introduce the contextual factors relevant to understand the empirical data. Starting by explaining the content of the green building certifications used in our empirical data. Thereafter, the three cases are described followed by a short review of the housing market and CO₂ emission that can be attributed to energy consumption in Sweden.

4.1 Green building certifications

4.1.1 LEED

Leadership in Energy & Environmental Design or LEED is a third party certification that was developed by the U.S. Green Building Council (USGBC) as an environmental certification for buildings in 2000 (SGBC, 2015) and has since been developed further. The current version is called LEED v4 (USGBC, 2015). It is one of the most common certifications used worldwide and is one out of four certifications used by Sweden Green Building Council (SGBC, 2015).

There are four levels of certification in LEED, which are: certified, silver, gold, and platinum, which can be awarded to a vast number of projects. The projects can be sorted into five system groups depending on what kind of project that is being performed. These are: building design & construction, interior design & construction, building operations & maintenance, neighborhood development, and homes (USGBC, 2015; SGBC, 2015). Projects are placed into these system groups in order to make a difference between e.g. new construction and refurbishment, but also between homes and commercial buildings (USGBC, 2015). Within these system groups there are a big number of different projects that the certification can be applied to, all with different requirements. For example, there are certifications for schools, hospitals, single family homes, low rise-multi family homes, commercial buildings, laboratories, data centers, and warehouses just to name a few (USGBC, 2015).

The certification takes a number of different factors into consideration, which are; the local environment, water usage, energy usage, materials, and indoor air quality. The energy usage has a very high priority in LEED and amounts for 27 percent of the total amount of points awarded (Kats, 2003). Under these factors there are a number of prerequisites that has to be fulfilled. There are also extra credits that can be awarded for regional considerations and

innovation; however, the certification is not modified to individual markets or countries (SGBC, 2015; USGBC, 2015). The argument for this is that it is easier for customers; the level of certification is the same no matter where in the world you are (USGBC, 2015).

LEED for Homes

The rating system of LEED for Homes is made to encourage homebuilding towards more sustainable practices. It targets the top 25 percent of new homes with environmental features that are considered as best practice. To be certified, a building needs at least 45 out of the grand total of 136 credits throughout 18 prerequisites and extra credits within the eight categories listed below (USGBC, 2010).

1. Innovation & design
2. Location & linkages
3. Sustainable sites
4. Water efficiency
5. Energy & atmosphere
6. Materials & resources
7. Indoor environmental quality
8. Awareness & education

LEED in Sweden

As of April 2014 there were a total of 57 buildings that were LEED certified in Sweden and with 67 new projects in queue. These include all kinds of buildings and are not limited to homes. 90 percent of the buildings have been awarded with LEED have achieved gold or platinum, which SGBC says the tough energy laws in Sweden are largely accountable for (SGBC, 2014).

Critique Toward LEED

In complex issues such as the environment there are always things that can improve. LEED has had its fair share of critique and USGBC was also sued for false marketing over the certification as the claimant said that they were selling sustainability when, in fact, LEED was not promoting any real difference. There has also been critique toward the fact that LEED is

based on estimations of energy efficiency, not actual energy efficiency (NPR, 2012; Eco Brooklyn Inc., 2012).

Another issue with LEED is how they weigh different aspects (Eco Brooklyn Inc., 2012). When reading through the LEED rating system, things such as south facing solar applications for roofs over a certain size adds extra credits. While this is natural for us on the northern hemisphere it is much less useful, and even wasteful, on the southern since the sun is actually in the north. Another problem is the points for charging stations for electric cars which only has to be 3 percent of the total car parking as well as only offer 15 percent of the tenants bike racks (USGBC, 2010).

4.1.2 Nordic Ecolabelling

Nordic Ecolabelling, which is more commonly know as *Svanen* in Sweden, was founded by the Nordic Council of Ministers 25 years ago in order to help consumer make environmental conscious choices. Today, it is used on products ranging from batteries to small houses to services. The certification in Sweden is managed by Miljömärkning Sverige and is run as a not for profit organization owned by the Swedish state (Svanen, n.d.b).

As mentioned, the Nordic Ecolabelling can be awarded to small houses but also apartment buildings and pre-school buildings. The current version, 2.12, is valid since December 2009. The certification takes all steps in the building process into consideration, from construction process to materials to energy consumption. The finished product must also offer above standard indoor environment (Nordic Ecolabelling, 2009; Svanen, n.d.a).

Unlike LEED, there are no levels of the Nordic Ecolabel. To receive a certification the building has to fulfill all 50 of the mandatory requirements as well as a minimum of 40 percent of the 22 possible score points. The requirements are listed under five broad categories; instructions to residents/property managers, quality management and control of the construction process, material requirements, energy and indoor environment, and overall requirements. The certification is under constant development to enforce stricter regulations as time passes; the current version is valid until 31 December 2014 (Nordic Ecolabelling, 2009).

4.2 Case Descriptions

4.2.1 Jublet & Vålbehaget

Jublet & Vålbehaget are two residential buildings located next to each other in the central, expensive area of west Kungsholmen, Stockholm. Both buildings have very similar architecture and were developed and built by Skanska, Jublet in between 2011-2013 (Jublet, 2015) and Vålbehaget 2011-2013 (Vålbehaget, 2015). Together they hold 465 apartments. The price per square meter was significantly higher when selling apartments in Jublet, compared to the Stockholm average. However, in the development there was a focus on maximizing the value for money for the future residents (Byggnyheter, 2012).

Both buildings are certified with LEED gold where Vålbehaget was the first LEED-certified residential building in Sweden. It was also anticipated to become the lowest energy-consuming residential building in central Stockholm (Skanska, 2010). They are also 2 of only 8 LEED certified residential buildings in whole of Sweden (Ramírez, 2015). Jublet has a calculated energy-usage of 65 kWh/m², an FTX-ventilation system with heat exchanger, and district heating which is complemented by geothermal heating (Jublet, 2015), where we could not find similar information for Vålbehaget it should be similar due to the projects interconnectedness and similarities.

Criteria	Vålbehaget	Jublet
Sustainable sites	22/26	22/26
Water efficiency	6/10	6/10
Energy and atmosphere	22/35	17/35
Material and resources	4/14	2/14
Indoor environmental quality	5/15	6/15
Innovation	6/6	5/6
Regional priority credits	4/4	4/4
Sum and score	69 – Gold	62- Gold

Table 4.1. Score of Jublet and Vålbehaget in the LEED certification process (USGBC, 2015b; 2015c)

4.2.2 Solallén

Sollallén is the project name for the 21 newly built townhouses in Vikaholm, which is a city district in the outskirts of Växjö. Construction of the houses started in December 2013 and most people moved in in February 2015. The houses have one floor, modern architecture, high ceilings, and a small garden in front of the house (Skanska, 2015b). The most highlighted parts in the marketing of the houses were that it was located in an area close to nature, had green dwelling attributes where low operating costs were highlighted together with the fact that they have solar panels and geothermal heating, and also that it was relatively close distance to the city center and the local university (Skanska, 2015b).

The houses are certified with Nordic Ecolabelling, however; the decision to certify the buildings was made in June 2014, when most of the houses had already been sold (Linderos, 2015). In the house brochure (Skanska 2015c), the sustainability aspect had significant attention and the sustainable attributes and features mentioned were:

- ☘ Solar panels with an expectancy to produce more energy than needed for heating the house, water, and property electricity.
- ☘ Geothermal heating during the winter, which can also be used to cool the house during the summer, hence good indoor-quality all year around.
- ☘ An expect energy consumption of 28 kWh/m²/year.
- ☘ Low flush water faucets.
- ☘ Environmentally certified kitchen appliances, class A+.
- ☘ Construction material crosschecked in a Skanska proprietary chemical database in order to be able to choose environmentally friendly alternatives where possible.
- ☘ Construction wood from sustainable forestry.
- ☘ Energy efficient windows and good isolation.
- ☘ FTX-ventilation system (that recycles heat in the ventilation-air).
- ☘ Separation of sources.

4.2.3 Hammarby Sjöstad

Hammarby Sjöstad or Sjöstaden, which is also often referred to, was originally meant to be developed as the 2004 Olympic village in Stockholm with a focus on the environmental

aspects (Stockholm Stad, 2014a; Wangel, 2013 in Teleman, H., Caldenby, C., Ullstad, E., von Platen, F., 2013). The project was initiated in 1990 and the master plan was to develop the old industry area into a new and sustainable neighborhood (Stockholm Stad, 2014a) and is one of three planned sustainable neighborhoods throughout Stockholm (Stockholm Bygger, 2010).

In total there have been 41 developers and 29 architect firms involved in the development of Hammarby Sjöstad (Stockholm Stad, 2015) and the area is planned to be completed in 2020 with a total of 11 000 apartments and a total of 25 000 inhabitants and is a part of Stockholm Vision 2030 (Stockholm Stad, 2014a).

The neighborhood has a clearly defined environmental program and even has it's own sustainability model called the Hammarbymodellen that integrates waste-, water- and energy-handling. It has also been aiming to improve the traffic in the neighborhood by promoting public transport and carpools (Stockholm Stad, 2014b).

In Hammarby Sjöstad, 50 percent of the energy used comes from combustible- and organic waste and there has also been a goal to reduce the energy demand per square meter to 55 kWh per year compared to the normal 100 kWh/m²/year (Stockholm Stad, 2015; Skanska n.d.). Hammarby Sjöstad has often been referred to as a role model for sustainable development, not only for Swedish developers but there have also been a vast number of international visitors that want to learn from the city (Stockholm Bygger, 2010). The city has gotten a lot of international attention and as many as 12 000 industry representatives and decision makers visit the city every year (Hållbar Stad, n.d.).

According to Hållbar Stad (n.d.), Hammarby Sjöstad used 30 to 40 percent less energy than a comparable neighborhood from 1990. However, according to a study in 2012 the average energy consumption of 50 buildings in Hammarby Sjöstad was 115 kWh/m²/year which is still lower than average for Sweden but still much higher than the goal set out (Wangel, 2013 in Teleman et al., 2013).

4.3 The Housing Market

4.3.1 Stockholm

There is a lack of housing in Stockholm, which is driving up prices (SVD, 2013a). Currently Stockholm is the seventh most expensive city in Europe to purchase an apartment in (DN, 2015). The problem with the housing market is a topic continuously revisited by media, even gathering international attention (SVT, 2014). According to Ingrid Eikien, CEO at Mäklarsamfundet, the prices for apartments in Stockholm will continue to increase at a high pace (DN, 2015).

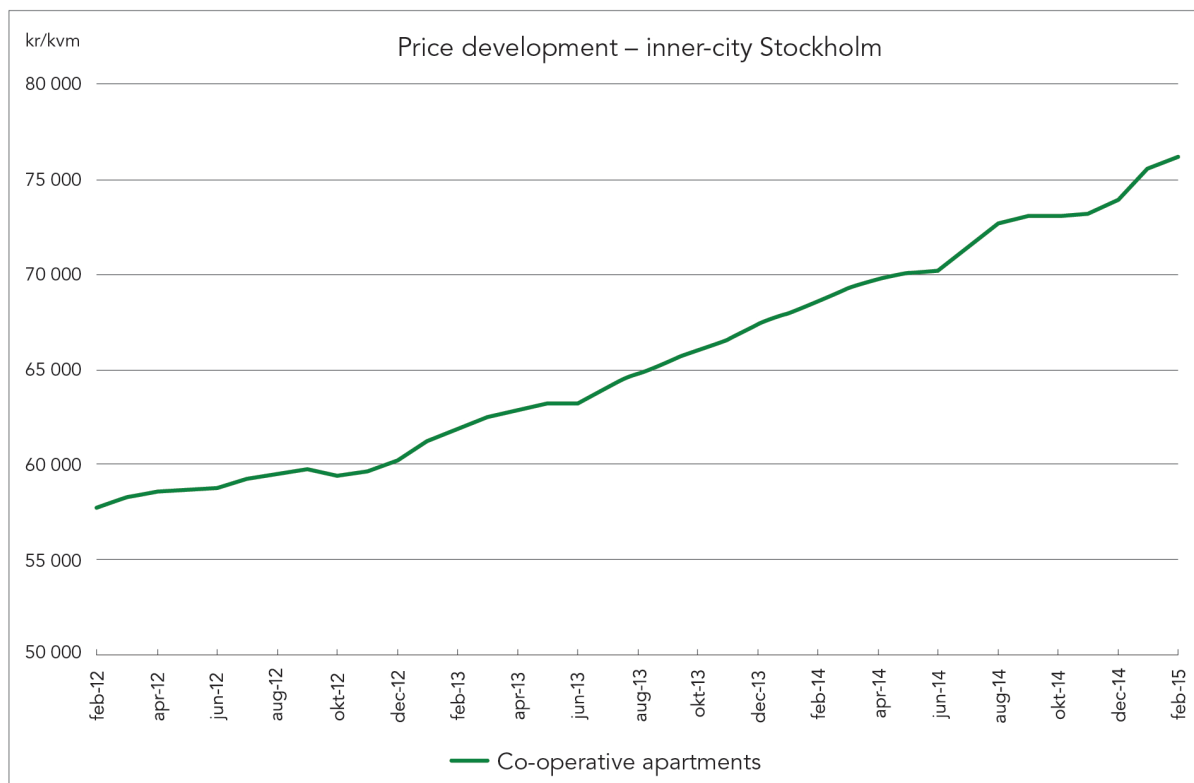


Figure 4.1. The price increase (SEK/m²/year) for apartments in central Stockholm between February 2012-February 2015 (Mäklarstatistik, 2015a)

For example the prices increased 11 percent in February 2015, compared to the previous year (Mäklarstatistik, 2015a). This is mainly due to the fact that the demand increases in a higher pace than supply. For example, only 1700 new apartments were constructed in Stockholm during 2012 (SVD, 2013a). The explanation for the low construction rate seems to be due to long planning processes and complicated rules and laws which makes new construction inefficient as well as high taxes for capital gains which opposes the incentives to sale ones

apartment (SVD, 2013a). The problem is the same if one wants to rent an apartment. In 2012, 400 000 people were registered in the municipality waiting list and it takes an average of 7 years to get an apartment (SVD, 2013b).

4.3.2 Växjö

Compared to Stockholm, the housing market in Växjö is significantly less turbulent and prices lower. The average price in Växjö is 19 555 SEK/m² (Mäklarstatistik, 2015b) compared to Stockholm's 76 000 SEK/m² (figure. 6). This implies almost a four times higher purchasing power for people in Växjö compared to Stockholm, if the same income is assumed. This is true even if the percental development has been similar which, as mentioned, was 11 percent during the last year in Stockholm (4.3.1) compared to an average of 10 percent in Växjö (Mäklarstatistik, 2015b).

4.4 Relationship Between CO₂ Emissions and Energy Consumption in Sweden

In Sweden, residential housing use 22.5 percent of the total energy consumption according to the International Energy Agency, IEA. Within the building sector, the country has set high goals of reducing overall energy consumption. The goal is to reduce energy consumption by 20 percent in 2020 and 50 percent by 2050 (IEA, 2013).

In 2012 the building code was revised, requiring new residential, public and commercial buildings to consume less than 90 kWh/m² /year in the southern climate zone and 130 kWh/m²/year in the northern (IEA, 2013).

Today, the average energy consumption in a Swedish apartment is 150 kWh/m²/year, which means that the average 90 m² apartment use roughly 13 600 kWh per year (Energimyndigheten, 2010).

