Solution sets for the Cost reduction of new Nearly Zero-Energy Buildings – CoNZEBs

EU H2020-EE-2016-CSA

Projekt ID: 754046

Common report on interviews with end-users in NZEBs – CoNZEBs

Deliverable D4.1

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Title page:

Content

About CoNZEBs

This report is one of the outcomes of the work within CoNZEBs. CoNZEBs is an EU Horizon 2020 project on the topic 'Cost reduction of new Nearly Zero-Energy Buildings' (call H2020-EE-2016-CSA, topic EE-13-2016). As such it receives co-funding by the European Union under the Grant Agreement No. 750046. The project period is from 01/06/17 to 30/11/19.

The planned work can be summarised as follows:

CoNZEBs identifies and assesses technology solution sets that lead to significant cost reductions of new Nearly Zero-Energy Buildings (NZEBs). The focus of the project is on multi-family houses. Close cooperation with housing associations allows for an intensive interaction with stakeholders and tenants. The project starts by setting baseline costs for conventional new buildings, currently available NZEBs and buildings that go beyond the NZEB level based on the experience of the consortium. It analyses planning and construction processes to identify possible cost reductions.

An investigation of end-users' experiences and expectations together with a guide on co-benefits of NZEBs promotes living in these buildings and enhances the energy performance by conducive user behaviour.

The technology solution sets include approaches that can reduce costs for installations or generation systems, pre-fabrication and construction acceleration, local low temperature district heating including RES, and many more. All solution sets are assessed regarding cost savings, energy performance and applicability in multi-family houses. A life cycle assessment of different building levels and NZEBs using the solution sets provides a longer term perspective.

Communication to stakeholders and dissemination of the project results includes events and discussions with the national housing associations.

The CoNZEBs project team consists of 9 organisations from 4 different countries:

Table 1:   Project partners within the CoNZEBs consortium

	Project partner	Country	Website
1	Fraunhofer Institute for Building Physics (Coordinator)	Germany	www.ibp.fraunhofer.de
2	Aalborg Universitet	Denmark	www.sbi.aau.dk
3	Kuben Management AS	Denmark	http://kubenman.dk
4	Agenzia Nazionale per le Nuove Tecnologie, l'Energia e lo Sviluppo Economico Sostenibile (ENEA)	Italy	www.enea.it/en
5	Gradbeni Institut ZRMK doo	Slovenia	http://www.gi-zrmk.si/en/
6	ABG Frankfurt Holding Wohnungsbau- und Beteiligungsgesellschaft mit beschränkter Haftung	Germany	www.abg-fh.com
7	Boligselskabernes Landforening (BL)	Denmark	www.bl.dk/in-english
8	Azienda Casa Emilia Romagna della Provincia die Reggio Emilia (ACER Reggio Emilia)	Italy	www.acer.re.it
9	Stanovanjski Sklad Republike Slovenije, Javni Sklad (SSRS)	Slovenia	http://ssrs.si/

In Germany, national co-funding is provided by Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit within the research initiative Zukunft Bau (SWD-10.08.18.7-17.33).

1. Introduction

This introduction describes Work Package 4 (WP4) of the CoNZEBs project and the results of the activities under Task 4.1 Learning from the end-users of existing and future NZEB multi-family houses.

The goal of WP4 Task 4.1 was to learn about the opinion of end-users in existing and future multi-family NZEBs regarding:

- ⌂ their expectation and experience with living in NZEBs,
- ⌂ their potential doubts and fears ,
- ⌂ the used technologies,
- ⌂ the quality of life in such buildings,
- ⌂ the relative impact of NZEBs on the real-estate value.

End-users' opinions were collected with a commonly developed questionnaire that was slightly adapted for each country. With respect to the specifics of the multi-family building sector, share of tenants- or owners-used flats and experiences with early NZEBs, the participating countries also adapted the methodology of information collection.

The questionnaire covers topics like low energy consumption, use of renewable energy sources (RES), building technologies, costs, indoor comfort and other co-benefits of living in NZEBs that are relevant to sustainable building and the real-estate sector. The questionnaire is divided in two parts, the first part is meant for people already living in NZEBs and the second for people not yet living in NZEBs.

This report summarizes the findings of the interviews with current NZEBs users and/or potential future end-users of NZEBs as Deliverable D4.1 'Common report on interviews with end-users in NZEBs'.

Based on this report, a guide for end-users will be developed to motivate people to live in multi-family NZEBs and to contribute to the public acceptance of the importance of reducing the energy use in buildings. The guide shall be intended not only for end-users living in multi-family NZEBs but also for housing associations to convince their tenants of benefits and co-benefits of living in NZEBs.

2.   Multi-family building stock and end-users

2.1   Germany

In the following chapters the multi-family building stock in Germany and the end-users living inside of these buildings will be described.

2.1.1   Multi-family building stock in Germany

In Germany there are about 18.2 million residential buildings, as shown in Figure 1. About 3.2 million of those are multi-family buildings with three or more residential units per building. They represent 17% of the total residential building stock.

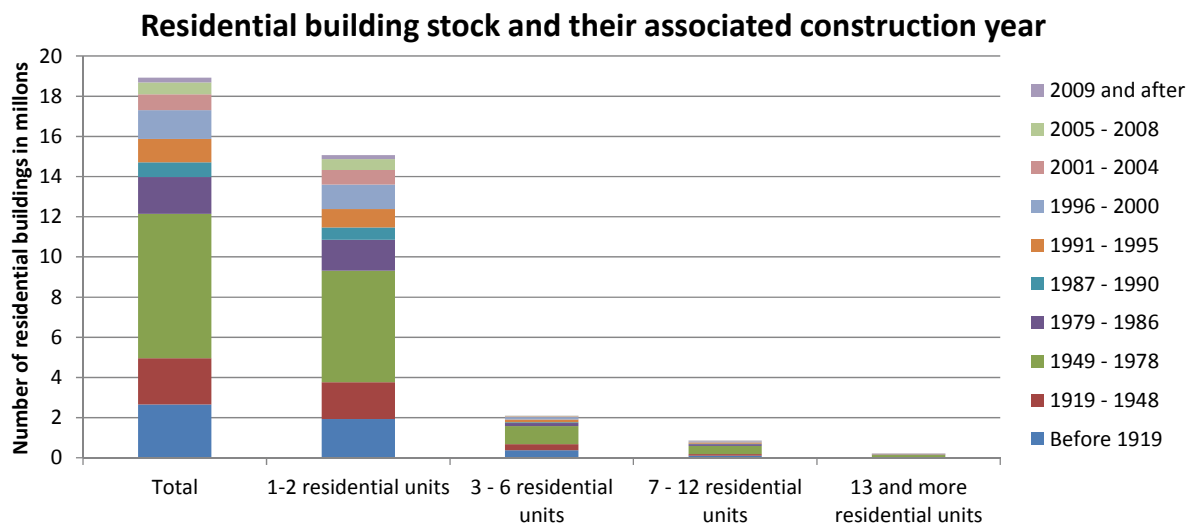**Residential building stock and their associated construction year**

Figure 1:   **Residential building stock in Germany with the corresponding building construction year [DE 1]**

As Figure 1 indicates, a huge proportion (73%) of the existing multi-family buildings have been built until 1978 and therefore before the first German law restricting the energy use of buildings [DE 2].

Residential units in the German building stock
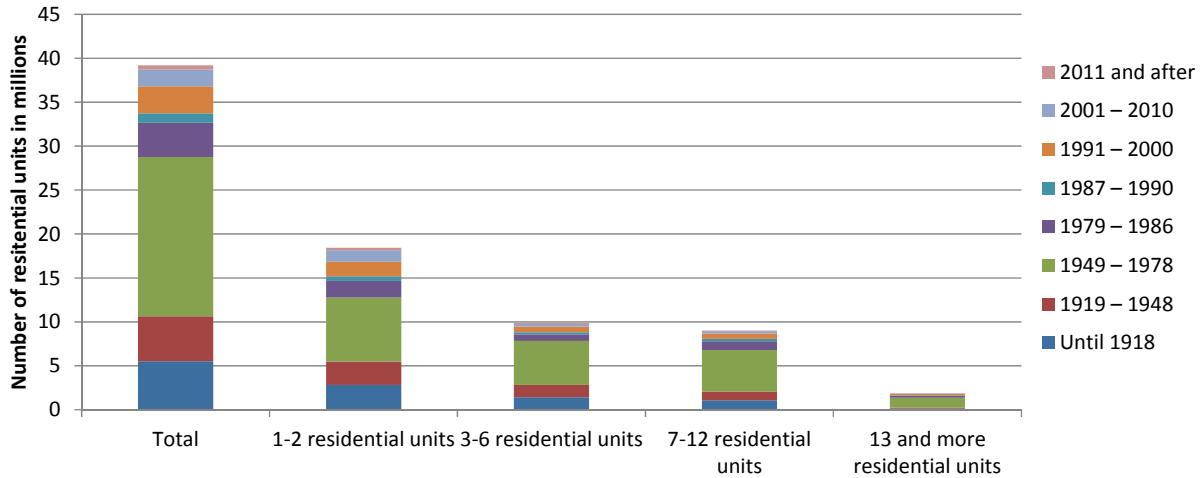
Figure 2: **Residential units in Germany with the corresponding building construction year[2]**

Figure 2 shows, that 20.7 million residential units are located in multi-family buildings, which is 53% of the total residential units in Germany. 77% of the residential units have been built before 1979. As shown in Figure 3 most of the residential units in multi-family buildings are rented out (77% of all multi-family buildings) and nearly 9% are vacant.

Utilization structure of the residential unit stock in Germany
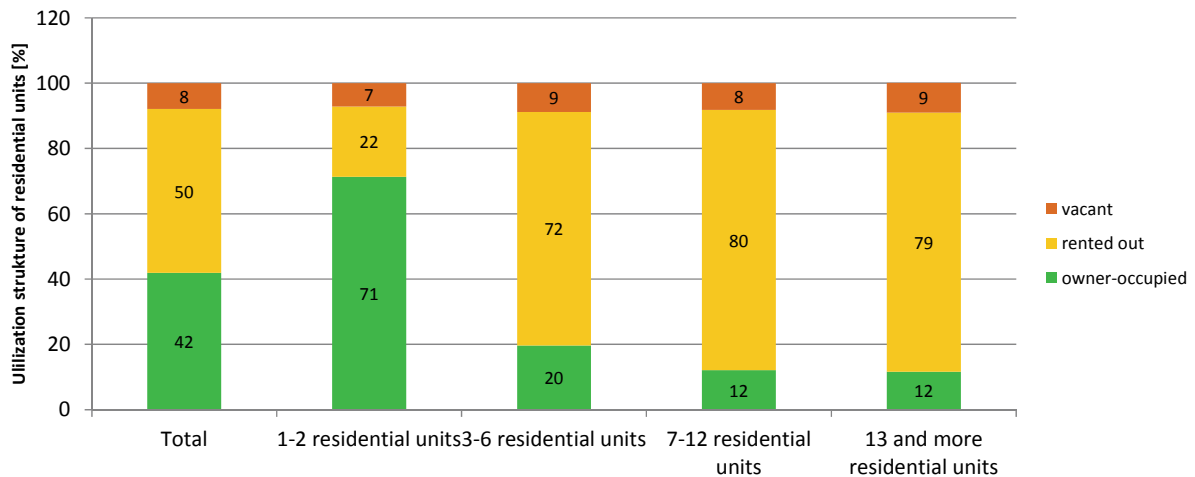
Figure 3: **Utilization structure of the residential unit stock in Germany [DE 3]**

The vacancy rate in multi-family buildings, further evaluated in Figure 4, shows that it generally drops with decreasing building age, indicating that new buildings, which are also more energy efficient, are more attractive to own or rent.

Vacancy rates in mulit-family buildings depending on year of construction
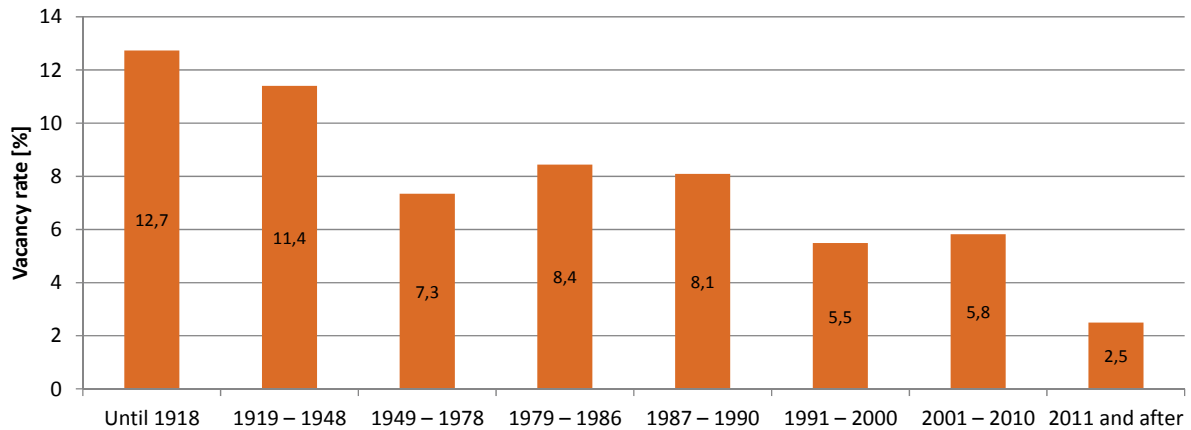
Figure 4: **Vacancy rates in multi-family buildings in Germany depending on year of construction [DE 3]**

The average built apartment size increased by more than 9 m² per apartment since 2000 as shown in Figure 5. This results in an also increased area-use per person, which now amounts to 44.4 m² per person, increasing by more than 4 m² since 2000.

Average apartment size in multi-family buildings in Germany
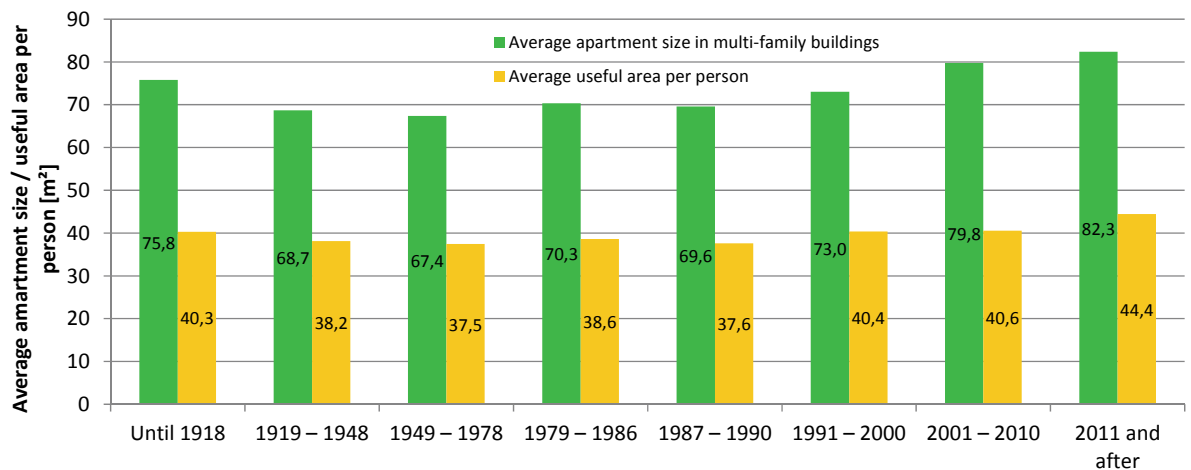
Figure 5: **Average apartment size in Germany depending on year of construction [DE 3]**

**Permits granted for the construction of apartments in multi-family
buildings**
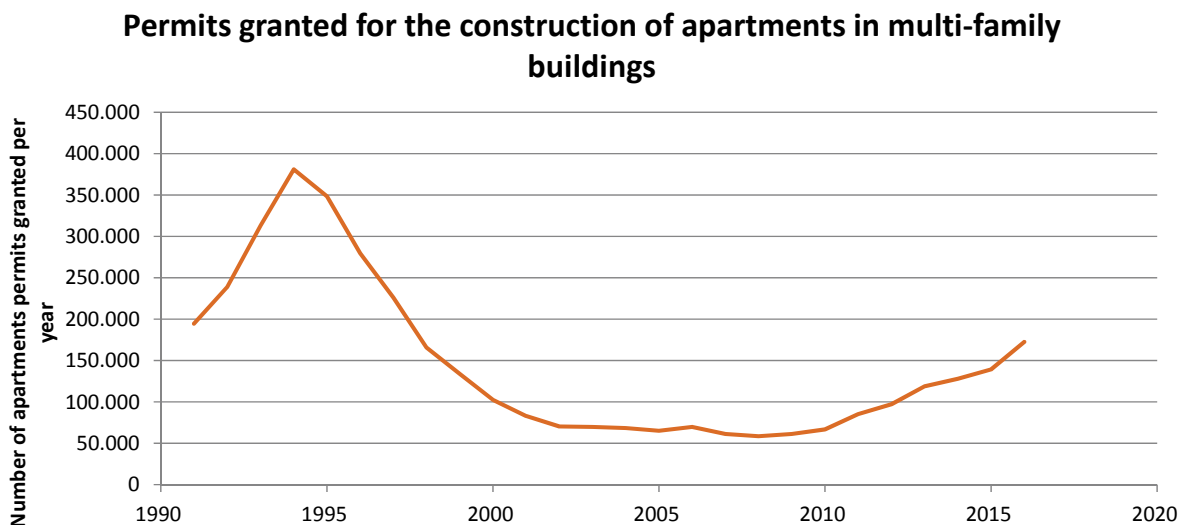
Figure 6: **Constructed living area in multi-family buildings in Germany since 1993 [DE 4]**

In Figure 6 the development for newly-built multi-family buildings can be observed. The annually constructed living area in multi-family buildings doubled since 2010. The constructed living area is expected to further increase in the next few years.

In 2016 a total of 172,679 residential units in multi-family buildings were granted building permission [DE 4]. The KfW (state-owned bank which grants subsidies for energy-efficient new construction or retrofits) funded in the same year 57,036 new residential units in multi-family buildings that already fulfil the likely to be NZEB-standard in Germany[1] [DE 5]. Thus, 33% of all residential units in multi-family buildings built in 2016 are already NZEBs.

The increasing numbers in constructed living area as well as permitted living area and the existing multi-family stock demand for cost-efficient ways to accomplish the future NZEB-standards in construction as well as in renovation without subsidies.

2.1.2   End-users

26% of final energy use in Germany in 2014 was caused by households, of which 85% was used for heating and hot water [DE 7]. The influencing factors on the energy use of private households, which decide whether consumers are more economical or more wasteful are complex. The energy consumption of private households depends on two factors. First there is the non-personal factor, which depends on the size and location of the residential building as well as the HVAC equipment, insulation level and control strategy. The second factor is

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[1] Germany has not yet legally defined the details of the national application of the nearly zero-energy building. For the CoNZEBs project the energy performance level of a KfW 55 house (~27% lower primary energy use if compared with the minimum energy performance requirements for new buildings in 2018) was defined to be the likely to be NZEB-standard. This is based on the German country report of the Concerted Action EPBD platform from 2016 [DE 6].

determined by personal influences, to which user behavior, but also user influences such as occupancy density, the duration of occupancy and the current life situation belong.

A whole series of empirical studies [DE 8] was able to identify very different requirements to the room temperatures perceived as comfortable. The individually pleasant temperature selection varies depending on the room use and can differ within the family. In a survey which featured 20,325 households, temperature ranges of 18 to 25 °C for the living room and from 10 to 22 °C for the bedroom have been found. The averages were 21.2 (living room) and 16.1 °C (bedroom).

In the EU project SAVE@Work4Homes [DE 9], more than 2,600 households, including over 1,000 tenants of three German housing companies, were asked about their everyday energy consumption behavior (see Figure 7) and their motivation to save energy (see Figure 8).
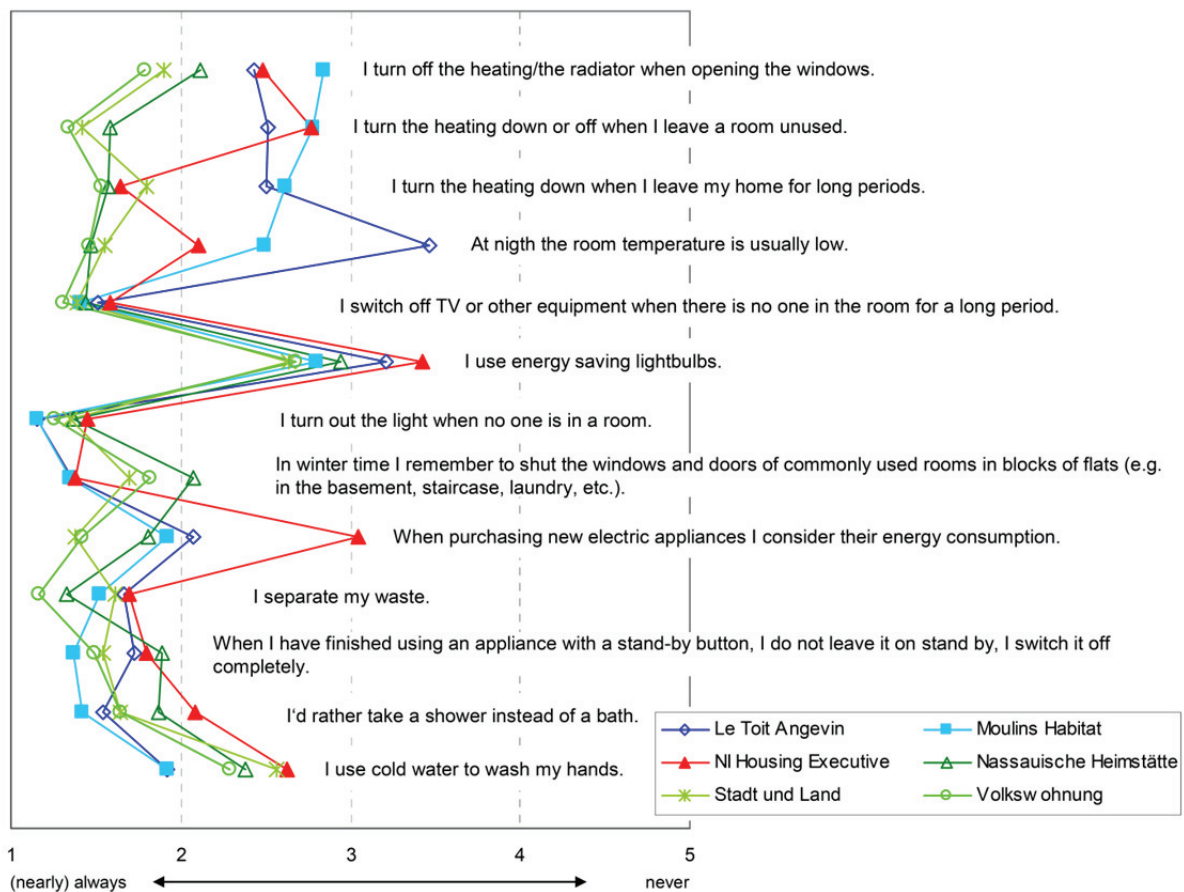

Figure 7: **Behavior pattern of everyday energy consumption by site, mean values [DE 9]**
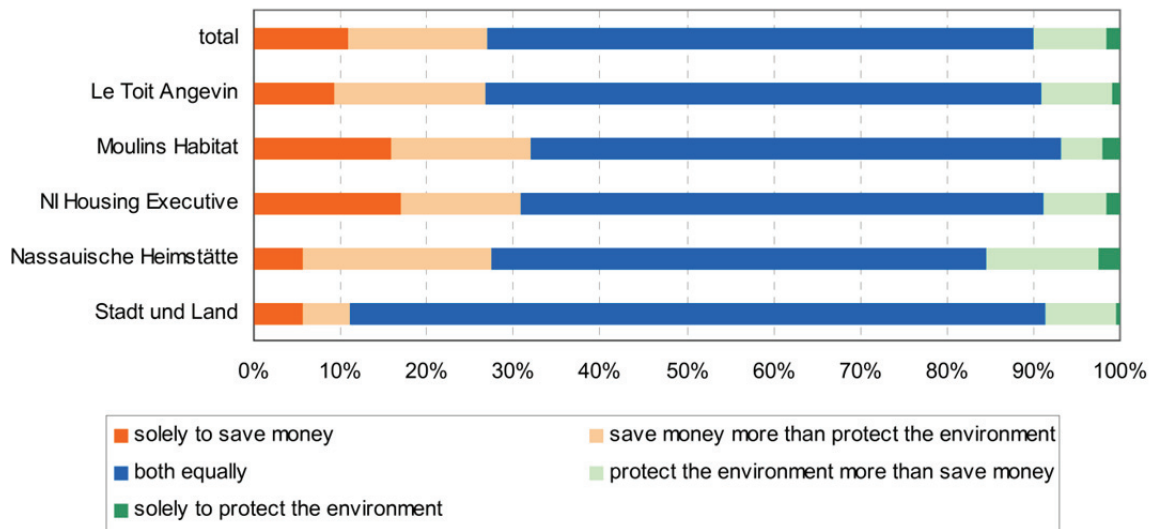
Figure 8:   **Tenant's motivation to save energy [DE 9]**

As shown in Figure 7 the German tenants (3 green lines) are very aware of measures to reduce their heating consumption and tend to use those frequently. Also measures to reduce the electricity consumption, except for energy saving light bulbs, are used frequently.

To actively reduce the energy consumption in buildings or apartments the end user first of all has to know how much he or she consumes. The end users in Germany are however ill-informed about their personal energy consumption. 86% [DE 10] don't know their costs for domestic hot water and only 38% [DE 11] know their costs for electricity exactly.

Regular information on heat consumption leads to a reduction in heating energy consumption for most tenants, which has an effect for several years [DE 12]. It can be assumed that this also applies to electricity consumption.

2.2   Denmark

2.2.1   Multi-family buildings stock

The total number of residential homes in Denmark is approx. 2.8 million. The properties are divided into four main sectors: owner-occupied housing, cooperative housing, private rental housing and social housing. The four types of housing differ in ownership, taxation, public support, the degree of regulatory regulation, the extent of the individual's right of disposal, the degree of community, etc. The general housing sector is the foundation for the solution of a number of social housing tasks and the municipalities play a major role in the construction and operation of public housing. Part of the general housing is targeted citizens with special housing needs. Sector sizes are shown in Figure 9.
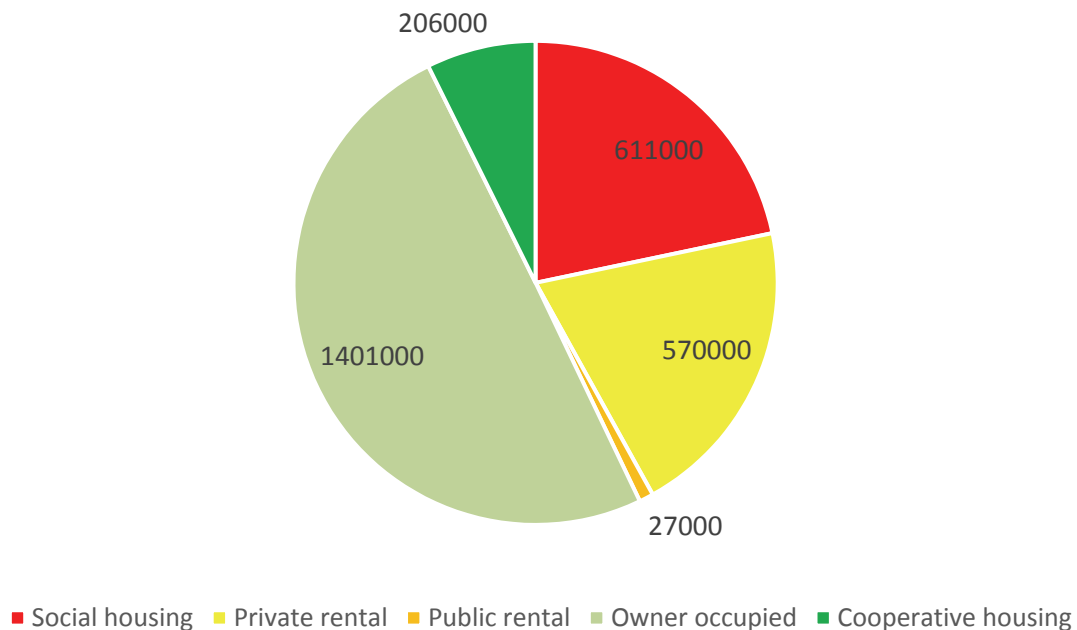
Figure 9: **The Danish housing market divided into individual sectors (2017) [DK1].**

The distribution between the four main sectors is particularly affected by new construction. However, other conditions can also be an important factor. For example, more than half of the housing units have arisen because the tenants of a private or publicly owned rental property have formed a cooperative housing association that bought the property on a cooperative basis. Likewise, in connection with the so-called parent purchase, housing will in principle change status from owner to private rental property.

Figure 10 and Figure 11 show how the housing stock we have today is divided into the four sectors and broken down by year of construction. The figure starts at year 1900 and there are 10% of the current housing stock that was built before 1900. Measured on the housing stock we have today, there has been a net increase in housing since 1900, on average, about 20,000 homes annually. But net growth (and building volume) has fluctuated a lot between years.

If you disregard the housing units (where a large part, cf. above, are converted private rental), the figure shows that over the very long period there are major displacements regarding the composition of the new building in the housing sector. This is due to several different circumstances. Including primarily the construction of owner-occupied housing is highly cyclical in relation to the rest of the housing sector. For social housing, it is seen that they are relatively newer, while private rental homes and cooperative homes are relatively older.

The breakdown of the housing market in the four sectors in each municipality is shown in Figure 12. It is seen that there are significant geographic differences in the division of the four sectors in the individual municipalities and that there is a relative close connection between the four sectors and geographical location. Generally speaking, the proportion of owner-occupied housing is decreasing with increasing urbanism, while the opposite of the other sectors is on the rise, with increasing urbanism.

Tenant houses, i.e. private rental housing and social housing are predominantly located in the larger municipalities and with a high concentration in the metropolitan area, cf. Figure 12. Similarly, the proportion of cooperative housing in and around the capital is high. Property owners have opposed a high proportion in provincial provinces and most in the least provinces municipalities.
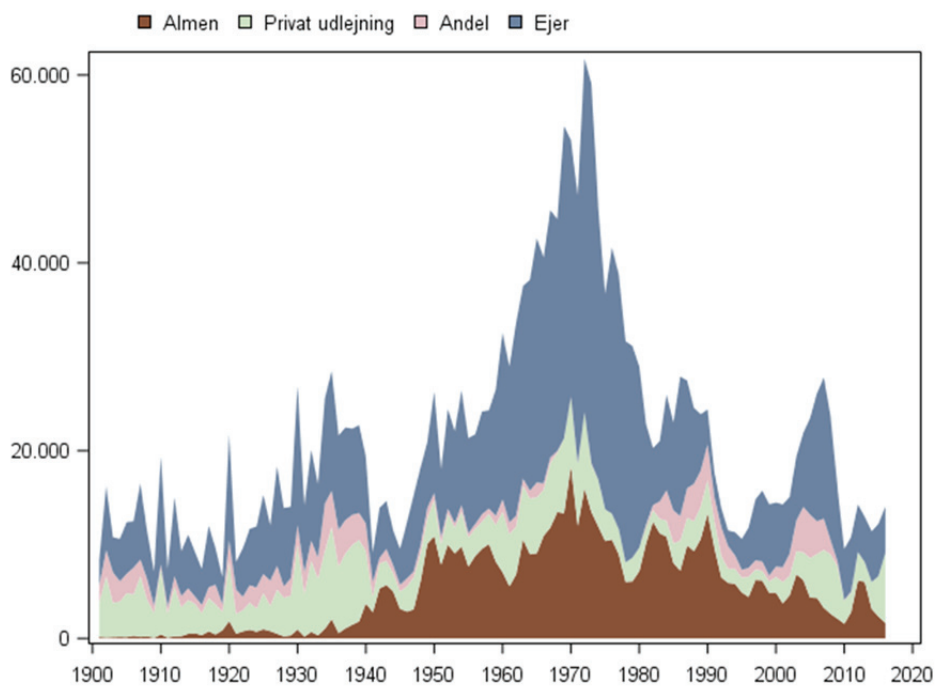
Figure 10:   **Housing stock divided by sectors by year of construction since 1900 (number of homes). Translation of Danish legends (from left to right): Social housing; Private rental; cooperative housing associations; Owner occupied flats [DK 1].**
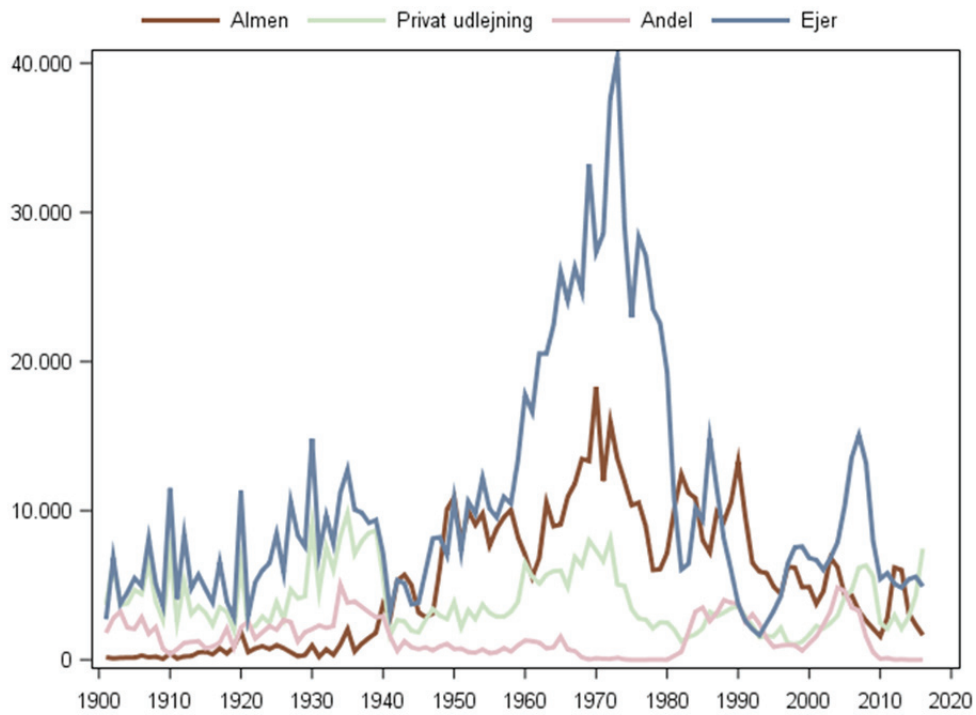
Figure 11: Housing stock divided by sector by year of construction since 1900 (number of homes). Translation of Danish legends (from left to right): Social housing; Private rental; cooperative housing associations; Owner occupied flats [DK 1].

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Social housing

Procentandel af almene boliger

☐ 5,5-11,4%   ☐ 11,4-16,3%
☐ 16,3-19,0%   ☐ 19,0-27,6%
☐ 27,6-66,4%

Private rental

Procentandel af private udlejningsboliger

☐ 2,8-11,4%   ☐ 11,4-16,4%
☐ 16,4-18,4%   ☐ 18,4-20,7%
☐ 20,7-35,5%

Cooperative dwellings

Procentandel af andelsboliger

☐ 0,2-2,3%   ☐ 2,3-2,9%
☐ 2,9-3,6%   ☐ 3,6-4,3%
☐ 4,3-31,5%

Owner occupied flats

Procentandel af ejerboliger

☐ 18,7-50,9%   ☐ 50,9-57,3%
☐ 57,3-61,8%   ☐ 61,8-68,0%
☐ 68,0-79,4%
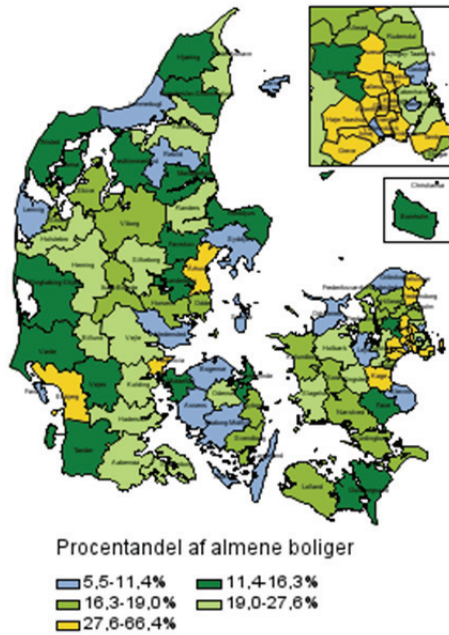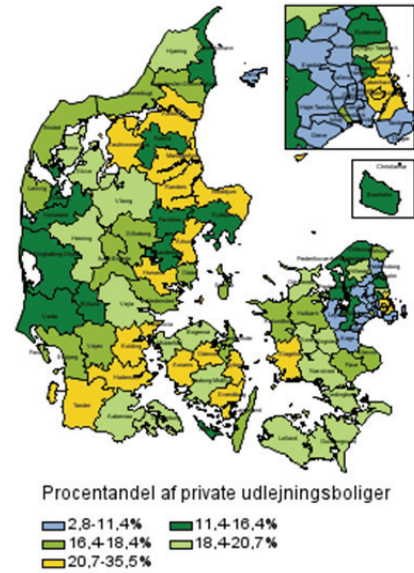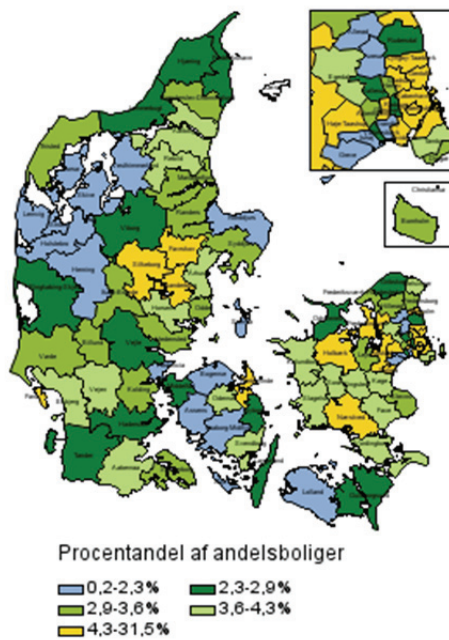
Figure 12: The Danish multifamily housing market in the municipalities divided by the individual sectors 2017 [DK 1].