On average, the CO₂ emissions from what is called the *Nordic Production Mix* is 125,5 CO₂ ekv/kWh (Martinsson, Gode, Arnell & Höglund, 2012) which means that the average CO₂ emission from a Swedish apartment is 1706,8 kg based on our calculation. The average

energy cost in 2011 was 1,37 SEK/kWh (IEA, 2013) meaning that the annual cost is roughly 18 632 SEK using the 13 600 kWh/year.

5. Empirical Findings

The structure of the empirical findings will mainly follow the interview guide. As mentioned in our methodology, the empirical findings will be presented on a case aggregated basis. Thus, every subheading is followed by a presentation of the findings that could be aggregated and did not differ between the cases. Thereafter the findings that stood out are emphasized and described. The respondents have been renamed so that the initial letter in the respondents name is the same as the initial letter of the case name, for example the respondent Johannes is from Jublet & Vålbehaget.

5.1 Consciousness and the Knowledge About Sustainability

The respondents were asked about the term sustainability and questions about their consciousness about it. This was done in order to get an indication about their previous knowledge and to evaluate if it could have been a factor affecting their decision.

The knowledge about sustainability and what it means, as well as the general level of sustainable consciousness seem to be very similar for all respondents and not dependent on the case. The variation that we observed was on an individual level and was not dependent on any other demographic factor used in this research, except that those that had more knowledge about the subject had encountered it in their professional life.

5.1.1 Definition of Sustainability

All respondents, except three, had a very similar definition of the sustainability concept. Either they defined it as a low use of resources or a use of resources that could be matched with the Earth's natural regeneration. The answer from one respondent serves as a general response: *"To not waste resources, I would say." (Jenny)*

Some respondents instead emphasized the environment in their definition *"it means doing something that doesn't affect the environment more than necessary." (Susanne)* Others also mentioned that sustainability is about leaving the Earth in the same state as it is today, for the well-being of future generations. However, the general overlying theme was that sustainability is about the conservation of the environment through less use of resources.

The three respondents that had a more academically correct definition of the concept simply had so because they work with, or had some relationship to the concept at work. For example Johanna who works in the construction business said:

"[...] it's because I work with what I do [that I know the definition] otherwise I would not have known it. To put it simple, I would say economical, ecological, and social sustainability where you don't consume resources of the future."

5.1.2 Energy Consumption Related to CO₂ Emissions

There was a low knowledge among all the respondents about the relationship between CO₂ emissions related to the heating and energy consumption of the building. Most of the respondents said that they did not know about the relationship at all.

Only a few recognized that there has to be a relationship between the emissions and energy consumption, but these respondents also said that they had not thought about it. For example, Helena said: *"I don't know if I thought about that. Of course there has to be [...] It's not something I've reflected on."*

5.1.3 Global Warming

When it came to global warming, most respondents answered that they follow what is being said in media but not much else. Most answered like Sanna and said they knew *"[...] about as much as everyone else, not more nor less"* but there were a few who were more environmentally conscious and answered *"4 out of 5 maybe. I wouldn't say that I'm an expert but I read about it."* (Julius) However, this was also something that was related to individuals rather than case specific.

5.2. List one - the Relative Importance of General Housing

Aspects

This part of the empirical findings focuses the questions related to the relative importance of the various housing aspects which mainly were regarding the decision making process, the open question about the main reasons why the respondents moved, and the first list in the interview guide.

5.2.1 The Decision Making Process

The decision making process to move had significant variation between the cases. The most explanatory factor seem to be whether the dwelling was purchased, as in the case of Jublet & Vålbehaget and Solallén, or rented, as in the case of Hammarby Sjöstad.

In the case of Jublet & Vålbehaget the decision making process was somewhat shortened since all respondents had a clear picture of where they wanted to live, which generally was somewhere in central Stockholm or "*inside the tolls*" as one respondent said. Most respondents had considered at least one alternative ex ante making the decision, however this was not always the case. When deciding whether or not to move, the factors presented below were generally weighted against the price. To get an apartment in the two buildings, one had to make a declaration of interest, get an apartment offered, make a decision, and thereafter wait for the construction to finish. Depending on when in the process our respondents declared their interest they waited 2 to 4 years before they moved in.

At Solallén the decision process was also similar between the respondents. Most were weighing between purchasing a house in the outskirts of Växjö or buying an apartment in a central part of town. It seems that the respondents at Solallén generally considered more alternatives and had a longer decision making process than the ones in Stockholm. One of the reasons for this could be the difference in the housing markets in the two cities. Simply, more alternatives could be available to evaluate compared to Stockholm.

An extensive decision making process was not present among the residents in Hammarby Sjöstad. Generally, all respondents had been in the queuing system for rental apartments for a very long time, some up to 11 years. The apartments are highly demanded and the long queue

time allowed the respondents to get an apartment in the area, however, with no choosing between different apartments. Also, most respondents stated that they had not looked for apartments in different areas. Hanna for example said that:

"It wasn't much of a process, we noticed that we were eligible to apply for an apartment through the housing society here in Hammarby Sjöstad so it was very short."

There could be many reasons for this, first of all; when renting an apartment there is no capital expenditure being made by the respondent. This means that the financial risk of making a wrong choice is low, thus the process of evaluating alternatives and the pro's and con's would not be of the same importance. Second, as mentioned in 4.2.3, the area has had a lot of media coverage, which could mean that the respondents had sufficient information about the area to be confident about their choice, deeming other alternatives to be less attractive.

5.2.2 Open Question - What Aspects and Parameters Were Taken Into Consideration When Making the Purchase

In order for us not to create bias or impose any preconceptions on our respondents we started by asking them about what had been the most important aspect when they moved and followed up with asking about what other aspects that had been important.

In all three cases, most respondents answered that they needed a bigger home. However, this was the only common feature among all three cases.

"We needed something bigger and better." (Siv)

"No, it was [...] size and then we wanted to live in southern Stockholm." (Hampus)

"I wanted a bigger apartment." (Jennifer)

In Stockholm, another common feature except the size of the apartment was that the respondents thought that it was very important with the location of the apartment. The respondents' term location translate into a mix between what we defined as accessibility and

neighborhood physical qualities, which will be further evaluated later in the empirical findings. This was not something that the respondents at Solallén mentioned and thus differentiated the cases.

Some respondents at both Jublet & Vålbehaget and Hammarby Sjöstad mentioned that location was the main reason for them to move. Jasmine said that *"To have a little shorter travel time to and from work so it was mainly the location that mattered."* When we delved a little deeper there were also many respondents who mentioned that location was a factor they considered, even though it was not the most important. For example, Hanna said that *"It was mainly the size of the apartment and the location that was important."*

However, at Solallén, the location seemed to be of limited importance and most of the respondents answered that, after size, the factors affecting their decision to move was the design and layout of their townhouse, both interior and exterior. Some also mentioned the green aspects and indicated that they received good value for money.

"It was mainly the type of house, that it has a little garden and that it's a townhouse. [...] that we like the design – there's a high ceiling and that it had three bedrooms." (Susanne)

There was another aspect that we had not included in our interview guide but seemed to be a recurrently mentioned as an important factor that influenced the decision. Several respondents from all cases were excited about the fact that they moved into a new building. They explained that it would not need to be renovated anytime soon, as well as stressing the freshness and design.

To summarize, most of the respondents in all cases stated that they mainly wanted to move because of the size of the apartment. Many were also excited about moving into newly built homes. It is also clear that the location of the apartment is much more important in Stockholm than it was in the Växjö case.

5.2.3 The Ranking of Aspects

At this point in the interview, we presented the respondents with our first list containing the various dwelling attributes that we had found in our literature review.

As mentioned in the methodology, the respondents were asked to rank the relative importance of the five dwelling aspects listed below. Ranking it as number 1 indicated that it was the most important aspect and 5 indicated the least important. The numbers presented below is an average of the respondents preferences divided by case. It is meant to be used as an indication and to see if there were any patterns in our findings, however; it is not a statistical test and thus should be interpreted with carefully.

Jublet & Vålbehaget	Avg. score	Sollén	Avg. score	Hammarby Sjöstad	Avg. score
Regular dwelling attributes	1,67	Regular dwelling attributes	1,57	Accessibility	1,83
Neighborhood physical qualities	2,08	Green dwelling attributes	2,00	Neighborhood physical qualities	2,67
Accessibility	2,17	Neighborhood social qualities	3,43	Regular dwelling attributes	2,83
Neighborhood social qualities	4,00	Neighborhood physical qualities	3,71	Green dwelling attributes	3,50
Green dwelling attributes	4,33	Accessibility	4,43	Neighborhood social qualities	4,67

Table 5.1; 5.2; 5.3. The local average ranking in all three cases for list one

5.2.4 Neighborhood Physical Qualities

In all cases, those who valued the neighborhood physical qualities highly did so because of the access to surrounding nature.

At Jublet & Vålbehaget, the second most important aspect to move after regular dwelling attributes was the neighborhood physical qualities. The importance of course differed among the respondents as well as the reasons why it was important. However, the most commonly mentioned factors were parks and green spaces. Johnny told us about how it enhanced his quality of life:

“I think it’s beautiful to look at this kind of view [the respondent moves over to look through his window and out over the lake] and I think it gives me quality in life when it’s beautiful when I look out. That’s the main thing, another is that it’s nice to walk [along the lake].”

This was also something that many other respondents mentioned. Beyond the personal life quality, it is also possible that such preference existed because most of the respondents that we interviewed had children of a young age.

Compared to the case of Jublet & Vålbehaget the neighborhood physical qualities were of less importance when choosing dwelling at Solallén. This is interesting since the houses were located in the outskirts of Växjö and had access to a lot of nature, which was the priority in the neighborhood physical quality list at Jublet & Vålbehaget. Saga said it:

"Didn't affect my choice because it was a newly constructed area [...] and you don't really know how the area will look so it doesn't become that important".

Another respondent said that she had taken it for granted since all the options they had considered had all the neighborhood physical qualities explanatory points and therefore it was not an affecting factor. However, those who had ranked it highly mainly did so because of the access to nature.

In Hammarby Sjöstad the neighborhood physical qualities along with regular dwelling attributes were the most important aspects after accessibility. Those who ranked it among top three did it mostly because the closeness to water and green spaces. Hilda said *"It's the vicinity with green spaces that was the important part. It's even more important now that I'm a mom, that you can stroll around."* There was also one respondent that said it was important because she valued the fact that it was a beautiful area, mostly due to the architecture and surrounding nature.

5.2.4 Neighborhood Social Qualities

As can be seen in Tables 5.1; 5.2; 5.3, the social qualities of the neighborhood were relatively unimportant in all three cases. It seems that it is especially unimportant in the two cases from Stockholm. Jasmine from Jublet & Vålbehaget motivated this unimportance by saying:

"You make new friends and hopefully you keep the old ones you have when you move around so it was not so important that they are just around the corner. If you live in a city such as Stockholm you travel to friends and family, they are never at a walking distance."

And Hampus from Hammarby Sjöstad simply stated that: *"No, it's nothing important really."* There was only one respondent from Stockholm, living in Hammarby Sjöstad, who actually mentioned that it was important with the status of the neighbors and that it was a low crime rate in the area.

At Solallén, many respondents mentioned that it was not the social status of the inhabitants but rather that it was a safe neighborhood that was the important factor among the social qualities. It was also the reason why they ranked it relatively higher compared to the two cases in Stockholm. Saga said, *"[...] it's not like I care about how much money my neighbors make and what kind of job they have but of course it's important that you live in a safe area."*

The reason why safety seem to be relatively more important at Solallén than at Jublet & Vålbehaget and Hammarby Sjöstad might have its explanation in what Johannes from Jublet & Vålbehaget said about *"[...] crime and that sort of stuff, it's not really something you reflect on when you live in the [center of the] city. It is what it is."*

5.2.6 Accessibility

It is interesting to note that the extent to which accessibility was valued correlated with the distance to the center of the city. In Hammarby Sjöstad, which is located the closest to the city center of Stockholm, it was valued the highest, while Solallén it was on average valued as the least important factor affecting one's choice. Those who valued it highly, meaning respondents at Jublet & Vålbehaget and in Hammarby Sjöstad, did so because it was close to work or the city center, which meant less time travelling and also being able to do so with public transport or bicycle. Hanna from Hammarby Sjöstad said that *"[...] it's only because it's close to the city and it's easy to get to and from work. That's what I valued."* while Johanna from Jublet & Vålbehaget stated that *"It's convenient and it happens to be that we both work very close to home."*

At Solallén, where accessibility was ranked the lowest, it seemed to have been done so because the respondent simply prioritized the other aspects and therefore made a rational trade-off decision. Many had also moved from the city center and in doing so, Stig said that *"I reason that way because we lived closer to the city center before, so practically we switched from living more centrally to move here."* which is similar to the response from most other respondents in Solallén.

5.2.7 Regular Dwelling Attributes

In two of three cases, this was the most determining factor when people moved. As has already been mentioned in 5.2.2, most respondents said that size was the most determining factor when they moved. Many respondents were starting families and thus needed at least one more room.

"The apartments qualities was the main reason that we moved, meaning, it had to be bigger and that's why it's most important." (Julius)

Jörgen, at Jublet & Vålbehaget seem to only have read the heading and therefore gave the motivation that *"[...] it was a newly constructed building and then I know that it's a pretty good quality."* In other words he took the actual quality of the construction for granted, which has nothing to do with the explanatory points in our list. Jörgen was also the only respondent who did not rank this attribute in top three.

Another respondent, Johnny, ranked it in third place and stated the same reason. As well as taking the apartment size as something of a prerequisite when moving.

"This is tricky because, some things you take for granted and you proceed from that. Naturally, the apartment size is determining but then it can be anywhere [in terms of location]."

5.2.8 Green Dwelling Attributes

In Hammarby Sjöstad and Jublet & Vålbehaget, the green dwelling attributes were ranked in fourth and fifth place, respectively. However, at Solallén it was ranked second. This could seem somewhat unexpected since the respondents at Jublet & Vålbehaget lived in a house with LEED gold certification; a very high ranking as mentioned earlier, and therefore could

be expected to value it higher. However, it is important to notice that all the respondents in Jublet & Vålbehaget saw it as a bonus although it was not a decisive factor when the decision to move was made.

*“Yeah, it was always on the back of my mind. It was never determining but rather a bonus.”
(Johannes)*

“The sustainability aspects were more of a bonus as it’s more important that the apartment is in a good neighborhood.” (Jonas)

In other words, most of the respondents considered the environmental aspects to be important, at least to some extent, and valued the fact that their house was constructed to conserve the environment. Though, compared to the other aspects, they stated that they simply could not rate it higher.

In Hammarby Sjöstad, the green attributes ranked a little higher than it had at Jublet & Vålbehaget, but only higher than the social qualities of the neighborhood so it was still a rather low priority among the respondents. This may have several explanations; first, we only have 6 respondents from Hammarby Sjöstad. Secondly, the difference in upfront investment and could thus imply a more attractive offer. Lastly, the respondents from Hammarby Sjöstad contacted us rather than the other way around which may create bias in the results, as can be seen by the answer from Hanna.

“I work with environmental issues so it would have been terrible if I didn’t put this high. [...] I think that these questions are important and know that there has been a more thought here [regarding sustainability] compared to other areas [...]”

Ranking the green dwelling attributes second, it is obvious that the respondents in Solallén valued it highly and that it had a big impact on their decision to move. It was also something that was confirmed by their later statements. Many of them said that it was both an economical aspect as well as a feeling of contributing to a better environment that was the motivating factor, some valuing one more than the other. This was not something that we saw in the two cases in Stockholm at this point of the interview.

"Yes, especially when you move to something newly constructed it's obvious that you want it to be constructed as environmentally friendly as possible. In one part, it's because of the environment but also [...] for economical reasons." (Sofia)

"No I definitely it's because both my economy and the environment should go hand in hand, it's something I think is very positive [...]. It's supposed to feel like you get value for your money [...]" (Sven)

There were also many respondents at Solallén who ranked sustainability high because they had not taken the non-toxic building material for granted. This was something many respondents in Stockholm actually had done, which we found out in a later part of our interviews.

Earlier in the interview, Susanne said that she did not know about the green aspects prior to moving into the house and thus rated it in fourth place. Hence we asked if she would have valued it higher after her experience she stated

"Yes, I would. Because now we feel the difference when living here. That we have very good air, that it is quiet and you don't hear your neighbors at all. The solar panels also have their big pros [...] it feels very good living in a house like this."

One respondent, Stig, especially stressed the environmental aspect reasoned that *"Around 2010 we decided that when we do something in the future we will try to be environmentally friendly [in our purchase decisions] when buying cars and such."*

When asked what made them draw such a sharp line in 2010 he answered *"You can say that it's this way; you can't do a lot but you can at least do a little for the environment."*

5.3. List Two - The Relative Importance of Various Green

Attributes

The second list that the respondents were asked to rate had the same principle as list one, however it includes the six explanatory points of the green dwelling attributes from list one, which also are the most common green dwelling attributes used in similar research. While list one is supposed to explain the relative importance of the various housing aspects, list two is supposed to explain the relative importance among the green attributes found in list one.

Jublet & Välbehaget	Avg. score	Sollallén	Avg. score	Hammarby Sjöstad	Avg. score
Non-toxic building Material	2,4	Low energy consumption	1,86	Non-toxic building Material	1,83
Sound isolation	2,6	Non-toxic building Material	2,86	Low energy consumption	2,67
Low energy consumption	3,0	Heat isolation	3,43	Heat isolation	3,83
Ventilation	3,4	Sound isolation	3,86	Ventilation	4,00
Heat isolation	4,2	Ventilation	3,86	Sound isolation	4,17
Low water consumption	5,3	Low water consumption	5,14	Low water consumption	4,50

Table 5.4; 5.5; 5.6. The local average ranking in all three cases for list two

5.3.1 Did it Matter That the Dwelling Had Green Attributes?

The first question in our interview guide was regarding how much the respondents knew about their building before they decided to move. This was asked in order to see if they had knowledge about the sustainability attributes without creating any bias in the following parts of the interview. Our aim was to see if they mentioned anything about the sustainability aspect. In general, the respondents knew quite a lot about their housing before they moved.

Many mentioned that they knew about the sustainability aspects, it was especially clear in Hammarby Sjöstad where most respondents said they had previous knowledge of the environmental focus.

"I knew quite a lot, I grew up in close by. I have been here when it [the area] have been developed and I knew that it was a sustainable neighborhood." (Hanna)

When it came to Solallén and Jublet & Vålbehaget there were more discrepancies among the answers although most respondents knew about the certifications and the sustainability aspects.

Later on, after asking the respondents to rank the first list, we asked them if the certification and green dwelling attributes had affected their decision to move. What we found was that all the respondents from Stockholm said that it had not affected their decision, however most said it was a bonus.

"[...] so it didn't affect the decision, no. On the other hand it's a bonus now that I know of the benefits." (Helena)

"It felt good but it's hard to find apartments so it was not a determining factor." (Jessica)

The answer that Jesper provided sums up the findings that we found in Stockholm pretty well when it comes to how the environmental aspects affect the decision. But again, many saw it as a positive bonus.

"No, actually not, not when it comes to Stockholm and what the house market looks like. You can't afford it, you think about yourself before the environment. It's as simple as that, and I think I speak for 95% of the population."

In other words, the environmental aspect does not seem to have been a major driving force among the Stockholm respondents who were making the decision to move. However, it is seems clear that the same aspect added some value, with some respondents at least post hoc their purchase decision.

When asking the same question in Solallén, we used both green attributes and certification as terms without knowing that our respondents' houses had not been certified prior to their decision to move. We therefore got some discrepancies in our answers since some respondents mainly focused on the certification by itself. For example Sofia said that:

"I probably didn't know anything about that but I got a email about a month ago saying something like 'congratulations, we've become certified with the Nordic Ecolabel'. So it probably wasn't something they thought of, or at least they didn't market it with that fact."

Regarding what aspects Sanna had taken into consideration when choosing housing she said:

"We also had a line of thoughts regarding the sustainability in the house and how it affected the value of the dwelling; to find something that future buyers also valued. Because we know we will not live here forever. [...] We also considered the lower operating cost [...]"

Another respondents from Solallén who thought about the environmental aspects was Sven who said:

"Absolutely! I figure that I make something good with my money if I invest in green and then, as a bonus, I think it as something that will generate profit when more people think about the environment."

As a conclusion we interpreted that, even though at least some value was added, the environmental aspects was not a direct decision factor for the respondents in the Stockholm cases whereas it had affected most of the respondents at Solallén to different degrees. This simply seems to be because other housing aspects were relatively more important for most respondents and not the fact that the respondents did not value the green attributes.

A strong explanatory possibility for this is how the housing market looks in Stockholm, in comparison to Växjö, where getting an apartment is hard enough by itself and therefore one cannot be captious about the environmental aspect. This will be further discussed in 6.1.

5.3.2 Trust in the Certification

The respondents were asked if they had any trust in the certification in the sense that the building performed as it was supposed to out of the environmental aspect. This question was added after a few of our initial interviews at Jublet & Vålbehaget since the respondents seemed have little knowledge about what the LEED certification meant. The respondents in general seemed to have a high trust and felt safe with the label. According to Jenny, the fact

that the certification was done by a third party also seem to add an additional dimension of that trust which was also something that others mentioned.

"[...] but it felt very serious. If it had been Skanska's own [certification] then I would have been a little hesitant but I have understood that it is some kind of external labeling and then it feels pretty safe that it is not something they just made up."

At Solallén on the other hand, the decision to certify was made after most of the houses had been sold, but prior to the respondents moving in. Thus it could not have been an affecting factor in their decision to move. However, we argue that a trust in the certification still implies trust for the quality control of the green attributes and that they perform as they are marketed to do. It could therefore be relevant for the respondents' future choice of housing, especially since they valued the green attributes highly in this study. Every respondent at Solallén expressed a significant trust to the Nordic Ecolabel certification. The reasons were either its brand or the difficulty to reach the certification. Stig also said that since it got the certification:

"[...] that it fulfilled the highest criteria at all the points that the Nordic Ecolabel has, then it doesn't only fulfill one aspect of the certification, but all criteria are either on max or more. Therefore I think it's important."

He continued by telling us that it is important that all green dwelling attributes work together and the certification is an important way to make sure they do. We interpreted the answer that a certification is a way to prevent greenwashing in the sense that the developer adds green attributes for marketing purposes that does not have any significant sustainability impact. Since the buildings in Hammarby Sjöstad does not hold a certification but instead is a district that has made numerous sustainability investments the question of trust in the certification had no practical holding in this specific case.

Overall, there seems to exist a trust in the certification and factors affecting that trust are first and foremost the fact that it is an external label and the brand of the label. What can be concluded is that Skanska's own certification, Grönt Initiativ, might not have gained the same response from our respondents.

5.3.3 Low Energy Consumption

Of the aspects in list 2, low energy consumption was ranked on first place in Solallén, second in Hammarby Sjöstad and third place in Jublet & Vålbehaget, thus being an highly valued attribute in all three cases. The motivation why it is ranked seems to be two-parted, with the respondents stressing the economic and environmental implications this attribute has. Some only stressing the first, others the second while some seem to point out the importance of a win-win situation for there to be any real change as Julius from Jublet & Vålbehaget stated.

"I think that, to succeed in a sustainable approach, there has to be some kind of win-win situation. It should not be that one person pays for sustainability for someone else. So I believe that low energy consumption is good for me but it is also good for the environment and therefore I think they are interconnected."

However, all of his neighbors at Jublet & Vålbehaget, interestingly enough said that when rating the low energy usage they mainly thought about the economic aspect while "[...] the environment comes as a bonus." (Johannes)

At Solallén the respondents in general seemed to value both sides of the coin, talking about both the environment and the energy cost with no clearly prevalent side. In contradiction to Jublet & Vålbehaget, there were more than one that prioritized the environmental aspect as well. This is interesting to notice since living in a house implies higher energy usage than in an apartment and therefore the economic incentive should logically be higher at Solallén. Susanne for example said that *"Partly it's the effect on the climate, that it decreases. Then of course it is also good for your wallet."*

In Hammarby Sjöstad however, all respondents emphasized or exclusively mentioned the environmental aspect, some considering the economic side being a bonus. For example Hanna said that:

"[...] it's important that the whole society saves, or lowers, their energy consumption and it's these kind of things that can be built into the infrastructure [to make it easier for people in general] because people are lazy."

In summary, there does not seem to exist a dominating intrinsic value for rating the low energy consumption highly. Possibly, the economic aspect may be a little more motivating.

5.3.4 Low Water Consumption

So far, many of the answers that we received from our respondents in the three cases has differed a little bit in between the cases. However, the low water consumption received the lowest rank among the sustainable attributes in all three cases. As Johnny at Jublet & Vålbehaget said:

“Regarding water, I really don’t care about that actually. [...] water usage is very important but I lack the environmental awareness and hence don’t value it.”

As we already mentioned before, the operating cost were not really something that the respondents at Jublet & Vålbehaget had in mind when they decided to move to their apartment.

It may very well be that there is a perceived abundance of water in Sweden and hence the respondents have no reason to value it high. It may have been different in another country or continent where water is scarcer. There were also, especially at Solallén, respondents who were annoyed with the low-flush faucets.

“It’s not something that I have thought about but I think it’s very annoying with the low-flush faucets.” (Saga)

In conclusion, there seems to be no awareness for water usage in any of the cases.

5.3.5 Non-Toxic Building Material

This seems to have been one of the most important aspects among all respondents in this study. However, there were those who ranked it low who often added that they had taken this attribute more or less for granted. There were also many who ranked it in first and second place but also said that they had taken it for granted. This means that the average score might not show a completely accurate number.

“I put non toxic building material as most important but I would not even have a look at it as I take it for granted [...] maybe it’s lack of knowledge about the usage of toxic building material [...]” (Jonas)

“Of course, I assume that when it says non-toxic building material that when you buy something new that it is tested and you see it as a given.” (Sofia)

It also seems that, since many of the respondents that we interviewed were part of families with young children, they tended to value non-toxic building material high for their children's safety but also for their own health.

“I’m going to spend a big part of my life here and if there’s dangerous substances in the walls there is a risk that it affects me and my daughter. The house will eventually be demolished and then it is also important that that works. Environmentally adapted from A to Z even if it will only be relevant in a distant future, but also renovation and refurbishment releases material from the house and it has to be good.” (Julius)

As can be seen from the last quote, there were also a couple respondents who mentioned that there is an environmental aspect and considered the buildings’ lifecycle and how the building material will affect the environment when being demolished.

It is quite clear from this study that all of our respondents valued this attribute high. Moreover, it seems that it is mostly for personal health that the respondents value this attribute, but there were also those who thought about the environmental aspects.

5.3.6 Heat Isolation

The heat isolation is the third most important attribute for the respondents in Hammarby Sjöstad and at Solallén. In all three cases, there were some respondents who mentioned that they thought that low energy consumption and heat isolation are interconnected like Sven *“If you ask me it’s connected with low energy usage.”* However, their ranking shows low energy consumption is more important.

Although some of the respondents also mentioned that they thought that heat isolation were interconnected with both sound isolation and low energy consumption it was ranked low in

comparison to other attributes. One reason that we believe can explain it being ranked low is that it might be easier to affect the indoor climate yourself, compared to affecting the other attributes such as sound isolation, like Jasmine told us when she said that:

“I mostly thought about myself actually, in my own apartment. You can always put some extra clothes on in case the isolation would have been worse.”

5.3.7 Sound Isolation

With sound isolating there is once again quite some difference between the cases. Hammarby Sjöstad and Solallén ranked its importance in a similar way, in fifth and fourth place respectively, whereas Jublet & Vålbehaget ranked it as the second most important attribute.

In Hammarby Sjöstad it seemed to be much less important when it came to sustainability among the respondents compared to Jublet & Vålbehaget. Again it seemed that it was mostly personal well-being that was the benefits that people perceived. Hanna said that she ranked it in last place because *“Sound isolation doesn’t feel so important compared to the others. They are so much more important than this.”*

At Solallén where it was ranked in fourth place, Sofia said:

“It’s mostly that old houses are extremely insufficiently soundproof and I understood that I wouldn’t have any problems with it here [in a newly constructed house].” (Sofia)

The big difference among the three cases was Jublet & Vålbehaget who ranked the sound isolation in second place. The underlying reason is similar to that at Solallén where many of the respondents said that they had earlier experience from apartments where the noise from neighbors had bothered them and that this was the reason why they valued it as high as they did.

“When you have lived in an old, shabby house where people mess around at night and so on, the sound isolation becomes very, very important [...] You don’t hear anything here and it’s amazing!” (Jenny)

Although the respondents from both Hammarby Sjöstad and Jublet & Vålbehaget live in apartment buildings, their views differed on sound isolation. It would have been logical to think that the difference would have been between Solallén and the Stockholm cases since the houses at Solallén are townhouses and not apartments where you have someone living in all directions.

5.3.8 Ventilation

Ventilation was not ranked among top three at any of the cases; hence we determine that it is not as important in comparison to the other attributes. Maybe it is because people like to have their windows and balcony doors open anyway and thus do not think about it that often – because it is such a quick fix for bad ventilation. It may also be that this feature is so subtle that you will not notice it until it is bad as shown by Jesper's and Sanna's responses:

“In general I don't think that you think about this until you notice [how good the ventilation is]. [...] It is very good.” (Jesper)

“I think it's hard to know how it would have been if we hadn't had good ventilation. [...] ventilation is important [...] Because you can often affect the indoor climate in other ways than through ventilation” (Sanna)

However, Sanna continued saying in the interview how fantastic the indoor climate is in the new apartment and how much it enhances the social living conditions.

5.4. Stated Willingness to Pay for Green Attributes and How it Affects Resale Value

Stated willingness to pay

Based on the experience they have had after moving into the apartment, the respondents were asked if they, in a hypothetical scenario, would be willing to pay for the green attributes in their building in order to receive them, *ceteris paribus*. This was in order to see if their experiences had changed their willingness to pay, and if so, how much. This is of course an attitude being stated and does not reflect their actual behavior. However, the question was

added to see if their attitude towards green attributes had changed post hoc moving in and how much the actual experience affects the willingness to pay.

In Jublet & Vålbehaget, more than half of our respondents said they would be willing to pay more for the green attributes and the certification, while one said he lacked the knowledge.

Julius for example said:

"Yes, I believe so. [...] so yes, I would be willing to pay a little extra to get the environmental certification, not just the certification but the benefits that it actually brings namely that we actually have a more sustainable house."

A point of view most of his neighbors shared. Many others said that they would be willing to pay more for the green attributes, ranging from 5 to 15 percent, while other indicated that the price increase could not be too high. This further strengthens our belief that even though the sustainability attributes are not a deciding factor, it is still perceived as beneficial and something that people do not mind paying for.