2.2.2   End-users

The Climate Barometer 2016 [DK 1] is based on a survey from Analyze Denmark among 1048 representatively selected Danes, while the results were prepared by the secretary leader in CONCITO (think-tank).

The random sample is extracted randomly and stratified by gender, age and geography (region), so it reflects the population composition of these parameters.

As a rule, the same basic questions are asked in each of these three areas, so that any changes in the attitude of the population can be followed over time. In this way, the Climate Barometer is the only Danish analysis that over the years reveals the development of the population's attitude to the climate challenge, its consequences and solutions.

The Climate Barometer 2016 shows that almost 9 out of 10 Danes consider global climate change a serious problem. Of this, 44% believes that it is a "very serious problem", while 42% believes that it is "to some extent" serious. Only 2% believes that it is "not at all" a serious problem.

The Climate Barometer 2016 confirms that many Danes would like to do more to reduce their personal contribution to greenhouse gas emissions and that there is still potential for promoting this effort through awareness, economic incentives, regulation and a generally better understanding of consumption patterns and their impact on the climate.

42% (against 38% in 2015) respond yes to the fact that they have done something in the last three years with the primary purpose of reducing their own contributio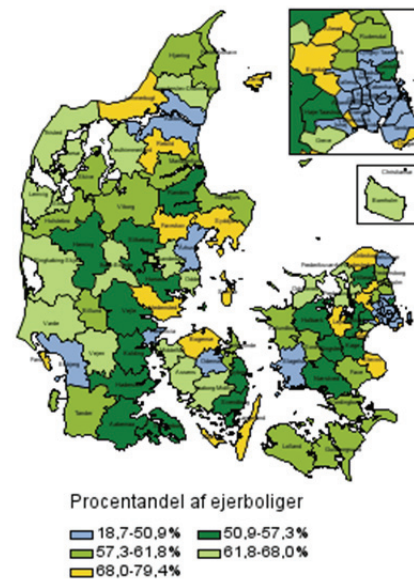n to global greenhouse gas emissions. Instead, if the environmentally friendly measures are taken to protect the environment or to save money, only 27% corresponds, it is primarily for environmental protection, while 36% answers that it's primarily for saving money.

The five most popular measures among respondents who have done something with the primary purpose of reducing greenhouse gas emissions are: Replacing incandescent bulbs with energy saving lamps (80%); sort waste (73%); less food waste (66%); always turn off computer and / or TV (62%); buy A-branded white goods (58%). The proportion that has slowed down in the consumption of meat has risen significantly from 25% in 2015 to 33% in 2016.

The five measures that, according to respondents, mean most of the Danes' personal emissions of greenhouse gases, is to save on electricity consumption in the home (38 %); take the bicycle and use public transport (38%); energy residences (35%); sort the waste (35%); change the car with a climate-friendly model (33%). In addition, the proportion of respondents pointing to less meat consumption as an effective climate measure has risen significantly from 20% by 2015 to 29% in 2016.

A large majority of 67% mentions that it is difficult or difficult to figure out which groceries are most climate-friendly.

What can and will the Danes do?

⌂ 42% say that they have done something in the past three years with the primary purpose of reducing their own contribution to global greenhouse gas emissions.

⌂ At the same time, 36% corresponds that the primary reason for environmentally friendly measures such as the post-insulation of the housing is economic considerations. Only 27% say that environmental considerations are the primary cause.

⌂ The most popular climate measure is to replace incandescent bulbs with energy saving bulbs, sorting of waste, reduction of food waste, always turn off computer and / or TV and purchase A-tagged domestic appliances. The proportion of the population that cuts significantly in consumption of meat is increasing rapidly.

⌂ The actions considered to be the most effective are to conserve electricity consumption at home, to take the bicycle and use public transport, to renew the housing, to sort the waste and to change the car with a climate-friendly model.

⌂ 67% answers that they largely or to some extent find it difficult to figure out which groceries are most climate-friendly.

⌂ 39% respond that they, to a lesser extent or not, associate the consumption of new material goods such as clothing, electronics and living equipment with quality of life.

⌂ 46% believes that we need to change lifestyles to limit climate change while 31% believes that technology can solve the problem without requiring major changes in our way of life.

2.3   Italy

2.3.1   Multi-family building stock

In Italy residential buildings are 11.9 million and account for the 79.3% of the overall building stock. The number of apartments are 31 million and the 77% of them are occupied by Italian residents [IT 1; IT 2; IT 3]. Residential buildings and are divided as follows:

⌂ 9.1 million (76,5%) are small houses
⌂ 2.3 million (19.3%) are multi-residential building with 3-8 floors
⌂ 476.000 (4,2%) are multi-residential building with more than 8 floors

A more detailed distribution, based on the number of apartments per building, is shown in Figure 13. As it can be noticed, most of the buildings are single-family (61.5%), followed by two-family houses (20%). Buildings with more than 9 apartments are a minority (4.3%); the highest part of multi-residential buildings is composed by 3-4 apartments (9.2%).
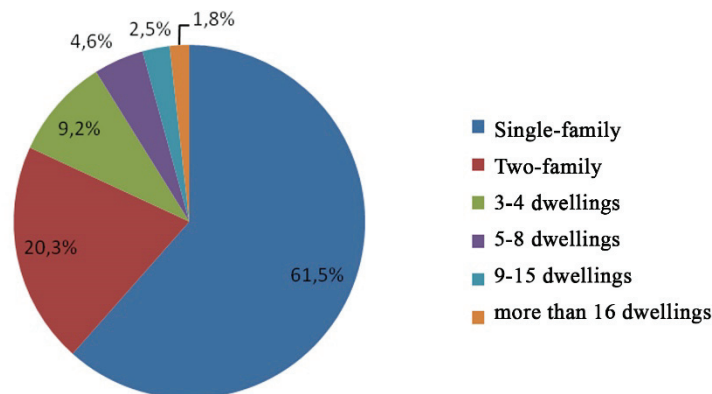

Figure 13:   Buildings classification based on the number of dwellings [IT 2]

As a consequence, the average number of dwellings per building is quite small, around 2.6. In relative terms, the oldest buildings contain fewer apartments, while buildings dated back to the 60's and 70's have the maximum number of dwellings per building (about 4) [IT 3].

Since 2006, Italian housing market and the building construction sectors experienced an economic crisis which caused a negative variation of apartment's prices from 2008. Contemporary, family income started decreasing from 2007 to 2011. This double effect, at the beginning, implied a collapse of buying and selling of real estate and a relative stability of building prices. After 2012, also prices started lowering together with building transactions. This scenario depends on the decrease of demand, which is affected by several factors such as: the constant reduction of incomes, the uncertainty about the future, the difficulty of access to the credit market ("credit crunch"), the reduction in the ratio between value of the properties and bank loans. It consequently affected the construction sector, blocking new investments especially in the residential sector. Investments in new residential buildings construction reached the lowest values in 2015: the number of new residential buildings available in the market in 2015 was 70% lower than 2008 [IT 4]. In 2017 a slight recovery in the construction sector was forecasted. Outlooks of the building construction sectors developed by ANCE (Associazioni Nazionale Costruttori edili) were promising: an increase of investments of 0.8% compared to 2016 in new residential buildings was expected [IT 5]. On the contrary in 2017 an investment increase of only 0.2% was experienced: it is a negligible increase and totally insufficient to create the conditions for an effective economic recovery [IT 6]. From the end-users side between 2014 and 2016, a slight increase of real estate

transactions has been experienced, faced with a further decline in market prices, which was however less pronounced year after year [IT 6]. In 2017 a slight increase of the transactions in new constructed multi-residential buildings was registered, coupled with a relative increase in prices of new apartments (up to 2.1% more than 2016) [IT 1; IT 2].

Figures of the market trends can be therefore summarized as follows:

⌂ Global variation of residential prices from 2009 to 2017 was about -26%. From 2014 to 2017 prices continued decreasing but the variation was less pronounced (-7.7 %). In 2017, compared to 2016, decrease of prices of existing building stock was about -2,3 % while new buildings experienced an increase of +2.1%.

⌂ The annual number of transactions in the building market was about 550000; from 2016 and 2017 they increased up to 650000.

⌂ Real estate transactions in new constructed multi-residential buildings slightly increased after 2014: in 2015 they were -12,6% lower than 2014, in 2016 -5.3% lower than 2015 and in 2017 -4,5% compared to 2017.

The Social Housing is a NETWORK IN ITALY.

In Italy there are 90 local authorities and social housing companies.

Nation	Number of social / public housing for rent	Total number of homes	Social housing for rent on the total housing
Italia	963.000	28.863.000	3,30%

Family units for rent excluding households residing in ERP housing: 4.06 million Average fees equal to 380 € / month and 430 € / month if free market [IT 10] of which:

1.   Number of taxpayers benefiting from rental deductions for low-income tenants (under € 30,987.41) to 2013: 931,208 [IT 11]

2.   Number of applications for access to public housing units unused in 2015: 650,000 [IT 12]

2.3.2   End-users

A national survey of the importance of building energy efficiency in the real estate transactions was developed by ENEA, Istituto per la competitività and Federazione Italiana Agenti Immobiliari Italiani. The analysis is aimed at studying the trend of residential buildings market from the perspective of the real estate brokers by classifying the transactions based on the certification levels of the apartments. Data from over 1000 real estate brokers were analyzed.

In line with the trends of 2013, also in 2014 most of the transactions (over 70%) concerned buildings and apartments with the lowest energy performance level (Class G in Italy). Conversely, dwellings certified with high energy levels (Class A; A; B; C) represents the 10-14% of the total transactions, among which apartments with certificate class C are more than 50%.

Trade of high quality apartments certified class A+ or A increased from 6% to 10% between 2013 and 2014. Less encouraging are data related to the importance of the energy performance certificate as influencing parameter in the real estate transaction: the 60% of buyers and sellers and the 42% of real estate brokers consider it useless [IT 8].

It should be noted that data from 2014-2016 showed even less attention payed by buyers to the energy performance of the residential units. This aspect could depend on several factors, including a regulatory framework affected by frequent changes and the knowledge of real estate operators which doesn't seem to be up-to-date, even when involved in training courses [IT 8].

A survey carried out in 2013 by the ISTAT [IT 9] showed that the average annual energy expense for each italian family is about 1600 €. Couples do normally spend on average 650 € less than families with 3 or more children. This expense is 30% higher in the North of Italy than in the South. An average of 87% of heating systems are on all days during the heating period, with geographical differences (98% in the North and 62% in the South). Heating system is used on average for 8 hours per day: 4 hours in the afternoon, 2 hours in the morning and 1 hour during the night. Families declared that within the previous 5 years (between 2009 and 2013) they invested in the energy retrofit of apartments: 50% for reducing electric expenses, 21% for reducing heating expenses, 15% for optimizing DHW systems and 10% for installing air conditioning systems.

ACER Reggio Emilia manages over 500 buildings and about 5400 dwelling units. Among the buildings, 71,4% is still owned by ACER, while the rest has been sold: 4700 units are still managed by the Agency, while privates own 800. ACER, even if does not own all the buildings, usually keeps managing them.

![CoNZEBs logo]
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Current composition:
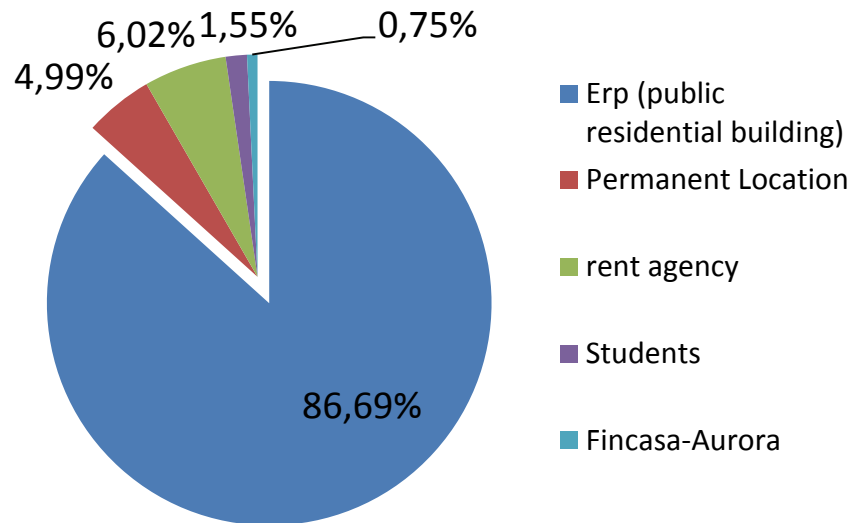
Figure 14:   **Composition of ACER Reggio Emilia assignees: type of rent**

Figure 15:   **Composition of ACER Reggio Emilia assignees: type of family units**

Families are the most important type and the elderly who live alone are growing.

Assignees: distribution by country
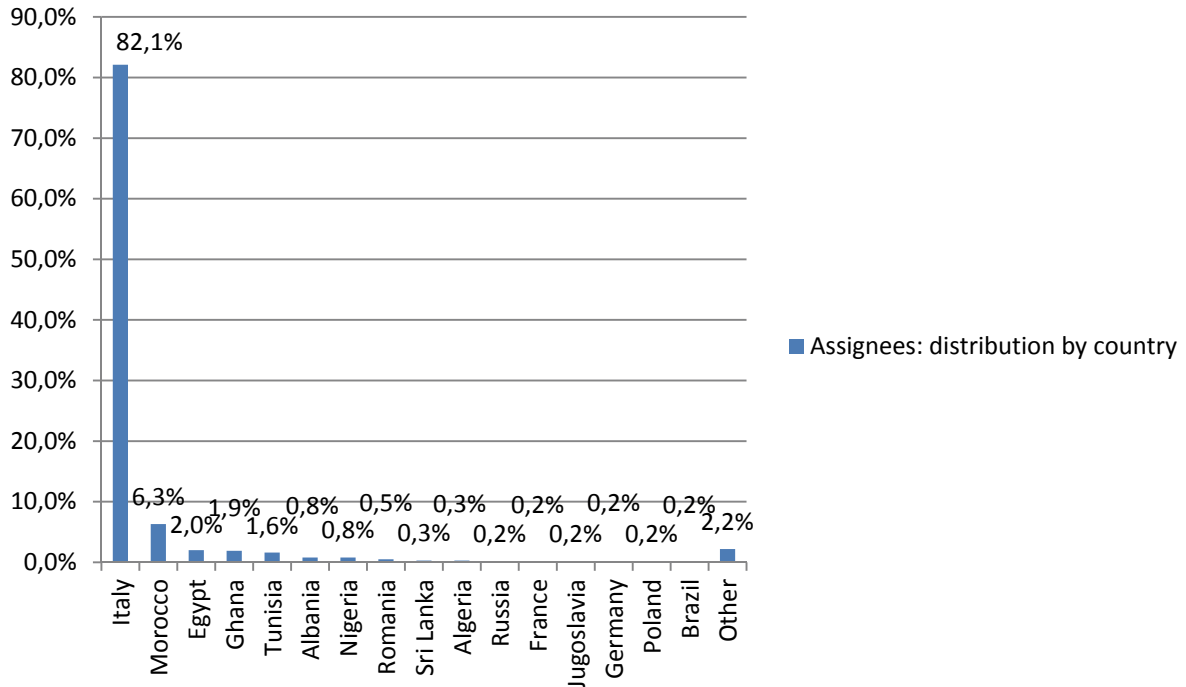
Figure 16: **Composition of ACER Reggio Emilia assignees: distribution by country**

The social-housing stock of the Region Emilia Romagna is characterized by an EPgl (Energy Performance Index) range of 270 e 130 kWh/m² year.

2.4 Slovenia

2.4.1 Multi-family building stock

In Slovenia there are slightly above 25.000 of multi-family buildings (MFB) with over 325,000 flats and 16.8 million of m² of useful floor area. MFB represent only 5% of all buildings, but contain 38% of all dwellings in Slovenia and 25% of useful floor area in residential sector.

The intensive construction of MFB started after 1945 and reached the pick in the period from early 60-ties to the late 70-ties of the 20th century, so approx. 51% of existing buildings (per useful floor area) are from that period and altogether 70% of buildings are built before 1980 (subject to major renovation). In the period between 1981 and 2008 the annu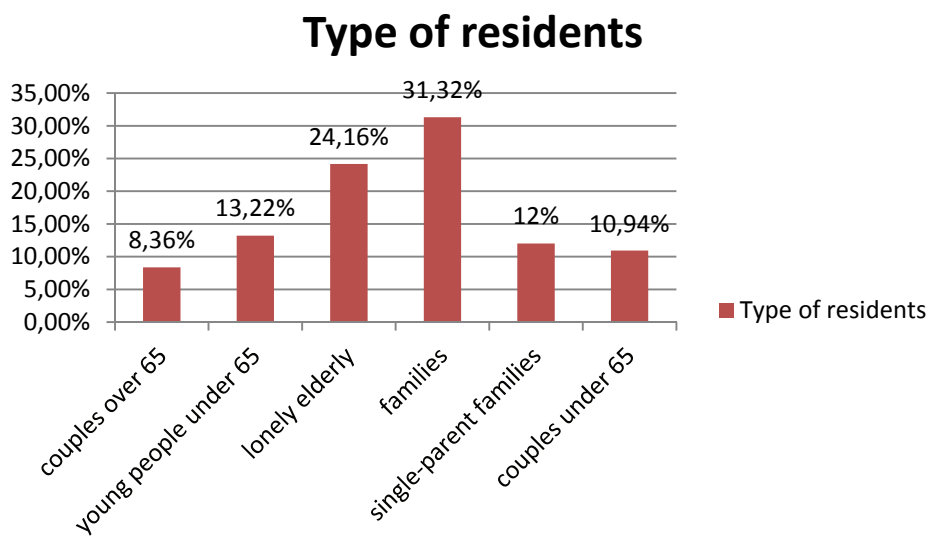al construction of MFB was moderate (roughly almost halved), but the thermal characteristics were subject to permanent improvement and in line with central European building practice and national regulation. After 2009 the Slovenian construction market experienced severe economic crisis, so that the construction of MFB significantly dropped [SI 1] to only 5% (or approx. 10,000 m² of useful floor are per year) of the annual construction in the years before the crisis (Figure 17). In 2015 and 2016 the market of MFB slowly started to recover [SI 2], but even in recent years only 82 MFB (with 340 flats on 29,740 m² of useful floor area) were constructed in 2016 (96 MFB with 355 flats on 32,157 m² of useful floor area in 2015), i.e. the annual construction of MFB in Slovenia is still around 15% of the before crisis activity.
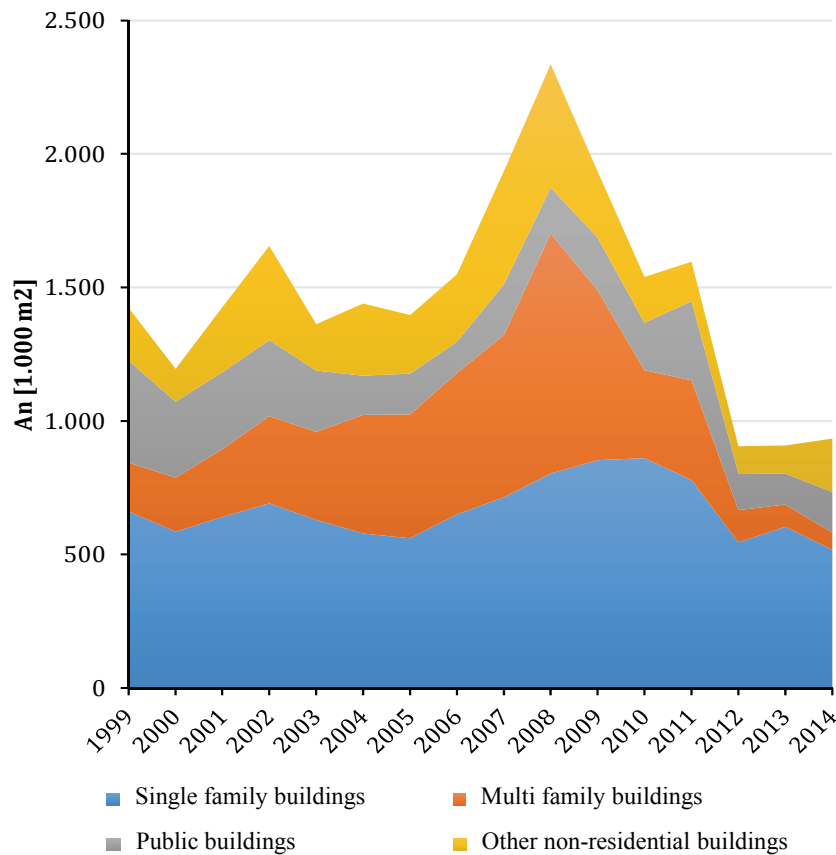
Figure 17:   Annual construction of buildings per building type (Source: SURS, Slovenia)

The above framework (very low rate of construction of new MFB in the period of economic crisis and the surplus of unsold apartments on the real-estate market from pre-crisis period) negatively influenced the expectations from early multi-family NZEBs. As very few MFB were constructed after 2009, also very few multi-family NZEBs were built in Slovenia. Therefore the stakeholders could not get sufficient experiences with large residential NZEB buildings. (In single family buildings the situation was vice versa, due to vivid construction of passive houses, supported by incentives). The end-users, i.e. the end-users of self-owned flats as wells as the tenants in social housing, are still lacking the experiences from living in NZEB apartment buildings.

Slovenia has experienced major (ownership) changes in the field of housing in the 90-ties. The privatisation of the former socially owned flats in Slovenia has been extensive. The ratio between individually owned flats and flats for rent prior to the privatisation of flats was 66.9% to 33.1%, and after the privatisation was completed the ratio was 88% to 12% in favour of individually owned flats. According to Census 2002 (SURS) 92,5% of all flats in Slovenia is owned by private owners, these can be used by the owner or privately rented out. Among the rest 7,5% of all flats the so called "housing organizations" play an important role.

Since 90-ties the key actors in the area of social housing supply in Slovenia are municipalities and non-profit housing organisations. According to the Housing Act, it is the duty of municipalities to build social flats and allocate them for renting. Non-profit housing organisations – legal persons established with the aim of ensuring the public interest in the field of housing - acquire and let non-profit flats out for rent.

The classification of flats for rent in Slovenia is somewhat specific. The Housing Act distinguishes between flats that can be rented freely at market prices, non-profit flats which are part of the instruments of social policy in the field of housing and for which the rent is regulated by statute, and social flats for the low-income population. There is no difference in the quality and the location between non-profit and social flats since uniform housing-construction standards are in force in Slovenia.

In addition to that the latest (2015) national housing programme [SI 3] amended the role of Housing fund of Republic of Slovenia (SSRS) with provision of rental housing, so that by the year 2020 60% of SSRS budget will be dedicated to building of new MFB for renting while SSRS will take over the task of a housing organisation. This role leads to the need for NZEB performance and optimization of costs. SSRS has also committed to meet advanced energy performance and sustainable building standards.

2.4.2   End-users

To understand the specific of Slovenian end-users in MFB it is important to stress that the mobility rate [SI 3, 4] of Slovenian population (moving to another apartment / change the address) is among lowest in Europe (6,2% in 2010). The mobility rate was even lower before 2000, however younger generations are more flexible and are slightly changing the habits). I.e., Slovenians rarely decide to buy or rent an apartment, and thus sharing the information and convincing them on benefits of living in NZEB it is very important.

A large national survey on energy efficiency in households REUS (2017) [SI 5] has been done periodically in Slovenia and tends to reflect the habits of population and households regarding energy efficiency. Some findings may be interesting for CONZEBs projects. REUS 2017 demonstrated that the end-users in households can be distributed in three groups: active (38%), sceptical (39%) and passive (23%) end-users. Active end-users are environmentally conscious and reflected in their decisions as well as in high energy efficient performance (potential clients for future living in NZEBs), while sceptical end-users are informed but have not (yet) accepted the environmental and energy efficient habits and they are lacking the proper motives for the next steps towards energy efficient performance (mostly families with a bit lower income, they are however important target group for CONZEBs information activities regarding living NZEBs). Passive end-users are neither energy

efficient in their habits nor they believe in environmentally conscious performance or act like that (mostly high income families, potential to be informed on benefits of living in new NZEBs).

REUS 2017 survey also showed the trends in end-users habits that could be relevant when promoting NZEBs: for example almost 7% of end-users keep the windows slightly open throughout the day. 25% of end-users has indoor temperature 22 $^{\circ}$C or more. Ventilation with heat recovery is slowly growing technology but it is still used in only 2% of Slovenian households. Cooling is fast growing in housing so that 19% of useful floor areas in residential buildings were air-conditioned in 2017 (15% in 2015). One can assume based on that findings that the indoor comfort is very important for the users, and that on the other hand may be the opportunity for promoting NZEBs.

3. Methodology of survey

3.1 Common methodology

3.1.1 Scope and target

To perform a survey of end-users' attitude to living in NZEBs a questionnaire was developed aiming at current and potential future users of NZEBs. The questionnaire has the list of common questions to be preferably used in all participating countries and an additional set of country specific questions that reflect the national situation of living in early NZEBs.

The aim of the questionnaire was to learn about the opinion of end-users in existing and future multi-family NZEBs regarding:

- ⌂ their expectation and experience with living in NZEBs,
- ⌂ their potential doubts and fears ,
- ⌂ the used technologies,
- ⌂ the quality of life in such buildings,
- ⌂ the relative impact of NZEBs on the real-estate value.

Apart from topics like low energy consumption, increased share of RES and less emissions and costs, the interviews with end-users also covered other co-benefits of living in NZEBs that are relevant to sustainable building and the real-estate sector. Possible drawbacks or challenges in connection with living in NZEBs were considered as well. The participation in the interviews for end-users was voluntary and the interview results were anonymised.

The common questionnaire is composed of two parts, where

![CoNZEBs logo]
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754046 CoNZEBs
D4.1: Common report on interviews with
end-users in NZEBs
29

⌂ the first part is intended for people who already live in NZEBs and

⌂ the second part is intended for people who do not yet live in NZEBs.

At the very beginning, a single question with which respondent defines whether he or she currently lives in NZEB or not, guides respondent to the corresponding part of the questionnaire.

In both parts of the questionnaire there are different types of questions:

⌂ questions with multiple choices,

⌂ questions with linear scale from 1 to 5,

⌂ questions with checkboxes,

⌂ questions with paragraph answers.

In the first part of the questionnaire the aim is to find out how much do respondents know about NZEBs and where did they get the information regarding NZEBs. Furthermore, questions are related to respondents' priorities as an apartment's user, comparison of maintenance costs between NZEBs and ordinary multi-family houses, technologies which characterize NZEBs, decision triggers for living in NZEBs and respondents' concerns and open questions about living in NZEBs and other high energy efficient building. In the last questions of part 1, the questionnaire gathers personal information about respondents – their age group, in which type of building do they live, the condition of the building in which they live (renovation status) and if they are considering moving in a new apartment in the period of the next 5 years.

The second part of the questionnaire has similar questions, the main difference is the question regarding renewable energy sources that respondents use in their buildings. At the end the respondents are asked to provide the data on their age group and on the current living conditions (i.e. energy quality of their dwelling), about their future plans on eventual moving, their knowledge about NZEBs and priorities connected with NZEBs.

3.1.2   Common part of the questionnaire

The common part of the questionnaire addressed the following main questions

⌂ Do you know what an NZEB (Nearly Zero Energy Building) is?

⌂ Where did you get the information about the NZEB (Nearly Zero Energy Buildings) and how good (useful, understandable) this information was for you?

⌂ What is important for you as an apartment user?

⌂ What do you think which technologies characterize most NZEBs?

⌂ What would be/were your decision triggers for living in an NZEB?

- ⌂ Age group of the interviewed end-user
- ⌂ In which type of building do you currently live?
- ⌂ Was your building recently energy renovated?
- ⌂ Are you considering moving in a new apartment within the period of the next 5 years?
- ⌂ Which type of renewable energy sources do you use?
- ⌂ Do you have any other concerns/doubts regarding living in high energy efficient buildings?

Full questionnaires are presented in annexes:

- ⌂ Common questionnaire in English
- ⌂ Questionnaires for each participating country (in national languages).
- ⌂ Adaptation of questionnaire for the EU project CoNZEBS website (google forms).

3.2   National methodologies

3.2.1   Germany

For the German version of the questionnaire the following changes to the common questionnaire have been made:

- ⌂ Part 1:
  - ⌂ At the question "What is important for you as an apartment user?" the answer possibility "healthy building materials used for finishing, floor covering, paints" was translated to "non-hazardous interior materials (Nicht-gesundheitsgefährdende Innenmaterialien)", which has a slightly more negative undertone than the original answer.
- ⌂ Part 2:
  - ⌂ The question "What do you think which technologies characterize most NZEBs?" in the German version does not include the answering-possibility "High thickness of insulation".
  - ⌂ The question "Which type of renewable energy sources do you use?" in the German version does not allow for the answer "Green energy".

The questionnaire was distributed by ABG Frankfurt using different ways. First, they inserted the questionnaire as letters in the mailboxes of end-users of some of the ABG owned houses. Second, they displayed the questionnaire in an energy consulting center that is open to everybody. Third, they distributed it after some of their events for architects, (local) politicians and other interested people, who are of course also end-users of residential buildings. Therefore not all questionnaire answers are from tenants of ABG. The collected

anonymous questionnaire answers were then analysed by Fraunhofer IBP. The survey period was between mid-February and end of March 2018.

A total of 46 respondents completed the German questionnaire, of which 36 currently live in an NZEB and 10 which are potential future users of NZEBs. The total number of 46 questionnaire respondents is only slightly lower than the aspired 50 interviewees and allows for good insights on the topic.

3.2.2   Denmark

The Danish questionnaire was significantly modified, as it was targeted residents in social housing companies and solely residents in NZEB multi-family houses. A translation of the Danish questionnaire is given in the Annex, section **Fehler! Verweisquelle konnte nicht gefunden werden.**.

Interviews were deemed not possible to carry out within the resources of the project compared with the narrow knowledge that can be extracted from a limited number of interviews. The Danish CoNZEBs survey was conducted in the Copenhagen area using the online survey tool 'Relationvice' and the survey was conducted by the communication department of Danish Social Housing (BL). Questionnaires were circulated to the social housing company Lejerbo Coenhagen/Bo-Vita.

The standard questions were modified according to the table below. Here, red text marks indicate new questions and strike-out text indicates deleted questions. Questions that are not mentioned in Figure 18 have not been changed.

What is important for you as an apartment user? (5 – the most important to 1 – the least important)	Answers
	Low energy consumption
	Low energy costs
	Low carbon emissions
	~~Use of renewables instead of fossil fuels~~
	Good thermal comfort
	Always fresh air in the apartment
	Environmental friendly
	~~Healthy materials used for finishing, floor covering, paints~~
	~~Information and communications technology - ICT control of devices (temperature, shading, lights...)~~
	~~E-mobility (use or possibility to use electric vehicle)~~
	~~Good access to daylight /day lit rooms~~
	Low rents (tenant) / Low investment costs (owner)
	~~Low management cost / low maintenance cost~~
~~In your opinion, do you have more maintenance costs in high energy efficient building comparing to ordinary multi-family house building?~~	
~~Which technologies that characterize high energy efficient building do you use in your building?~~	
~~Which type of renewable energy sources do you use?~~	
~~What were your decision triggers for moving in high energy efficient building? (5 – the most important to 1 – the least important)~~	

Figure 18: **Deleted (strike out) and added questions (red) compared to the standard questionnaire**

In addition to the changes above, some questions were added to the Danish questionnaire as indicated in Figure 19.

General questions	Do you know that you live in a NZEB?
	How happy are you in general for living in your NZEB?
	If moving, would you prefer a NZEB again?
Experiences with living in a NZEB 5 = very good; 4 = good; 3 = neutral; 2 = poor; 1 = very poor	How is living comfort of your NZEB building
	How is living cost of your NZEB building
	How is indoor climate in your NZEB building
	How is the indoor air in your NZEB building
Knowledge about NZEB solutions	Do you know if your NZEB have PV
	Do you know if your NZEB have mechanical ventilation
	Do you know if your NZEB have LED lighting
	Do you know if your NZEB have low energy refrigerators
	Do you know if your NZEB have intelligent energy control
Other issues	How often do you separate waste?
	How environmental conscious do you consider yourself?
	Do you think about how you use energy and water?
	How often do you open the windows?
	For how long time do you leave the windows open?

Figure 19:   **Additional questions in the Danish questionnaire**

3.2.3   Italy

Questionnaires for non-NZEBs users were distributed either by email, by hand or by Google Form, a system which allows to create online surveys and to easily collect data in a pre-compiled worksheet. They were mainly completed by people living in the Centre or South of Italy. The time period of collection was 3 months. 81 respondents completed part 1 of the questionnaire, which is dedicated to non-NZEB users; 70 of them were collected by ENEA and 11 by ACER.

50 Questionnaires for NZEB users were distributed and collected by ACER from February to May. The interviews were conducted by ACER Reggio Emilia organizing condominium meetings in which all the tenants of the selected buildings were invited to respond to the questionnaires supported by a company technician. The selected buildings are listed as follows:

1. Via Plauto - 69 apartments (part 1)
2. Via Compagnoni / Bergonzi - 8 buildings (part 1)
3. Via Emilia Ospizio - 21 apartments (part 1)
4. Luzzara - 3 buildings (part 2)

The presence among the respondents of many elderly or foreign citizens made it necessary for a technician to explain the meaning of some questions and answers.

Four additional questions were included in the section dedicated to NZEBs users. The four questions concerned:

1. Social relationships between tenants living in a NZEB building or traditional condominiums
2. The perception of security
3. The technological knowledge necessary to use a NZEB building
4. The perception of the causes that hinder the greater use of renewable sources instead of fossil sources.

3.2.4   Slovenia

Together, 97 respondents completed the questionnaire. The answers were actively collected in the period between February and May. The interviews were done at the occasion of events joining the stakeholders from multi-family buildings (end-users, housing companies, flat owners' and tenants' representatives, housing managers etc.).

Questionnaires were delivered via email to the end-users of NZEB situated in Ljubljana (in ownership of Housing fund of the Republic of Slovenia – SSRS), with the help of SSRS and to end-users of ECO Silver House, also a NZEB. From both NZEBs we managed to get 8 completed questionnaires.

Questionnaires were also performed on participants at group of tenants of SSRS, owners of flats in NZEB, the biggest fair in Slovenia (DOM) and at the caretakers' professional training. Obviously the focus was only on people who live in multi-family houses. So in this case the interviews were done in person, by giving them printed questionnaires and guiding, helping them answering the questions and writing comprehensive answers.

It can be concluded that it was easier to get respondents by delivering the questionnaire in person. In this case, also the answers were more comprehensive and more useful while writing the report. On the other hand, it was more difficult to get completed questionnaires via email, since people tend to decline the cooperation in such projects online. However, we believe that the gained answers give the quality overview of people's knowledge and opinion about NZEBs.

4. Results and analysis

In this chapter all the collected answers to questionnaire questions are analysed and discussed for each participating partner. The gathered answers are presented with corresponding charts, taking into account different national questions.

4.1 Germany

A total of 46 respondents completed the German questionnaire, of which 36 currently live in an NZEB and the other 10 are potential future users of NZEBs. In the following paragraphs each question is analysed separately and presented together with a corresponding chart.

4.1.1 Questionnaire part 1 – potential future users of NZEBs

This part of the questionnaire has been designed for potential future users of NZEBs. Therefore the questions asked differ from those asked to the end-users currently living in an NZEB (see chapter 4.1.1). Ten potential future users of NZEBs answered this part of the questionnaire.