Johanna at Jublet & Vålbehaget said that:

"[...] it's hard [to value] in a multi-family home. It has a much more substantial utility for freestanding single family houses because you are exposed to all costs in another way. [...] Even if I work with this, I would still have to say that it doesn't have any intrinsic value that is certified."

Thus saying that the green attributes and certification would matter more when purchasing a house.

As in the case with Jublet & Vålbehaget, more than half of the respondents at Solallén said that they would be willing to pay more for the green attributes. Sven said that:

"[...] now after [moving in]. Now when I have lived in a house like this, yes I would [...] I believe it's easily worth 3-5% I would say."

However, like some respondents at Jublet & Vålbehaget, Sanna said that she wanted some benefits in order for her to pay extra for an environmental certified building.

"No, not unless there were some other benefits for me, but since the environmental aspect is often connected to resource use [...] and the resource use cost money so for that reason you want to keep the operating cost low."

But she later on explained emphasized that she would be willing to pay a higher upfront cost for lower resource use and construction quality.

Interesting to note is that, Stig said that he had actually already paid about 250 000 SEK premium for his home at Solallén compared to other alternatives that they had look at. Also Saga said later that she had paid a little extra for their home.

"[...] so, it's tough, if it would have been 250 000 more I don't know if it would have been worth it. [So you already paid extra? Can we ask you how much?] Yes, 250 000 [SEK] more."

Since the respondents lease their apartments in Hammarby Sjöstad, the question was modified to accommodate this fact. When we asked people if they were willing to pay extra rent for the apartment if it, or the neighborhood, were fitted with sustainable attributes, some respondents answered that they were willing to pay a little extra for it while others said that it was already expensive as it was.

"Yes, I think I would have paid a little extra for it. It's really hard to say how much but a few hundred [SEK] extra per month I think I would have paid to get it a little bit more environmental but not several thousands." (Hanna)

Resale value

Resale value was a question we added to our interview guide during our interviews in order to see if the respondents thought that they would be able to sell their home at a higher price relative to similar homes due to the green attributes. At Jublet & Vålbehaget, we received answers that were both positive and negative but the majority thought that the resale value

would not be affected by the certification. Jennifer from Jublet & Vålbehaget stated that *"I think that it will have a positive effect on the resale price."*

Whereas Jasmine said:

"I actually doubt it even if many people think about the environment and stuff like that these days. Everything has its price and since it's already so expensive in Stockholm for regular apartments that aren't environmentally certified so I would be very hesitant that someone would pay extra for the environmental certification. I'm not sure whether there's any demand for it today."

In Hammarby Sjöstad this question was not applicable due to the fact that the respondents lived in rental apartments.

At Solallén, however, the answers were more unanimous where most respondents stated that they thought that the resale value would in fact be affected by the fact that the townhouses are certified. Siv said, *"Yes, I believe it will."*

As a summary, it seems that many people would consider paying extra for the common attributes of an environmentally certified building as long as the premium is not too high. Again, this is a stated preference and it was only Stig and Saga who said that they had actually paid a premium price for their homes.

Another aspect is that it seems that most respondents' at Jublet & Vålbehaget did not think that the certification would affect the resale while most respondents at Solallén think that it would. It might be the housing market that is radically different between the two cities and it might just not be practical to consider the sustainable attributes in Stockholm because of the difficulty of buying an affordable apartment.

5.5 Energy Efficiency Gap

The energy efficiency gap is a very complex issue and it is interconnected with many of the earlier responses that we have presented, for example the knowledge about the global warming and certification (information) and the decision process (how 'rational' was the choice to move). In this part of the empirical findings we will cover other aspects such as price, split-incentive, and upfront vs. long-term calculations that are relevant.

All respondents who had bought their apartment, meaning those at Jublet & Vålbehaget and Solallén, unanimously said that the price was a determining factor. At Jublet & Vålbehaget, all the respondents said that the price often put an upper limit of how much they were able to spend on their apartment. What was interesting was that we found several respondents who thought that they got good value for their money and only one who expressively said that they felt that it was expensive. Johannes said that: *“In the end I think it’s decisive. It can be as good as it gets, but if you can’t afford it, you can’t afford it.”*

Furthermore, many respondents said that they thought they got good value for their money at Solallén as well. As Saga said when we asked how important the price was: *“We compared with apartments in the city and these apartments were actually cheaper. [...] but what you got for your money was good here.”*

In Hammarby Sjöstad it seems that the price, or rent, was not very important among our respondents. Harriet motivated it by saying: *“It didn’t affect so much, it was pretty high so it was just to accept the fact really. So it didn’t really matter.”* This seems to indicate that when there is an upfront investment the price matters more than when the respondents only pay rent.

We continued by asking our respondents if they paid for their utility bill or if it was included in the monthly fee to see if there were any misplaced incentives. At Solallén and Jublet & Vålbehaget the respondents paid for heat, electricity, and water and in Hammarby Sjöstad they only paid for the electricity. We then asked whether or not they had considered the fact that they paid at least some part of the utility themselves, and if it would have mattered if it were the other way around. None of the respondents in any of our cases said that it would have altered their decision.

However, there were many who said that it was a positive thing to pay for the utility because it made them more aware of how much they used. Also, at Jublet & Vålbehaget there were no respondents who had made any considerations regarding the operating costs in relation to the price of the apartment. This might be because most of them had paid an excess of 4 million SEK for their apartment, which meant that the payback time would likely be very long, but

also that the utility bill did not affect their monthly budget in a major way. Julius from Jublet & Vålbehaget stated that no, it had not affected “[...] and when I realized that it concerned a couple of hundred crowns, which is not any big sum [...]” but also said that he felt that it was a moral issue to conserve the energy.

At Solallén, many said that the low operating cost was a factor they had considered when they bought their townhouse. As we have already said, Stig paid 250 000 SEK more for his home but here, Saga also said that:

“Yes, we have paid a little extra for this house but we have made some calculations that the house will have a low operating cost and that it will pay for itself in the end.”

We think that this may have two explanations. First, it might be because the utility bill seems to affect the respondents’ monthly budget in a more substantial way than that it had at Jublet & Vålbehaget and the expected energy consumption is lower at Solallén. Secondly, the upfront cost at Solallén was about half of what the respondents at Jublet & Vålbehaget had paid.

To summarize, we can see from our respondents’ answers that the price did indeed affect the decision to move when it was an upfront cost but not something that mattered to those who paid rent. We can also see that the utility bill, or misplaced incentive, would not have altered any of our respondents’ decisions. Another thing we saw was that the economic incentives differed between Jublet & Vålbehaget and Solallén where there is was greater incentive in the latter case and also that those respondents thought more about the operating cost than they had at Jublet & Vålbehaget.

6. Analysis & Discussion

Because of our inductive research approach and due to extensive empirical findings that cannot be categorized under a specific theory, we have decided to present the analysis and discussion in the same chapter. Previously identified theories will be used where applicable to describe our observations. The parts of our empirical findings that fall outside of our theoretical and conceptual framework will be discussed and explained by previously unidentified theories when possible. Finally, a revised theoretical and conceptual framework will be presented. The reader should also notice that many topics in the theoretical chapter are interrelated, thus some explanations might figure in many of the topics below and therefore seem repetitive. However, we deem this necessary to be able to carry out our discussion thoroughly.

Regular dwelling aspects, all cases	Avg. score	Green dwelling attributes, all cases	Avg. score
Regular dwelling attributes	1,68	Non-toxic building material	2,4
Neighborhood physical qualities	2,44	Low energy consumption	2,6
Accessibility	2,48	Sound isolation	3,32
Green dwelling attributes	3,24	Ventilation	3,68
Neighborhood social qualities	3,76	Heat isolation	3,88
		Low water consumption	5,08

Table 6:1, 6:2. The summarized average scoring for all cases

6.1 Difference Between the Willingness to Pay and What Affects One's Choice

Based on economics theory, the individual preferences and income affects one's willingness to pay for a certain product. These would also be the factors determining if the purchase would be made (Bergh & Jacobsson, 2010). If the individual willingness to pay is higher than the price, a purchase will be made and the purchasers' utility will be equal or higher than before (Bergh & Jacobsson, 2010; Katona, 1953; Arrow, 1951 in D. Lerner & H. D. Lasswell).

However, with many of our respondents in Stockholm saying that the sustainable attributes did not affect their choice there existed a willingness to pay for green dwelling attributes. This willingness to pay was distinguished by both their stated willingness to pay and through their ranking and discussion around the topic.

Based on this observation, we argue that the factors that affect an individuals’ willingness to pay should be separated from the factors affecting one's actual purchase decision. This phenomenon, we believe, can be described with Sterns (2000) framework of four types of causal variables, which in turn builds on a formulation of the ABC theory done by Guagnano, Stern & Dietz (1995). Behavior (B) is an interactive product of attitudinal variables (A) such as norms, beliefs, and values, i.e. Schwartz (1994) values types in our research, and contextual factors (C).

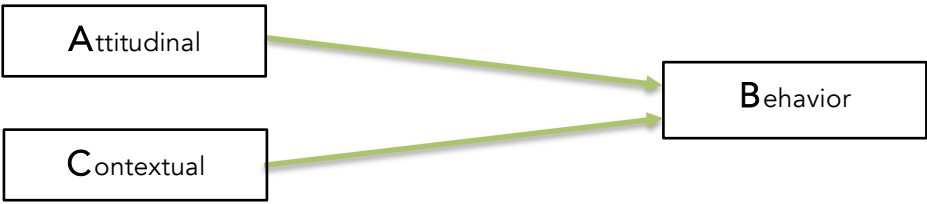


Figure 6.1. Illustration of the ABC-theory

Attitudes effect on behavior is the strongest when contextual factors are as close to zero as possible and the other way around. Meaning that contextual factors either work as a barrier or catalyst for environmental behavior. The more difficult or expensive a behavior is, the less the behavior depends on attitudinal variables (values) (Stern, 2000). The four types of causal variables are self-explanatory and presented below. Habit or routine has been made smaller since we are interested in one specific purchase decision.

Attitudinal factors	Contextual factors	Personal capabilities	Habit or routine
Norms, beliefs, factors	Interpersonal influences, advertising, legal and institutional factors, monetary incentives and costs, capabilities and constraints provided by technology and the built environment (e.g. availability)	Knowledge and skills required for a particular action, availability of time to act	Behavior change often requires breaking old habits and becomes established by creating new ones

Table 6.3. Summary of the four causal variables in Stern (2000)

In other words, even though ones' values imply a willingness to pay for some attributes of a product, it is not sure that these will be part of the criteria one use to evaluate it due to the effect of contextual factors (C). The most probable explanation to such a difference is two-parted according to us. First, even though our respondents valued green attributes high and were willing to pay for them, there were other aspects they valued higher such as regular dwelling attributes, implying a preference structure in the underlying attitudinal variables (A). Second, because of the contextual factors (C) of the housing market (as described in 4.4), other aspects are simply prioritized when making a decision, or behavior in the model (B), due to the lack of eligible options. Expressed differently, other, higher valued aspects become part of one's evaluation criteria. A low supply of dwelling should mean that prices will increase and therefore the income effect will make the individual consider options that does not necessarily maximize their utility (Bergh & Jacobsson, 2010).

The aforementioned relationship between individual willingness to pay and actual decision criteria would also explain the contradiction we noted in Zalejska-Johansson's (2012) findings. As mentioned, 75 percent of her respondents that lived in low-energy buildings stated that the fact that they were low-energy had no impact on the decision to move to the apartment. The same respondents were at the same time proud to live in green buildings, which they also stated increased their environmental awareness.

6.2 What Factors Affect Willingness to Pay

When people are making a decision to move, there are many different attributes they consider (Hu, 2015). Evaluating a buyer's preference, it has been common to use four categories to assess such a preference; neighborhood physical qualities, neighborhood social qualities, accessibility, and regular dwelling attributes (Wang & Li, 2006; Pan & Zhang, 2008; Jiao & Liu, 2010). When analyzing green buildings, a fifth attribute containing green dwelling attributes is added (Banfi et al., 2014; Yau et al., 2014; Chau et al., 2010; Hu et al., 2013) but the reasons for buying green dwelling varies among consumers (Kriese & Scholz, 2011). The answers to our open question, regarding what our respondents took into consideration when moving, prior to presenting list one, presented only one factor that could not be fitted in any of the categories; that it was newly constructed.

In our three cases, the most important attribute among the respondents when deciding to move to a green house was the regular dwelling attributes followed by neighborhood physical and accessibility. This implies that even if the building is green, many of the common dwelling aspects still reign supreme.

It was only at Solallén that the green dwelling attributes had been a real consideration for the respondents when they moved, where low energy consumption and non-toxic building materials were the priorities. According to Chau et al. (2010) and Yau et al. (2014) attributes with direct economic incentives command a willingness to pay. This was also the observation in our case since low energy consumption, which was ranked the highest, implies economic benefits. However, when asking our respondents about their reasoning, the environmental aspect was mentioned several times and there was no clear prevalent side. In the cases where the green attributes did not affect the decision, it was either the economic incentive (Jublet & Vålbehaget) or the environmental (Hammarby Sjöstad) that was stressed. Therefore, no clear conclusion can be drawn, besides that the care for the environment does seem to be an affecting factor in Sweden, something that has not been observed in Hong Kong (Chau et al. 2010), Nanjing, China (Hu, 2015) or Macau (Yau et al. 2014).

Minnery et al. (2003 in Miller et al., 2005) found that green buildings often are perceived as less aesthetically pleasing. However, in our study, respondents in all of our three cases said that the design was an important aspect they considered and therefore it seems that the design of the apartment was not a barrier for green houses. Adversely, due to the fact that they were newly constructed, all respondents who mentioned the look of their dwelling said that it was aesthetically pleasing.

Kats (2003) found that there was a 2 percent price premium when building public and commercial LEED certified buildings and that, when making a lifecycle calculation; there is a positive NPV. Ellis (2009) presented information that indicates that there is a 0.5 percent to 7 percent increase in capital cost when building a green dwelling, dependent on the certification level. Naucér & Enkvist (2009) also found that many energy efficient investments could be made at a negative or very low cost. In our study, many respondents said that they thought they received good value for their money, hence it would seem that they did not consider

themselves paying a premium price for their home. There was really only three respondents who said they paid a price premium or considered their home to be expensive. The one at Jublet & Vålbehaget considered it to be expensive whereas the two at Solallén paid a price premium because of the environmental features and the low operating cost. However, there could be other explanatory factors for this, for example that the apartments at Jublet & Vålbehaget were lower priced than similar apartments sold at market price in the area.

6.3 Energy Efficiency Gap

As previously mentioned (2.3.1), we choose to categorize several explanations of the energy efficiency gap under market barriers and failures. The market failures is presented under three terms; asymmetric information, externalities, and misplaced incentives. The market barriers we found applicable were incomplete markets for energy efficiency, low priority of energy issues (Brown, 2011) and heterogeneity of the population (Jaffe & Stavins, 1994).

6.3.1 Asymmetric Information

Sustainable development is often divided into what is called the triple bottom line including social, economical, and environmental sustainability (Elkginton, 2004). Our empirical findings show that there were only three out of 25 respondents who knew about the triple bottom line definition and these respondents had learned about the term at work. As mentioned in UNECE (2005) the environmental aspect has gotten disproportional attention compared to the two other pillars in discussions and debates. This is also something we observed with most of our respondents who generally only thought about the environment aspects when defining the term sustainability. This may have lead our respondents to think that sustainability in the dwelling context only is concerned with the environmental factors and benefits, thus missing out on how green dwelling features affect the economic and especially the social living conditions.

Our respondents seemed to have been able to link the economic and environmental aspect to each other. However, they could not necessarily explain how they correlate, as will be discussed below. How the environmental aspect correlate with the social was something very few respondents knew about prior to moving into their home. Social dwelling condition for example include; a lot of sunlight, sound isolation, and good ventilation system, which

implies an *"Internal environment that is thermally, visually and acoustically comfortable"* (QDPW, 2008:6).

Why this perceptual difference exists is probably due to the lack of knowledge and willingness to educate oneself as a consumer in combination with how the marketing of the houses is done by the developer and real estate agents. If the house is marketed as sustainable, environmentally friendly, or green; we argue that it is probable that people will associate it with environmental benefits and thus it would only attract consumers who value this strongly.

If, on the other hand, the consumers would also see their own intrinsic values represented in the sustainable approach there might have been a faster adoption. For example, since general dwelling attributes was ranked as one of the two most important aspects by the respondents in this study, and was generally done so because of comfort and pleasure, it is possible that sustainable social conditions could be valued equally high. Post hoc of their living experience, many respondents that had no prior knowledge about the social aspect of green attributes pointed out how good these social conditions are and that they will value them higher in future purchase decisions.

6.3.2 Externalities

As has already been mentioned in the theory chapter, externalities emerge from all production and consumption (Ayres & Kneese, 1969) and when a third party is affected (Bergh & Jacobsson, 2010). It has been known for a long time that externalities can create market failures (Gillingham & Palmer, 2013) and we believe that the externalities can be a major explaining factor why green building adoption among consumers has been slow.

On average, household energy usage in apartments in Sweden cause an externality of 1706,8 kg CO₂ ekv/kWh (Martinsson et al., 2012; IEA, 2013). This may not sound like a lot, but in Sweden, the average CO₂ emission per capita is somewhere between 4,2 to 7 tons. Meaning that a household of three could reduce their individual emission by 8 to 13.2 percent³

³ $\frac{(1706,8 \text{ kg CO}_2 \frac{\text{ekv}}{\text{kWh}})}{\text{Estimation of 3 individuals per household}} / 4,2 \text{ alt. } 7 \text{ tons}$

(Ekonomifakta, 2012; Sveriges Radio, 2012; UN, 2011; UN, 2010; E.ON., 2015). The question is again who is responsible for this, the consumer (Coase, 1960) or companies (Pigou, 1932) and who may be willing to pay or willing to accept.

What is evident is that the respondents in this study did not know much about the relationship between the CO₂ emissions and their individual energy consumption and thus knew little about these externalities. This is interesting because there were no difference between those who said that they were environmentally conscience and those who said they had little information. It could imply that there is a general lack of knowledge about externalities although we cannot prove this statistically from our study.

The results from our study further suggest that externalities is one possible reason for the market failure and slow adoption among consumers when it comes to green buildings as suggested by Brown (2001), Golove & Eto (1996), Jaffe & Stavins (1994), Bonde (2012), Gillingham & Palmer (2013), and Alcott & Greenstone (2012).

6.3.3 Misplaced Incentives

The aforementioned authors state that misplaced incentives might be another reason for the market failure of green buildings.

When analyzing the three cases we see that there existed two different split incentive situations. At Jublet & Vålbehaget and Solallén, where the respondents pay for their utilities, there should according to the theory be no reason for Skanska to build as energy efficient as possible unless the consumers are willing to pay a price premium. In Hammarby Sjöstad the respondents do not pay for water and heating and therefore the other split incentive would be that Familjebostäder has no incentive to build as energy efficient as possible.

Starting with the former, it seems that the economic incentive was only considered among the respondents at Solallén when they decided to move into their townhouse. Many of the respondents said that the low operating costs had affected their decision. At Jublet & Vålbehaget the same consideration was not taken. This ambiguous answer may be explained

by the fact that the respondents at Jublet & Vålbehaget generally had a higher income than the respondents at Solallén and that the economic incentive thus became too small for them. A second reason could be that the calculated energy usage was significantly lower at Solallén (28 kWh/m²/year) compared to Jublet & Vålbehaget (65 kWh/m²/year), thus giving a higher incentive to consider the operating cost in their purchase decision. Although classified as a barrier and not a failure, another reason could be the heterogeneity among the population (Jaffe & Stavins, 1994). This is when an, on average, energy efficient investment may not be adopted by the all due to differing preferences.

In Hammarby Sjöstad the respondents did not have the same monetary incentive because they only paid a part of their utility. They had not, like the respondents at Jublet & Vålbehaget, considered the low operating costs to any extent as was predicted by the theory since they were not the beneficiaries of the cost savings. However, they paid a significant monthly rent for their apartment and also had, in general, a higher income than the respondents at Solallén.

We also found that there was no significant difference between the cases in how respondents conserved energy. The theory states that if the consumer is not the beneficiary, then they will have no incentive to conserve energy (Brown, 2001; Golove & Eto, 1996; Jaffe & Stavins, 1994; Bonde, 2012; Alcott & Greenstone, 2012). In this study there were no answers that suggest that this is true. The answers from the respondents in Hammarby Sjöstad suggest that they conserve as much energy as the respondents at the two other cases. Again, it may be because the respondents at Hammarby Sjöstad are more environmentally concerned and this would need further studies to be confirmed.

Since the respondents in Stockholm on average had a higher income than those at Solallén, the income effect would suggest that these respondents also had more money to spend on premium goods. There were also many respondents in Stockholm who said that they bought mostly eco labeled food, which would suggest that this notion is true. The implications of this will be furthered discussed in the conclusion.

6.4 The Decision Making Process and Bounded Rationality

Our study further provides evidence that there is no rational man in the sense that is suggested by economic theory (Bergh & Jacobsson, 2010; Kantona, 1953; Arrow, 1951 in D. Lerner & H.D. Lasswell, Sugden, 1991; Ayres & Kneese, 1969) but rather what Simon (1955) calls an organism of limited ability and information.

We do not suggest that buying a green building is the rational choice for every consumer because his or her preferences will most likely differ. However, it is not difficult to argue from an economics perspective that a home-purchasing decision should be as rational as possible, due to the vastness of the financial implications. Meaning that one should gather as much information as possible regarding available options and their attributes.

When making a decision to move, there are virtually hundreds, maybe thousands of aspects one could consider. From the distance to one's grandmother's house to the tint of grey the tiles in the kitchen has. In most of these aspects, it is probable to have a preference for one or the other. Based on our observations, we argue that the respondents from all three cases has framed and simplified their decision (Simon, 1955), and among these the implications that the environmental aspects have. It is also clear that the dwelling was purchased because of other attributes than energy efficiency, meaning that the market for energy inefficiency as well as the low concern for energy efficiency are barriers to green dwelling adoption (Brown, 2011).

Tversky & Kahneman (1986) state that choices are based on norms, habits, expectancies, and how the choice problem is presented. By eliminating some of the factors, the choice problem can be simplified. One example could be that discussed in 6.3.1 about how the term sustainability is interpreted. Another could be that of non-toxic building material, which several respondents said that they had taken for granted when they bought their home. This expectancy implies that when the respondents framed their decision, they also cancelled out options that they deemed were shared among the alternatives (Kahneman & Tversky, 1979). Thus, the expectancy of non-toxic material led to the cancellation of the same – simplifying the choice but also removing, or cancelling out, a benefit that they valued highly when asked.

6.5 The Framing of Marketing of Green Dwelling Projects

From a single-family case previous study conducted, Millet et al. (2005) concluded that attributes such as safety, comfort, and livability should be communicated to the potential customer and not necessarily low energy usage and economic savings. In other words was referred to as social sustainability (QDPW, 2008) in a housing context (2.1.3).

Reviewing our empirical data and comparing it to how some marketing for green housing is structured, for example for the case of Solallén (Skanska, 2015b), we argue that this holds true in our Swedish context as well. There seems to be a predominant focus on low energy usage and thus low operating costs. However, there were many respondents who stressed how good their social living conditions were, for example the indoor climate, air quality, and the quietness compared to their previous dwelling. Most also said that they did not consider aspects like these to any significant extent. This is probably why the ranking of heat- and sound isolation as well as ventilation was comparably lower than low energy usage and non-toxic building material. Thus, personal experience seems to increase the valuation of green attributes. The implications of this will be discussed in the conclusion.

Another thing we also noticed, especially at Solallén, was that many respondents believed that the resale value of their house would be positively affected by the fact that it had green dwelling features. Even though the purpose of our study has not been to measure how these green attributes affect resale value we reason that there should exist a connection. If one regards the scarcity of green dwelling compared to the growing environmental and sustainability awareness both on an individual and societal level. Therefore there could be an incentive for companies involved in green dwelling projects to stress the fact that green attributes is a safe investment and hopefully present data that support such a case.

Non-toxic building materials scored the highest on an aggregated average, mainly explained by concerns for individual health and secondly due to a concern for the environment. However, many individuals took the usage of these for granted in new constructions. Even though it is beyond our expertise and resources to evaluate if this holds true, we believe that there might be a difference between regular newly constructed houses and their green counterparts. This is due to the strict requirements in all sustainability certifications we have

encountered. Even if it was of great importance for our respondents, the fact that there has been a thorough and careful selection of building material is something we have only seen briefly mentioned in the marketing we have come across. One reason for this could be that construction companies simply are unwilling to make such a comparison due to the effect it could have on sales on the dwelling that is not certified.

The fact that the houses in Solallén had solar panels installed seemed to be valued by many respondents. Of course, one of the reasons for this is the financial implications it has. However, we believe that the visibility and the familiarity of the solar panels could be an affecting factor why the respondents valued it high and were willing to pay for the green attributes, compared to for example a FTX-ventilation system that is practically invisible. Another example of this is that some respondents mentioned the pros of not having radiators.

6.6 Values Affecting Choices

To our knowledge, the only existing article regarding what intrinsic values motivate people to purchase green dwelling was written by Hu et al. (2015) where the empirical data was gathered in Nanjing, China. Other articles, such as Yau et al. (2014) and Hostetler & Noiseux (2010) speculate in the matter based on their findings. Hu et al. (2015) concluded that altruistic values such as environmental awareness and the willingness to protect it were not factors that affected her respondents' choices, as did Hostetler & Noiseux (2010) and Yau et al. (2014). This holds partly true in two of our cases as well. First of all, respondents in the two Stockholm cases stated that the green dwelling attributes did not affect their choice, but rather being a beneficial bonus. With that being said, most of the respondents in Stockholm considered themselves environmentally conscious and make everyday choices that conserve the environment.

However, at Solallén, where the location, housing market, and prices were different, there were two out of the seven respondents who had universalism, especially the willingness to protect the environment, as motivational values. All other respondents at Solallén, similar to the cases in Stockholm, considered the environmental aspect as a bonus. The reason for this difference between the cases could be manifold. One could be because of the effect of the

housing market, as discussed under 6.1. Another reason could simply be due to that fact that we have a relatively small sample, rendering the results misleading.

Hu et al.'s (2015) results showed that the people living in green dwelling in Nanjing valued neighborhood social quality followed by green dwelling attributes and neighborhood physical quality with pleasure and health being the prominent values affecting their choice. It is interesting to notice that the highest valued green attribute in her research was non-toxic building material driven by the care for one's health, it was also one of the two most important attributes in all our cases.

The non-toxic building materials together with low energy consumption were the clearly highest ranked attributes when looking on an average of all cases. We can therefore also assume that the values associated with attributes were the most dominant ones when making the dwelling choice. Once again, it should be noticed that both Stockholm cases, the green dwelling attributes did not expressively affect out respondents' choice, even though they valued it as a positive bonus. However in Solallén, where this was more occurring, the attributes of low energy consumption and non-toxic building material were the most dominant ones as well, thus the following discussion should hold true for all cases.

In our research, the value type security or more specifically the value of health and family security (Schwartz, 1994), were associated with the preference for non-toxic building materials. While the value types of universalism, and thus values of environmental protection, unity with nature etcetera, together with power, or more specifically wealth creation, were the most dominant value types. Post hoc their living experience, many of our respondents also indicated their revaluation of how they value the indoor comfort due to thermal control, good air, and sunlight exposure etcetera. Such attributes were generally associated with the values of pleasure and enjoyment of life, in other words hedonism. Which was one of the motivating factors to a change in consumer behavior identified by Huynh & Larsson (2014). However, many of our respondents in Stockholm said that protecting the environment was important to them, but when choosing housing, there were simply other motivational value types, such as power (Schwartz, 1994), that were more important.

6.7 Revised Theoretical and Conceptual Framework

Based on the analysis and discussion of our empirical data we have revised our theoretical and conceptual framework, that we argue better explains the factors affecting one's willingness to pay and decision making process for green dwelling.

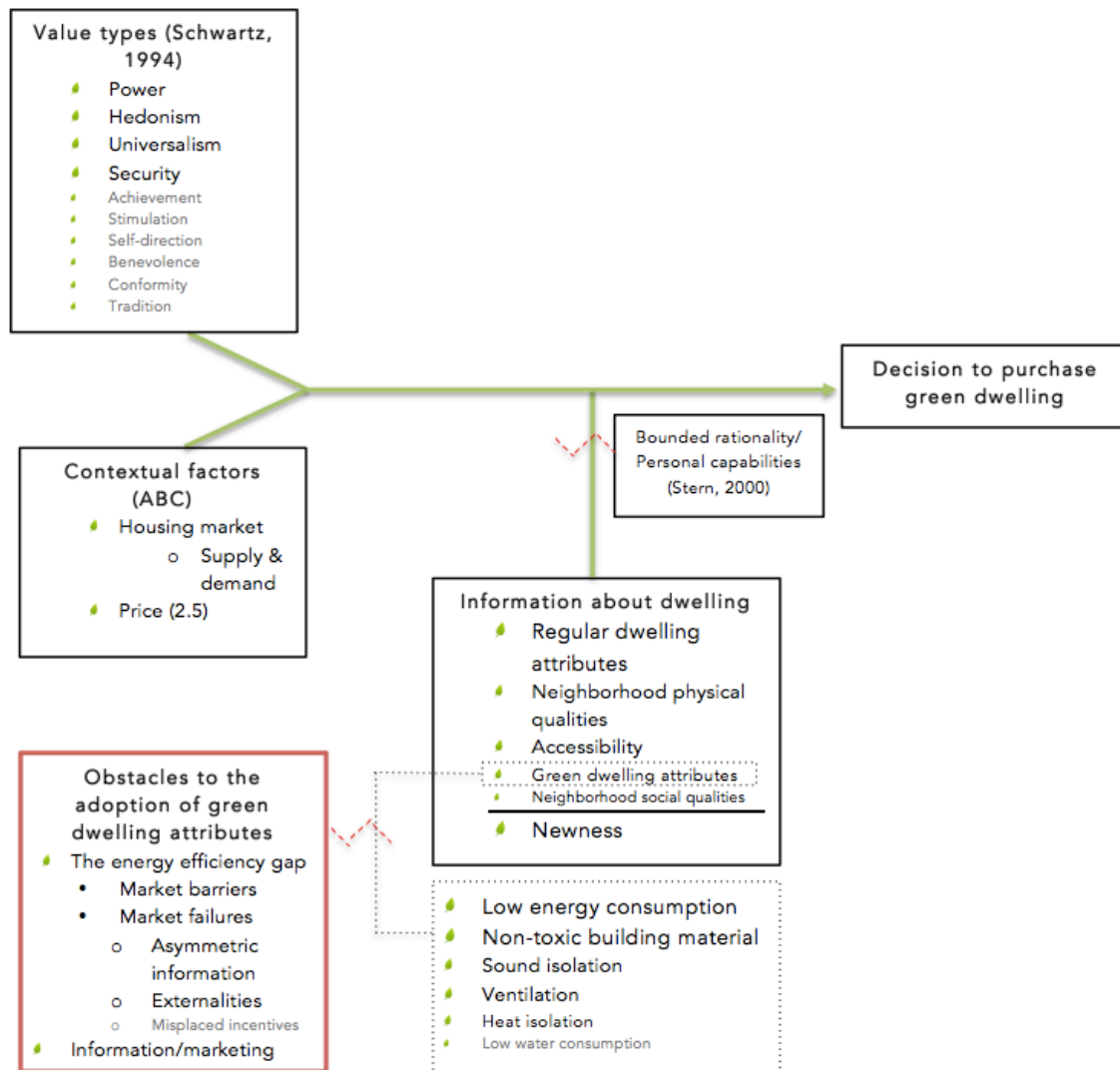


Figure 6.2. Revised theoretical framework

The size of the text reflects the relative importance of the factors based on our empirical data. *Contextual factors* were added as an equally important factor to values in the decision making process (Stern, 2000). The fact that the dwelling was newly constructed, *newness*, was added as a dwelling aspect. However, it was kept in neutral size since it was not an aspect ranked by our respondents. The box previously called factors affecting the decision was renamed

obstacles to the adoption of green dwelling attributes and thus illustrated as an interference. Furthermore, *bounded rationality*, that we argue equals *personal capabilities* (Stern, 2000) in this context, was extracted from the previously named factors affecting the decision and is illustrated as an individual limit to gather and process information about the dwelling. The start of the decision making process was left out because it is unclear whether the decision starts prior or after the effect of *values* and *contextual factors*.