The first question ("Do you know what an NZEB (Nearly Zero Energy Building) is?") was designed to check whether the respondent thinks he or she knows what an NZEB is. Surprisingly (because Germany has not yet a legal national detailed definition of the NZEB), 70% said they know at least partly what an NZEB is, while 30% admitted that they don't know really much about it (see Figure 20).
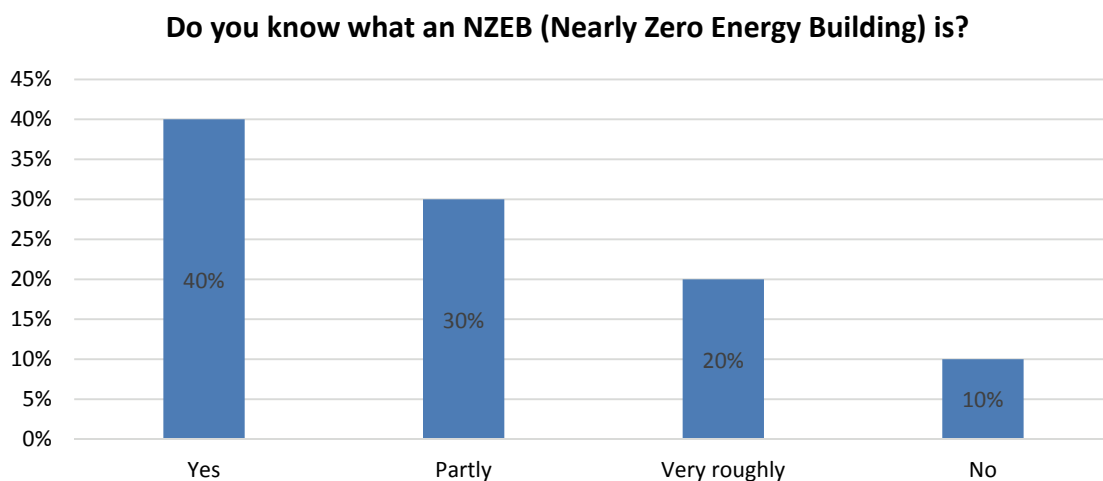

Figure 20: Questionnaire results for the question "Do you know what NZEB (Nearly Zero Energy Building) is?" QP1 (N=10, Germany).

Source of information and its' quality (1-no information, 2- weak, 3-good, 4-very good, 5-excellent)

Figure 22: Question: "Where did you get the information about NZEB (Nearly Zero-Energy Buildings) and how good (useful, understandable) this information was for you?" QP1 (N=10, Germany)

Source of information and its' quality (1-no information, 2- weak, 3-good, 4-very good, 5-excellent)
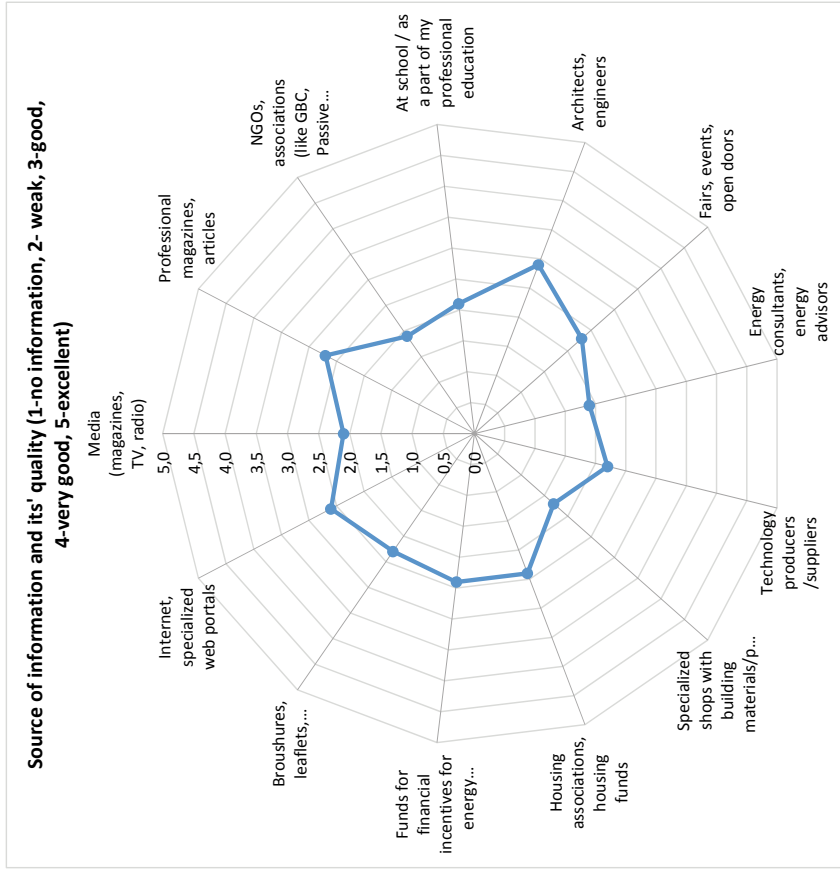

Figure 21: Mean values: "Where did you get the information about NZEB (Nearly Zero-Energy Buildings) and how good (useful, understandable) this information was for you?" QP1 (N=10, Germany)
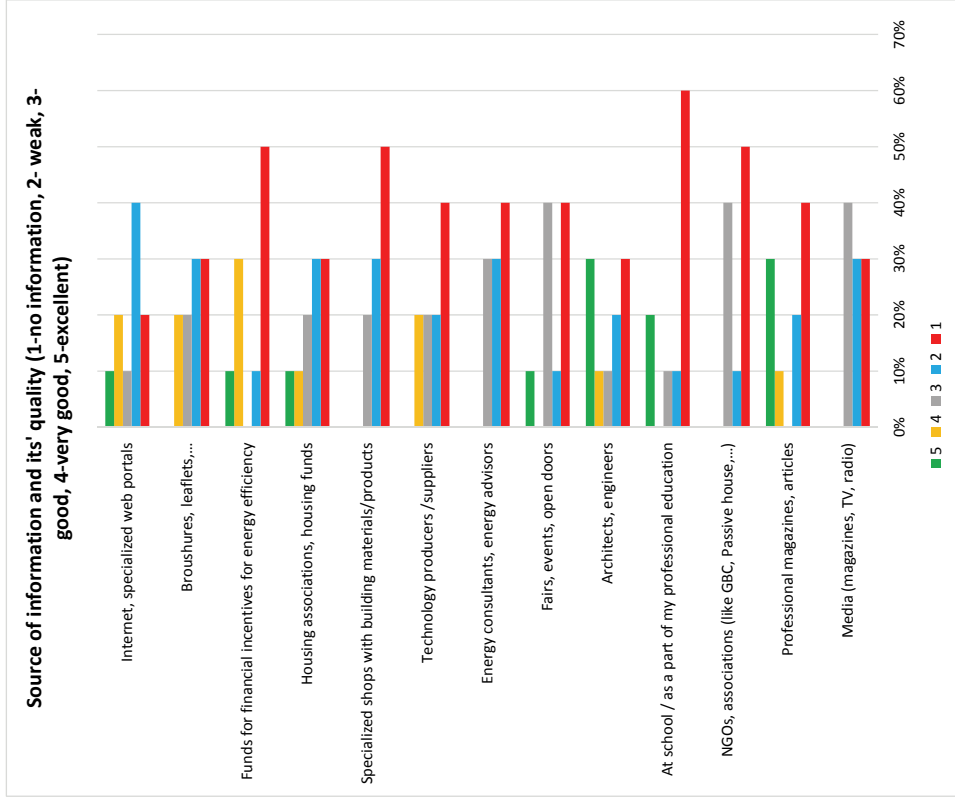
The second question ("Where did you get the information about the NZEB (Nearly Zero-Energy Buildings) and how good (useful, understandable) this information was for you?") wants to shed some light on the information sources potential end-users have to inform themselves about NZEBs. The results are shown in Figure 21 and Figure 22. The outcome is that the potential users trust the most in professional sources like architects and engineers as well as professional magazines.

The third question ("What is important for you as an apartment user?"), whose results are shown in Figure 24 and Figure 25, led to the interesting result that for the respondents daylight, low rents, low management costs, low energy consumption, low energy costs and healthy materials used are equally important. The high importance of healthy building materials is certainly linked to a slightly different translation of the answer. The original answer was "Healthy materials used for finishing, floor covering, paints" the German translation in the questionnaire was "Non-hazardous interior materials (Nicht-gesundheitsgefährdende Innenmaterialien)", which has a more negative undertone than the original answer. Non-hazardous interior materials should be obligatory in any case, that's why the German respondents picked that answer most frequently. The potential users found e-mobility and wooden buildings unimportant.

The fourth questions for the attendees was "In your opinion, do you have more maintenance costs in high energy efficient buildings comparing to ordinary multi-family house buildings?". Since the potential future users have no experience with that topic the answers might be partly based on feelings and rumours.
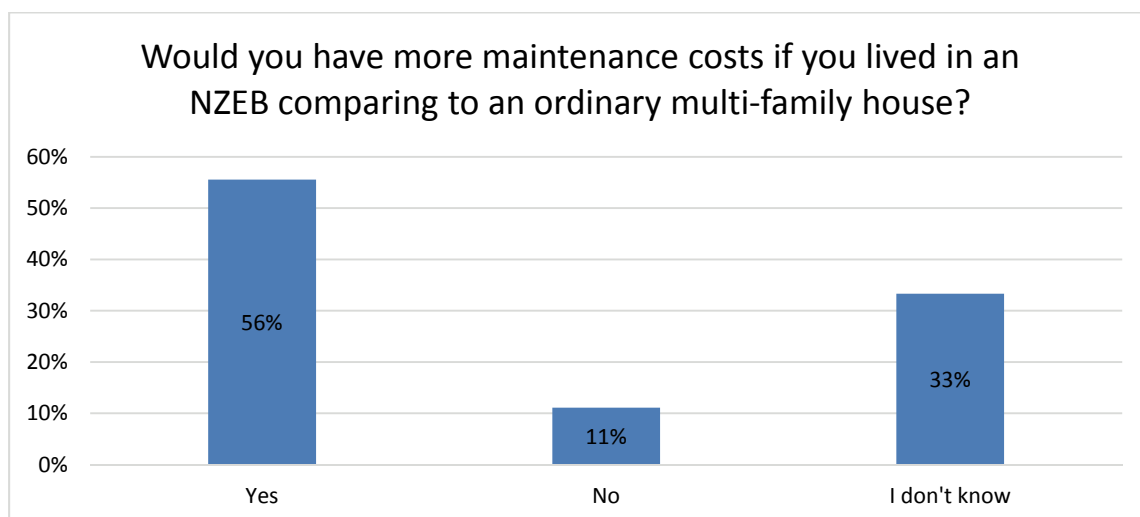

Figure 23:   **Questionnaire results for the question "Would you have more maintenance costs if you lived in an NZEB comparing to an ordinary mulit-familiy house?" QP1 (N=10, Germany)**

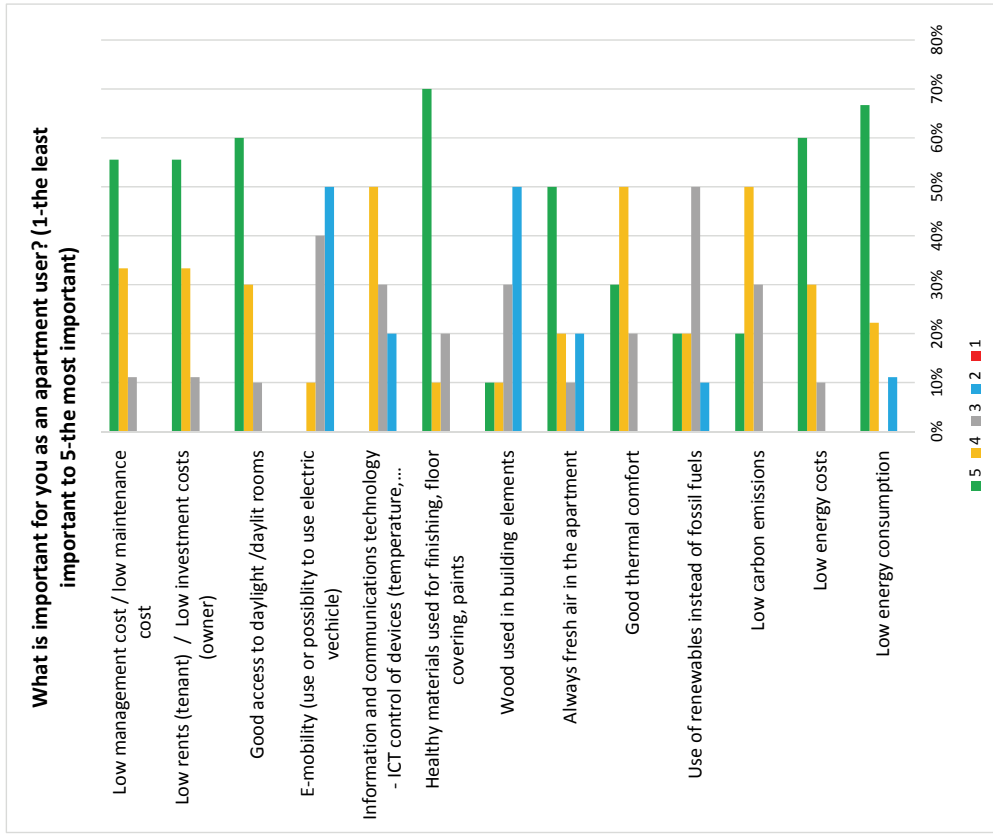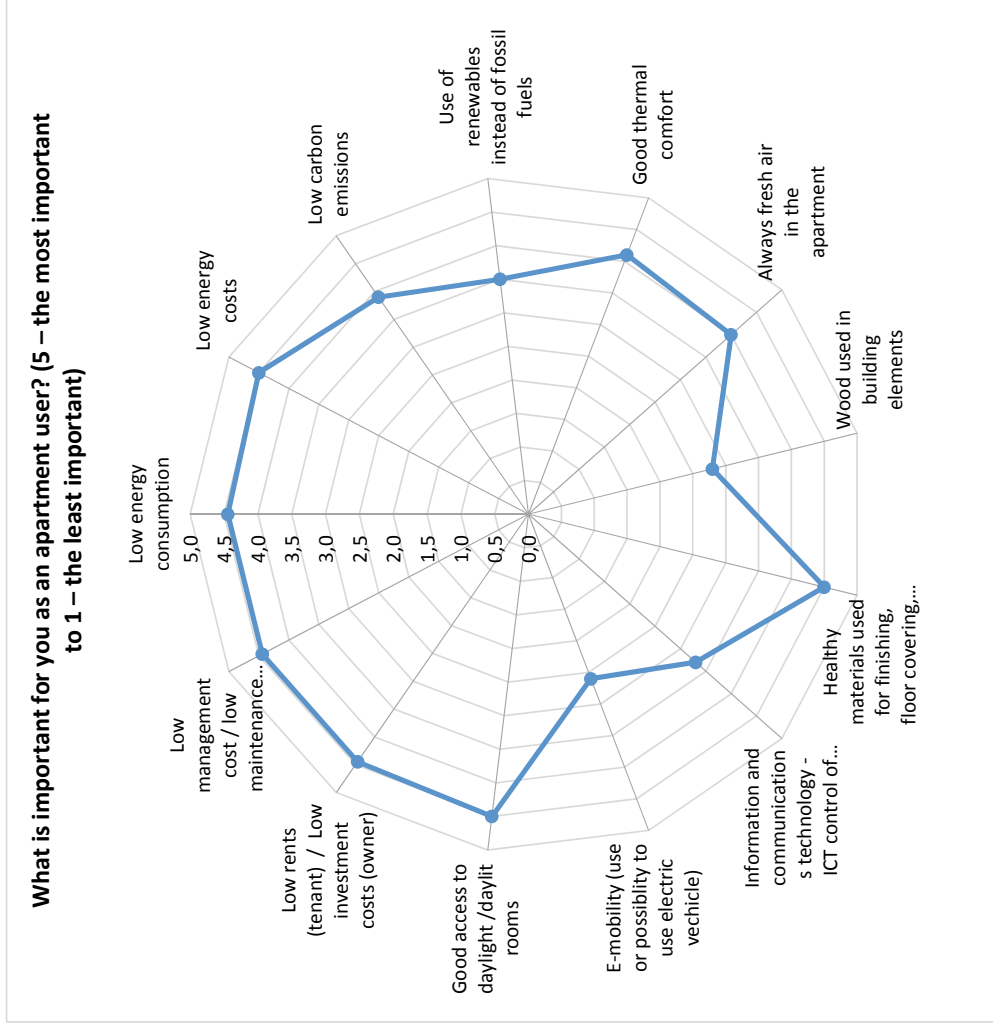**What is important for you as an apartment user? (5 – the most important to 1 – the least important)**

Figure 24: Mean values: "What is important for you as an apartment user?" QP1 (N=10, Germany)

What is important for you as an apartment user? (1-the least important to 5-the most important)

Figure 25: Question: "What is important for you as an apartment user?" QP1 (N=10, Germany)

Unfortunately 56% of the respondents believe that the maintenance costs of NZEBs are higher than those of ordinary multi-family houses. 33% admit that they don't know.

The fifth question for the potential NZEB users was about the technologies that characterise NZEBs. According to the respondents the most important technologies for NZEBs are triple-glazed windows, mechanical ventilation with heat recovery, high thickness of insulation, good airtightness and the use of solar energy (see Figure 26 and Figure 27). As the least important technologies the respondents identified smart technologies and natural insulation materials.

The results of the sixth question ("What would be your decision triggers for living in an NZEB?"), shown in Figure 28 and Figure 29, reveal that the most important triggers on average are low energy costs, good indoor air quality and the location of the building. The least important triggers on average are the neighbours' experiences with NZEBs and automated home appliance.

The seventh question of the questionnaire was an input box where the responding potential future NZEB-users have been asked to share their concerns and questions about living in an NZEB. Four out of 10 of the potential future inhabitants of NZEBs raised questions or expressed concerns about living in NZEBs. One said that he has no concerns if the installed HVAC-systems and controls are durable, simple and efficient. Another participant was uncertain about the combination of wooden construction and low energy buildings because of moisture damages. One concern was about the possibility to lower the heating temperature in the dorm room.

Technologies that characteritze NZEBs (5 – the most important to 1 – the least important)
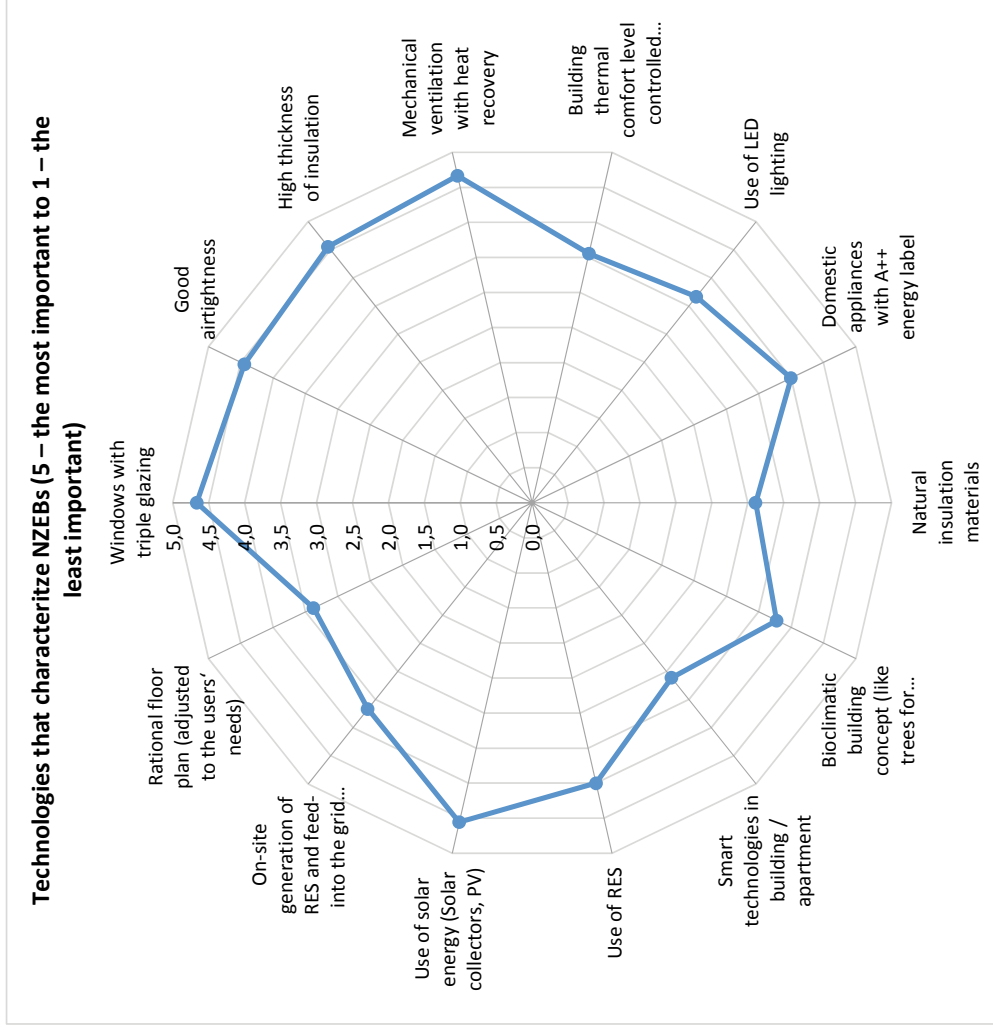
Figure 26: Mean values: What do you think which technologies characterize the most NZEBs?" QP1 (N=10, Germany)

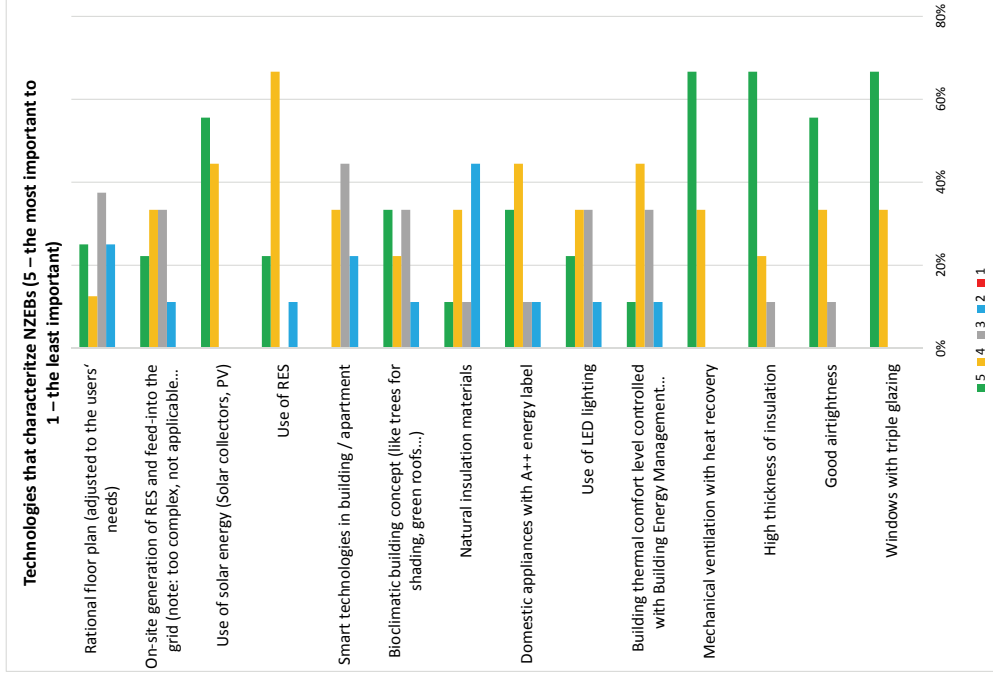**Technologies that characteritze NZEBs (5 – the most important to 1 – the least important)**

Figure 27: Question: "What do you think which technologies characterize the most NZEBs? " QP1 (N=10, Germany)

Decision triggers for living in NZEBs (5 – the most important to 1 – the least important)
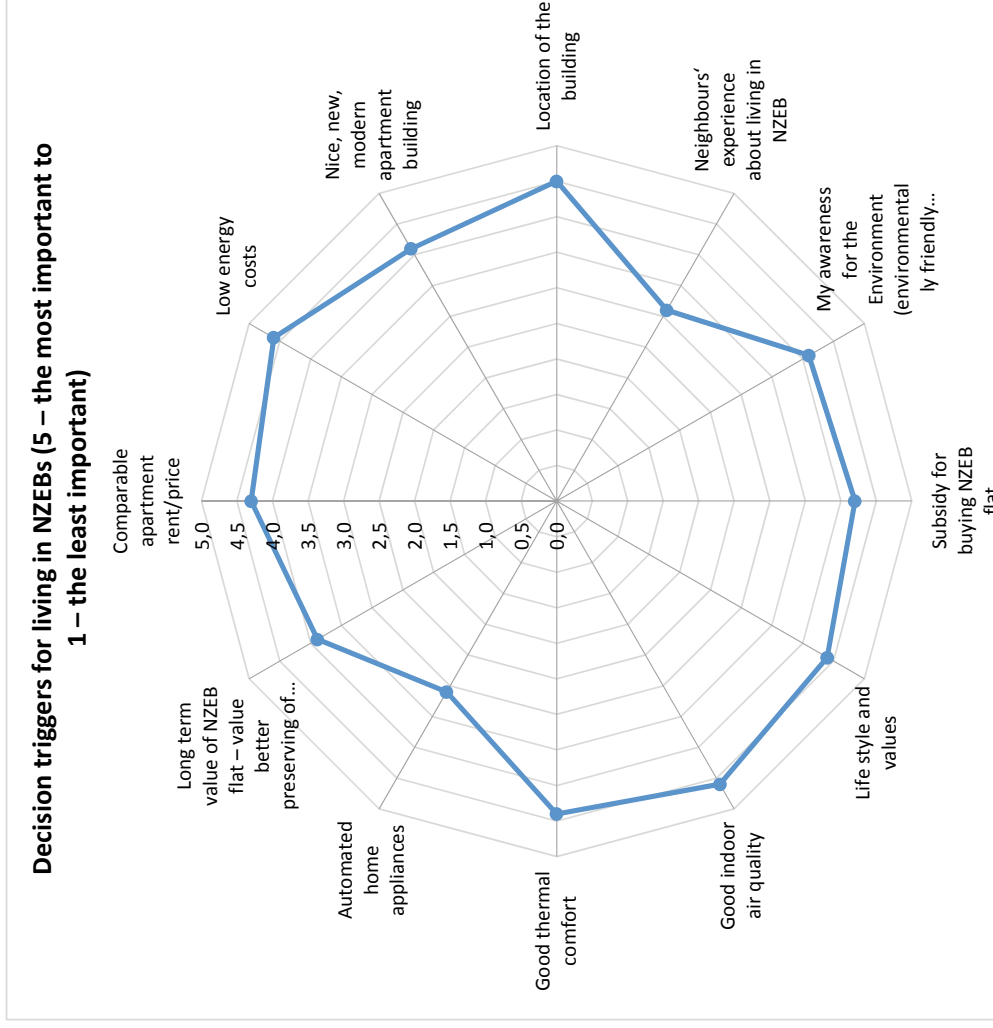
Figure 28: Mean values: What would be your decision triggers for living in an NZEB?" QP1 (N=10, Germany)

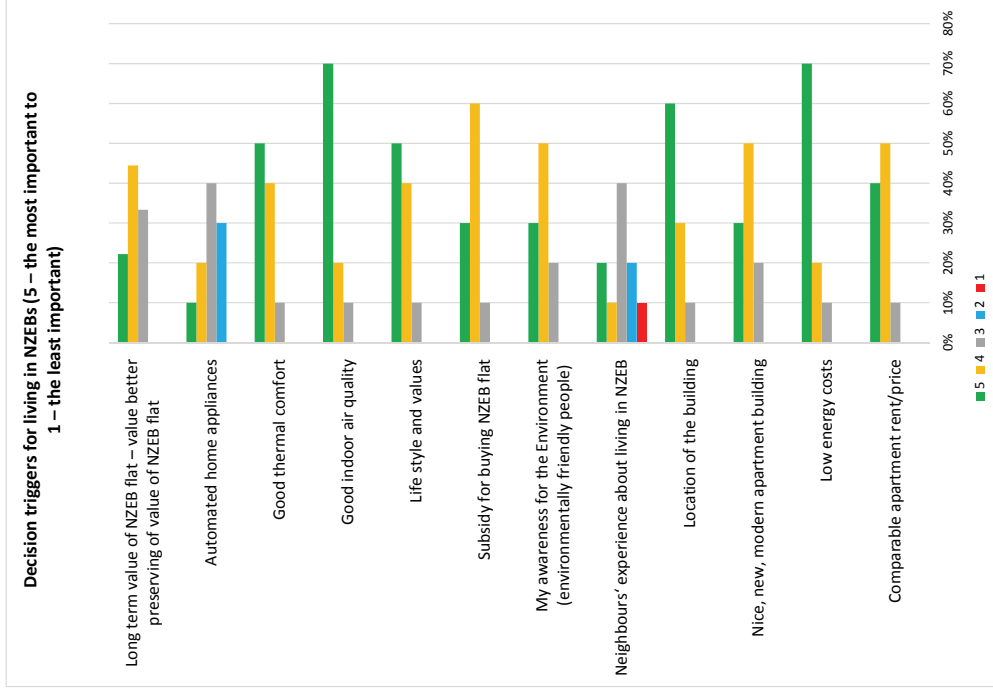**Decision triggers for living in NZEBs (5 – the most important to 1 – the least important)**

Figure 29: Question: "What would be your decision triggers for living in an NZEB?" QP1 (N=10, Germany)

The following four questions are designed to get to know the respondent better. First off, the age group of the interviewed user is asked and the results are shown in Figure 30.
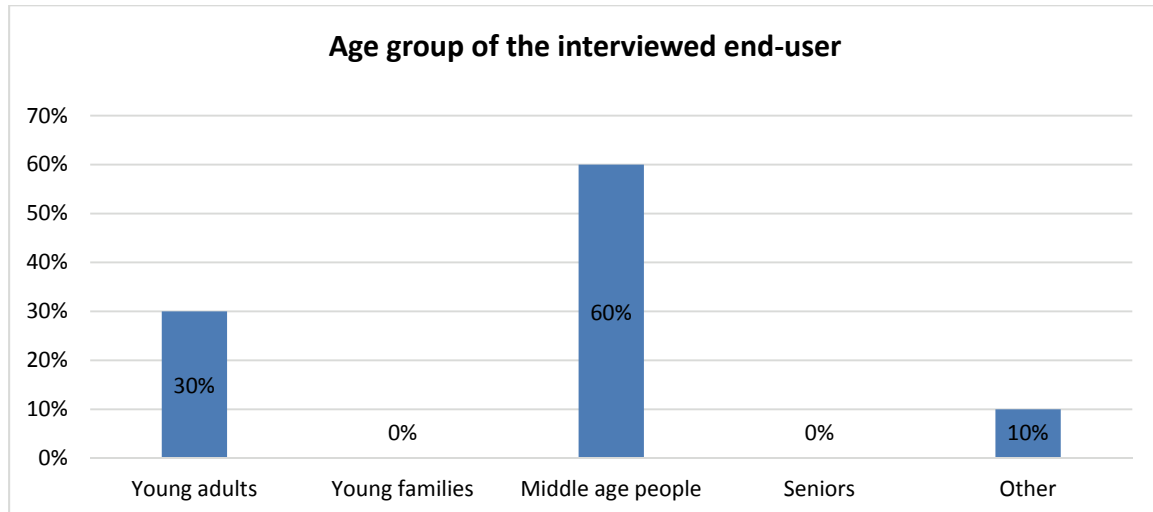
Age group of the interviewed end-user

Young adults	Young families	Middle age people	Seniors	Other
30%	0%	60%	0%	10%

Figure 30: Questionnaire results for the question "Age group of the interviewed end-user" QP1 (N=10, Germany)

To evaluate the current living conditions of the respondents they were asked the question "In which type of building do you currently live?". The answers to that question are shown in Figure 31. Most respondents to part 1 of the questionnaire (60%) live in buildings built before 1980 and none lives in a building built after 2002.

In which type of building do you currently live?

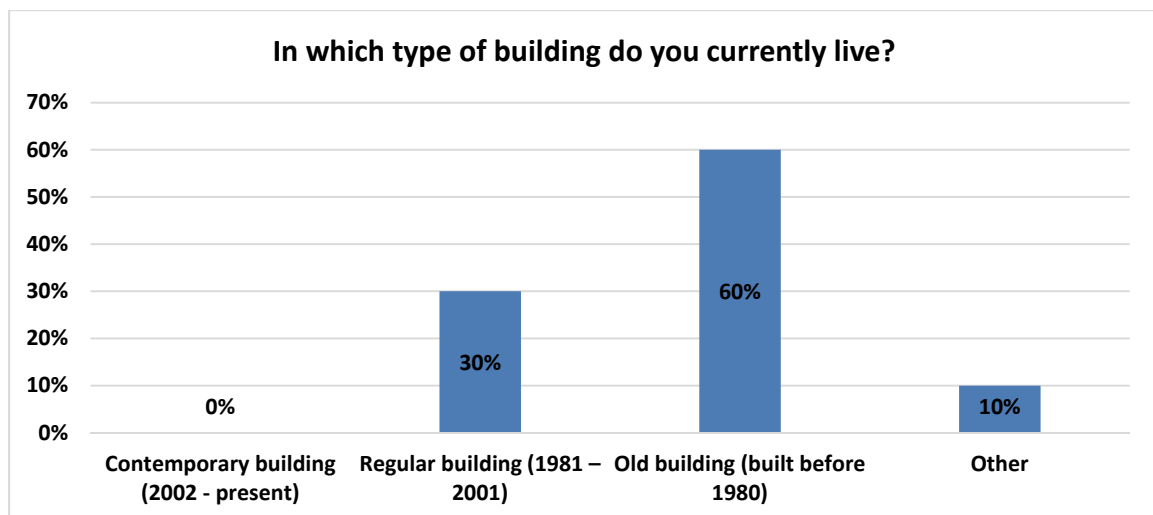| Contemporary building (2002 - present)	Regular building (1981 – 2001)	Old building (built before 1980)	Other
0%	30%	60%	10%

Figure 31: Questionnaire results for the question "In which type of building do you currently live?" QP1 (N=10, Germany)

To further deepen the knowledge of the living conditions of the respondents to the questionnaire they were asked about the renovation status of the building they are living in. The results, shown in Figure 32 indicate that most of them (66%) live in partly energy

renovated buildings. None of the respondents lives in a completely energy renovated building.
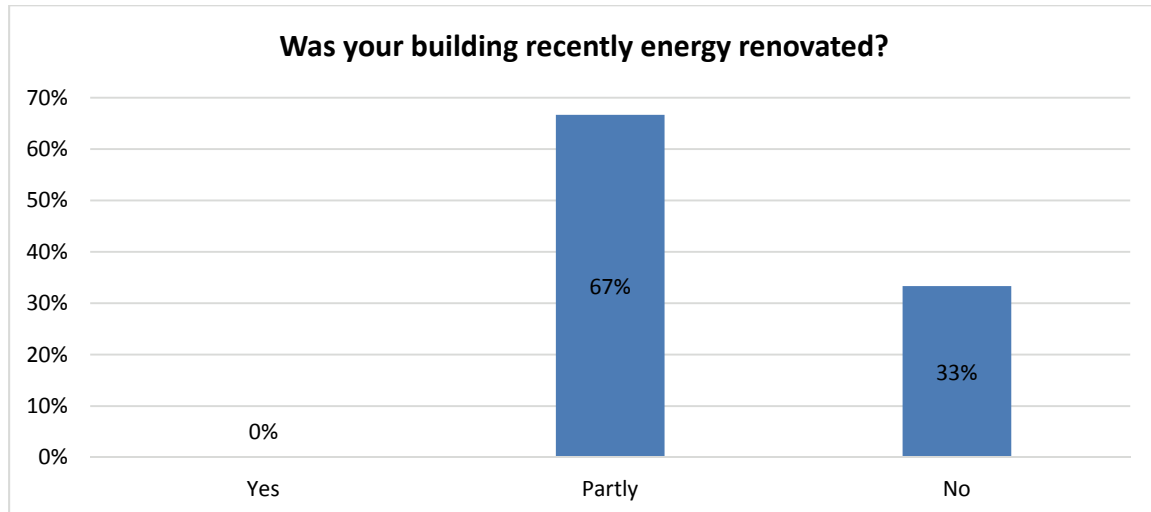
Was your building recently energy renovated?

Figure 32: **Questionnaire results for the question "Was your building recently energy renovated?" QP1 (N=10, Germany)**

The last question to the respondents was whether they consider moving in a new apartment in the next five years. The results, shown in Figure 33, illustrate that half of the respondents consider moving out in the next five years, the other half is not considering this step.

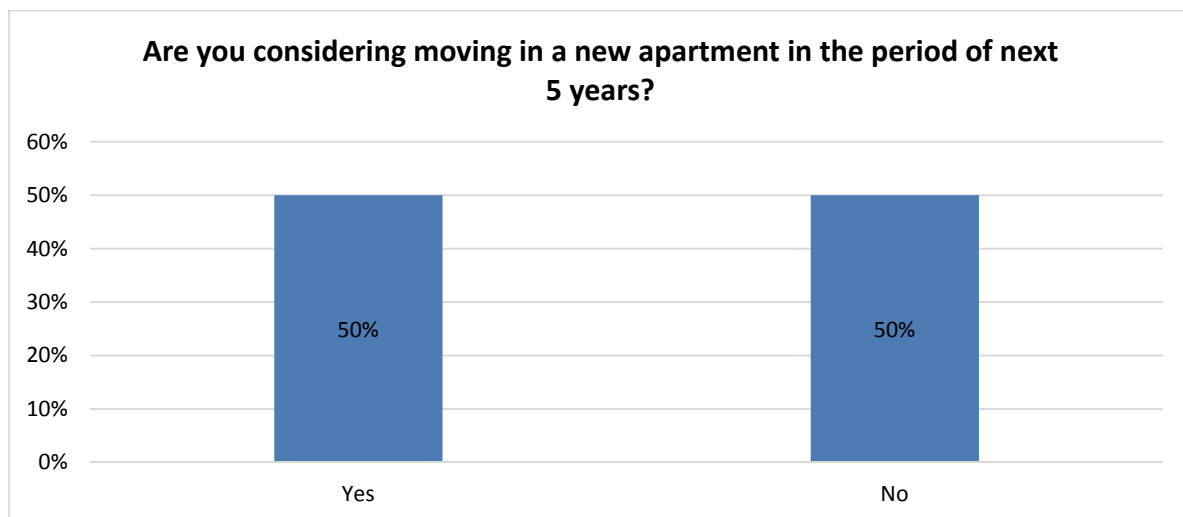**Are you considering moving in a new apartment in the period of next 5 years?**

Figure 33: **Questionnaire results for the question "Are you considering moving in a new apartment in the period of the next five years?" QP1 (N=10, Germany)**

4.1.2   Questionnaire part 2 – end-users of NZEBs

The questionnaire for the end-users currently living in a NZEB(-like building) has been filled by 36 people. The result of the questionnaire therefore offers a brought field of end-user experience with NZEBs and allows for good and reliable results.

The first question for the participants of the questionnaire was "What is important for you as an apartment user?". Figure 34 shows the mean value of the answers, whereby the use of healthy building materials is assessed with the highest importance. The issue with the healthy building material answer has already been explained in chapter 4.1.1. Other very important aspects for the end-users are good access to daylight, low energy consumption and low energy costs. Least important for the end-users are e-mobility and the use of wood. In Figure 35 the percentage frequency of the answers from 5 (most important) to 1 (least important) is shown.

The second question for the participants was "In your opinion, do you have more maintenance costs in high energy efficient buildings comparing to ordinary multi-family house buildings?". Since most of the end-users probably don't know the real costs for maintenance, their answers, shown in Figure 36, might reflect also opinions and assumptions. The results show that most of the end-users have an opinion to the topic, but the no-fraction is leading slightly with 53% compared to 44% answering with yes.

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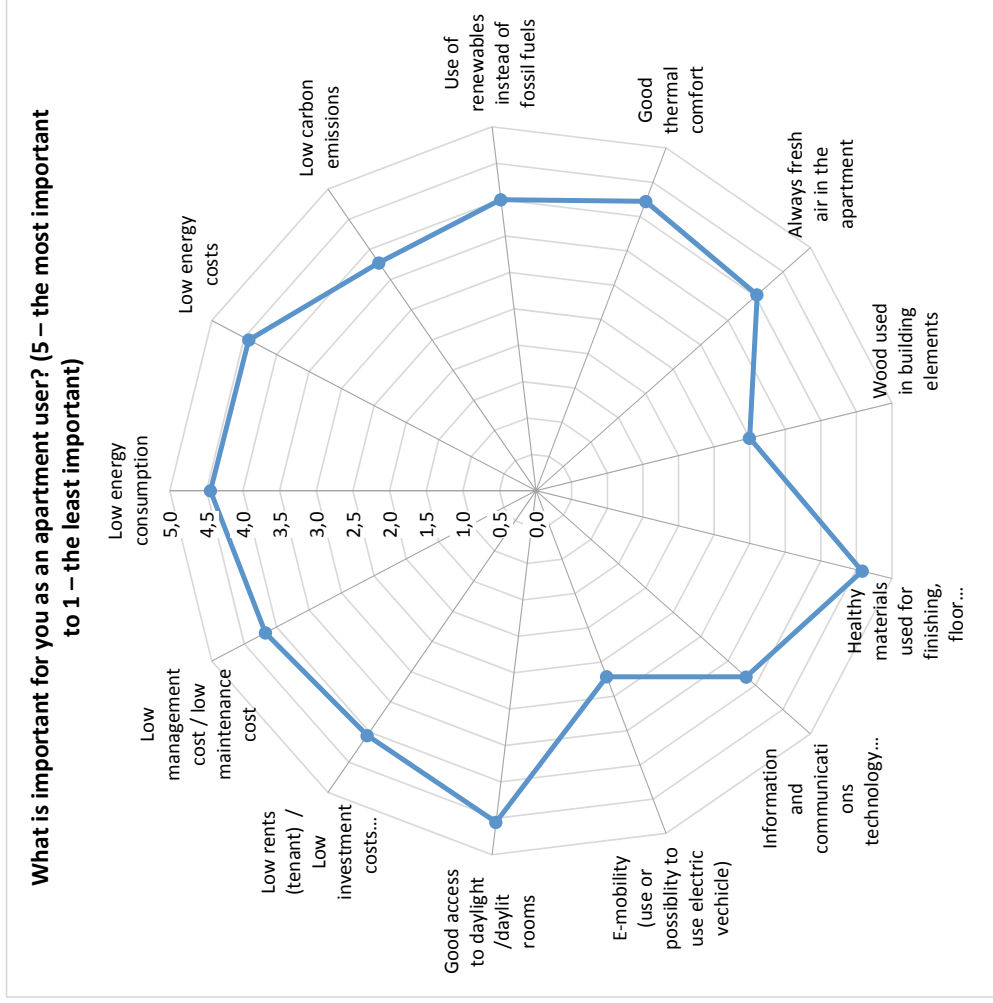**What is important for you as an apartment user? (5 – the most important to 1 – the least important)**

Figure 34: Mean values: "What is important for you as an apartment user?" QP2 (N=36, Germany)

What is important for you as an apartment user? (5 – the most important to 1 – the least important)
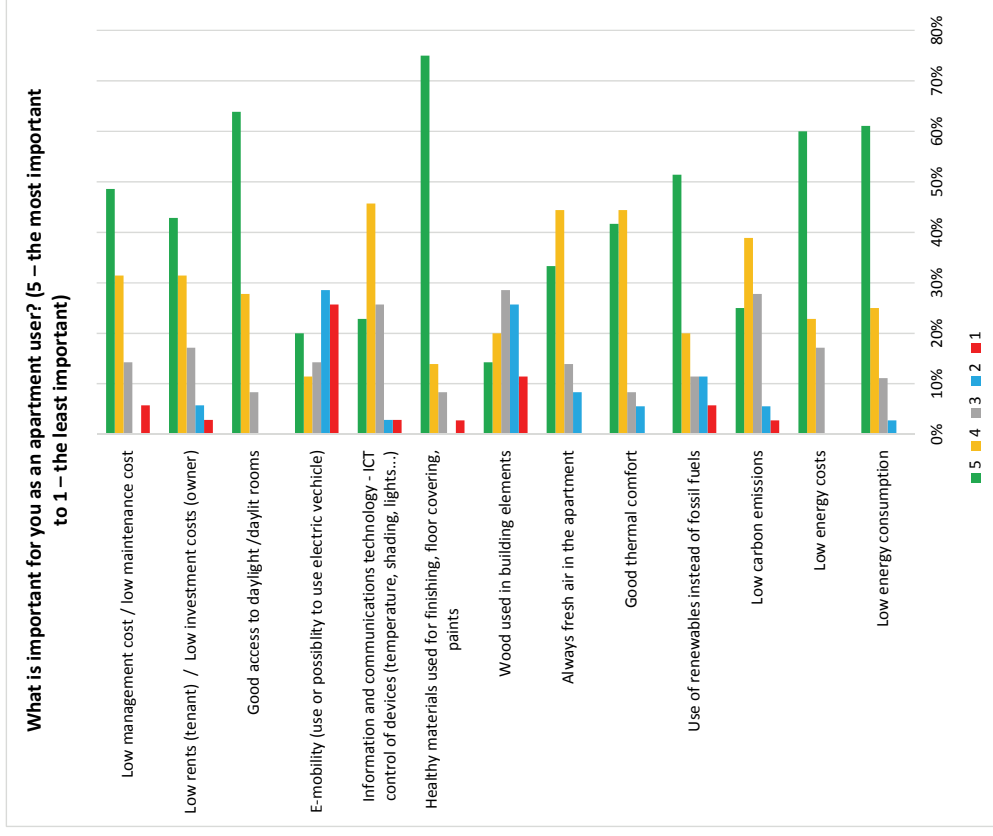
Figure 35: Question: "What is important for you as an apartment user?" QP2 (N=36, Germany)

In your opinion, do you have more mainteinance costs in high energy efficient building comparing to ordinary multi-family house buildings?
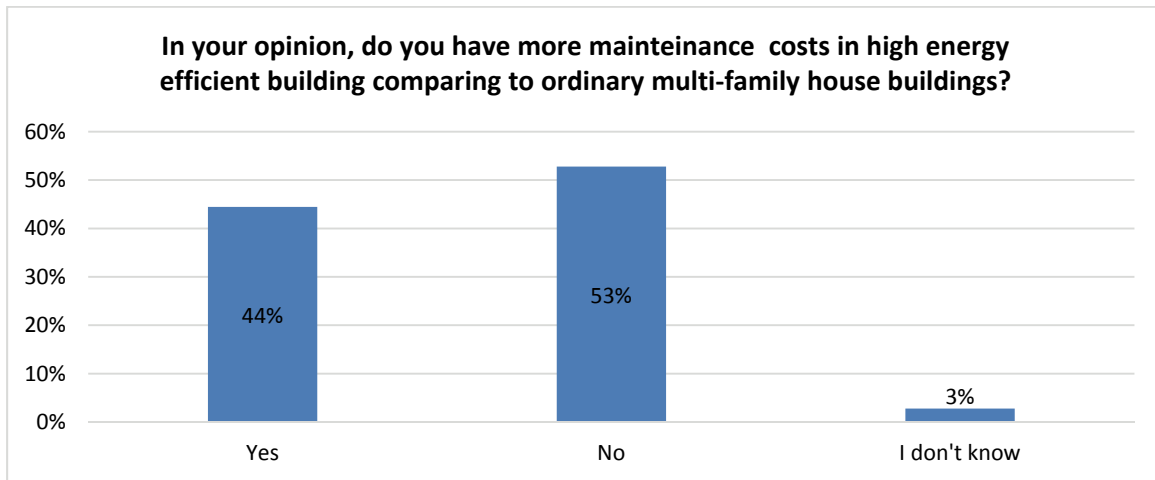
Figure 36: Questionnaire results for the question "In your opinion, do you have more maintenance costs in high energy efficient buildings comparing to ordinary multi-family house buildings?" QP2 (N=36, Germany)

The third question asked was: "Which technologies that characterize high energy efficient buildings do you use in your building?". The results are shown in Figure 37.

Which technologies that characterize high energy efficient buildings do you use in your building?
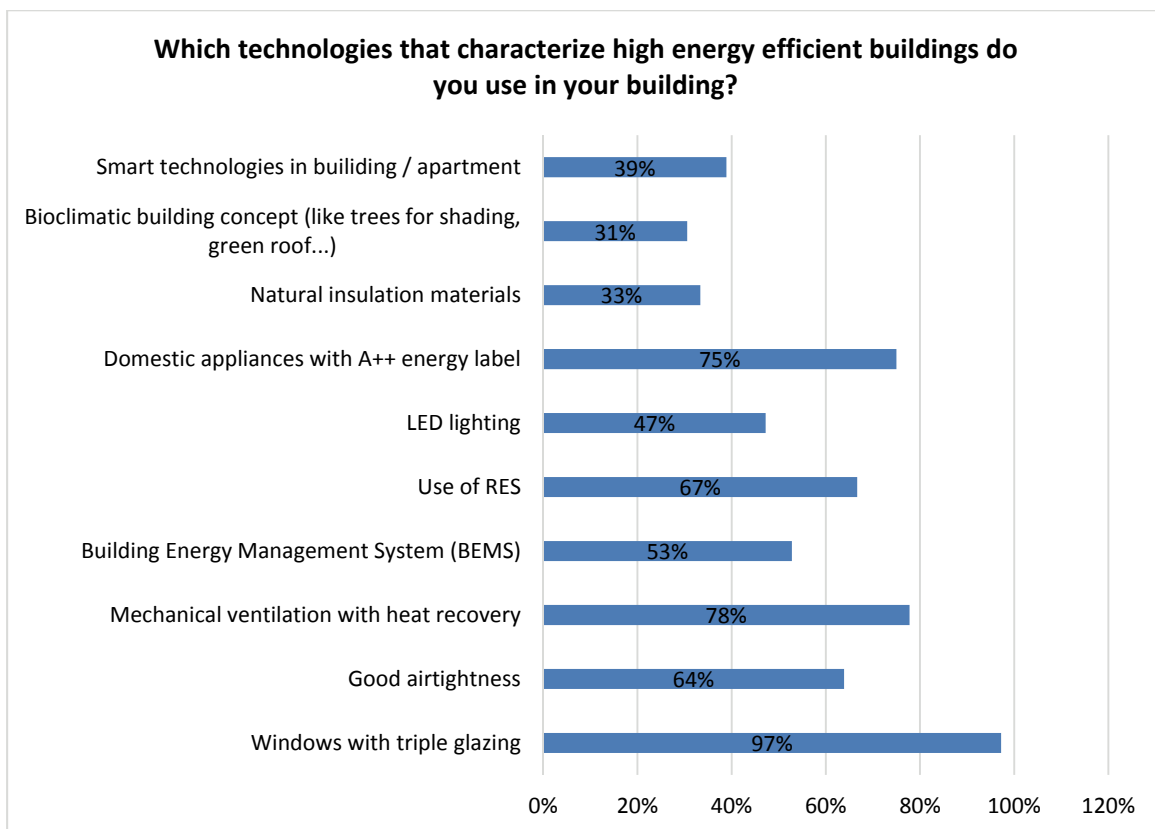
Figure 37: Questionnaire results for the question "Which technologies that characterize high energy efficient buildings do you use in your building?" QP2 (N=36, Germany)

The chart shows that nearly all of the questionnaire participants answered that they live in a building with triple-glazed windows, mechanical ventilation with heat recovery and energy-

efficient domestic appliances. Smart technologies, natural insulation materials and bioclimatic building conceps are the least mentioned technologies.

According to the results of the fourth question ("Which type of renewable energy sources do you use?") , shown in Figure 38, the most used renewable energy source is solar energy (50%), followed by heat pumps with 36 %. Least used is wind power and biomass with only 2% each.
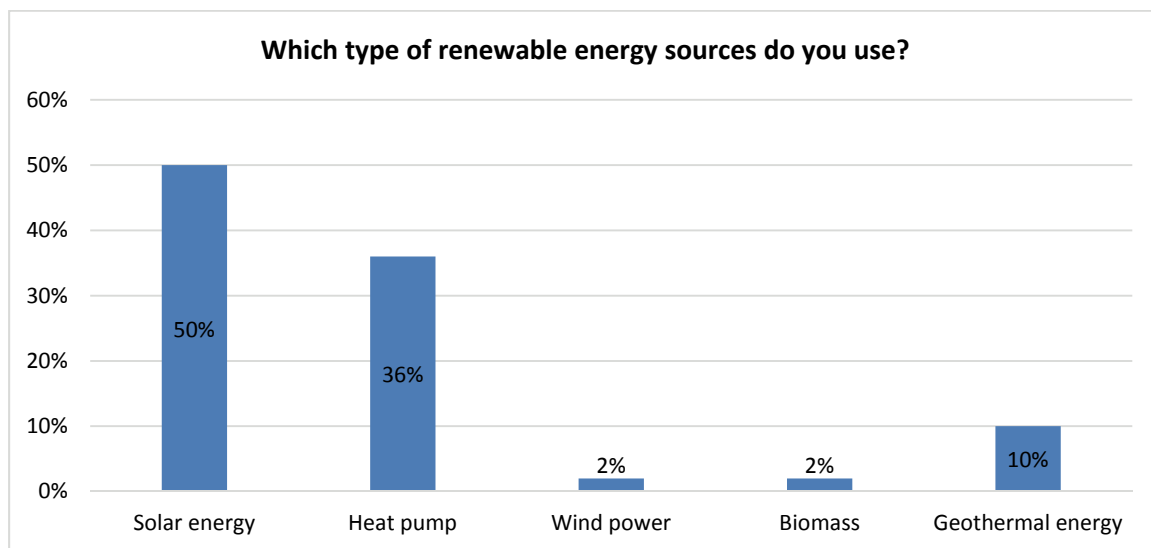

Which type of renewable energy sources do you use?

Figure 38: **Questionnaire results for the question "Which type of renewable energy sources do you use?" QP2 (N=36, Germany)**

The results of the fifth question ("What were your decision triggers for moving in high energy efficient building?"), shown in Figure 39 and Figure 40, indicates that the most important decision triggers for moving into an NZEB are the location of the building, its appearance/building age and low energy costs. However good thermal comfort, good indoor air quality and even the awareness for the environment are also regarded as important triggers. As least important have been considered subsidies for buying, the long-term value of the building and automated home appliances.

The sixth question was an input box where the responding NZEB-users have been asked to share their negative and positive experiences about living in a NZEB. Most of the negative experiences related to living in an NZEB building concern ventilation. Of the 16 respondents who had negative experiences with NZEBs, 5 said that the humidity in the rooms was too low* and 3 each complained that the ventilation was too loud, not functioning or that the maintenance (filter change) is time-consuming or too rarely carried out. Of the

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*Comment: Mechanical ventilation systems without moisture recovery lead in general to lower room humidity in the cold season because of the higher ventilation rate compared to manual window ventilation (which usually provides a lower air change rate). The outside air in winter contains only low humidity in g/m³.

16 participants, 9 (56%) had at least one point of criticism about the ventilation system. With two entries each, negative experiences about the poor mobile phone and WLAN network reception as well as the slowly reacting heating were reported. Additional points of criticism not connected to the NZEB-level of the building were the location of the building (traffic) and failures of the household equipment that was provided by the housing company.

16 survey participants entered positive experiences about living in NZEBs in the questionnaire. 5 of them emphasized the very good sound insulation both against outside noise and to their neighbours ("absolute silence"). There were 4 positive remarks on each of the following topics: good indoor climate and quality of living ("T-shirt in summer and winter"), transparency of energy consumption and low energy costs. The modern and high-quality equipment was positively evaluated by 3 survey participants. Comments referred also to the positive feeling ("awareness") of living in a high performance building.

What were your decision triggers for moving in high energy efficient building? (5 – the most important to 1 – the least important)

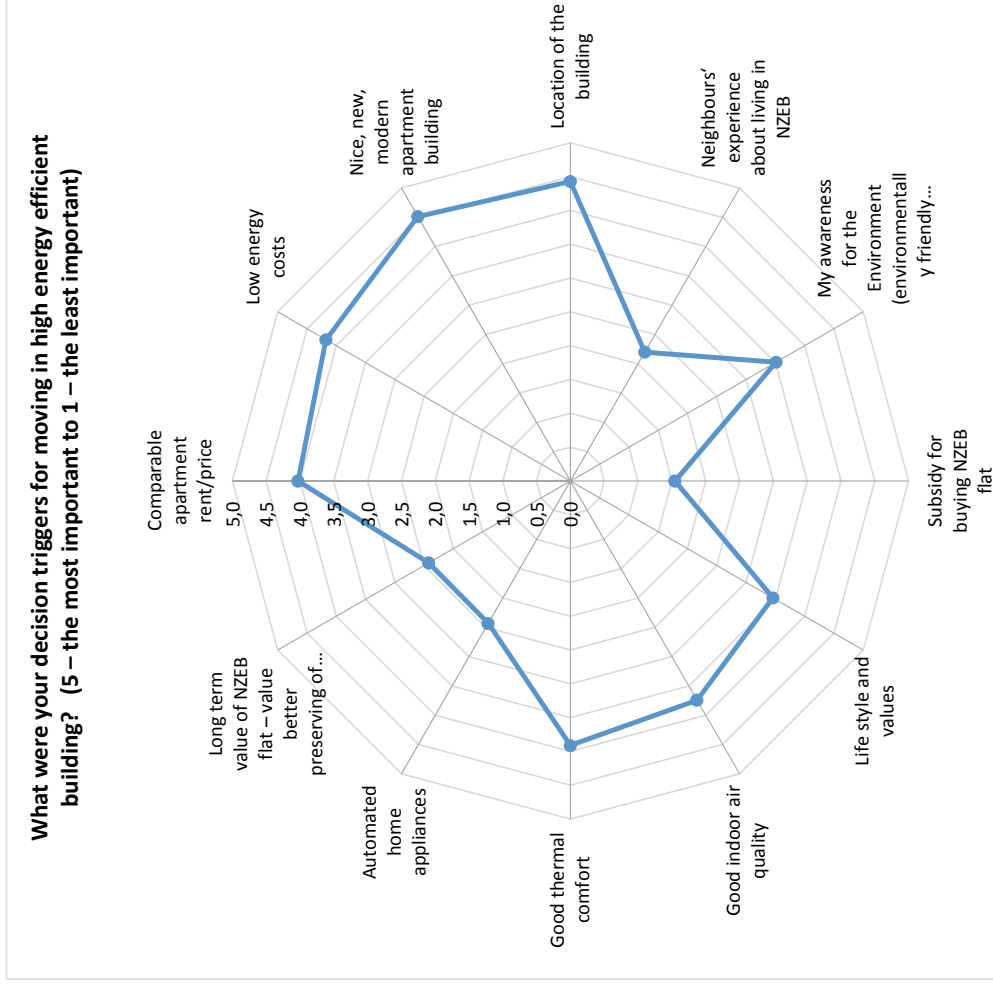**Figure 39: Mean values: "What were your decision triggers for moving in high energy efficient building?" QP2 (N=36, Germany)**

What were your decision triggers for moving in high energy efficient building? (5 – the most important to 1 – the least important)
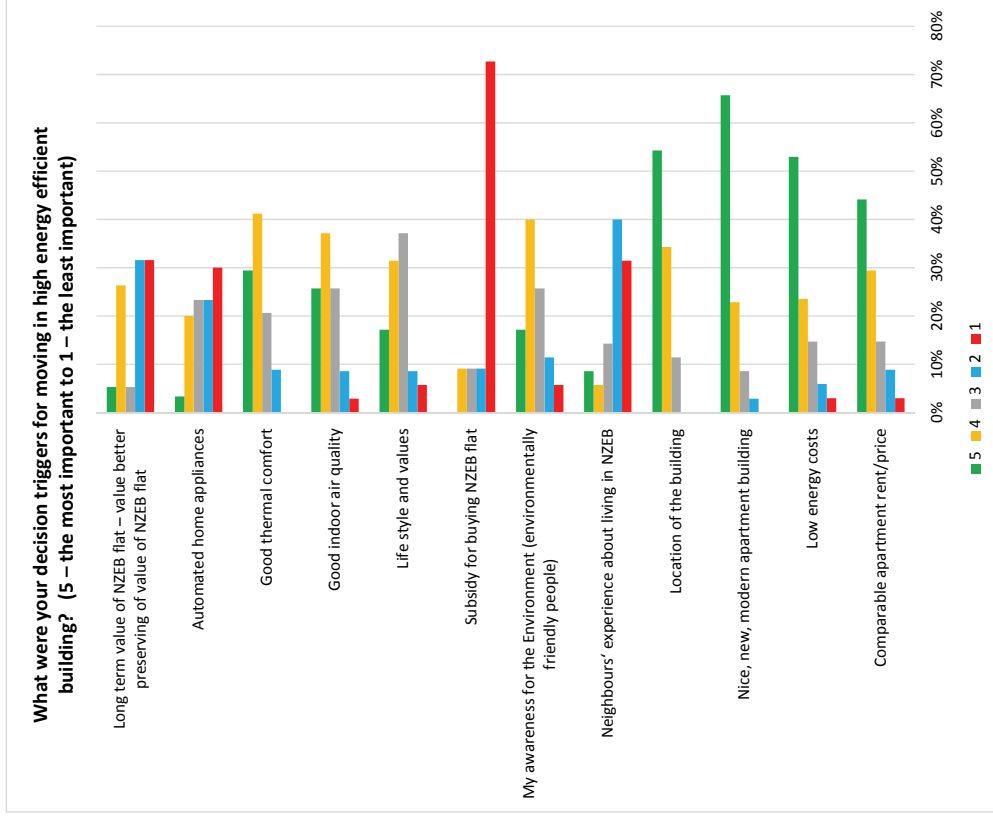

Figure 40: Question: "What were your decision triggers for moving in high energy efficient building?" QP2 (N=36, Germany)

To get some personal information about the questionnaire participants the last question was about their age ("Age group of the interviewed end-user?"). As shown in Figure 41 most of the attendees refer to themselves as middle age people (46%). 29% are young adults and 19% members of young families, indicating that mostly younger people live in NZEBs.
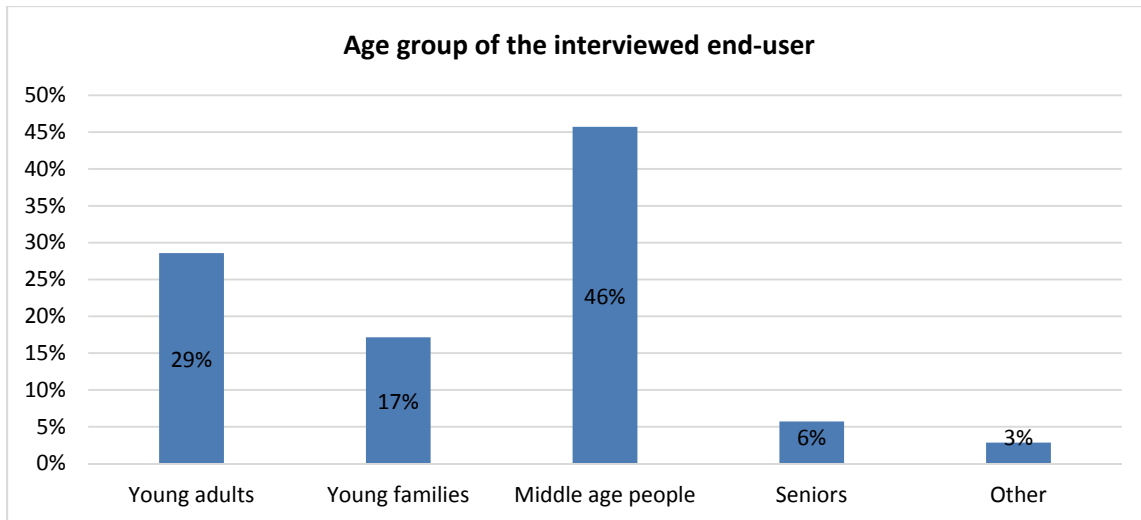

Figure 41: **Questionnaire results for the question "Age group of the interviewed end-user?" QP2 (N=36, Germany)**

4.2　　　Denmark

The information below identifies the group of residents in Danish NZEB social housing who answered the questionnaire. Most respondents, 79 %, are in the younger age categories.
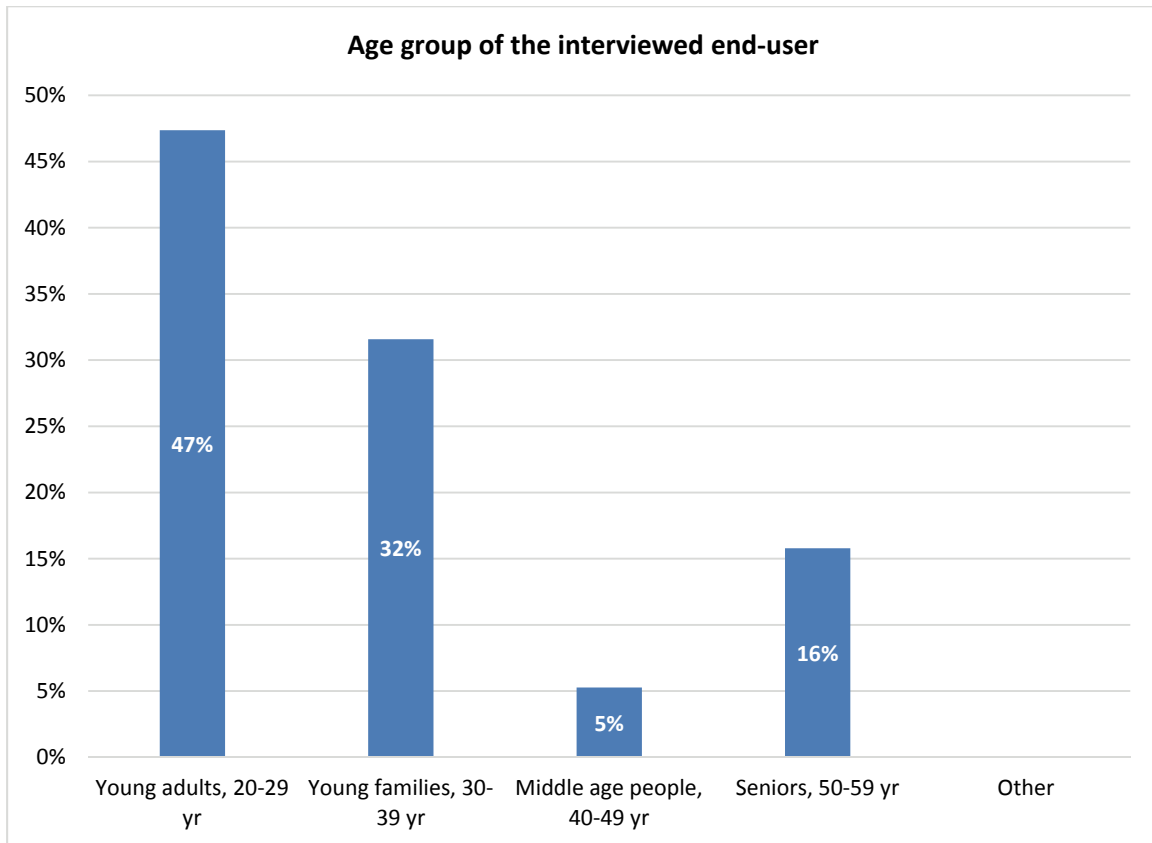
Figure 42:　　　**Distribution of respondents' age in the Danish questionnaire survey (N= 19, Denmark)**

All respondents in the Danish questionnaire survey live in NZEBs, but it was interesting to analyse their knowledge about the energy-wise quality of the building they live in.
A question on their knowledge about living in an NZEB was thus included in the questionnaire and the results are shown in Figure 43. Only 32% of the respondents knew that they were living in a NZEB.
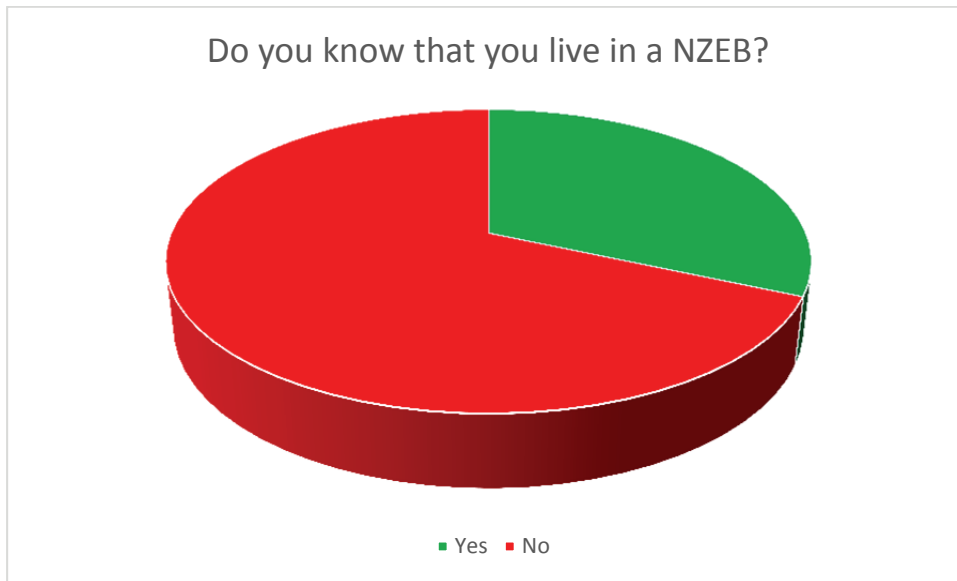
Figure 43: **Knowledge about living in a NZEB among Danish respondents (N= 19, Denmark)**

After having informed that the respondents were living in a NZEB, the general experience about living in a NZEB was investigated on a 5-step scale as depicted in Figure 44.
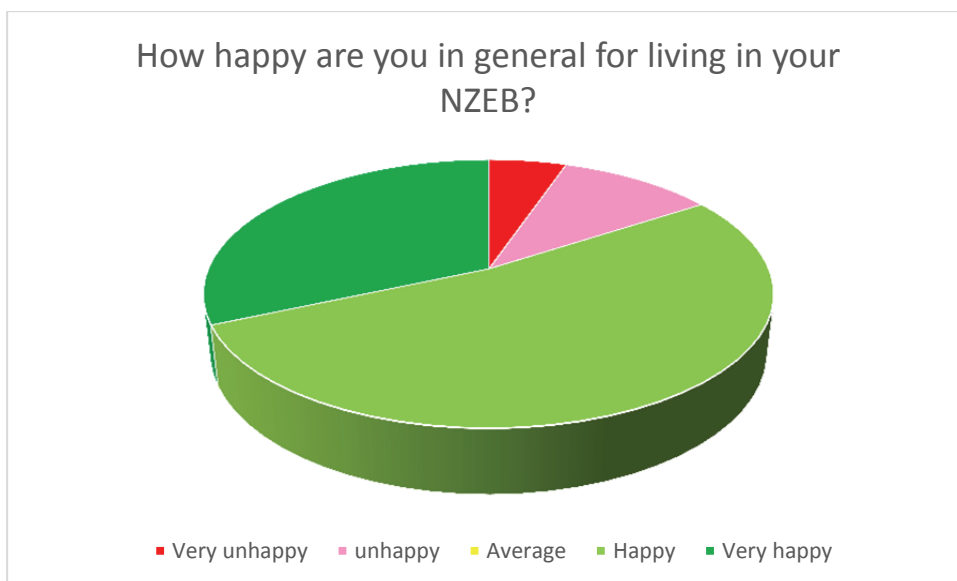
Figure 44: **General satisfaction among respondents about living in a NZEB multifamily house (N= 19, Denmark)**

Another interesting question in this context was the residents' willingness to move into another NZEB in case they had to move, and the answers are shown in Figure 45. Additionally, we investigated the residents' general environmental consciousness and habits about venting by opening windows (see Figure 53).
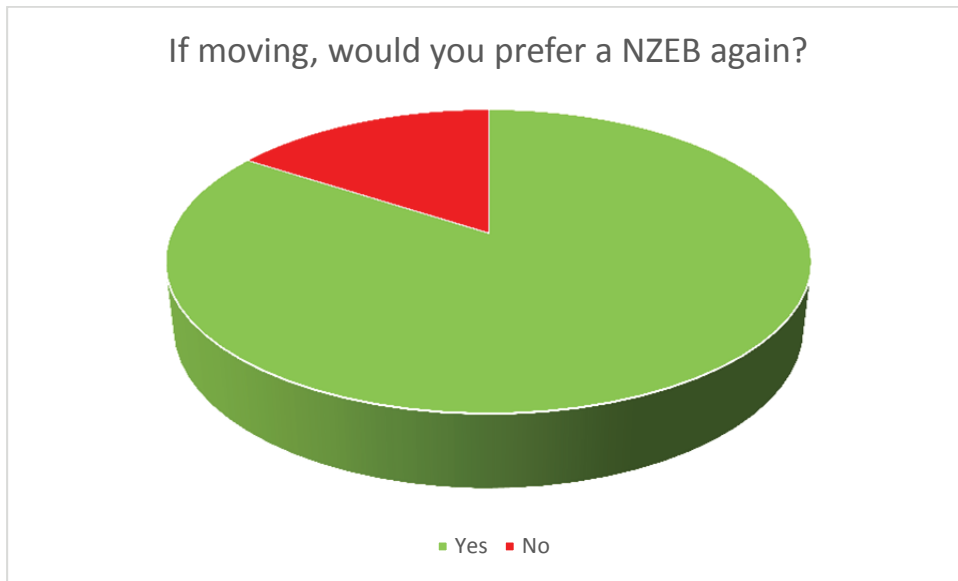
Figure 45:   **Residents' willingness to move into another NZEB in case they need to move (N= 19, Denmark)**

Figure 46:   **Residents' habits with regard to waste separation (N=19, Denmark)**

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Figure 47: **Residents' perception of their environmental consciousness (N= 19, Denmark)**
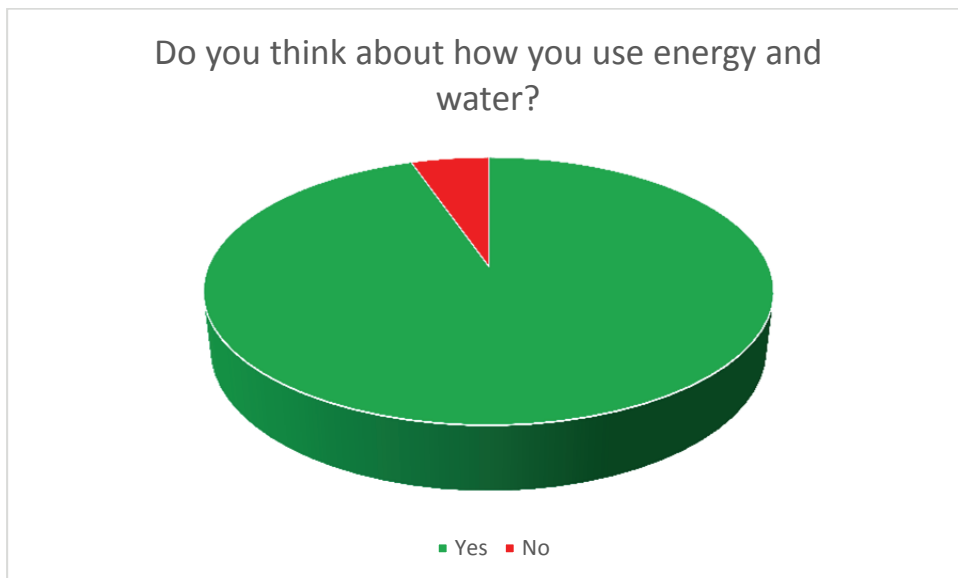
Figure 48: **Residents' consciousness about water usage (N= 19, Denmark)**

4.2.1   Questionnaire part 1 – potential future users of NZEBs

No questions related to part 1 of the questionnaire was collected in Denmark. All questionnaires were distributed to current residents of NZEB houses of social housing companies.