8. Conclusion

In this chapter we will draw conclusions based on our findings, discuss what theories were applicable in explaining the studied phenomena as well as what managerial implications this has and how to increase the adoption of green dwelling. Lastly, our methodology will be evaluated and suggestions for future research will be made.

The purpose of this study has been to add insight into the decision process of consumers who have bought a green dwelling and what factors affected their willingness to pay.

Reevaluating the preliminary framework and assessing the containing factors' importance as well as revising our framework and identifying new factors this purpose has been met. Our findings show that:

- 🍃 The contextual factors seem to impact the decision of green dwelling purchases significantly.
- 🍃 The general dwelling aspects still dominate the purchase decision in most cases.
- 🍃 Concerning the green dwelling attributes, people mostly value low energy usage and non-toxic building materials.
- 🍃 There seems to be a general lack of knowledge about the benefits of green attributes and the economic incentives are only partly explanatory to their adoption. Environmental awareness seems to play a role.
- 🍃 Externalities seem to play a significant role
- 🍃 The decision making process seems to be influenced by bounded rationality and prospect theory seems to be highly applicable. People only consider a very limited amount of factors when they buy their dwelling.
- 🍃 There seems to be a value in experience of green dwelling attributes and a higher valuation of social living conditions after experiencing them.
- 🍃 Security, universalism, hedonism and power seems to be the most explanatory values for the purchasing of green dwelling.

8.1 Theoretical Implications and Applicability

The theories and concepts that we identified in our preliminary framework seem to explain a part of why consumers have not yet adopted green dwelling, some more than others. Previous articles that aimed to spur green dwelling adoption among consumers have had a predominant focus on explaining the willingness to pay for green dwelling through the preferences among housing aspects e.g. Hu et al., (2014). However, this only explains part of the consumers' behavior due to many other affecting factors.

Most of the explanations provided by the energy efficiency gap seem to affect the decision process and willingness to pay for green attributes in a significant way. We believe that it is especially true for externalities. However, we suggest that the misplaced incentive (table 2.5) might only be valid when it regards smaller investments. We do not think it is an explanatory variable when the upfront investment is large or when the consumer's income is large enough to ignore the cost of their utilities.

Bounded rationality as well as prospect theory seems to be highly applicable to consumers' decision to buy a green dwelling. As discussed, many respondents seem to have simplified and framed decisions in order for them to be able to cope with all the attributes of a dwelling.

Assessing the applicability of Schwartz (1994) framework, in comparison to other value-based frameworks and theories as underlying explanations of green purchase behavior, is beyond the scope of this study. Even though we could distinguish clear value types and this fills a function, the reader should be attentive that contextual factors would probably have a strong impact and thus the values alone are not sufficient to explain the purchase decision. For example, if green dwelling would be a societal standard or legislated (contextual factor), conformity (Schwartz, 1994) would probably be a significantly more distinguished value type.

8.2 Managerial Implications

Our insights were supposed to contribute and assist developers, real estate agents, policy makers, and other affected parties to make better informed decision in order to spur the

development of green dwelling. Based on our research, we believe there are several implications that managers and other parties should consider.

Externalities seem to be a major explaining factor why green dwelling attributes have not been adopted among consumers yet. There seems to be a general lack of knowledge among consumers and how they affect the CO₂ emissions and thus the environment. The bigger question is what has to be done to spur a change?

The climate and sustainability debate, which has been a topic of discussion since the Brundtland report (UN, 1987), does not seem to have had any substantial effect on consumers' knowledge. Based on this and on the fact that the energy industry and building sector are significantly more aware about the externalities, we argue that it is the companies who have most of the responsibility as Pigou (1932) suggested almost 100 years ago. For example, energy companies and the building sector could illustrate the negative impacts that externalities have on society since it seems that the monetary incentives are too small in many cases. Therefore we would suggest that the externalities are shown in a way so that consumers can value it.

When consumers pay for their utility, have a lower income, significantly lower energy consumption, and also have a lower upfront investment of their home; the monetary incentive could be a valid option to sell green dwelling. However, when the upfront investment is higher, thus lowering the monetary incentives through low operating costs, there might be more suitable incentives available. This would also be in line with the argument about the populations heterogeneity (Jaffe & Stavins, 1994) where the offer of an, on average, energy efficient solution will only be adopted by a part of the consumers.

However, we believe that the responsibility has to be extended beyond the companies. To spur real change, creating NGOs and other external organizations with the aim to educate the consumers about their impact would be a suggestion. Stricter policies for sustainability standards are also not far-fetched to suggest. As mentioned in the introduction, it has previously been argued that the biggest obstacle to increase supply is the price premium associated with development green dwelling (Casals, 2006; Yau et al. 2014). However,

according to our literature review, the upfront investment could increase by 7 percent for the highest ranking of green dwelling according to BREEAM or 12.5 percent for a zero-emission building (which has higher standards than both BREEAM and LEED) (Ellis, 2009). Such an added price premium is not substantial if looking at the historical development of dwelling prices in Sweden. For example, during last year between March 2014 and March 2015 there has been an average price increase of 13 percent for all dwelling in Sweden (Mäklarstatistik, 2015c).

Companies should probably also review their marketing strategy. As mentioned, the predominant focus when selling green dwelling seems to be on lowered operating cost. However, if the economic incentives are small, other attributes should probably be stressed. For example, the careful selection of material or how much the social living conditions are improved, the latter is something there seems to be a general lack of knowledge about.

8.3 Methodological Implications

As mentioned in the methodology, we asked respondents to rate the different attributes from 1 to 10 but decided not to use them in the study because of how differently the respondents use the scale. In retrospect, we reckon that we should have used a scale with fewer alternatives i.e. 1 to 5 to get a useful rating. Also, we did not take into consideration that some attributes generally had been cancelled out (Kahneman & Tversky, 1979; Tversky & Kahneman 1986) such as the use of non-toxic building materials. Thus, the ranking system was not sufficient to use in order to understand consumers preferences without taking the respondents comments into consideration.

It is also possible that we should have anticipated that the separation of location into accessibility and neighborhood physical qualities could create confusion and ambiguities in our answers.

Furthermore, our sample size is rather small and is a convenience sample and has been done in a Swedish context. Therefore, our generalizability is rather limited in this study. The study may also experience bias, first of all regarding the respondent from Hammarby Sjöstad as

these respondents contacted us and may therefore be more concern about environmental issues.

8.4 Suggestions for Future Research

The study has added insights into the decision-making process and willingness to pay for green dwelling among consumers. An interesting and logical step would be to statistically test to what extent the different identified factors affect the decision in order to be able to make further generalizations. It would also be interesting to study if there is any difference in the decision making process and willingness to pay between consumers living in a green dwelling compared to consumers living in a regular dwelling. Another suggestion would be to investigate how the results would vary in another country where many contextual factors may be different.

Furthermore, a study that investigates how green dwelling is marketed and the purchaser's perception of that marketing would be very interesting to take part of. It would be interesting to know what aspects are highlighted, how much of the information has the consumers used in their evaluation, and are the highlighted aspects in marketing the same that the consumers value?

References

Printed sources

Scientific Articles

Arrow, K. J. 1951. Mathematical models in the social sciences. In D. Lerner & H. D. Lasswell (Ed.). *The Policy Science*. Stanford University Press, Stanford, California.

Arrow, K. J. 1959. Ration choice functions and orderings. *Economica*, 26(102): 121-127.

Ayres, R. U., & Kneese, A. V. 1969. Production, consumption, and externalities. *The American Economic Review*, 59(3): 282-297.

Banfi, S., Farsi, M., Filippini, M., & Jakob, M. 2008. Willingness to pay for energy-saving measures in residential buildings. *Energy economics*, 30(2): 503-516.

Bonde, M. 2012. Difficulties in changing the existing leases - One explanation of the "energy paradox"?. *Journal of Corporate Real Estate*, 14(1): 63-76.

Brown, M. 2001. Market failures and barriers as a basis for clean energy policies. *Energy Policy*, 29: 1197-1207.

Casals, X. G. 2006. Analysis of building energy regulation and certification in Europe: Their role, limitations and differences. *Energy and Buildings*, 38(5): 381–392.

Chau, C. K., Tse, M. S., & Chung, K. Y. 2010. A choice experiment to estimate the effect of green experience on preferences and willingness-to-pay for green building attributes. *Building and Environment*, 45(11): 2553-2561.

Chegut, A., Eichholtz, P., & Kok, N. 2014. Supply, demand and the value of buildings. *Urban Studies*, 51(1): 22-43.

Coase, R. H. 1960. The problem of social costs. *Journal of Law and Economics*, 3: 1-44.

Crawley D, Aho I, Hinks J, Cook G. 1999. Building environmental assessment methods: Applications and development trends. *Building Research and Information*, 27: 300-308.

Dempsey, N., Bramley, G., Power, S., & Brown, C. 2011. The social dimension of sustainable development: Defining urban social sustainability. *Sustainable Development*, 19(5): 289-300.

Donald, J. W., & Atul, J. K. 2001. Concerns about climate change and the role of fossil fuel use. *Fuel Processing Technology*, 71: 99-119.

- Eichholtz, P., Kok, N., & Quigley, J. M. 2010. Doing well by doing good? Green office buildings. *American Economic Review*, 100(5): 2492-2509.
- Fuerst, M., & McAllister, P. 2011. Green noise or green value? Measuring the effects of environmental certification on office values. *Real Estate Economics*, 39(1): 45-69.
- Gioia, D. A., Corley, K. G. & Hamilton, L. A. 2012. Seeking qualitative rigor in inductive research: Notes on the Gioia methodology. *Organizational Research Methods*, 16(1): 15-31.
- Glavič, P., & Lukman, R. 2007. Review of sustainability terms and their definitions. *Journal of cleaner production*, 15(18): 1875-1885.
- Goodland, R. 1995. The concept of environmental sustainability. *Annual review of ecology and systematics*, 1-24.
- Guagnano, G. A., Stern, P. C., & Dietz, T. 1995. Influences on attitude-behavior relationships: A natural experiment with curbside recycling. *Environment and Behavior*, 27: 699-718.
- Hirst, E., & Brown, M. 1990. Closing the energy efficiency gap: Barriers to the efficient use of energy. *Resources, Conservation and Recycling*, 3: 267-281.
- Horowitz, J. K., & McConnell, K. E. 2002. A review of WTA/WTP studies. *Journal of Environmental Economics and Management*, 44(3): 426-447.
- Hostetler, M., & Noiseux, K. 2010. Are green residential developments attracting environmentally savvy homeowners?. *Landscape and Urban Planning*, 94(3): 234-243.
- Howie, P., Murphy, S. M. & Wicks, J. 2010. An application of a stated preference method to value urban amenities. *Urban Studies*, 47: 235-256.
- Hu, H., Geertman, S., & Hooimeijer, P. 2014. The willingness to pay for green apartments: The case of Nanjing, China. *Urban Studies*, 51(16): 3459-3478.
- Jaffe, B. A., & Stavins R. N. 1994. The energy-efficiency gap. What does it mean?. *Energy Policy*, 22(10): 804-810.
- Jackson, T. 2007. Mainstreaming sustainability in local economic development practice. *Local Economy*, 22(1): 12-26.
- Jiao, L., & Liu, Y. 2010. Geographic field model based hedonic valuation of urban open spaces in Wuhan, China. *Landscape and Urban Planning*, 98(1): 47-55.

- Johnston, P., Everard, M., Santillo, D., & Robèrt, K. H. 2007. Reclaiming the definition of sustainability. *Environmental science and pollution research international*, 14(1): 60-66.
- Kahneman, D., & Tversky, A. 1979. Prospect theory: An analysis of decision under risk. *Econometrica*, 2: 263-292.
- Karp, D. R. & Gaulding, C. L. 1995. Motivational underpinnings of command-and-control, market-based and voluntarist environmental policies. *Human Relations*, 48(5): 439–465.
- Karp, D. G. 1996. Values and their effects on pro-environmental behavior. *Environment and Behavior*, 28, 111–133.
- Katona, G. 1953. Rational behavior and economic behavior. *Psychological Review*, 60(5): 307-318.
- Kriese, U., & Scholz, R. W. 2011. The positioning of sustainability within residential property marketing. *Urban Studies*, 48(7): 1503-1527.
- Miller, E, Buys, L., Barnett, K., & Bailey, C. 2005. Smart housing and social sustainability: Learning from the residents of Queensland’s Research House. *Australian Journal of Emerging Technologies and Society*, 3(1): 43- 57.
- Murphy, K. 2012. The social pillar of sustainable development: A literature review and framework for policy analysis. *Sustainability: Science, Practice, & Policy*, 8(1): 15-29.
- Pan, H., & Zhang, M. 2008. Rail transit impacts on land use: Evidence from Shanghai, China, *Transportation Research Record*, 2048: 16-25.
- Pope, J., Annandale, D., & Morrison-Saunders, A. 2004. Conceptualising sustainability assessment. *Environmental impact assessment review*, 24(6): 595-616.
- Redclift, M. 1992. The meaning of sustainable development. *Geoforum*, 23(3): 395-403.
- Redclift, M. 2007. Sustainable development (1987-2005): An oxymoron comes of age. *Horizontes Antropológicos*, 3(SE)
- Schultz, P. W., & Zelezny, L. C. 1999. Values as predictors of environmental attitudes: Evidence for consistency across cultures. *Journal of Environmental Psychology*, 19: 255–265.
- Schwartz, S. H., & Bilsky, W. 1987. Toward a psychological structure of human values. *Journal of Personality and Social Psychology*, 53: 550-562.