4.2.2 Questionnaire part 2 – end-users of NZEBs

As all questionnaires in the Danish survey were distributed to current residents of multi-family NZEB in social housing companies, the answers reflect this situation. Some of the questions were modified or changed to meet this situation (see section 3.2.2 Denmark). Figure 49 show the results of questions related to residents' perception of what is important when selecting a new flat in a block of flats. Some of the same answers are shown in Figure 50.
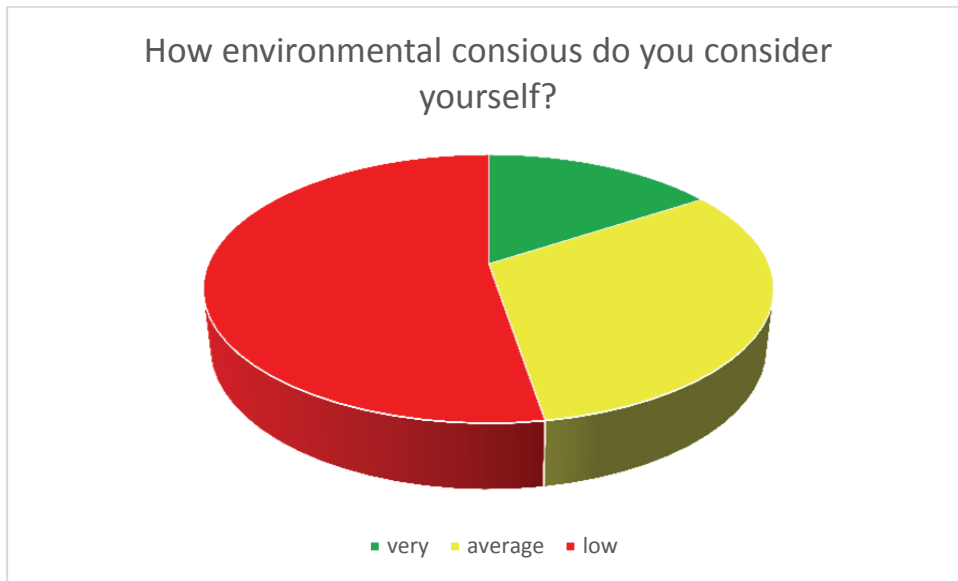
The most important topics for the tenants when choosing a flat is "Low energy consumption" and "Low energy costs" both with a total of 95% of the answers being "important" or "very important". This is followed by "Good thermal comfort" with 89% of the answsers and "Low rents (tenant)" with 79% of the answers.
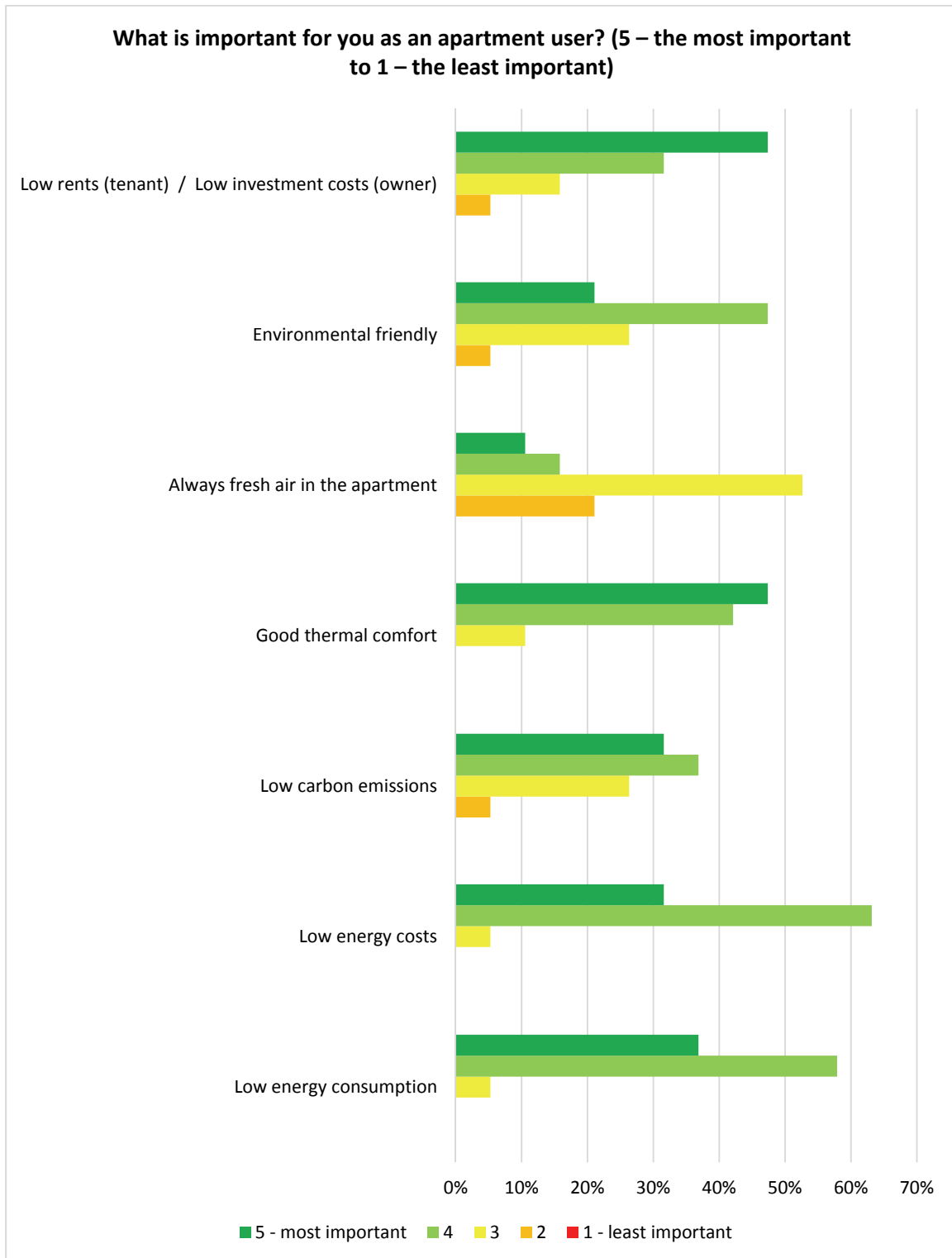
Figure 49: Question: "What is important for you as an apartment user?" QP2 (N=19, Denmark)

Calculating the average score from the answers, a slightly different picture can be drawn as depicted in Figure 50. Here "good thermal comfort" comes as the most important issue with an average score of 4.4, closely followed by "Low energy consumption" and "Low energy costs" both with an average score of 4.3.
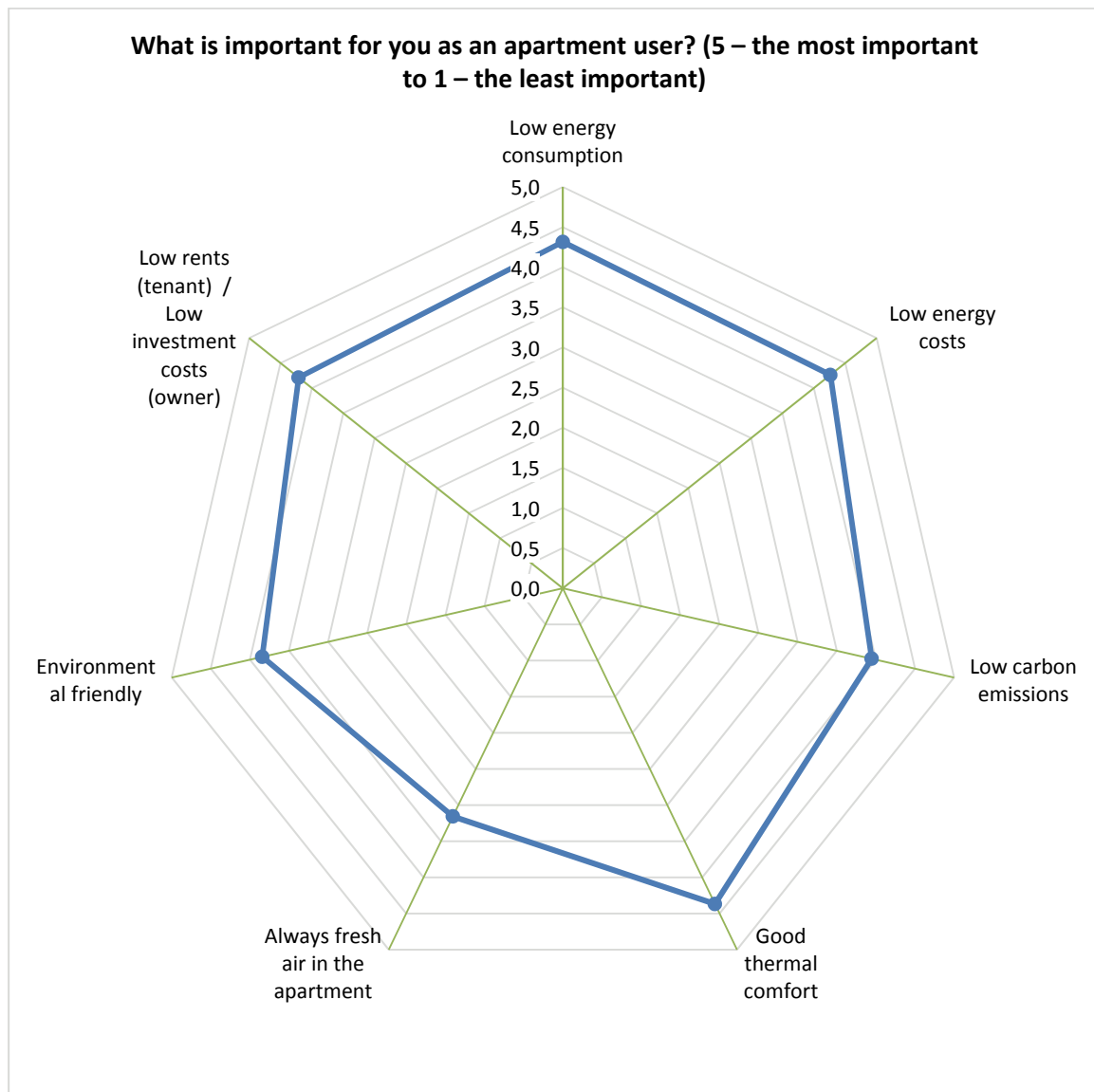
Figure 50: **Mean values: "What is important for you as an apartment user?" QP2 (N=19, Denmark)**

In the following we investigate current residents' experiences with living in a NZEB, i.e. living comfort, knowledge about RES installations and energy efficient measures in their NZEB, and their habits about operating the windows. The latter is interesting as opening windows are considered a healthy habit in general. However, all NZEB multi-family house in Denmark are equipped with mechanical ventilation with heat recovery due to a requirement in the Danish Building regulation.

In general, the indoor climate is considered as being good in the NZEBs as 75-% answers either "good" or "very good". This might seem a little in contract to the fact that 69-% evaluate the indoor air as being good or very good. The cost of living in a NZEB is slightly

dominated by "neutral" (47 %) to "good" or "very good".
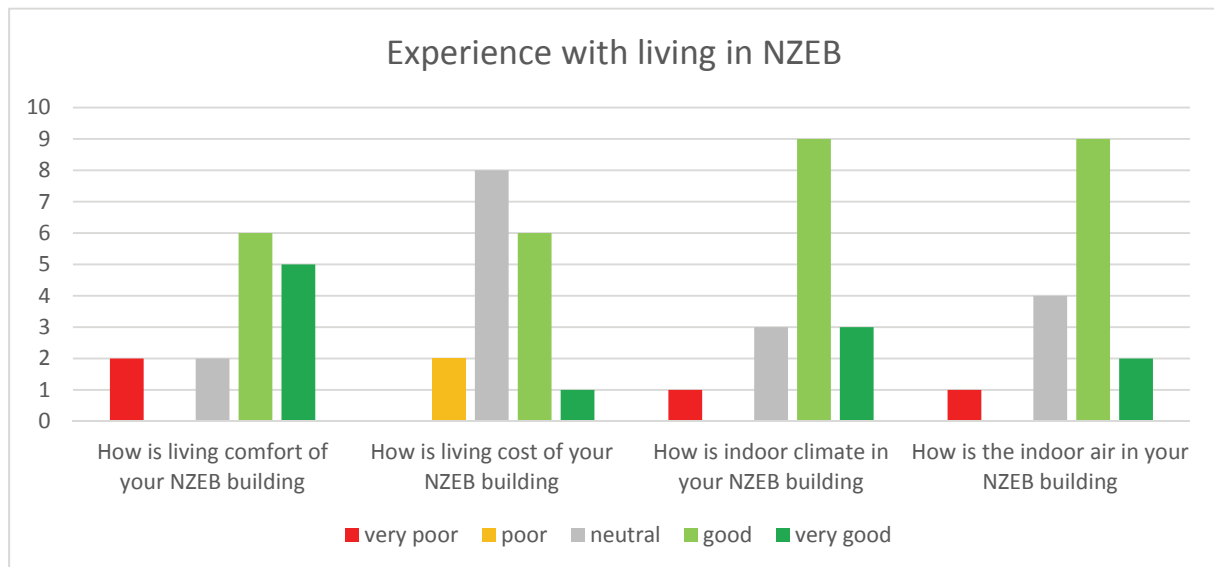
Figure 51: **Residents' experience with living in a NZEB, QP2 (N= 19, Denmark)**

The residents knowledge about special installations found in NZEBs are rather limited (Figure 52) , except for the presence of solar cells (PV) that are visible from the street and mechanical ventilation that can be seen, felt and heard inside the flats.
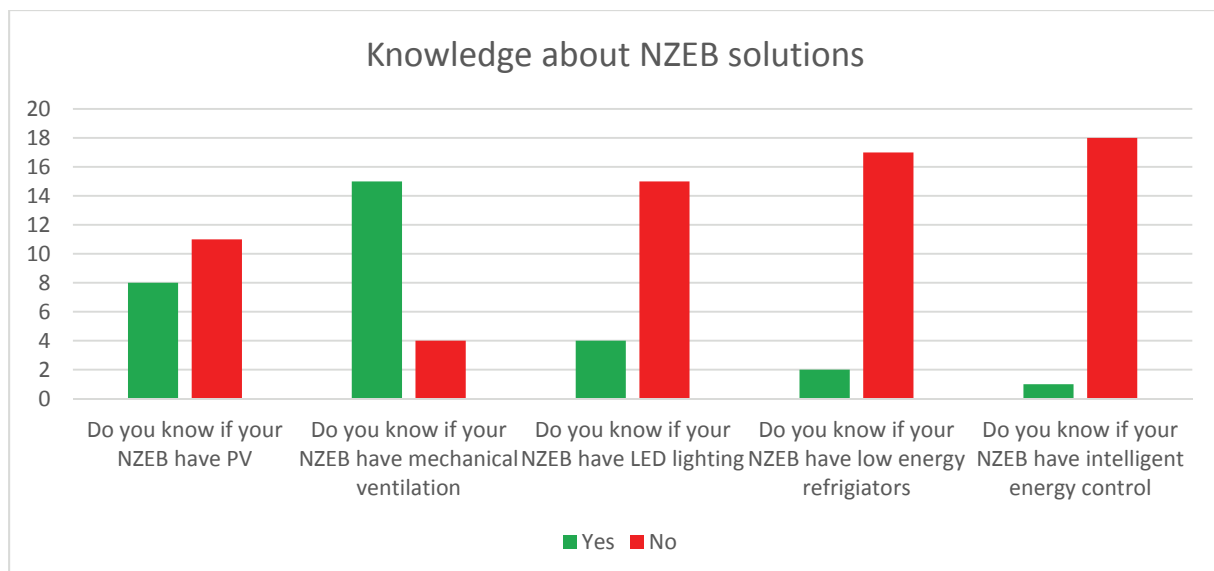
Figure 52: **Residents' knowledge about RES installations and energy efficient measures in the NZEB where they live, QP2 (N=19, Denmark)**

All multi-family NZEBs in Denmark are mechanically ventilated due to a requirement in the Danish Building regulations [DK 3]. Despite that, 37% of the residents claim that they are opening the windows several times every week to ensure fresh air in their flats (Figure 53). And most of the residents (70%) who are opening the windows are leaving the windows open for more than 10 minutes (Figure 53).

Figure 53: **Residents opening of windows in mechanically ventilated multifamily houses QP2 (N=19, Denmark)**

Figure 54: **Duration of residents opening of the windows, QP2 (N= 19, Denmark)**

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4.3   Italy

The biggest part of the respondents of Questionnaire Part 1 belongs to the category of "Middle age people", who reside in buildings with high energy performance mainly of social housing.
Respondents have little knowledge about the technologies used in NZEB buildings to achieve high energy performance.
The low consumption and energy costs, the psycho-physical and environmental comfort, are considered as the aspects that are most appreciated by the interviewees.
Living in a NZEB building is perceived as an improvement in individual or family living conditions, but not as an improvement in the social relationships between condominiums.
Most people show positive experiences about life in buildings with high energy efficiency, in particular comfort, low energy costs and lower environmental impact are appreciated.
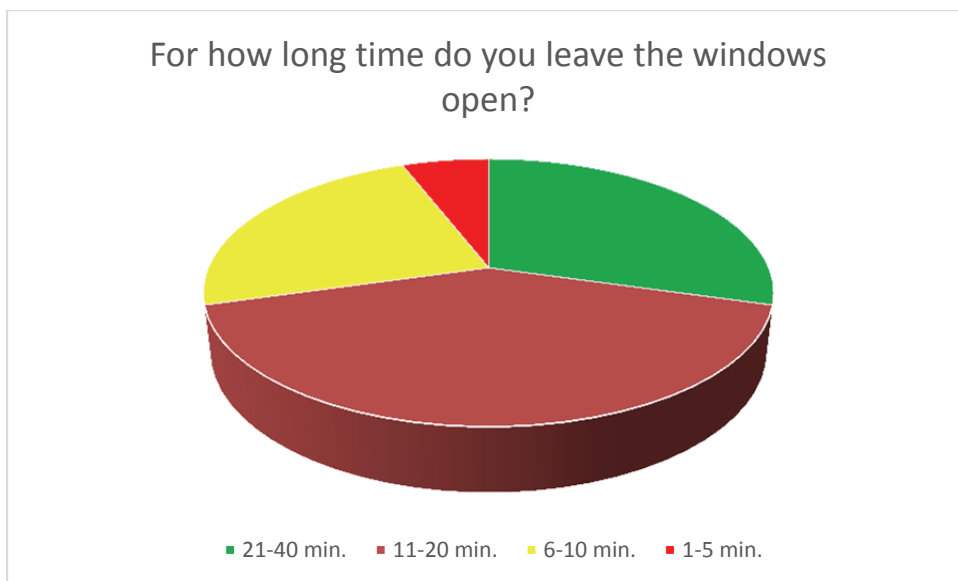Among the negative experiences, there are some people who complain about high consumption and maintenance costs and other isolated cases that complain about excessive soundproofing and poor air permeability.

The biggest part of the respondents of Questionnaire Part 2 belongs to the category of "young adults", is living in old buildings and is considering the idea of moving in a new apartment within the next 5 years. Respondents are partly aware of what an NZEB is; information about this type of building have been obtained from different sources (there is not a clear prevalence of one source on the others) but the quality of the gathered information is on average considered quite scarce. As apartment users, respondents gave high importance to low energy consumptions and low emissions. In the next paragraphs each question is analysed separately and presented together with the corresponding chart.

4.3.1   Questionnaire part 1 – potential future users of NZEBs

Findings regarding the self-estimation of awareness about NZEBs are shown in Figure 55.
Most respondents have partial or very rough knowledge about NZEBs (31%). 21% of the people are aware about it and 16% are not informed. The distribution of answers shows that the dissemination of information about high efficient buildings is still lacking in our country.
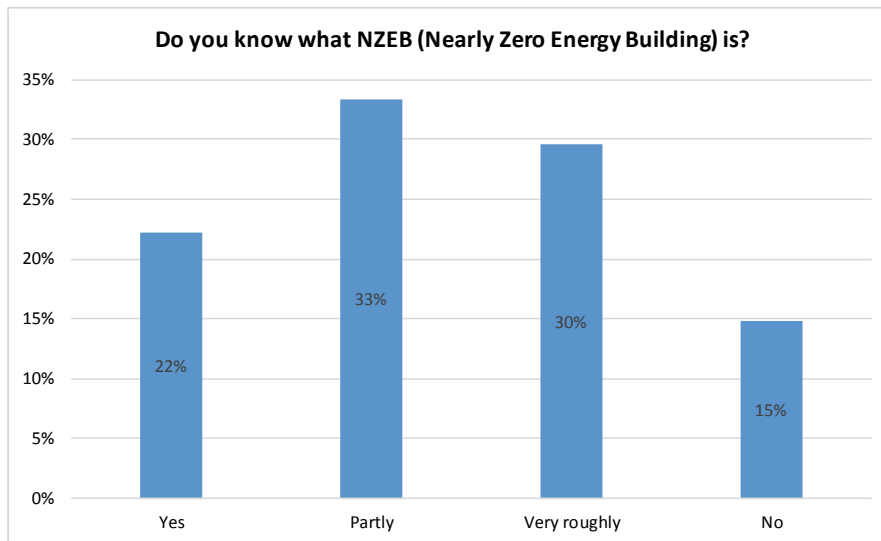
Figure 55:   Questionnaire results for the question "Do you know what NZEB (Nearly Zero Energy Building) is?" QP1 (N=81, Italy).

In Question 3 people were asked to rate from 1 to 5 the quality of information about NZEBs gathered from different sources (5- Excellent, 4-Very good, 3-Good, 2-Weak, 1-No information). Results in Figure 56 are shown in terms of percentage ratio of the number of answers given for each score in respect to the total given answers. In most sources score 1, represented by the red bar, got the highest percentage, showing that the level of information achievable trough the listed sources is in general very scarce. This lack is also noticeable in Figure 57, which represents the average value obtained by each source. The radar graph highlights that, on average, respondents chose "internet and specialized web portals" as the best source of information, assigning an average rate of quality of 3. It is followed by "architects and engineers" and "funds for financial incentives for energy efficiency" with an average score of 2.5. The worst sources of information are apparently "NGOs and other associations (like GBC, Passive house…)", "Housing associations" and "Fairs and events".
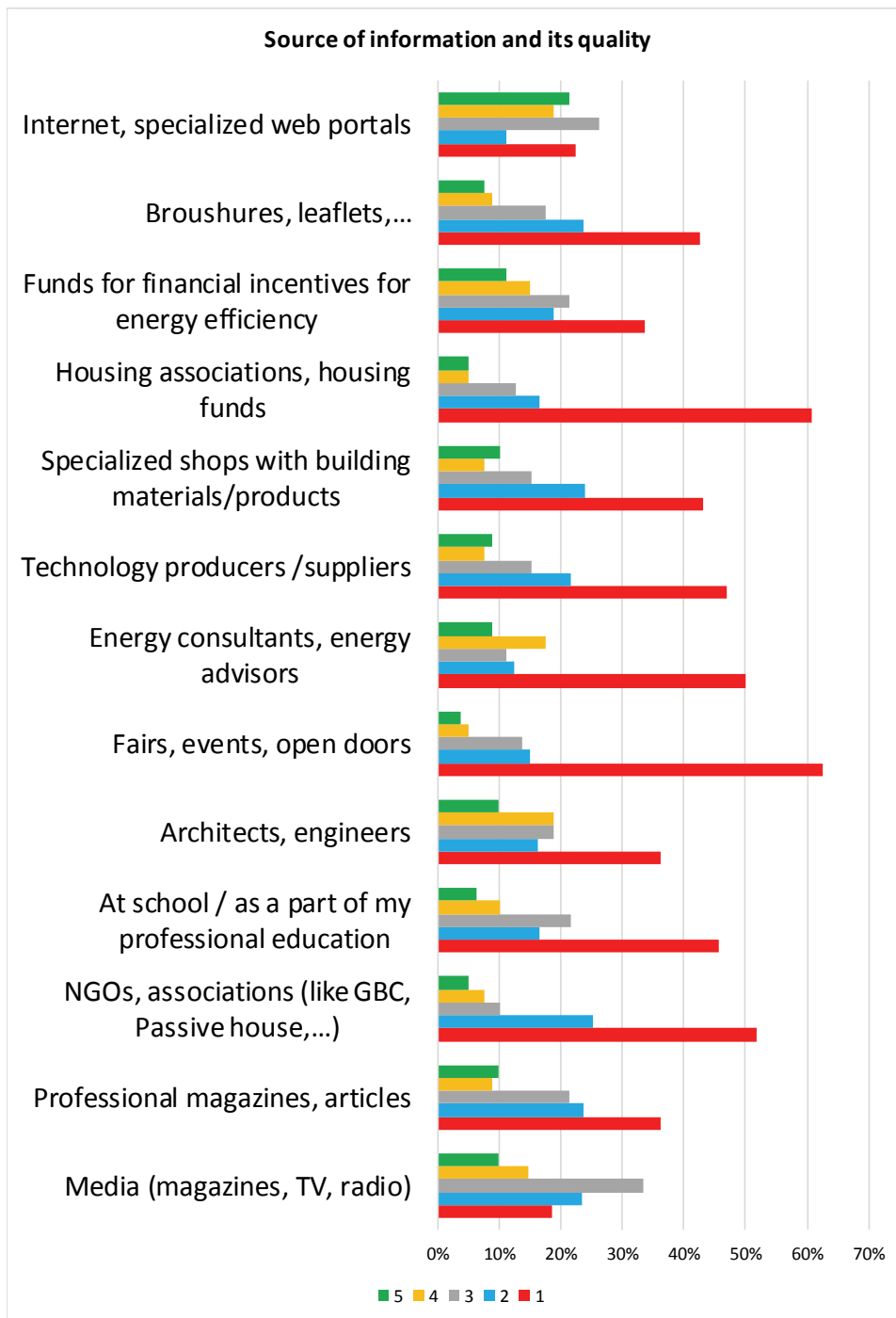
Figure 56: Question: "Where did you get the information about NZEB (Nearly Zero Energy Buildings) and how good (useful, understandable) this information was for you?" (N=81, Italy)
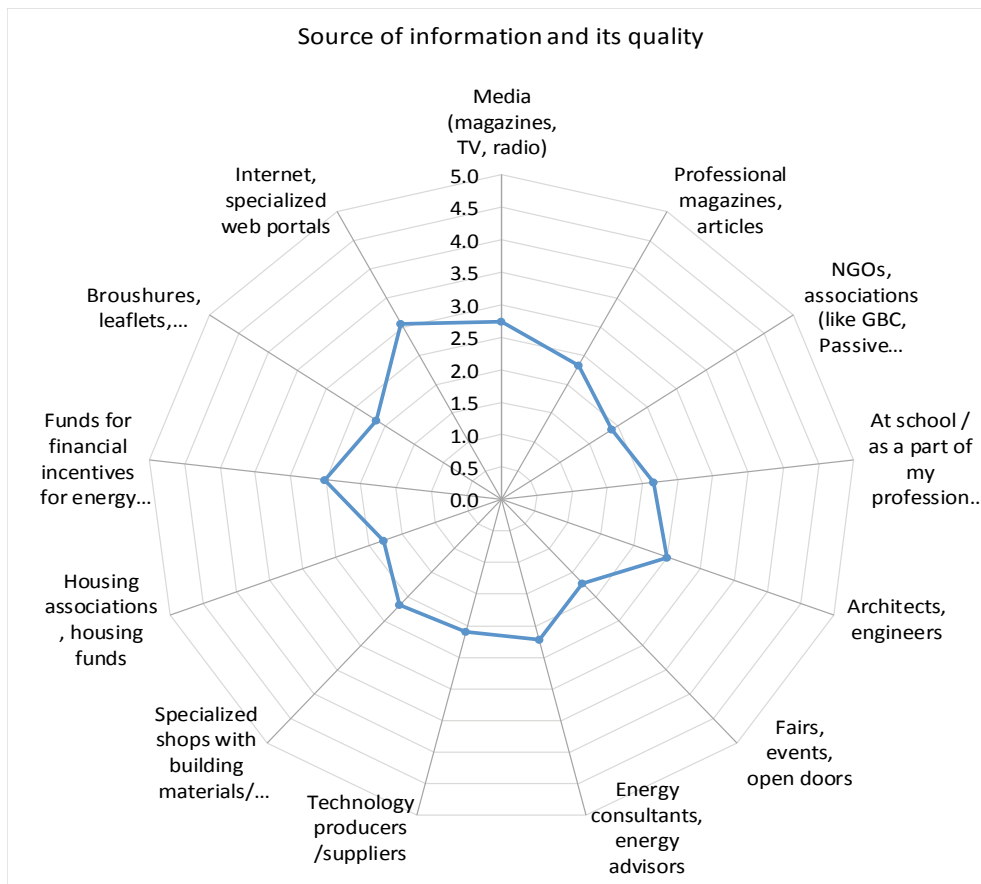
Figure 57: **Mean values: "Where did you get the information about NZEBs (Nearly Zero Energy Buildings) and how good (useful, understandable) this information was for you?" QP1 (N=81, Italy)**

Question 4 asked the most and least important aspects of NZEBs for respondents as potential future users. Rates were given in the range from 1 to 5 (1-no importance to 5-high importance) and results are shown in Figure 58 as percentage ratio of the number of answers given for each score respect to the total given answers.

The results show that in general all the aspects are considered significant for the respondents. In fact all of them achieved a big number of answers with scores 4 (between 20% - 35% of all respondents) and 5 (40% - 75%) and a few answers with score 1 (under 10% of the people).

More in detail, considering the average value obtained by each aspect shown in Chart 5, it can be noticed that people valued the most "Low energy consumption" and "Low carbon emissions" parameters, assigning them an average score of 4.6 and 4.5. Secondly, "Low energy costs" and "Use of renewable sources" were chosen, with an average score of 4.3. The least important is "Wood used in buildings elements" probably due to the fact that wood is not a commonly used technology in residential buildings in the Centre and South of Italy where respondents come from.
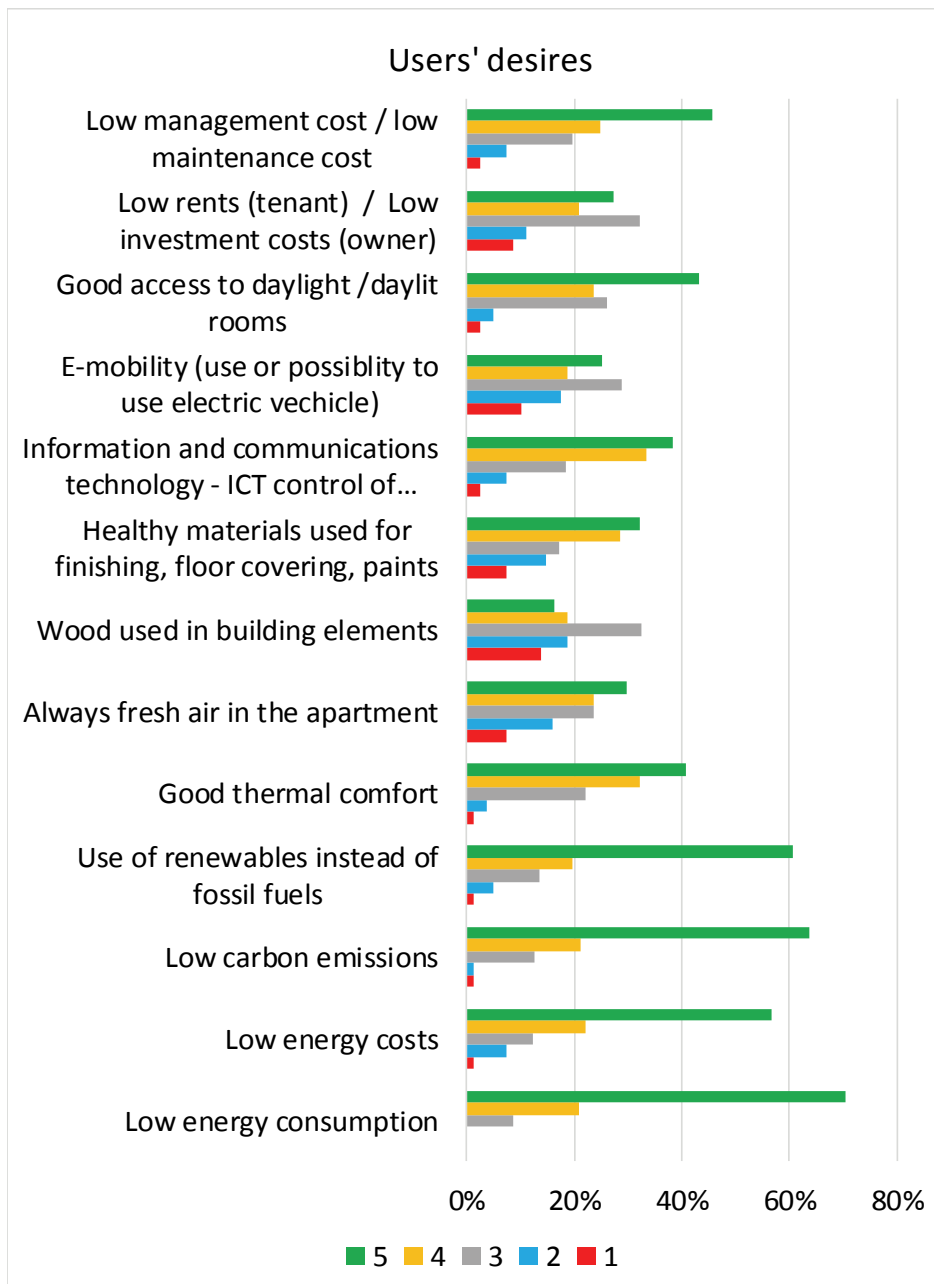
Figure 58: Question: "What is important for you as an apartment user?" OP1 (N=81, Italy)
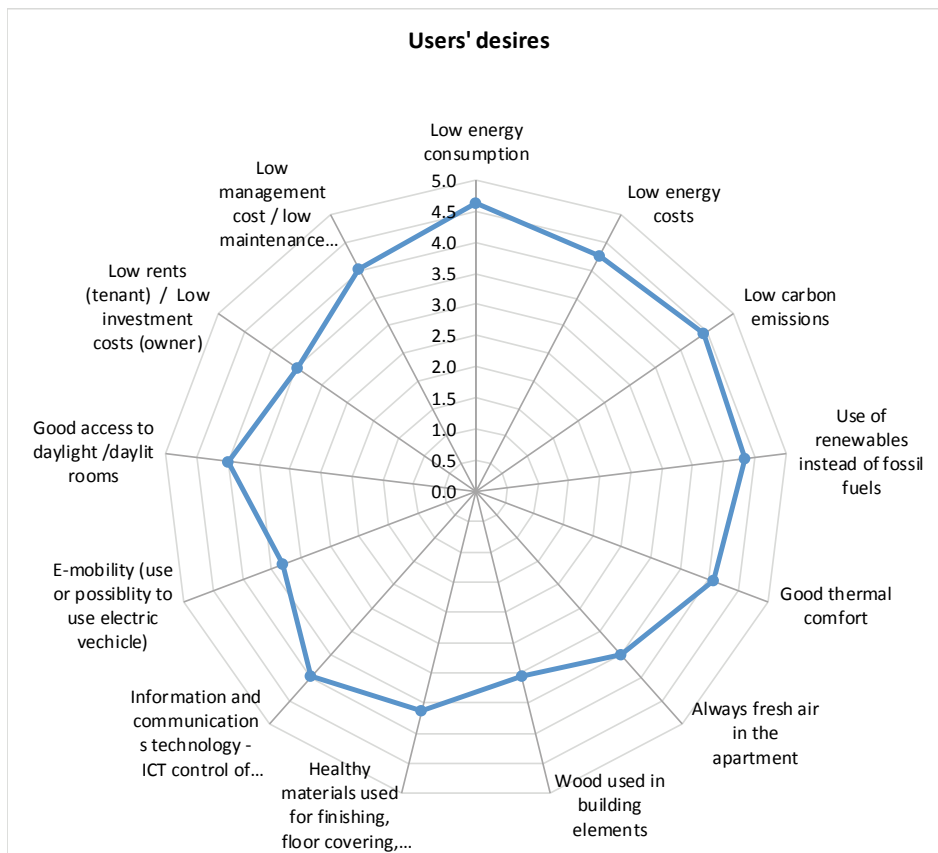
Figure 59:   **Mean values: "What is important for you as an apartment user?" QP1 (N=81, Italy)**
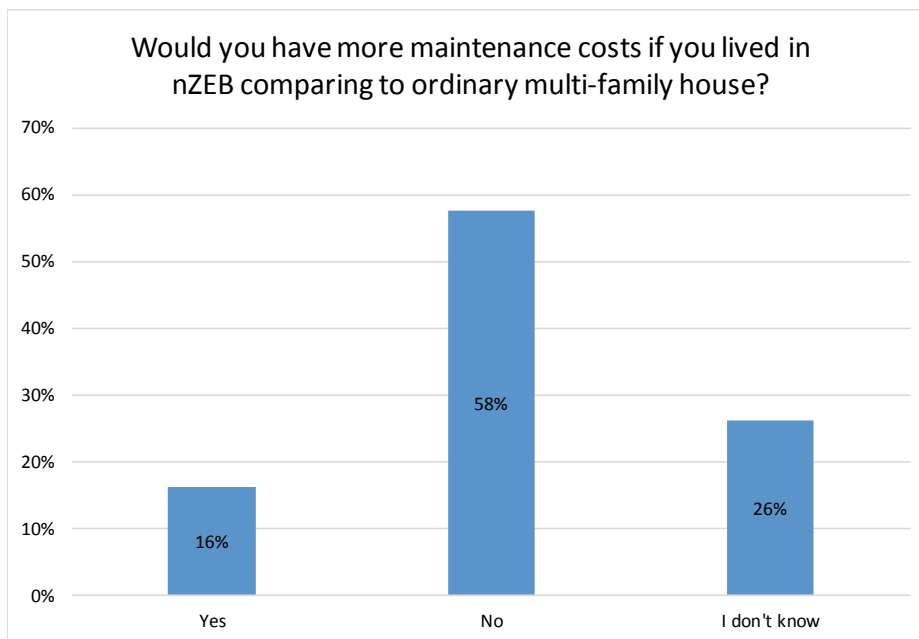
Figure 60:   **Questionnaire results for the question "Would you have more maintenance costs if you lived in an NZEB comparing to an ordinary mulit-familiy house?" QP1 (N=81, Italy)**

In Figure 60 the percentage distribution of responses about maintenance costs in NZEBs is shown. As it can be noticed more than 50% of people think that living in NZEBs would guarantee lower maintenance costs compared to ordinary buildings.