Schwartz, S. H., & Bilsky, W. 1990. Toward a theory of the universal content and structure of values: Extensions and cross-cultural replications. *Journal of Personality and Social Psychology*, 58: 878-891.

Schwartz, S. H. 1994. Are there universal aspects in the structure and contents of human values?. *Journal of social issues*, 50(4): 19-45.

Simon, H. A. 1955. A behavioral model of rational choice. *The Quarterly Journal of Economics*, 69(1): 99-118.

Stern, P. C. 2000. Towards a coherent theory of environmentally significant behavior. *Journal of social issues*, 56.

Sugden, R. 1991. Rational choice: A survey of contributions from economics and philosophy. *The Economic Journal*, 101(407): 751-785.

Tversky, A., & Kahneman, D. 1974. Judgement under uncertainty: Heuristics and biases. *Science*, 185(4157): 1124-1131.

Tversky, A., & Kahneman, D. 1986. Rational choice and the framing of decisions. *The Journal of Business*, 59(4, Part 2): S251-S278

Visser, P., van Dam, F. & Hooimeijer, P. 2008. Residential environment and spatial variation in house prices in the Netherlands. *Tijdschrift Voor Economische En Sociale Geografie*, 99(3): 348-360.

Wang, D., & Li, S. 2006. Socio-economic differentials and stated housing preferences in Guangzhou, China. *Habitat International*, 30(2): 305-326.

Whitehead, J. C., & Cherry, T. L. 2007. Willingness to pay for a green energy program: A comparison of ex-ante and ex-post hypothetical bias mitigation approaches. *Resource and Energy Economics*, 29(4): 247-261.

Yung, Y. A. U., Chiu, S. M., & Lau, W. K. 2014. Economising subsidies for green housing features: A stated preference approach. *Urbani Izziv*, 25(2).

Zalejska-Jonsson, A. 2012. Evaluation of low-energy and conventional residential buildings from occupants' perspective. *Building and Environment*, 58: 135-144.

Books

Bergh, A., & Jakobsson, N. 2010. *Modern mikroekonomi. Marknad, politik och välfärd (1st edition)*. Norway: Norstedt AB.

Bryman, A., & Bell, E. 2011. *Business Research Methods (3rd edition)*. Glasgow, UK: Bell & Bain Ltd.

Schwartz, S. H. 1992. *Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries*. In M. Zanna (Ed.), *Advances in experimental social psychology*, 25: 1-65. Orlando, FL: Academic.

Elkington, J. 2004. *The triple bottom line: Does it all add up*. London, UK: Earthscan.

Hicks, J. R. 1946. *Value and Capital*. Oxford: Clarendon.

Pigou, A. C. 1932. *The Economics of Welfare (4th edition)*. London, UK: McMillan and co.

Wangel, J. 2013. Hur hållbara är Hammarby sjöstad och Norra Djurgårdsstaden? in Teleman, H., Caldenby, C., Ullstad, E., von Platen, F 2013. *Hållbarhetens villkor*. Malmö, Sweden: Arena.

Reports & other publications

Allcott, H., & Greenstone, M. 2012. *Is there an energy efficiency gap?*. Working paper 17766, National Bureau of Economic Research, Cambridge, Massachusetts.

Allcott, H., & Wozny, N. 2012. *Gasoline Prices, fuel economy, and the energy paradox*. Working Paper, Center for Energy and Environmental Policy Research, Cambridge, Massachusetts.

BRE, 2007. Information Paper 4/05: *Costing Sustainability: How much does it cost to achieve BREEAM and EcoHomes ratings?*

Ellis, C. R. 2009. *Who pays for green? The economics of sustainable buildings*. EMEA Research.

Gillingham, K., & Palmer, K. 2013. *Bridging the energy efficiency gap. Insights for policy from economic theory and empirical analysis*. Discussion paper, Resources for the Future.

Golove, W. H., & Eto, J. H. 1996. *Market barriers to energy efficiency: A critical reappraisal of the rationale for public policies to promote energy efficiency*. Energy & Environment Division at Lawrence Berkeley National Laboratory, Berkeley, California.

Hu, H., Geertman, S., & Hooimeijer, P. 2015. Working paper. *The values driving the choice for green apartments in Nanjing China: Does environmental awareness matter?*

Huynh, L. & Larsson, H. 2014. *Värdefulla invånare i en hållbar context. En studie av individvärden och beteenden i Västra Hamnen och Hyllie, Malmö*. Master thesis, School of Economics and Management at Lund University, Lund, Sweden.

Högberg, L. 2011. *Incentives for energy efficiency measures in post-war multi-family dwellings*. Licentiate thesis, Building & Real Estate Economics, School of Architecture and the Built Environment, Royal Institute of Technology, Stockholm, Sweden.

IEA, 2013. *Energy Policies of IEA Countries. Sweden. 2013 Review*. IEA, Paris, France.

IPCC, 2014. *Climate Change 2014. Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]*. IPCC, Geneva, Switzerland.

Kats, G. 2003. *Green building costs and financial benefits*. Boston, MA: Massachusetts Technology Collaborative.

Martinsson, F., Gode, J., Arnell, J., & Höglund, J. 2012. *Emissionsfaktor för nordisk elproduktionsmix*. Svenska Miljöinstitutet, Stockholm, Sweden.

McKenzie, S. 2004. *Social sustainability: towards some definitions*. Working paper, Magill: Hawke Research Institute, University of South Australia.

Minnery, J., McFallan, S., Mead, E. & Fedrick, D. 2003. *'Barriers to safer housing'*, Final Report for the Queensland Department of Housing & Queensland Health, Queensland.

Naucmér, T., & Enkvist, P. A. 2009. *Pathways to a low-carbon economy: Version 2 of the global greenhouse gas abatement cost curve*. McKinsey & Company, 192.

Nordic Ecolabelling 2009. *Nordic Ecolabelling of Small houses, apartment buildings and pre-schools*.

QDPW, 2008. *Smart and Sustainable Homes Design Objectives*. Queensland Department of Public Works, Brisbane, Australia.

SGBC, 2014. *LEED in motion: Sweden*. Sweden Green Building Council.

Stockholm Bygger 2010. *Europas Miljöhuvudstad 2010 Stockholm en stad i hållbar förvandling*. Stockholm Bygger.

Strandbakken, P., & Heidenstrøm, N. 2011. *Socially Sustainable Housing*. National Institute for Consumer Research (SIFO), Oslo, Norway.

Tan, T. H. 2011. *Measuring the willingness to pay for houses in a sustainable neighborhood*. Forthcoming, International Journal of Environmental, Cultural, Economic and Social Sustainability.

USGBC, 2010. *LEED for Homes Rating System Multifamily Mid-Rise October 2010*. U.S. Green Building Council.

UN, 1987. *Our common future. World Commission on Environment and Development* Oxford University Press.

UN, 2009. *Buildings and Climate Change. Summary for Decision-Makers*. United Nations Environment Programme, Paris, France.

UN, 2014. *World Urbanization Prospects: The 2014 Revision*. Department of Economic and Social Affairs. New York.

Web sources

Byggnyheter, 2012. Kungsholmen växer med kvarteret Jublet. Byggnyheter homepage. Retrieved: 2015-04-20. Available at: <http://www.byggnyheter.se/2012/06/kungsholmen-vaxer-med-kvarteret-jublet>

DN, 2015. Stockholm tio-i-topp på bostadsmarknaden. DN homepage. Retrieved: 2015-04-20. Available at: <http://www.dn.se/ekonomi/stockholm-tio-i-topp-pa-bostadsmarknaden/>

Eco Brooklyn Inc., 2012. Review and Critique of LEED. Eco Brooklyn Inc. homepage. Retrieved: 2015-04-14. Available at: <http://ecobrooklyn.com/review-critique-lead/>

Ekonomifakta, 2012. Koldioxid per capita – internationellt. Ekonomifakta homepage. Retrieved: 2015-05-16. Available at: <http://www.ekonomifakta.se/sv/Fakta/Miljo/Utslapp-internationellt/Koldioxid-per-capita/>

Energimyndigheten, 2010. För dig som bor i lägenhet. Energimyndigheten homepage. Retrieved: 2015-05-03. Available at: <https://www.energimyndigheten.se/Hushall/For-dig-i-lagenhet/>

Energimyndigheten, 2012. Utsläppshandel I EU. Energimyndigheten homepage. Retrieved: 2015-04-20. Available at: <http://www.energimyndigheten.se/Foretag/Utslappshandel/Om-utslappshandel/>

E.ON., 2015. Mitt klimatfotspår. E.ON. homepage. Retrieved: 2015-05-16. Available at: <http://www.eon.se/om-eon/om-energi/energigeni/utbildningsmaterial/mitt-klimatfotspar/>

EU, 2015. The EU Emissions Trading System (EU ETS). EU homepage. Retrieved: 2015-04-29. Available at: http://ec.europa.eu/clima/policies/ets/index_en.htm

Hållbar stad, n.d. Hammarby Sjöstad visar kretsloppstänkande. Hållbar Stad homepage. Retrieved: 2015-03-15. Available at: <http://www.hallbarstad.se/projects/20-hammarby-sjostad-visar-kretsloppstankande>

Jublet, 2015. Mäklarinfo. Brf Jublet homepage. Retrieved: 2015-04-04. Available at: <http://www.brfjublet.se/?rID=1117&page=maklarinfo>

Köhler, N. 2012. Energisnålast I Stockholms innerstad. Byggindustrin homepage. Retrieved: 2015-04-17. Available at: <http://byggindustrin.se/artikel/nyhet/energisnålast-i-stockholms-innerstad-18316>

Mäklarstatistik, 2015a. Mäklarstatistik - t.o.m. februari 2015. Mäklarstatistik homepage. Retrieved: 2015-04-10. Available at: http://www.maklarstatistik.se/media/19035/fördjupad_statistik_201503.pdf

Mäklarstatistik, 2015b. Växjö. Mäklarstatistik homepage. Retrieved: 2015-05-16. Available at: <http://www.maklarstatistik.se/maeklarstatistik/kommun.aspx?Main=Vaxjo&LK=780&Typ=Boratter&Months=12&Ant=90&Extra1=8888&Extra2=8888>

Mäklarstatistik, 2015c. Fortsatt uppåt på bostadsmarknaden. Mäklarstatistik homepage. Retrieved: 2015-05-03. Available at: <http://www.maklarstatistik.se/pressmeddelande/pm-2015-05-13.aspx>

NCC, 2015. Svanen - det officiella nordiska miljömärket. NCC homepage. Retrieved: 2015-05-03. Available at: <http://www.ncc.se/hallbarhet/vart-miljoarbete/miljocertifieringar/svanen/>

NPR, 2012. Critics Say LEED Program Doesn't Fulfill Promises. National Public Radio homepage. Retrieved: 2015-04-14. Available at: <http://www.npr.org/templates/story/story.php?storyId=129727547>

Oanda, 2015. Historical exchange rates. OANDA homepage. Retrieved: 2015-05-01. Available at: <http://www.oanda.com/currency/historical-rates/>

SCB, 2015. Nationalräkenskaper, kvartals- och årsberäkningar. Retrieved: 2015-05-01. Available at: http://www.scb.se/sv_/Hitta-statistik/Statistik-efter-amne/Nationalrakenskaper/Nationalrakenskaper/Nationalrakenskaper-kvartals--och-arsberakningar/

SGBC, 2015. LEED. Sweden Green Building Council homepage. Retrieved: 2015-04-13. Available at: <http://www.sgbc.se/docman/om-sweden-gbc-2014/332-infoblad-leed-2014/file?Itemid=446>

Skanska, 2010. Skanska startar bygget av landets första LEED-bostäder. Skanska homepage. Retrieved: 2015-04-17. Available at: <http://www.skanska.se/sv/Om-Skanska/Pressmeddelande/Nyhet/?nid=cyJEBSVT>

Skanska, 2015a. Gröna bostäder i Stockholms nya stadsdel. Skanska homepage. Retrieved: 2015-04-17. Available at: <http://www.skanska.se/sv/projekt/projekt/?pid=10346>

Skanska, 2015b. Växjö, Solallén Vikaholm. Skanska homepage. Retrieved: 2015-04-02. Available at: <http://bostad.skanska.se/bostader-och-projekt/Vaxjo-Solstigen-Vikaholm/>

Skanska 2015c. Kom hem till ett vackert och grönt kvarter. Brf Solallén, Vikaholm, Växjö. Skanska homepage. Retrieved: 2015-04-02. Available at: <http://bostad.skanska.se/Services/FileStoreProxy/GetFile.ashx?id=0528e926-a554-4522-8c96-dbc1e184a01d>

Skanska, n.d. Hammarby Sjöstad. Skanska homepage. Retrieved: 2015-03-15. Available at: <http://www.skanska.se/sv/kampanjer/125/hammarby-sjostad/>

Stockholm Stad, 2014a. Hammarby Sjöstad. Stockholm Stad homepage. Retrieved: 2015-04-14. Available at: <http://bygg.stockholm.se/Alla-projekt/hammarby-sjostad/>

Stockholm Stad, 2014b. Miljöperspektiv. Stockholm Stad homepage. Retrieved: 2015-04-14. Available at: <http://bygg.stockholm.se/Alla-projekt/hammarby-sjostad/Miljoperspektiv/>

Stockholm Stad, 2015. Facts and figures. Stockholm Stad homepage. Retrieved at: 2015-04-14. Available at: <http://bygg.stockholm.se/Alla-projekt/hammarby-sjostad/In-english/Facts-and-figures/>

Svanen, n.d.a. Svanenmärkta Hus. Svanen Retrieved: 2015-04-14 Available at: <http://www.svanen.se/Templates/Criteria/CriteriaGetFile.aspx?fileID=466>

Svanen, n.d.b. Om Oss. Svanen homepage. Retrieved at: 2015-04-16. Available at: <http://www.svanen.se/Om-oss/>

SVD, 2013a. Så ska bostadsbristen i Stockholm lindras. SVD homepage. Retrieved: 2015-04-16. Available at: http://www.svd.se/naringsliv/pengar/bostad/sa-ska-bostadsbristen-i-stockholm-lindras_8714276.svd

SVD, 2013b. Lägenheten är din - om drygt sju år. SVD homepage. Retrieved: 2015-04-16. Available at: http://www.svd.se/nyheter/stockholm/lagenheten-ar-din-om-atta-ar_7821996.svd

Sverige Radio, 2012. Ny beräkning: 4,4 ton CO2 per svensk. Retrieved: 2015-05-16. Available at: <http://sverigesradio.se/sida/artikel.aspx?programid=3345&artikel=5369199>

SVT 2014. New York Times tar upp Stockholms bostadsbrist. SVT homepage. Retrieved: 2015-04-16. Available at: <http://www.svt.se/nyheter/regionalt/stockholm/new-york-times-tar-upp-stockholms-bostadsbrist>

The Greenhouse Gas Protocol, 2012. GHG Protocol for Cities. The Greenhouse Gas Protocol homepage. Retrieved: 2015-02-10. Available at: <http://www.ghgprotocol.org/city-accounting>

UN, 2010. Environmental indicators. Greenhouse gas emissions. UN homepage. Retrieved: 2015-05-16. Available at: http://unstats.un.org/unsd/environment/air_co2_emissions.htm

UN, 2011. Environment Statistics Country Snapshot. UN homepage. Retrieved: 2015-05-16. Available at: http://unstats.un.org/unsd/environment/envpdf/Country_Snapshots_Aug%202011/Sweden.pdf

UNECE, 2005. Sustainable development - concept and action. UNECE homepage. Retrieved: 2015-03-12. Available at: http://www.unece.org/oes/nutshell/2004-2005/focus_sustainable_development.html

USGBC, 2015a. LEED. U.S. Green Building Council homepage. Retrieved: 2015-04-13. Available at: <http://www.usgbc.org/leed>

USGBC, 2015b. Kv Jublet. USGBC homepage. Retrieved: 2015-04-04. Available at: www.usgbc.org/projects/kv-jublet

USGBC, 2015c. Kv Vålbehaget. USGBC homepage. Retrieved: 2015-04-04. Available at: www.usgbc.org/projects/valbehaget

Vålbehaget, 2015. Mäklartinformation. Vålbehaget homepage. Retrieved: 2015-04-04. Available at: <http://www.brfvalbehaget.se/?rID=1147>

WHO, 2015. Air pollution costs European economies US\$ 1.6 trillion a year in diseases and deaths, new WHO study says. World Health Organization homepage. Retrieved: 2015-04-28. Available at: [http://www.euro.who.int/en/media-centre/sections/press-releases/2015/air-pollution-costs-european-economies-us\\$-1.6-trillion-a-year-in-diseases-and-deaths,-new-who-study-says](http://www.euro.who.int/en/media-centre/sections/press-releases/2015/air-pollution-costs-european-economies-us$-1.6-trillion-a-year-in-diseases-and-deaths,-new-who-study-says)

E-mail correspondence

Linderos, S., 2015. Kundansvarig & Marknadskoordinator, Skanska. Email correspondence. 2015-04-20.