When asked to rate how significant the technical solutions are that characterize NZEBs, people answered very positively, similar to the question about users' desires. In fact all the solutions are considered quite important and typical for NZEBs as shown in Figure 61. Rate 4 was given on average to all the questions by the 30% of respondents and Rate 5 by the 45%. Only a few answers got score 1 (5% of respondents on average).

The average values obtained by each solution are shown in Figure 62. "Use of solar energy" and "Use of Renewable sources" achieved the highest scores on the 5 points scale. (4.7 and 4.5 respectively). The least important is "Windows with triple glazing" which was given a rate of 3.5. All the other solutions reached to an average score of around 4.
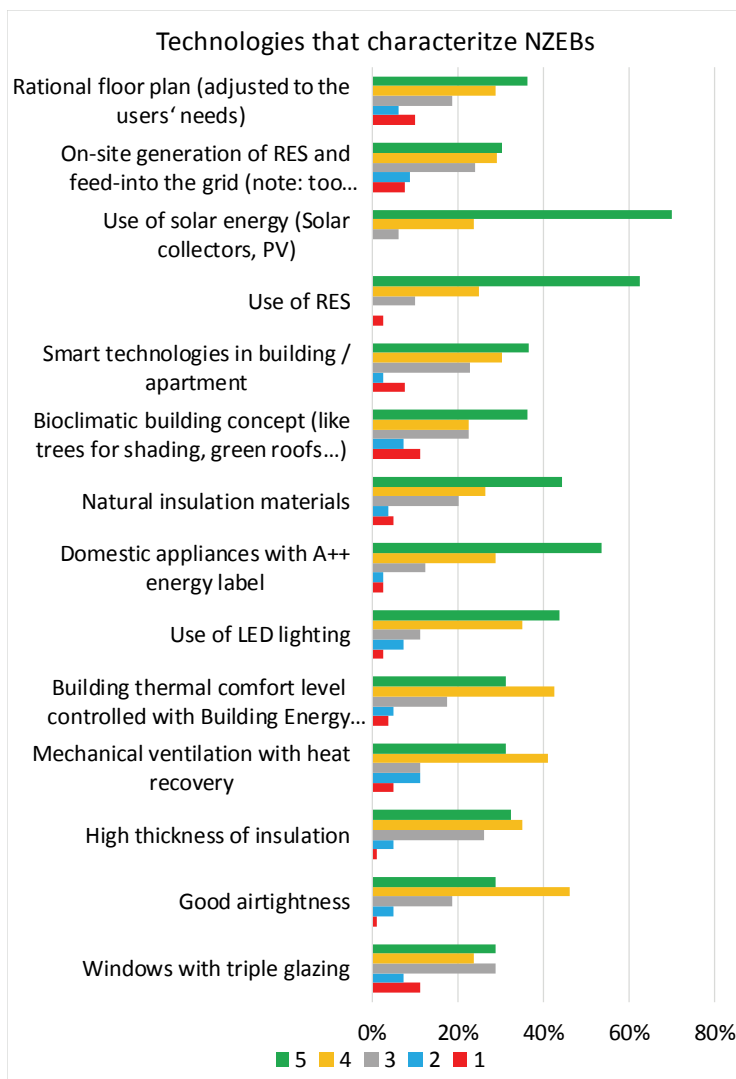
Figure 61:   **Question: "What do you think which technologies characterize the most NZEBs?" QP1 (N=,81 Italy)**

Figure 63 shows results of the question "What would be your decision triggers for living in NZEB? (rate from 5 – very high importance to 1 – very low importance). Rate 5 was given on average to all the questions by 50% of the respondents. 68% of them considered the "Low energy cost" parameter as very important (score 5). This is partly divergent with results of Figure 58 where people were asked to rate the most important aspects as apartment users. In that case 57% of respondents gave rate 5 to "Low energy cost", which was considered less important than "Low energy consumption", "Low carbon emissions" and "Use of renewable sources".

Average values obtained by each solution are shown in Figure 64. "Low energy cost" and "Subsidy for buying NZEB flats" and "Life style and values" achieved the highest scores with a rate of 4.5. The least important is "Neighbours'experience about living in NZEB".
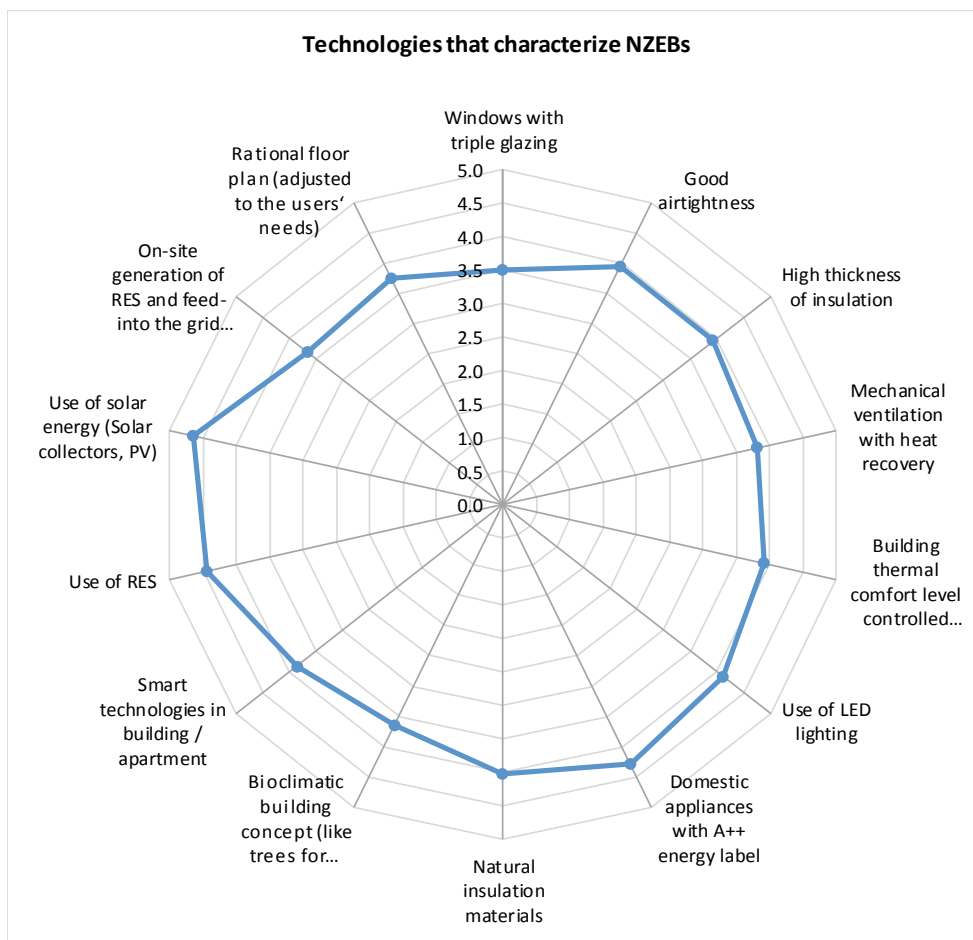
Figure 62:   **Mean values: What do you think which technologies characterize the most NZEBs?" QP1 (N=81, Italy)**
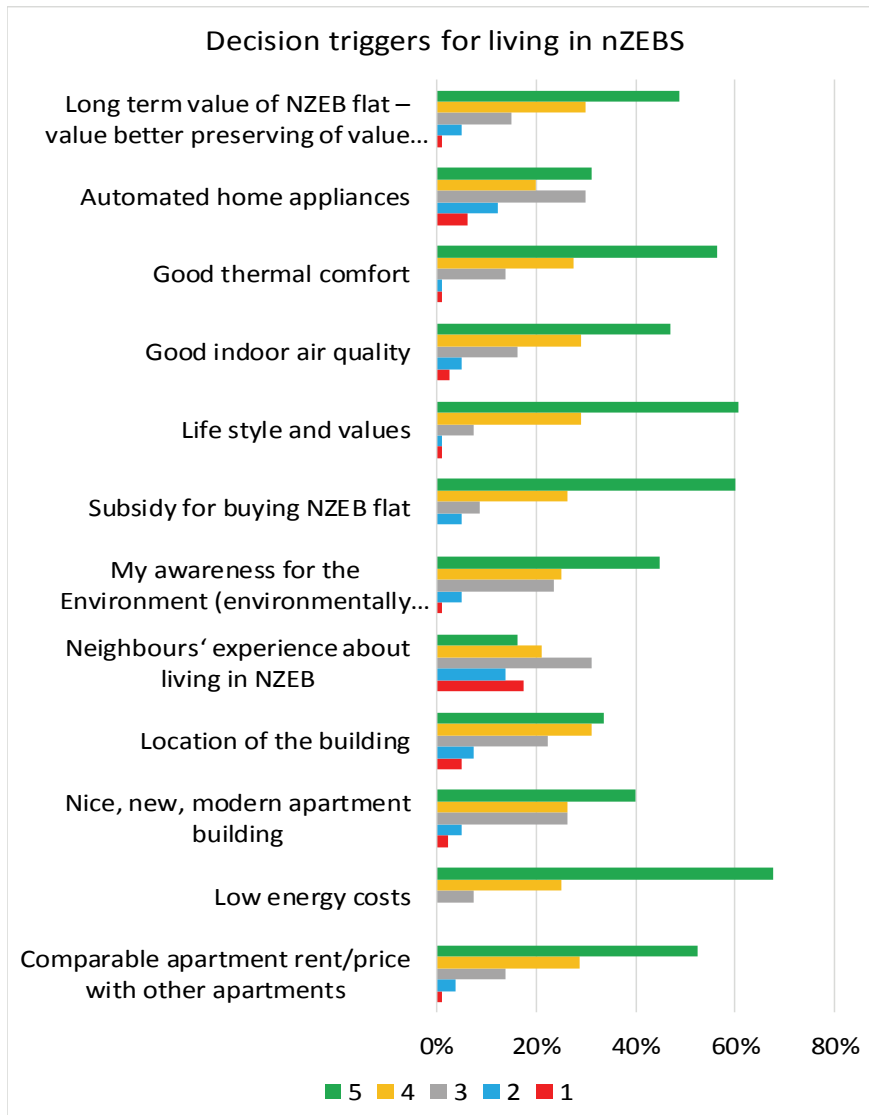
Figure 63:   Question: "What would be your decision triggers for living in an NZEB?" QP1 (N=81, Italy)
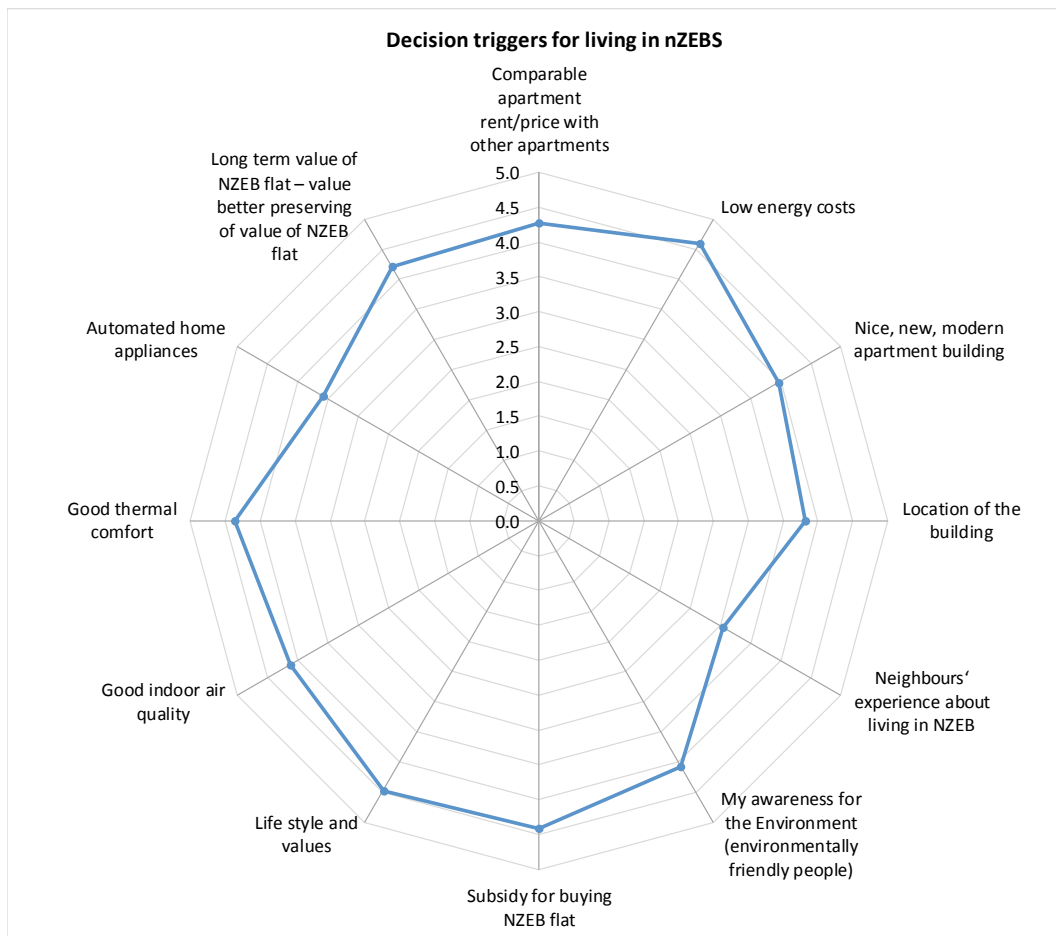
Figure 64: **Mean values: What would be your decision triggers for living in an NZEB?" QP1 (N=81, Italy)**

Figure 65 - Figure 68 give personal information about the respondents. In Figure 65 it can be seen that 41% of respondents are young adults and "Young families" and "Middle aged people" are equally distributed (26% on average). As shown in Figure 66, only 13% of the respondents are living in contemporary building (built between 2000 and 2018), while the 56% are living in very old buildings (built before 1980). 20% and 44% of the buildings occupied by respondents have been respectively fully and partly energy renovated in the last years (see Figure 67). Finally, 53% of the respondents is considering moving in a new apartment in the next 5 years (see Figure 68).

Age group of the interviewed end-user
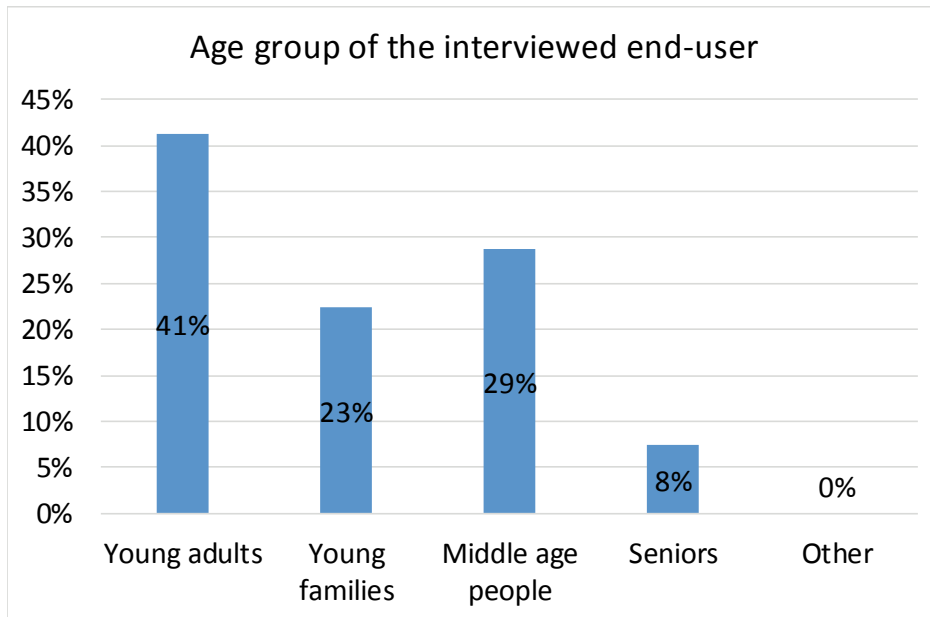
Figure 65: Questionnaire results for the question "Age group of the interviewed end-user" QP1 (N=81, Italy)

In which type of building do you currently live?
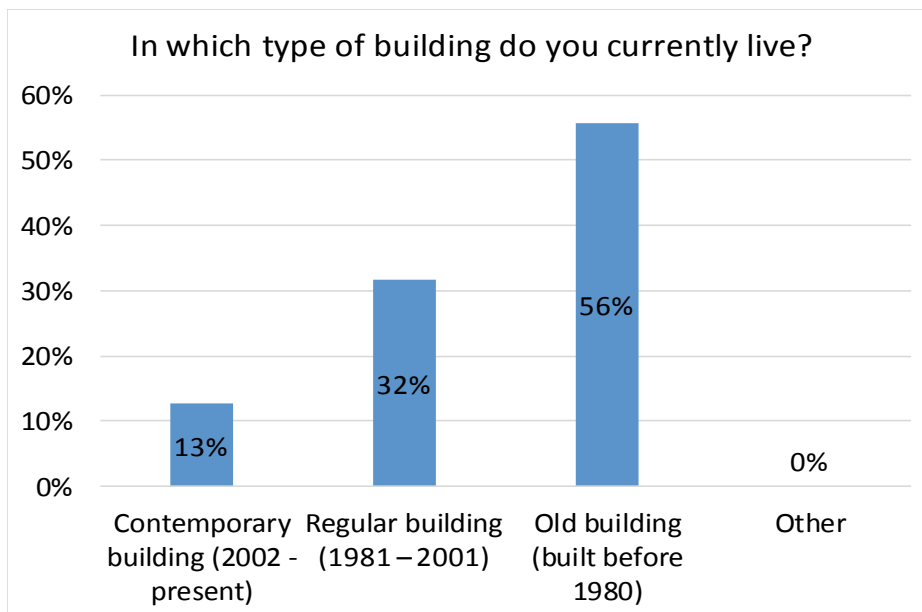
Figure 66: Questionnaire results for the question "In which type of building do you currently live?" QP1 (N=81, Italy)

Was your building recently energy renovated?
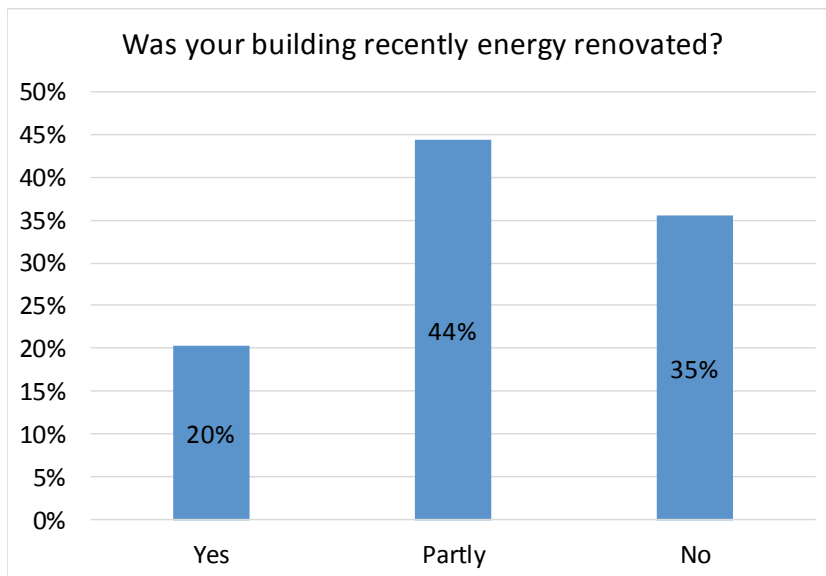
Figure 67: **Questionnaire results for the question "Was your building recently energy renovated?" QP1 (N=81, Italy)**

Are you considering moving in a new apartment in the period of next 5 years?
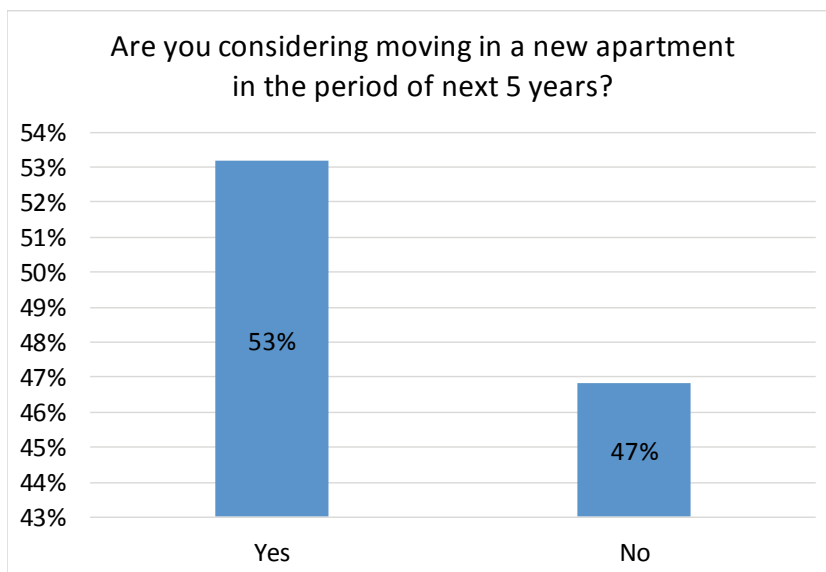
Figure 68: **Questionnaire results for the question "Are you considering moving in a new apartment in the period of the next five years?" QP1 (N=81, Italy)**

4.3.2 Questionnaire part 2 – end-users of NZEBs

The first question (Figure 69) is about what end users consider important when using their energy efficient apartments. In general, all proposed solutions have been considered important or very important as can be noted by the answers, in particular good access to daylighting and good thermal comfort and are indicative of how well-being, in the broad sense, in your home has an index of greater importance than other issues (costs,

environment, materials) even in social buildings. The use of wood, ICT technologies and healthy materials, on the other hand, are considered less important because their assessment probably presupposes specific knowledge that is not typical of the inhabitants of social housing.
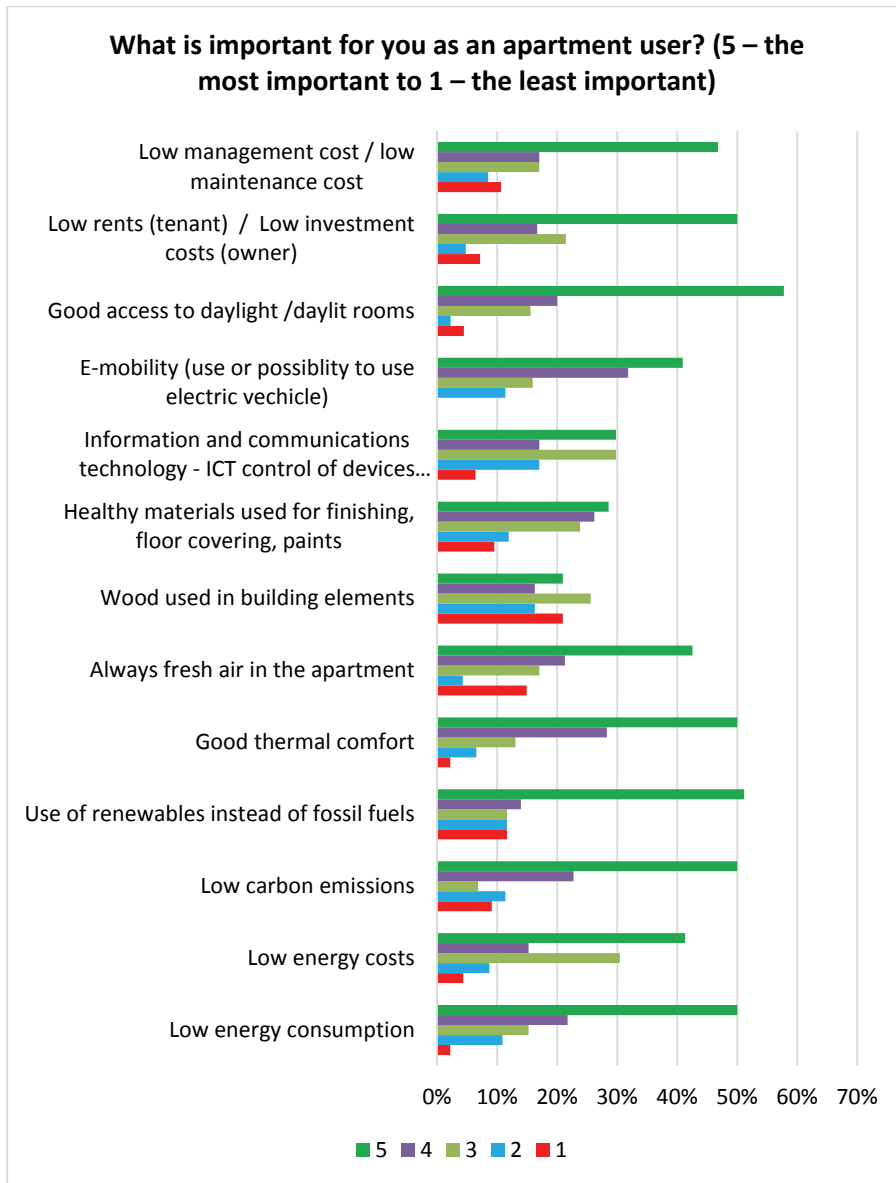
Figure 69: **Question: "What is important for you as an apartment user?" QP2 (N=50, Italy)**

The second question (see Figure 71) is "In your opinion, do you have more maintenance costs in high energy efficient building comparing to ordinary multi-family house building?" The 40% of those interviewed say they do not know the answer. This indicates that the systems and technologies of a NZEB building are not known in detail. 32% believe that maintenance costs will be higher and 28% think that they will not be higher.

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What is important for you as an apartment user? (5 – the most important to 1 – the least important)
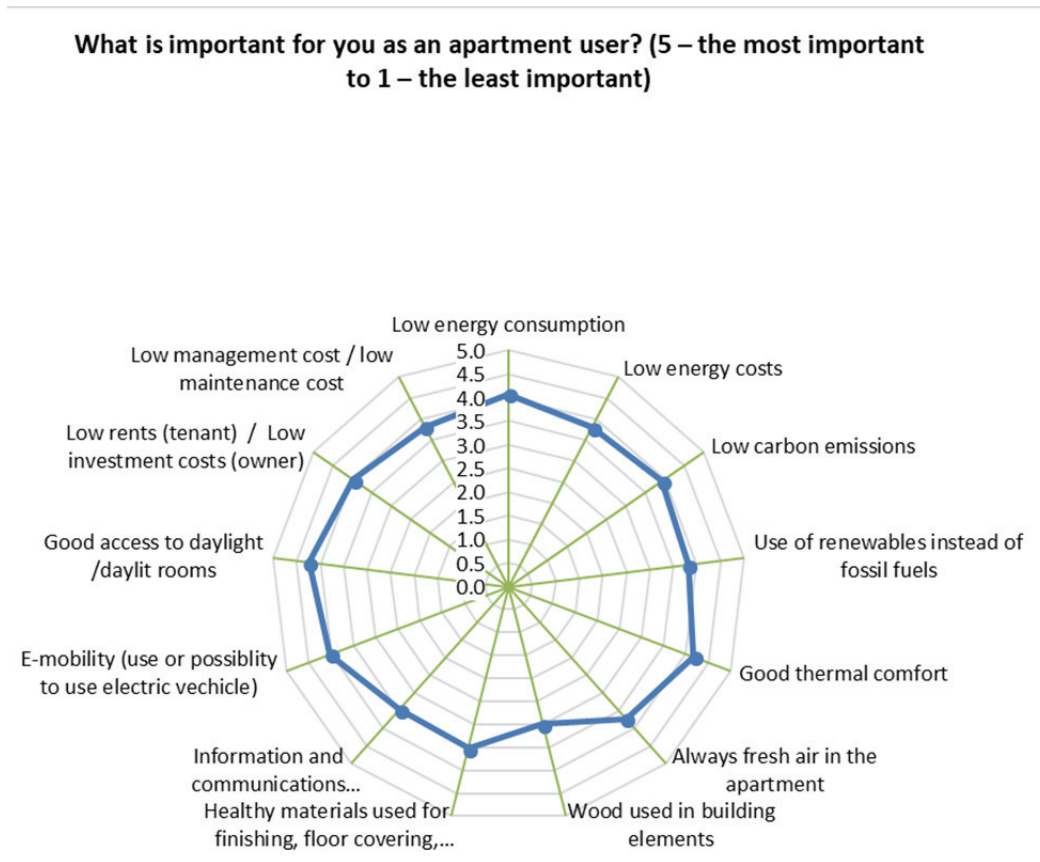
Figure 70: Mean values: "What is important for you as an apartment user?" QP2 (N=50, Italy)
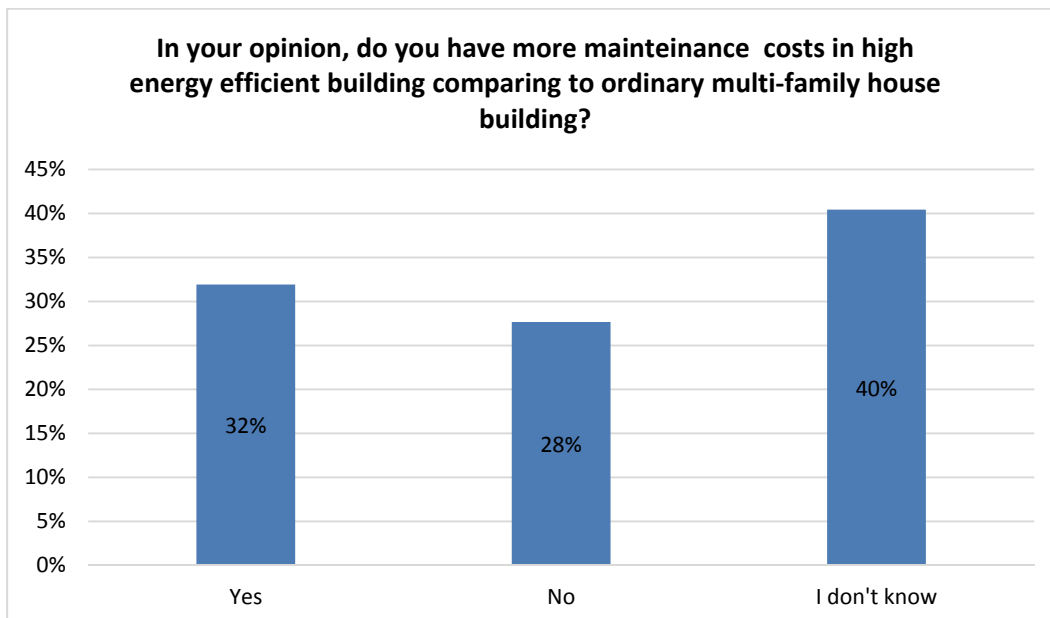
Figure 71: Questionnaire results for the question "In your opinion, do you have more maintenance costs in high energy efficient building comparing to ordinary multi-family house building?" QP2 (N=50, Italy)

The third question (see Figure 72) is "Which technologies that characterize high energy efficient building do you use in your building?". Here the answers are very diversified. The answer that obtained the highest percentages was "Good airtightness" with 74%. "Good airtightness" together with "High thickness of insulation", which has obtained a high percentage, are significant of the fact that the high insulation of the casings and the low air permeability of the interior environments require a proper sizing and management of the ventilation, both natural or mechanical. The use of solar energy, the use of A ++ appliances and LED lights have achieved high scores, which means that the most easily implemented technologies in the building, which do not require management by the user, are also the most exploited . For the same reason, the items that obtained lower percentages were "Thermal comfort of the building controlled with integrated energy management system" and "On-site generation of renewable resources and introduction into the network" as they require greater attention to the management.

Which technologies that characterize high energy efficient building do you use in your building?

- Rational plan of the apartments… 34%
- On-site generation of renewable… 8%
- Use of solar energy (solar collectors,… 46%
- Use of RES 38%
- Smart technologies in builiding /… 18%
- Bioclimatic building concept (like trees… 32%
- Natural insulation materials 26%
- Domestic appliances with A++ energy… 58%
- LED lighting 56%
- Thermal comfort of the building… 6%
- Mechanical ventilation with heat… 12%
- High thickness of insulation 46%
- Good airtightness 74%
- Windows with triple glazing 16%

0% 10% 20% 30% 40% 50% 60% 70% 80%

Figure 72: Questionnaire results for the question "Which technologies that characterize high energy efficient buildings do you use in your building?" QP2 (N=50, Italy)

The fourth question (see Figure 73) is "Which type of renewable energy sources do you use?". To this question a part of the tenants of social housing has not responded and this means that, despite having answered the previous question, they do not really know what technologies are used in their condominium or in their home. However, a majority showed that they know that solar energy is used, while 29% use heat pumps and 9% have responded because they use district heating that partly generates energy through the remote use of renewable sources.

Which type of renewable energy sources do you use?