Ramírez, A., 2015. LEED-SP Service Provider, Spain green building council. Email correspondence. 2015-03-27.

Appendix 1. Respondent demographics

Case	Name	Age	Education	Family	Household income (1000 SEK)	Home cost (million SEK)	Rent (if applicable)	
Jublet & Vällbehaget	Johanna	35-49	Bachelor	Couple w/ children	80<	4<		
	Julius	35-49	Master or above	Couple w/ children	80<	2-4		
	Johannes	35-49	High school or lower	Couple w/ children	40-80	2-4		
	Jenny	35-49	Bachelor	Couple w/ children	40-80	4<		
	Jan	49<	Bachelor	Single/couple w/o children	80<	4<		
	Jonas	21-34	Master or above	Couple w/ children	80<	4<		
	Jens	21-34	High school or lower	Single/couple w/o children	20-40	4<		
	Jörgen	35-49	High school or lower	Couple w/ children	80<	4<		
	Jasmin	35-49	Bachelor	Couple w/ children	40-80	2-4		
	Jennifer	49<	Master or above	Single/couple w/o children	80<	4<		
	Jesper	21-34	High school or lower	Single/couple w/o children	<20	2-4		
	Jessica	21-34	Master or above	Single/couple w/o children	20-40	2-4		
Hammarby Sjöstad	Hanna	21-34	Master or above	Single/couple w/o children	20-40		6 500	
	Helena	35-49	Master or above	Couple w/ children	40-80		12 000	
	Hampus	35-49	High school or lower	Single/couple w/o children	40-80		9 800	
	Harriet	49<	Bachelor	Other	20-40		10 500	
	Hilda	35-49	Bachelor	Couple w/ children	80<		10 800	
	Hedvig	49<	Bachelor	Couple w/ children	80<		13 400	
Solallén	Sven	21-34	High school or lower	Single/couple w/o children	20-40	1-2		
	Sofia	49<	Master or above	Single/couple w/o children	<20	1-2		
	Stig	49<	High school or lower	Couple w/ children	40-80	1-2		
	Susanne	21-34	Bachelor	Couple w/ children	20-40	1-2		
	Siv	21-34	Bachelor	Single/couple w/o children	20-40	1-2		
	Saga	21-34	Bachelor	Couple w/ children	40-80	1-2		
	Sanna	21-34	Bachelor	Single/couple w/o children	20-40	1-2		

Appendix 2. Information letter

The letter is a general template used in all three cases, where some minor adjustments were made to fit the case.



LUNDS UNIVERSITET
Ekonomihögskolan

MASTER'S THESIS LUNDS UNIVERSITET

Greetings,

We are two students from Lund University who are writing our master's thesis in the topic of sustainable development.

The global urbanization today implies huge life quality improvements for individuals but it also has its problems. It is estimated that about 70 % of the total energy-related greenhouse gas emissions stem from cities where much of it is related to the same individuals. However, it is assessed that there is a lot of improvement potential to lower such usage.

You who are reading this live in X, a city that is viewed as an innovative by many and where there is a lot being done to improve the sustainable development.

We want to ask you why you chose to move to the apartment that you live in today would be very grateful if you could help us by partaking in an interview.

Your insights and thought will hopefully contribute to a more sustainable development and therefore we hope that you want to give us your opinion on the topic.

Please contact us on the number or through the email provided below if you have any further questions.

Best wishes,

Emil Rydén

✉ Sta11ery@student.lu.se
☎ 072 730 27 27

Robert Waszkiewicz

✉ robert.waszkiewicz@gmail.com
☎ 073 580 37 30

Appendix 3. Interview guide: Jublet & Vålbehaget and Solallén

Open/explorative questions:

1. What and how much did you know about your dwelling before you moved here?
2. What were the main reasons for you moving here?
3. Who was the most active and influential in your decision to move?
4. If you try to recall, what other parameters and aspects did you take into consideration when you moved here? What were you looking for?
 - a. Why were these important to you?

Common dwelling aspects:

[Show List one to the respondent and ask them to rank the common dwelling attributes]

Regular dwelling aspects
1. Neighborhood physical qualities
2. Neighborhood social qualities
3. Accessibility
4. Regular dwelling attributes
5. Green dwelling attributes

[Asked about each individual aspects]:

5. Why have you ranked the aspects in this way? What are the benefits that you relate to these aspects?
6. Why do you want these aspects?

Open/explorative questions regarding the environmental aspect:

7. Regarding the fact that this is an environmentally certified building; did this affect your decision in any way?
 - a. **[If yes]**
 - i. In what way, and how much?
 - ii. Which aspect was the most important one for you?
 - b. **[If no]**
 - i. Why not?

Green dwelling attributes:

[Shows List two to the respondent and ask them to rank the green dwelling attributes]

Green dwelling attributes
1. Low energy consumption
2. Low water consumption
3. Non-toxic building material
4. Heat isolation
5. Sound isolation
6. Ventilation

[Asked about each individual attributes]:

8. Why have you ranked the attributes in this way? What are the benefits that you relate to these attributes?
9. Why do you want these attributes?
10. *Do you have any trust that the certification provides these attributes?*

Energy efficiency gap:

11. How important was the price when you chose your dwelling?
12. Was there any difference in price on this dwelling in comparison to others you were looking at?
 - a. How did this affect this your decision?
 - b. Were the other dwellings also certified?
13. Were there any other aspects you took into consideration regarding price of the apartment and the fact that it is certified?
14. Do you pay the utility bill yourselves or is it included in the monthly fee?
 - a. Had it affected your choice if it were the other way around?
 - b. To what extent does the utility bill affect your monthly budget?
15. If the house would not have been certified, would you then have been willing to pay a higher price, all else equal, to get it certified?
 - a. How much would you have been willing to pay?
16. *Do you think that the certification will affect the resale value?*
 - a. If so, how much?

General questions about sustainability:

17. How would you have defined the term sustainability?
18. Do you think about conserving energy?
19. Did you know anything about the buildings energy consumption and how it relates to CO₂ emissions?
20. How much would you say you know about global warming?
 - a. Do you care about it? Does it affect your everyday life?

Appendix 4. Interview guide: Hammarby Sjöstad

Open/explorative questions:

21. What and how much did you know about your apartment before you moved here?
22. What were the main reasons for you moving here?
23. Who was the most active and influential in your decision to move?
24. If you try to recall, what other parameters and aspects did you take into consideration when you moved here? What were you looking for?
 - a. Why were these important to you?

Common dwelling attributes:

[Shows List one to the respondent and ask them to rank the common dwelling attributes]

Regular dwelling aspects
1. Neighborhood physical qualities
2. Neighborhood social qualities
3. Accessibility
4. Regular dwelling attributes
5. Green dwelling attributes

[Asked about each individual aspects]:

1. Why have you ranked the aspects in this way? What are the benefits that you relate to these aspects?
2. Why do you want these aspects?

Open/explorative questions regarding the environmental aspect:

3. Regarding the fact that this is a sustainable neighborhood; did this affect your decision in any way?
 - a. **[If yes]**
 - i. In what way, and how much?
 - ii. Which aspect was the most important for you?
 - b. **[If no]**
 - i. Why not?

Green attributes:

[Shows List two to the respondent and ask them to rank the green dwelling attributes]

Green dwelling attributes
1. Low energy consumption
2. Low water consumption
3. Non-toxic building material
4. Heat isolation
5. Sound isolation
6. Ventilation

[Asked about each individual attributes]:

4. Why have you ranked the alternatives in this way? What are the benefits that you relate to these attributes?
5. Why do you want these attributes?

Energy efficiency gap:

6. How important was the rent when you chose your apartment?
7. Was there any difference in rent between this apartment and others you were looking at?
 - a. How did this affect this your decision?
 - b. Were the other dwellings also certified?
8. Were there any other aspects you took into consideration regarding rent of the apartment and the fact that it is certified?
9. Do you pay the utility bill yourselves or is it included in the monthly fee?
 - a. Had it affected your choice if it were the other way around?
 - b. To what extent does the utility bill affect your monthly budget?
10. If the neighborhood would not have been sustainable, would you then have been willing to pay a higher rent, all else equal, to make it sustainable?
 - a. How much would you have been willing to pay?

General questions about sustainability:

11. How would you have defined the term sustainability?
12. Do you think about conserving energy?
13. Did you know anything about the buildings energy consumption and how it relates to CO₂ emissions?
14. How much would you say you know about global warming?
 - a. Do you care about it? Does it affect your everyday life?

Appendix 5. Aggregated individual ranking

General housing aspects

	Jublet & Vålbehaget					Solallén					Hammarby sjöstad				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Neighbourhood physical qualities	3	4	3	2		1	2		2	2	1		3	1	1
Neighbourhood social qualities			3	3	6		1	2	3	1		1		2	3
Accessability	3	7	1		1		2		1	4	3	2	1		
Regular dwelling attributes	6	1	4		1	5	1	1			2	2		2	
Green dwelling attributes			1	7	4	1	1	4	1			1	2	1	2

Green dwelling attributes

	Jublet & Vålbehaget						Solallén						Hammarby sjöstad					
Rankordning	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
Low energy consumption	4		3	2	3		2	4	1				2	2				2
Low water consumption		1		1	2	8			1	1	1	4		1	1	1		3
Non-toxic building. Material	5	3	1	1	1	1	3		1	1	2		3	1	2			
Heat isolation			4	3	4	1		1	1	1	3			1	2	1	1	1
Sound isolation	2	6		3	1		2		2	2	1	1	1			2	2	1
Ventilation	1	2	4	2	2	1		2	1	2		2		1	1	2	1	1

Appendix 6. Article



Why not green?

2015-05-18

Global warming is a major concern in the society we live in today. We are constantly reminded of the terrible forces we have set in motion because our excessive use of fossil fuels. According to the United Nations, air pollution in Europe cost 600 000 peoples' lives every year due to sickness and decease. UN also estimate that there will be an increase in urban population of 2,5 billion people by 2050, which will be an immense challenge for future city development.

The construction business account for 30 percent of the total amount of CO₂ emissions and with the rapid urbanization there is great potential to lower overall emissions in the coming decades. Today there are several certifications for buildings that all aims to aid consumers in their purchase decision to create a more sustainable future.

These green, or sustainable buildings, has grown popular among companies that want

to differentiate themselves and contribute to a sustainable development. It has been shown in several studies that it is not only the environment that is the beneficiary of this trend – there are also monetary incentives for the companies as worker productivity, health and performance increases, creating a win-win situation. What is even more interesting is that studies show that the net cost for these green commercial buildings is lower than their regular counterparts.

However, the adoption of green dwelling among consumers has been slow – so why is that?

Imagine yourself lying in bed, you have just woken up after a good nights sleep and you feel energized and ready to conquer the world – imagine if this was the case every single morning. It certainly wasn't in your last apartment, where you were kept awake by the neighbors teenage son blasting music until the early hours and after a few hours sleep were awoken by the retired couples' nagging over breakfast.

Today there are many people in the hectic world we live in that walk around stressed and tired. Coming home after work, we should come home to a sanctuary, a comfortable harmonious place to relax. This is what a green building implies; beyond lowering your operating costs it contributes to a thermally, visually, and acoustically comfortable environment. Imagine having a home full of sunlight, with no need to open the windows or turn on the heating, since both thermal regulation and oxygen level is regulated by itself.

When considering alternative housing there are many variables to take into account. How much does it cost, can we afford it? How do I get to work? Where will my children go to school? Will I be able to take the dog for a walk? There are literally hundreds and thousands more questions like these and it is impossible to consider them all at once; it is especially hard when you have to compare them between alternatives, as you will have to consider twice as many things.

A study made by two students at Lund University show that many people do not consider many of the benefits of moving into a green dwelling but rather trade it for easy access to work or the size of the apartment.

In the study from Lund University, many consumers said that they first and foremost considered location and dwelling size when they bought their home and said: *“it was a bonus that the building was certified but it was not a determining factor.”* So why was it a bonus and not a determining factor? This is what the study aims to explain. The study was performed in Stockholm and Växjö where the student interviewed 25 consumers about why they had decided to move into a green dwelling.

The study found that their decision process was similar to what would expected according to relevant theory and only a few respondents had actually considered the green attributes of their dwelling prior to moving in. The most important green attribute was that it had a low energy consumption, which implies that the consumer also had a lower operating cost when it comes to utility bills. They also found that non-toxic building material was an attribute highly valued by the consumers but that many had taken it for granted, which they maybe might ought not to? Interesting enough almost no consumers had considered all the life enhancing qualities that a green building implies!

Most of the respondents also claimed to be environmentally friendly and with no doubt they are. However, the study showed that the consumers were unable to link

how their energy consumption was linked to the CO₂ emissions it caused. These CO₂ emissions, commonly known as externalities in economics, are often a cause for so called market failures and were also found to play a major role in why consumers have not adopted green dwelling just yet. This general lack of knowledge regarding the externalities was traced to a rather general lack of information regarding energy efficiency and the benefits of the consumers' apartments.

The study suggest that this information gap exist because consumers are unable to cope with all the information regarding the dwelling and therefore choose to focus on a couple of attributes, previously known to them, that are determined by the individuals' values and contextual factors. The authors argue that when the contextual factors, such as intensity of the housing market, are less demanding, the consumers

are able to consider green attributes to a higher extent than if the demands are high. These contextual factors also lead consumers to consider cost saving from energy efficient investments to a greater extent.

Therefore, and due to the contextual factors, the authors suggest that companies should play their role in the adoption of green. Why go by the old stigma 'location, location, location' when the consumer could be informed and value much more. Why produce regular dwelling at all when green dwelling has shown to be valued by most but only a possible option for few because of the today's low supply?

The authors say that the path to a sustainable development could be made a whole lot simpler, but everyone must take their role. What are you going to do next time you move? Hopefully there will be a green option for you to consider by then.