Solar energy	58%
Heat pump	29%
Wind power	0%
Biomass	0%
Geothermal energy	4%
Green electricity	0%
Other	9%
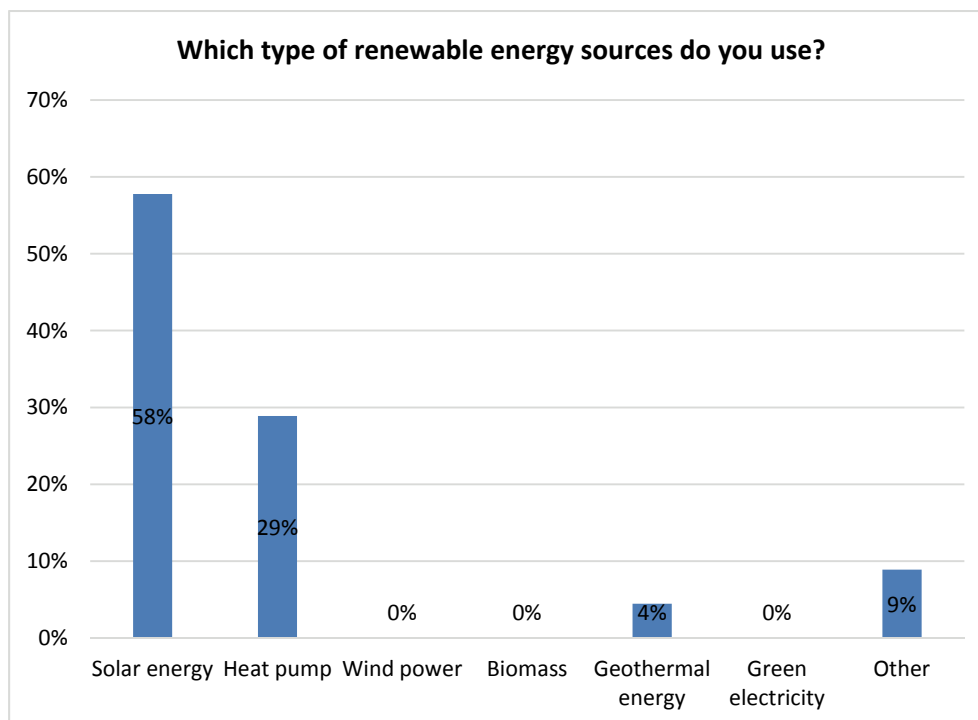
Figure 73: Questionnaire results for the question "Which type of renewable energy sources do you use?" QP2 (N=50, Italy)

The fifth question (see Figure 74) is "What were your decision triggers for moving in high energy efficient building?". In this case, some users did not respond, or partially answered, as people living in social residences do not choose the apartment directly but they get the assignment to a rent facilitated by a municipal ranking and can choose to accept or refuse.

The most significant motivations were "Nice, new, modern apartment building" and "Good thermal comfort" and this means that, as in the answers to the first question, the most important aspects are related to the psycho-physical well-being of the person. In general all the other evaluations were considered positive, apart from "Neighbors' experience about living in NZEB" that was not considered important and "Subsidy for buying NZEB flat" that was not considered significant because the social rents do not allow purchase of the house.
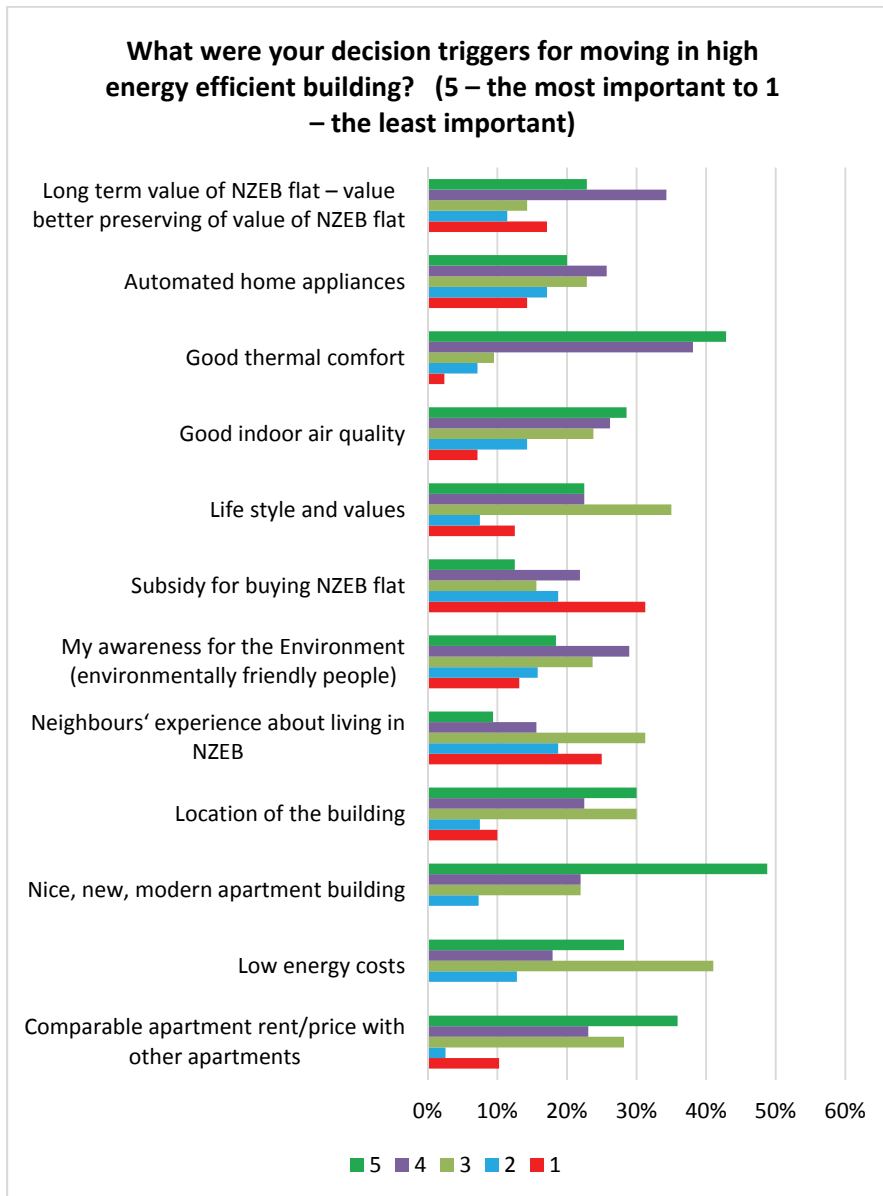
Figure 75: Mean values: "What were your decision triggers for moving in high energy efficient building?" QP2 (N=50, Italy)
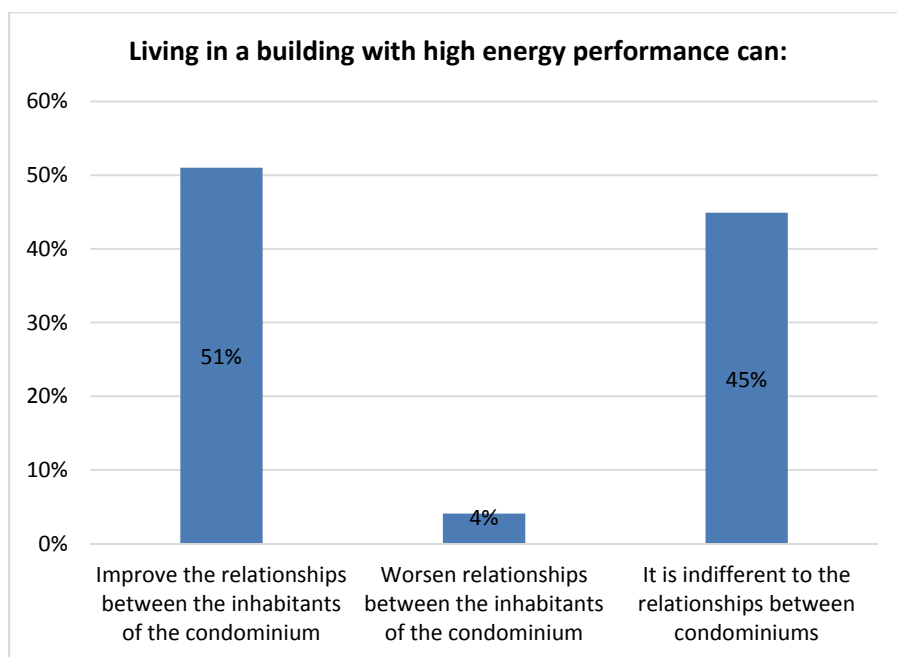
Figure 76: Opinion about: "Living in a building with high energy performance can improve the relationships between the inhabitants of the condominium?" QP2 (N=50, Italy)

The seventh question (see Figure 77) concerns the perception of safety in living in buildings with high energy performance and most people believe that they are safer (63%) or as safe as traditional ones (35%).

A building with high energy performance is:
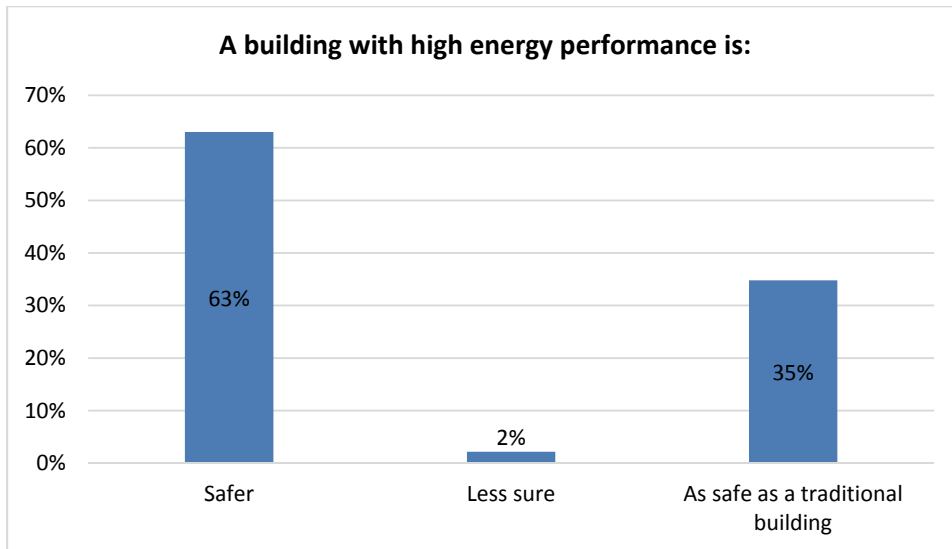
Figure 77: Opinion about: "A building with high energy performance is safer?" QP2 (N=50, Italy)

The eighth question (see Figure 78) concerns the technological skills that are necessary for those who live in buildings with high energy performance. 20% of the people did not answer this question, probably because they failed to understand the question and, comparing the answers with question number 11, they are mostly elderly or middle-aged people. Most respondents believe that technological expertise for the optimal use of NZEB buildings is useful, if not necessary.

A building with high energy performance:
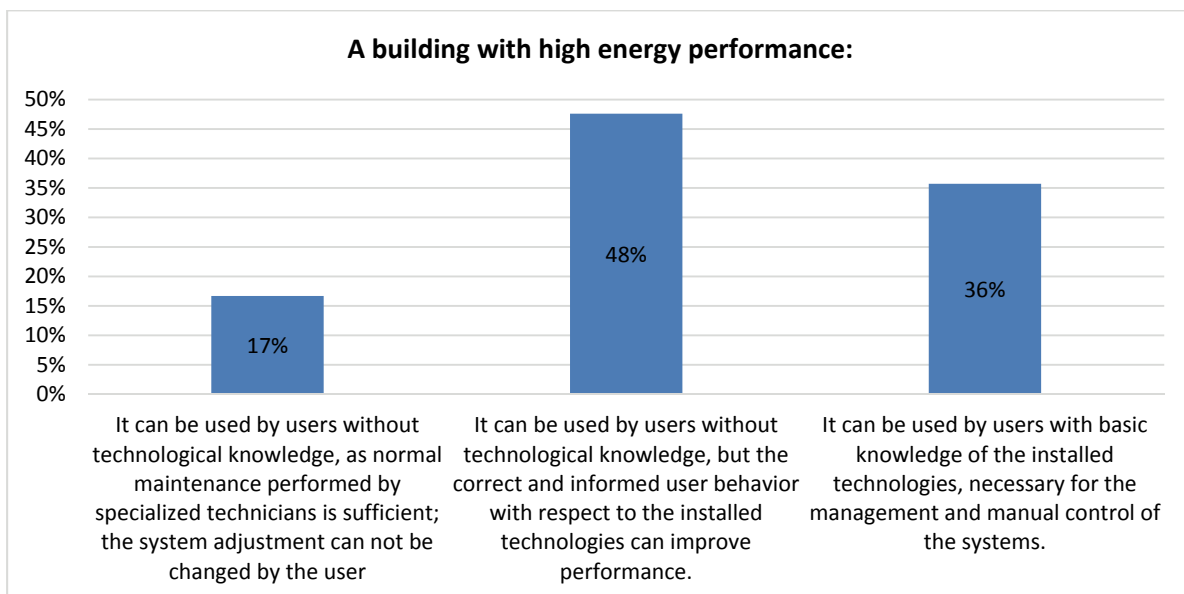
Figure 78: Opinion about: "A building with high energy performance can be used by users with or without technological knowledge?" QP2 (N=50, Italy)

The ninth question (see Figure 79), which specifically concerns the Italian situation, makes the interviewee reflect on the energy dependence of our country on the import of fossil fuels. Most believe it is a political issue (42%), to a lesser extent an economic (30%) or environmental (21%) problem, while only 7% think it is not a problem. In the question number 10 (Figure 79), most people show positive experiences regarding living in high energy efficient buildings; in particular comfort, low energy costs and lower environmental impact are appreciated. Among the negative experiences, however, there are some people who complain about high costs in consumption and maintenance and other isolated cases that complain about the excessive soundproofing and poor air permeability.
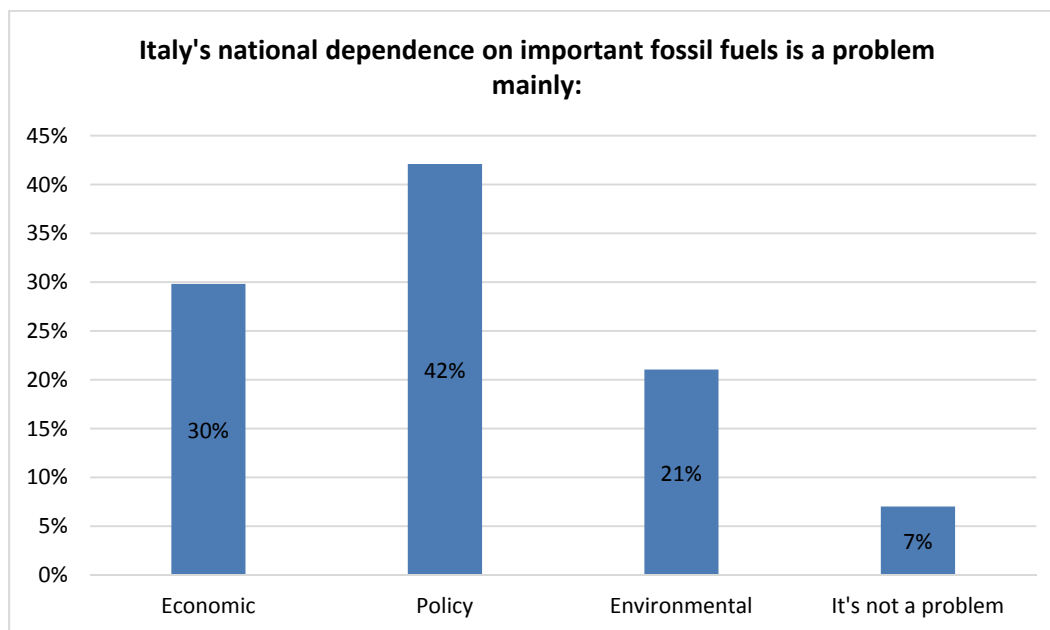
Figure 79: **Opinion about: "Is the Italy's national dependence on important fossil fuels a problem?" QP2 (N=50, Italy)**

The last question, number 11 (Figure 80), of the anonymous questionnaire, wants to identify the age group of the interviewees. There is a predominance of middle age people, 46%, while 22% are seniors, 20% are young families and 12% are young adults as described in the chart below.
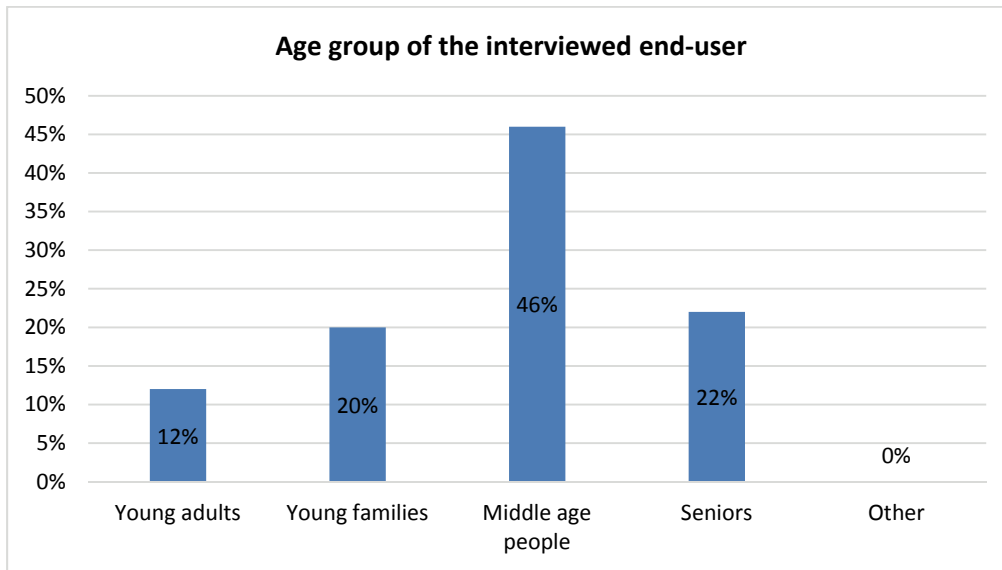
Figure 80: Questionnaire results for the question "Age group of the interviewed end-user?" QP2 (N=50, Italy)

4.4   Slovenia

In general in Slovenia most of the 97 respondents do have at least a minimum knowledge about NZEBs. Most of them see NZEBs as buildings with low energy costs, which is actually the most important parameter for the majority of respondents. Almost half of the respondents were middle age people and most of the respondents live in a building built before 1980. The first remark is that the majority of the respondents completed part 1 of the questionnaire, which states that most of them do not live in NZEB yet. The latter is not very surprising, since in Slovenia there are only few NZEBs currently built.

In the next paragraphs each question is analysed separately and presented together with the corresponding chart.

4.4.1   Questionnaire part 1 – potential future users of NZEBs

As already mentioned, the majority of the respondents do not live in an NZEB or any other high energy efficient building (see Figure 81). Consequently this questionnaire and report is very important for the Slovenian public, since it will give a valuable information regarding people's opinion about NZEBs and directions for the guide for end-users, which is part of the work package.

Do you currently live in high energy efficient building?
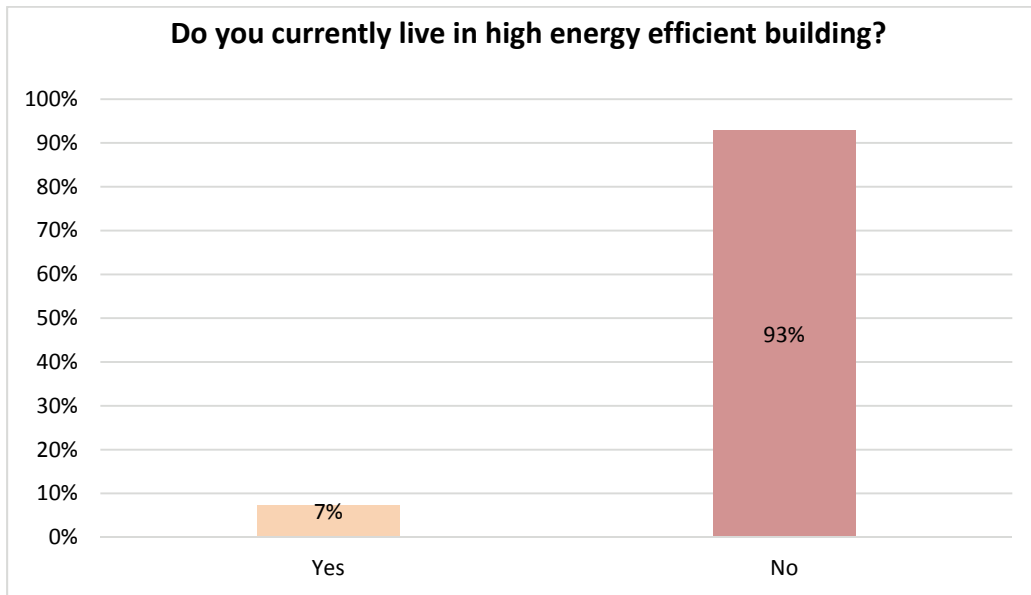
Figure 81: Ratio of people living in NZEBs, QP1 (N=97, Slovenia)

The findings about the self-estimation of knowledge about NZEBs are presented in Figure 82. From all of the respondents 33% know what an NZEB is, 47% partly know, 18% have a very rough image and 2% do not know what an NZEB is. The distribution of the answers to the 2nd question is showing that people generally have some knowledge about NZEBs, but it also indicates that the public needs more encouragement and additional information regarding advantages of living in NZEBs.

Do you know what an NZEB (Nearly Zero-Energy Building) is?
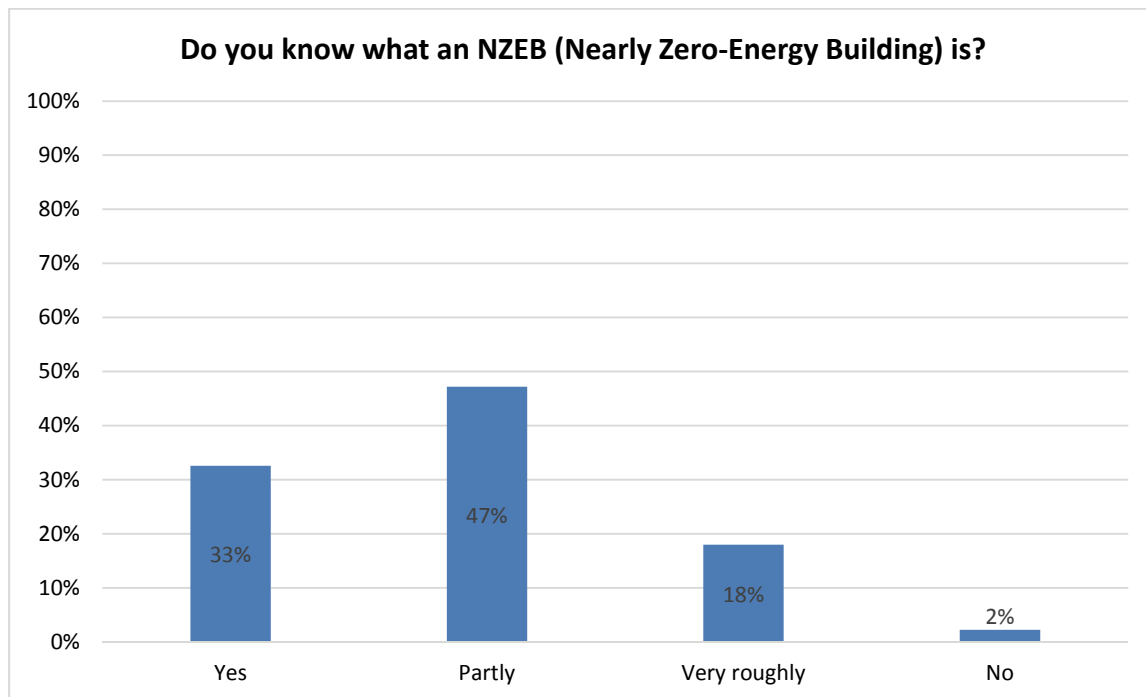
Figure 82: Questionnaire results for the question "Do you know what an NZEB (Nearly Zero-Energy Building) is?", QP1 (N=90, Slovenia)

Question 3 (see Figure 83) analyses sources of information from where respondents got the information about NZEBs and the source's quality. For the best source of information respondents chose internet and specialized web portals. Besides they rated highly also funds for financial incentives for energy efficiency and professional magazines. As a slightly worse source of information respondents chose media, fairs, events, open doors and brochures. The worst source of information are apparently NGOs and other associations (like GBC, Passive house…). Namely 52% of respondents rated this source with grade 1 (the worst).

From the Figure 83 and Figure 84 can be summarized that housing and other associations in Slovenia should be more active in the area of raising awareness and information about NZEBs.
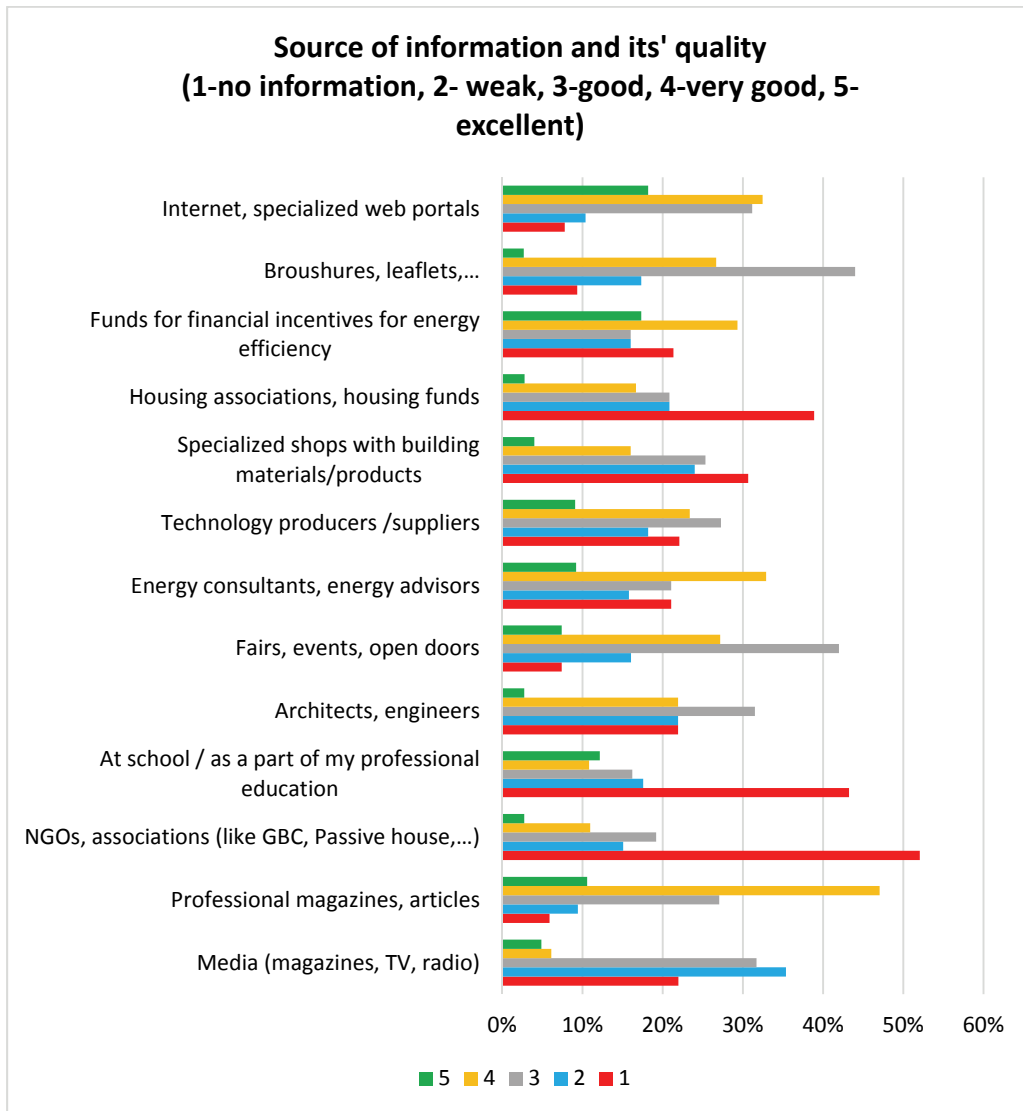
Figure 83: Question: "Where did you get the information about NZEB (Nearly Zero Energy Buildings) and how good (useful, understandable) this information was for you?", QP1 (N=90, Slovenia)
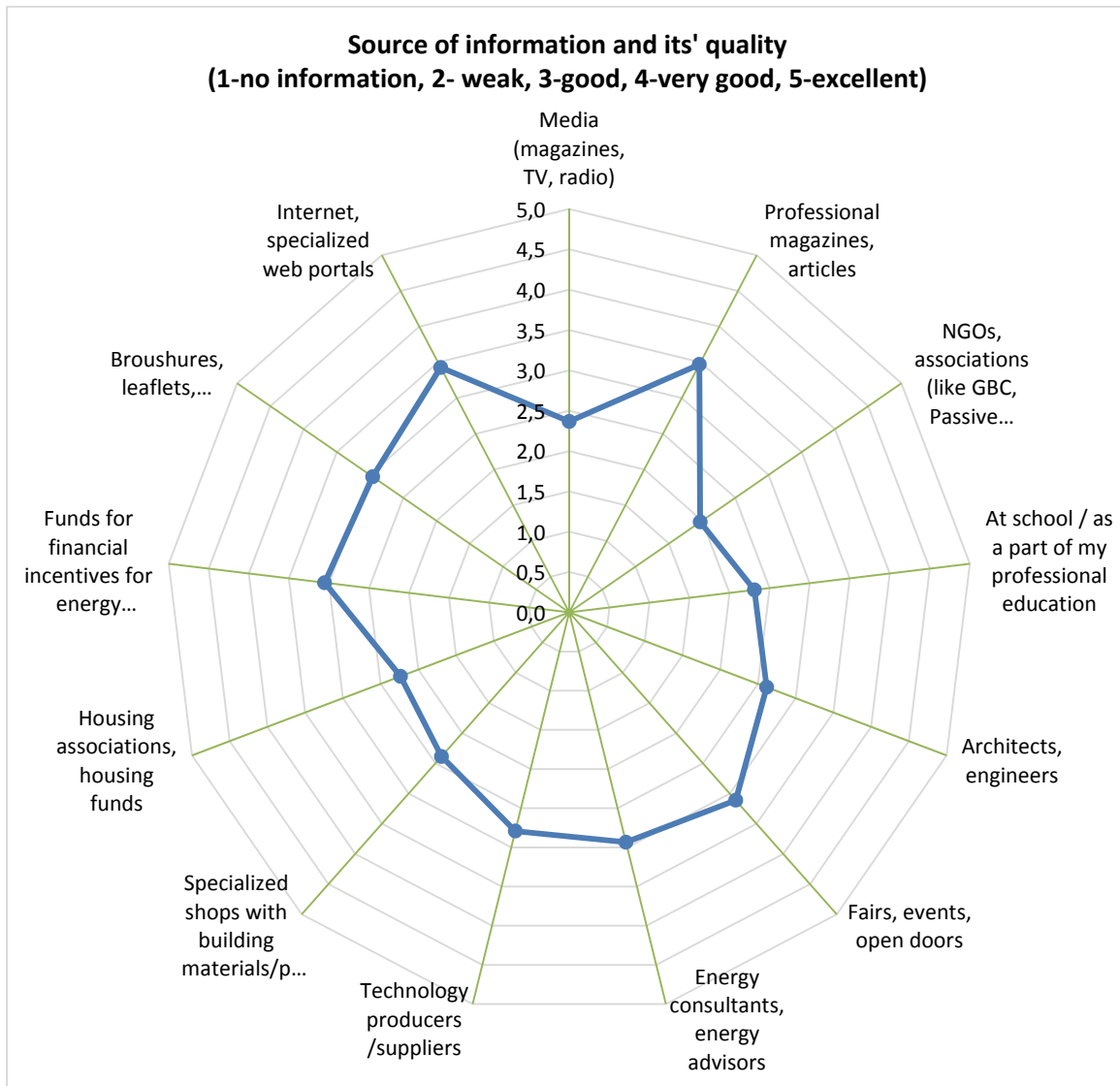
Figure 84: Mean values: "Where did you get the information about NZEB (Nearly Zero Energy Buildings) and how good (useful, understandable) this information was for you?", QP1 (N=90, Slovenia)

The question and answers presented in Figure 85 and Figure 86 give an overview of what is important to apartment users. According to questionnaire results in Slovenia people value the most low energy costs, good thermal comfort, fresh air in the apartment, low energy consumption and good access to daylight. Mentioned answers were all circled with the highest grade (5) between 50 % and 60 % of all respondents. Also, healthy materials used for floor finishing, floor covering and paints are relatively important to Slovenian respondents, alongside with low rents, low management and maintenance costs. The least important is currently e-mobility.

The ratio of importance of the mentioned parameters is presented in Figure 85 and Figure 86.
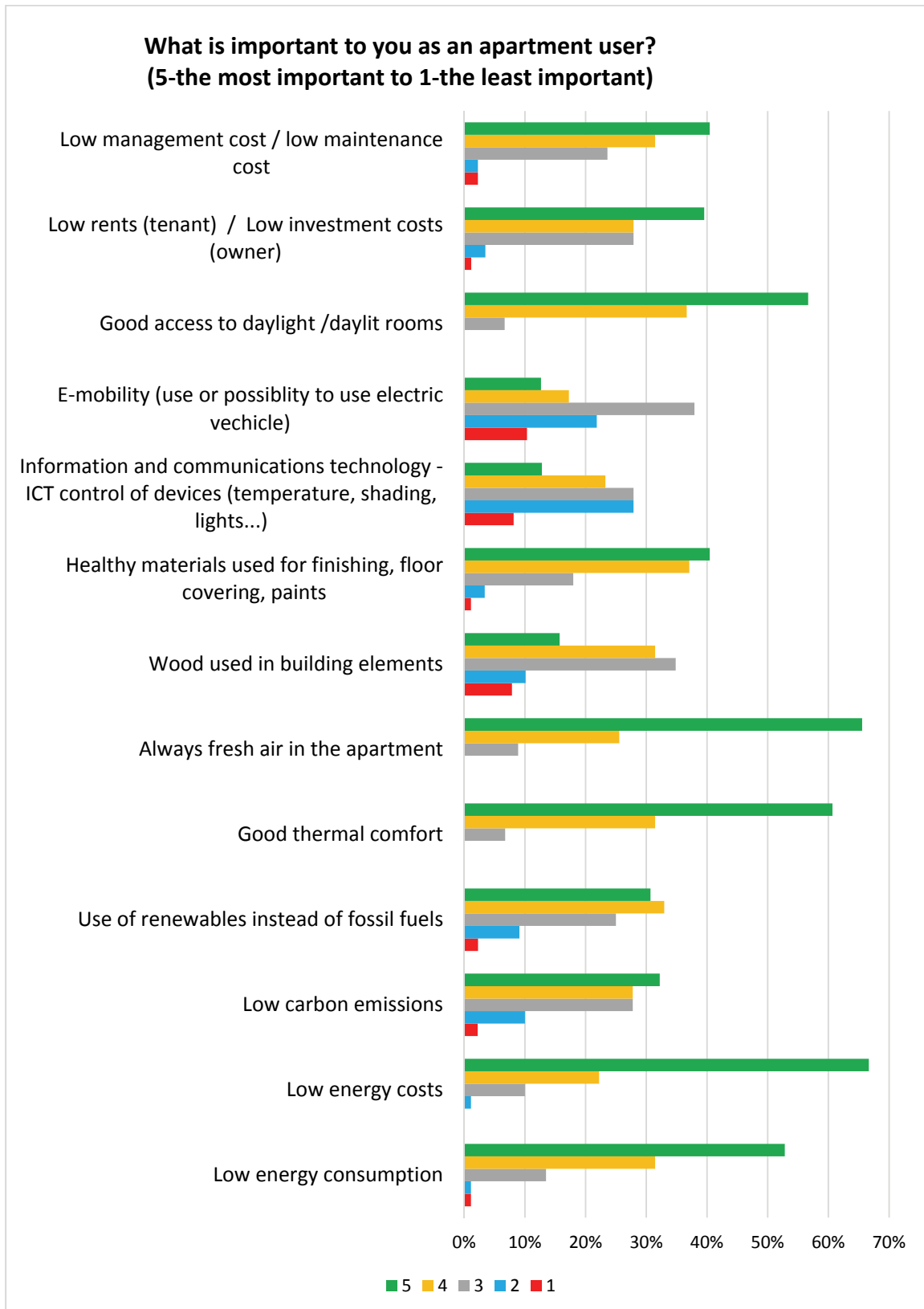
Figure 85: Question: "What is important for you as an apartment user?" , QP1 (N=90, Slovenia)
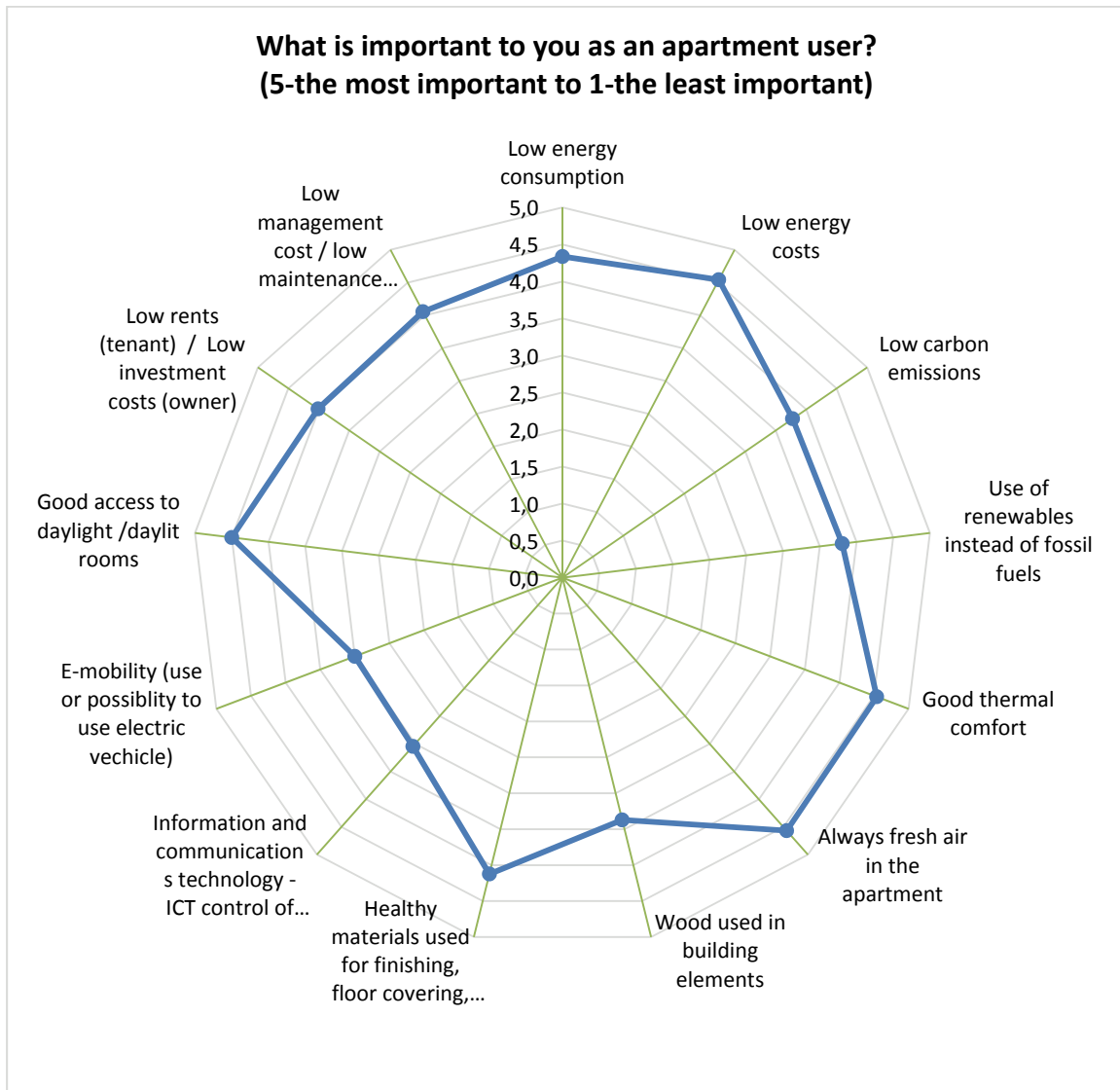
Figure 86: Mean values: "What is important for you as an apartment user?", QP1 (N=90, Slovenia)

The question in Figure 87 indicates how people look at NZEBs from the maintenance costs point of view. Expectedly, there were also sceptics, who think that NZEBs have higher maintenance costs; to be precise 32% of the respondents had this opinion. Their doubts and concerns are summarized in question 8 ("Do you have any concerns or open questions about living in NZEBs and other high energy efficient buildings? Please describe them").

On the other side, 50% of the respondents believe that living in NZEBs would not cause higher maintenance costs. The rest of the respondents couldn't decide or don't know whether maintenance cost would be higher or not. The described ratio of answers can be seen in the Figure 87.

Would you have more maintenance costs if you lived in an NZEB comparing to ordinary multi-family house?

- Yes: 32%
- No: 50%
- I don't know: 18%
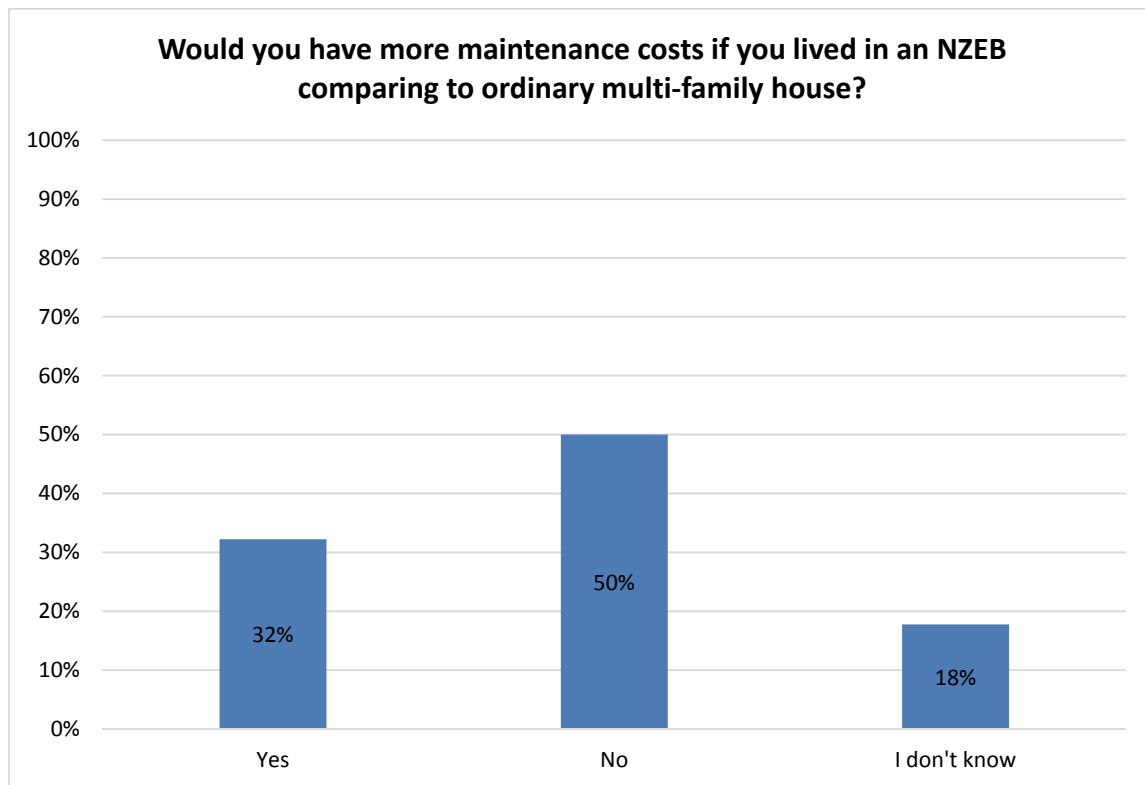
Figure 87: Questionnaire results for the question "Would you have more maintenance costs if you lived in an NZEB comparing to an ordinary multi-familiy house?", QP1 (N=90, Slovenia)

The question in Figure 88 and Figure 89 gives an overview, which technologies people consider as typical technologies that are implemented in NZEBs. Mainly, respondents chose good airtightness as the technology that defines most NZEBs, since 60% of respondents circled the highest grade for good airtightness. Furthermore, respondents consider also windows with triple glazing, high thickness of insulation, rational floor plan, domestic appliances with A++ energy label and renewable energy sources (RES) as technologies that are generally used in NZEBs. Technologies that they consider as less common in NZEBs are on-site generation of RES, feed-into the grid and smart technologies in building.

It can be noted that respondents considered more or less all of the listed technologies as an important part of NZEBs, which confirms that in general they have a quite good idea of NZEBs, what can also be seen from the Figure 82. Presumably they do automatically connect NZEBs with the use of RES, especially photovoltaics. Some concerns regarding the technologies used in NZEBs were expressed and are also summarized in question 8.

Technologies that characterize NZEBs
(5-the most important to 1-the least important to)
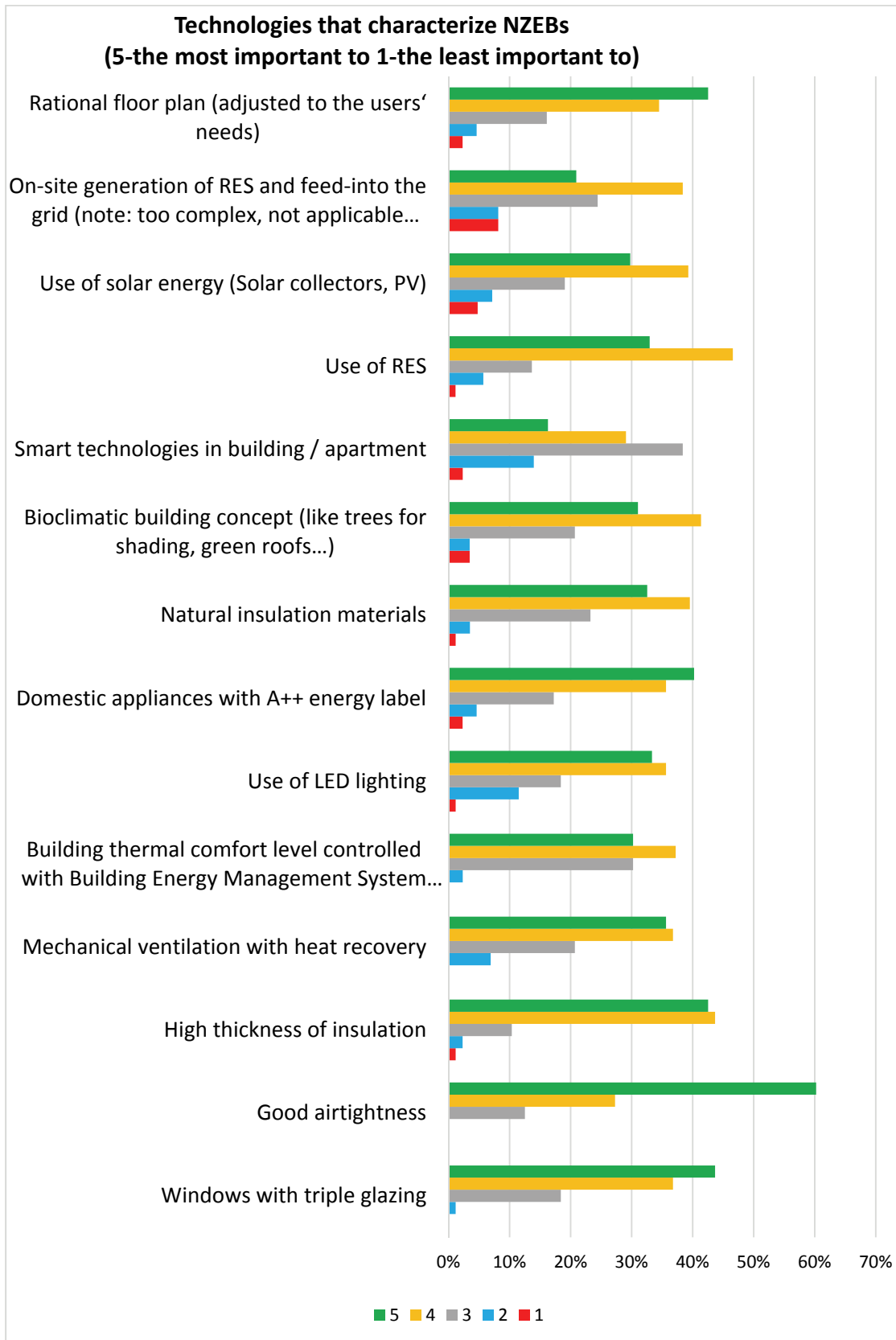
Figure 88: Question: "What do you think which technologies characterize most NZEBs?", QP1 (N=90, Slovenia)

Technologies that characterize NZEBs
(5-the most important to 1-the least important to)
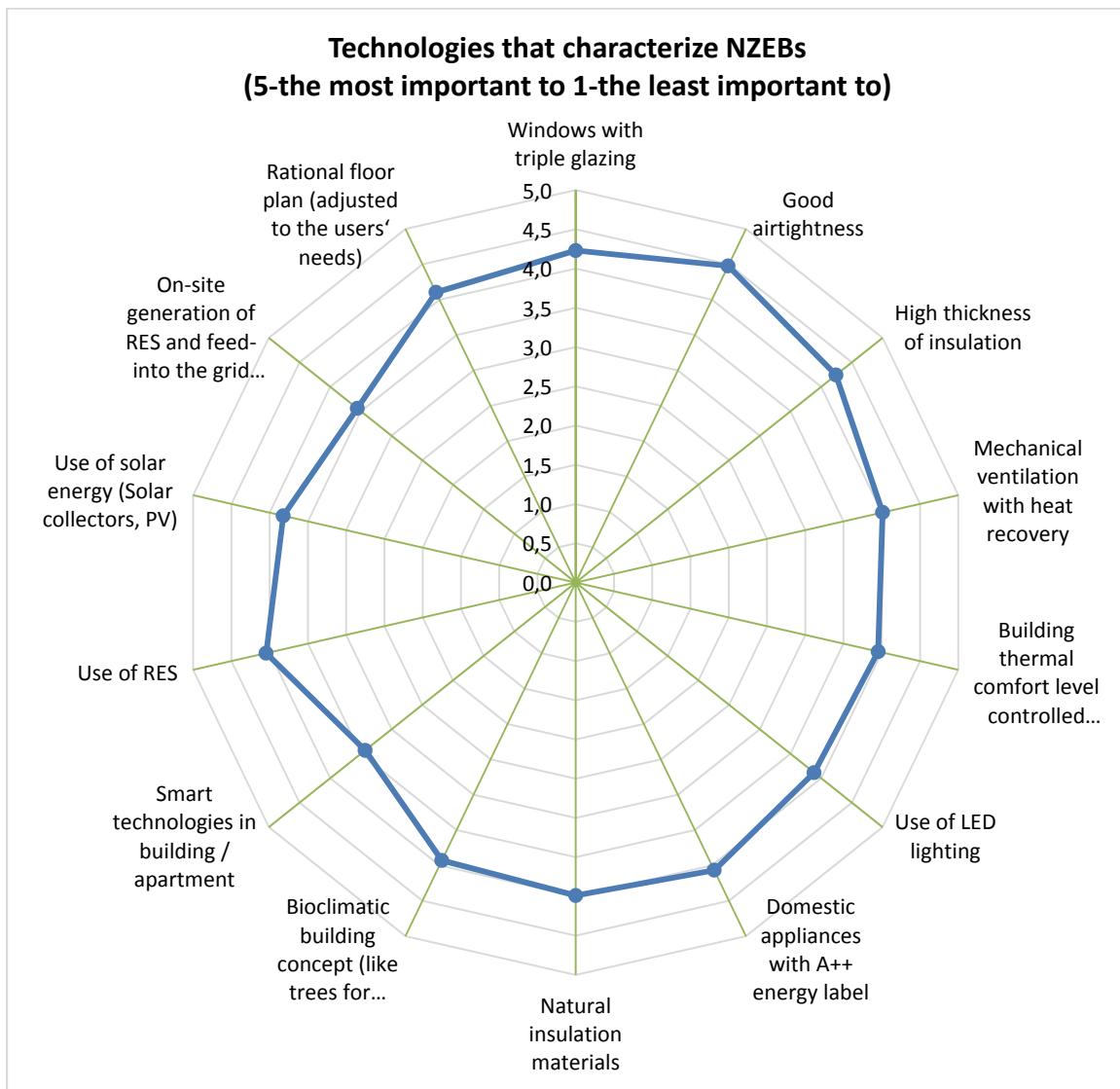
Figure 89: Mean values: "What do you think which technologies characterize the most NZEBs?", QP1 (N=90, Slovenia)

In the Figure 90 and Figure 91, the decision triggers, for which people believe that would convince them to live in NZEBs, were checked. The most important reason for living in NZEBs were low energy costs, that were already highly rated at the question 4, where user's desires were checked. Besides, reasons that would convince people to live in NZEBs are good indoor quality, location of the building, good thermal comfort, comparable apartment rent/price and of course subsidy for buying a NZEB flat. Slightly less important reasons are neighbours' experiences about living in NZEBs, long-term value of NZEB flat and awareness for the environment. The least important decision trigger are automated home appliances. A few of respondents even issued some concerns regarding devices installed in apartments, which is also summarized at question 8. For a quicker overview of decision triggers for living in NZEBs, results are also presented in a radar chart.
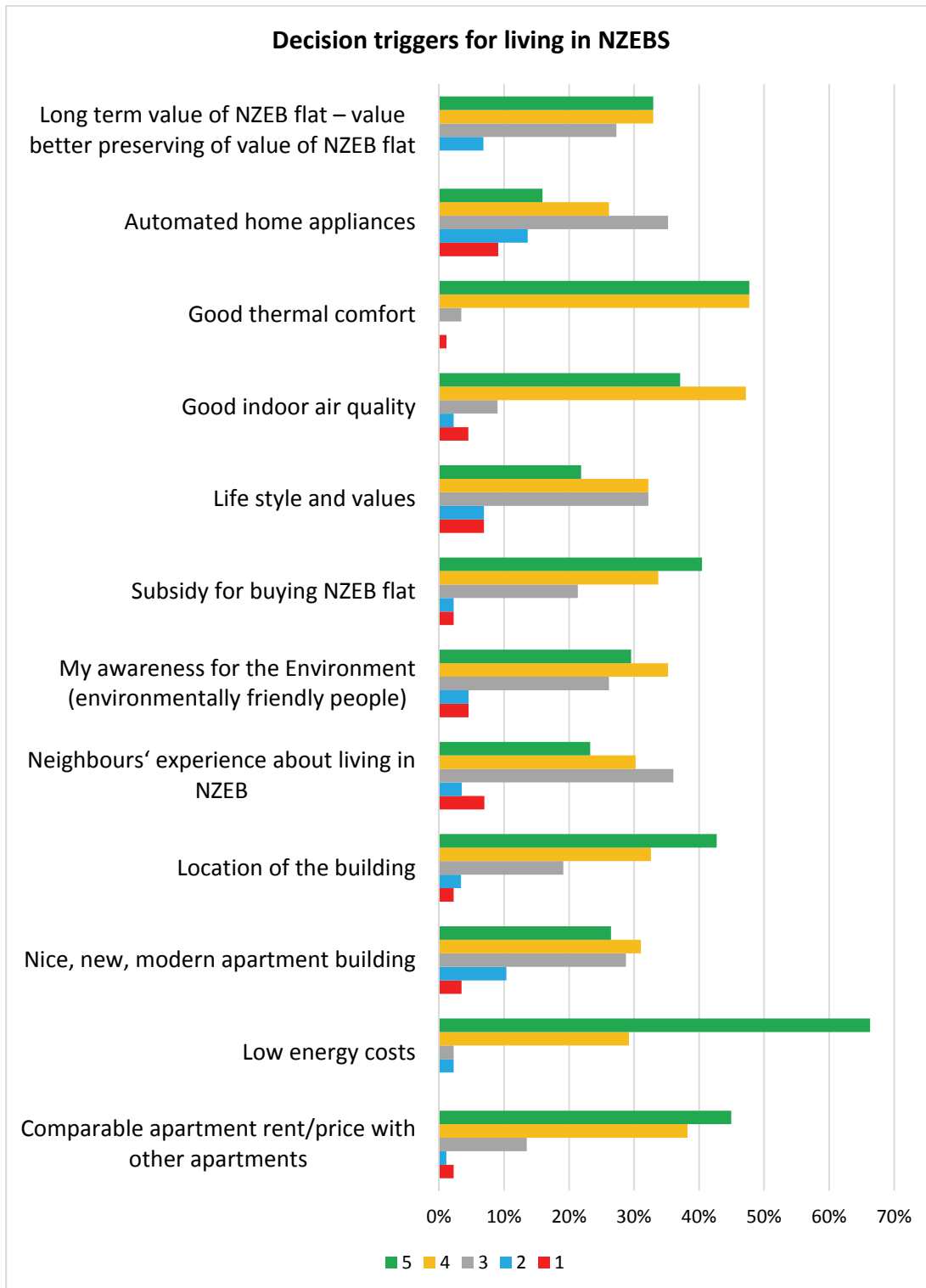
Figure 90: Question: "What would be your decision triggers for living in an NZEB?", QP1 (N=90, Slovenia)
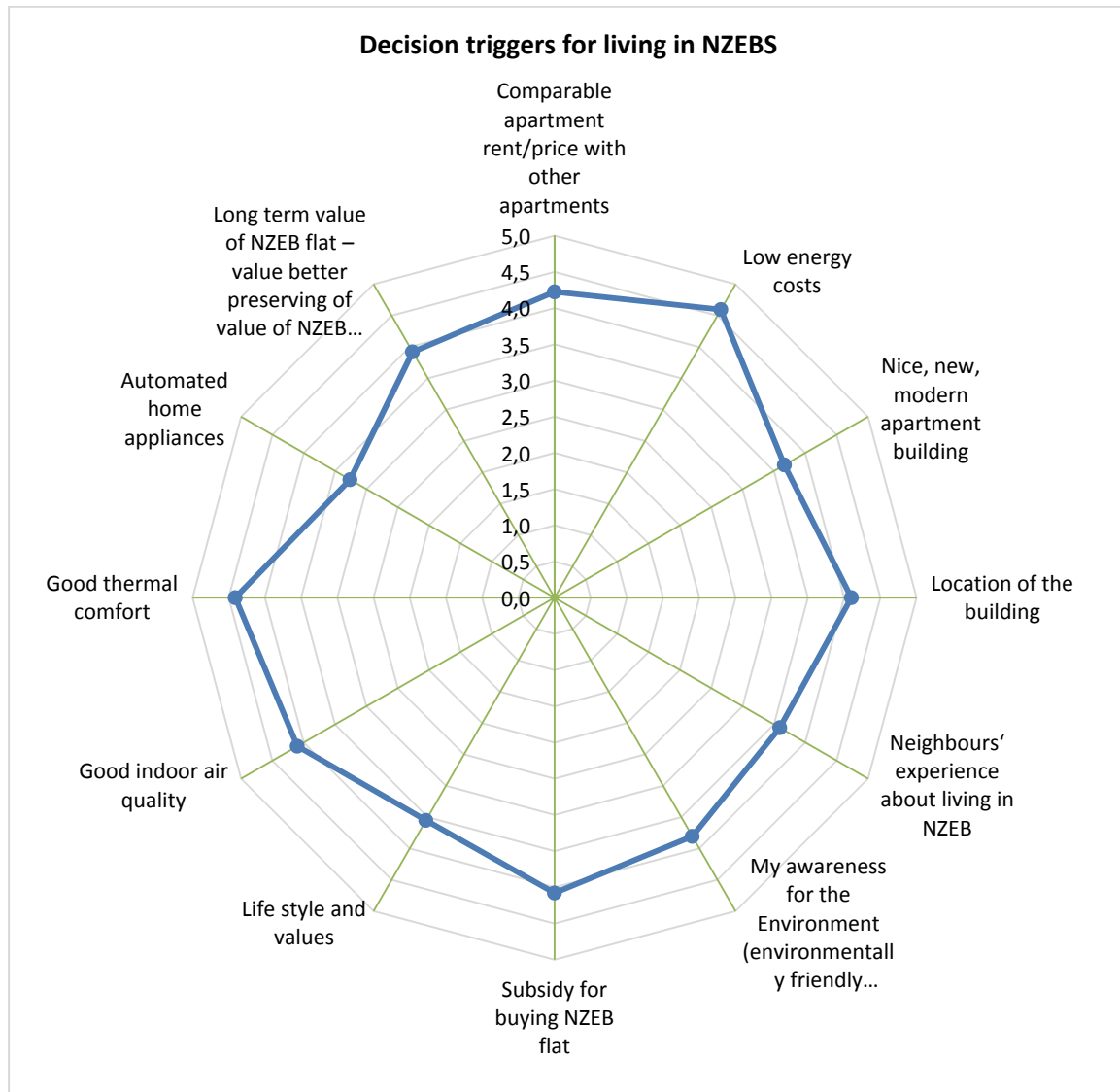
Figure 91: **Mean values: "What would be your decision triggers for living in an NZEB?", QP1 (N=90, Slovenia)**

As already mentioned, at question 8 ("Do you have any concerns or open questions about living in NZEBs and other high energy efficient buildings? Please describe them") respondents have written their concerns and other open questions about living in NZEBs and other high energy efficient buildings.

First, respondents had restraints regarding building operation in case it comes to a failure of the photovoltaics system. Connected with electrical devices, they wonder that there are too many devices installed, which actually worsens life in NZEB for an average user and actually increase investment and maintaining costs.

Also a common question was regarding construction, maintenance and renting costs. They wonder if it is worth to build NZEBs in a long term, since they don't have an image how big

the maintenance costs will be. Also, they expressed doubt about actually reaching the wanted energy balance, if each apartment owner uses devices arbitrarily and unprofessionally. Another expressed concern is about airtightness, because respondents doubt it is reasonable to reach low airtightness. Besides, one of the respondents recommended to enable voluntary construction of NZEBs facilities with subsidies, instead of forcing it with legislation.

In question 9 (see Figure 92), age groups of the interviewed end-users were checked. Almost half of the respondents were middle age people, 24% of them were young families, 16% were seniors and 11% were young adults.
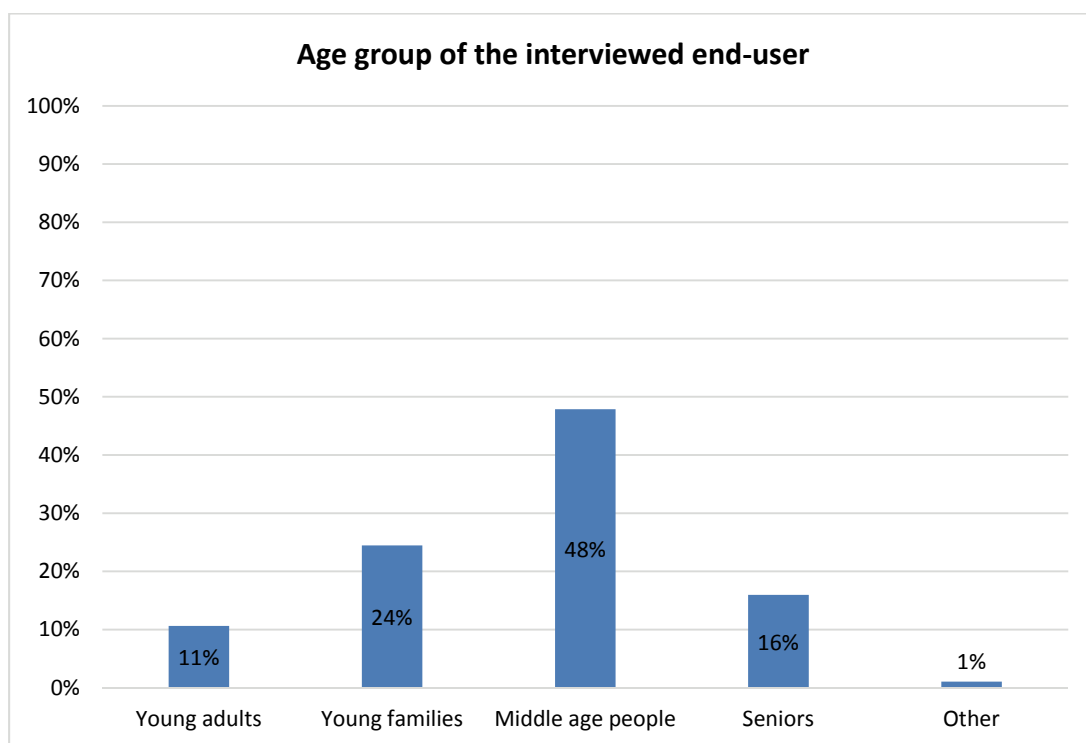
Figure 92: Questionnaire results for the question "Age group of the interviewed end-user", QP1 (N=90, Slovenia)

Almost half of the interviewed end-users live in an old building, built before 1980 (45%), 30% of them live in a regular building (built from 1981 to 2001) and 24% live in a contemporary building (2002 – present) (see Figure 93).

In which type of building do you currently live?

Contemporary building (2002 - present)	24%
Regular building (1981 – 2001)	30%
Old building (built before 1980)	45%
Other	1%
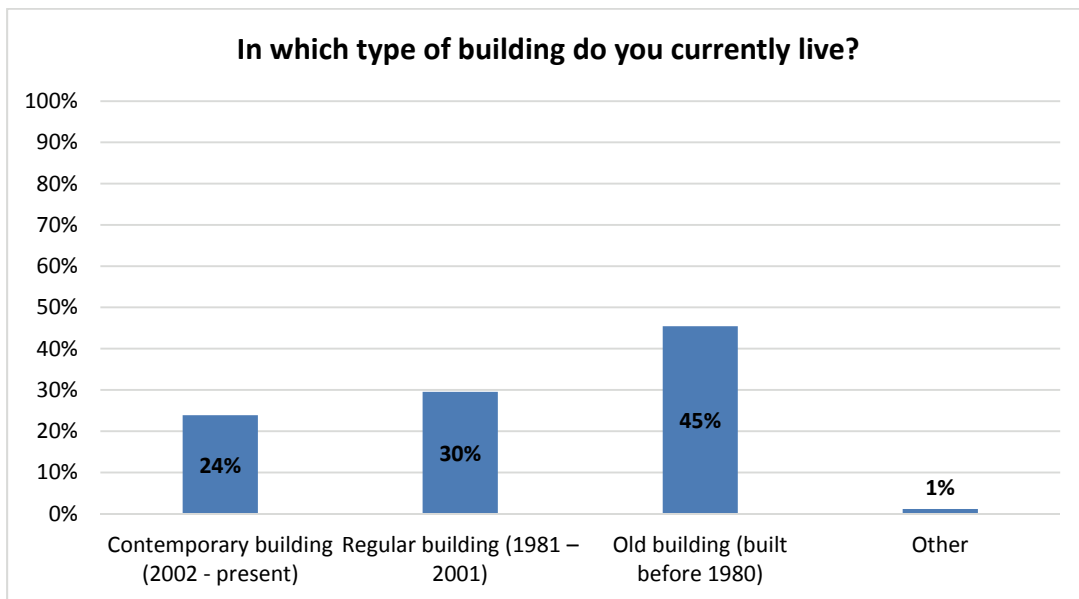
Figure 93: Questionnaire results for the question "In which type of building do you currently live?", QP1 (N=90, Slovenia)

In the question in Figure 94, the aim was to discover how many respondents live in already renovated buildings. Many of them already live in renovated buildings, to be specific 48%. Buildings of 34% of respondents were only partly renovated; Buildings of the rest of the respondents still haven't been renovated.

Was your building recently energy renovated?

Yes	18%
Partly	34%
No	48%
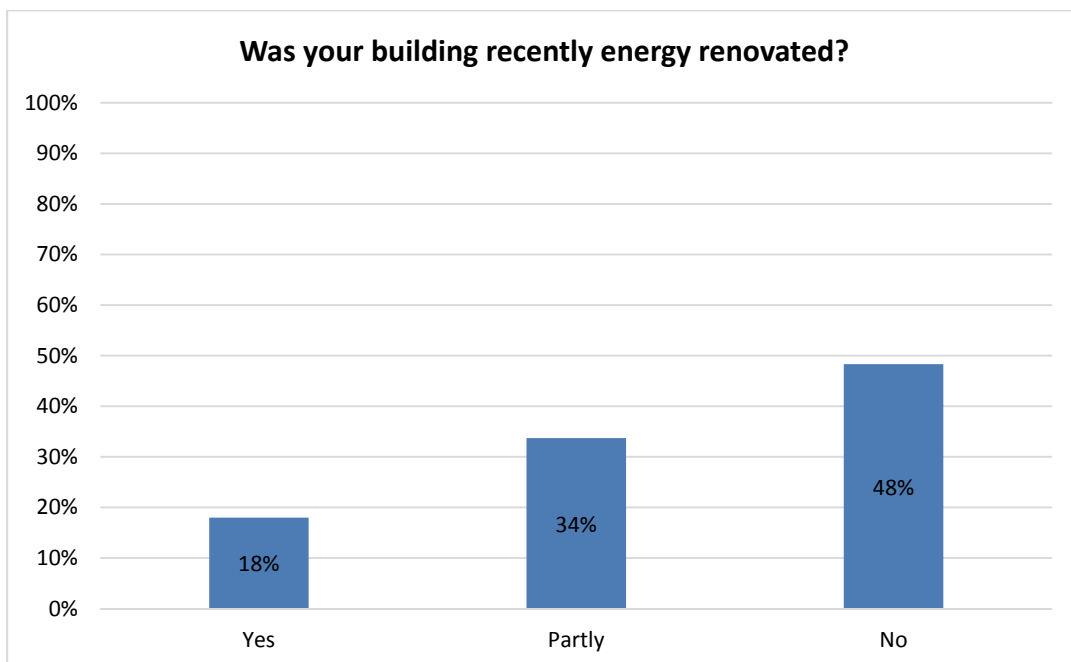
Figure 94: Questionnaire results for the question "Was your building recently energy renovated?", QP1 (N=90, Slovenia)

With the last question (see Figure 95) in this part of the questionnaire the goal was to check, if respondents are considering moving in a new apartment in the period of next 5 years. The answers were quite evenly divided, since 56 % of them answered that they are not planning and the rest that they are planning to move in a new apartment.

Are you considering moving in a new apartment in the period of next 5 years?
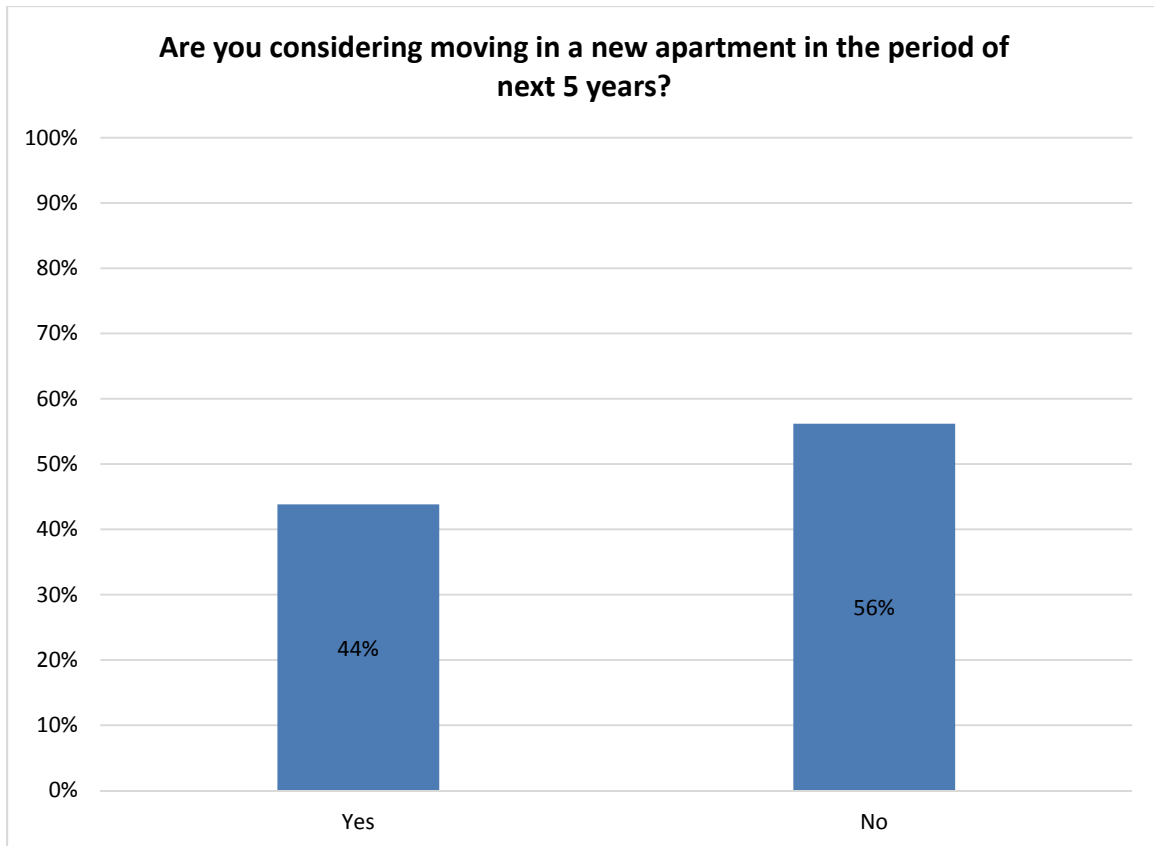
Figure 95: **Questionnaire results for the question "Are you considering moving in a new apartment in the period of the next five years?", QP1 (N=90, Slovenia)**

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4.4.2 Questionnaire part 2 – end-users of NZEBs

In the 2nd part of the questionnaire we focused on people who already live in NZEBs. With the first question in this part of the questionnaire we checked, what is important to our respondents as apartment users. The results are very similar to those in the 1st part of the questionnaire. So, the important parameter in this case are low energy costs. After that, respondents chose low rents/investment costs, fresh air in the apartment, good thermal comfort and access to daylight. As least important they chose e-mobility and information and communications technology. For the latter they also issued some concerns, which are describe in the question 6 ("Please describe your positive/negative experiences regarding living in high energy efficient building"). The overview of answers to this question is presented in the Figure 96 and Figure 97.
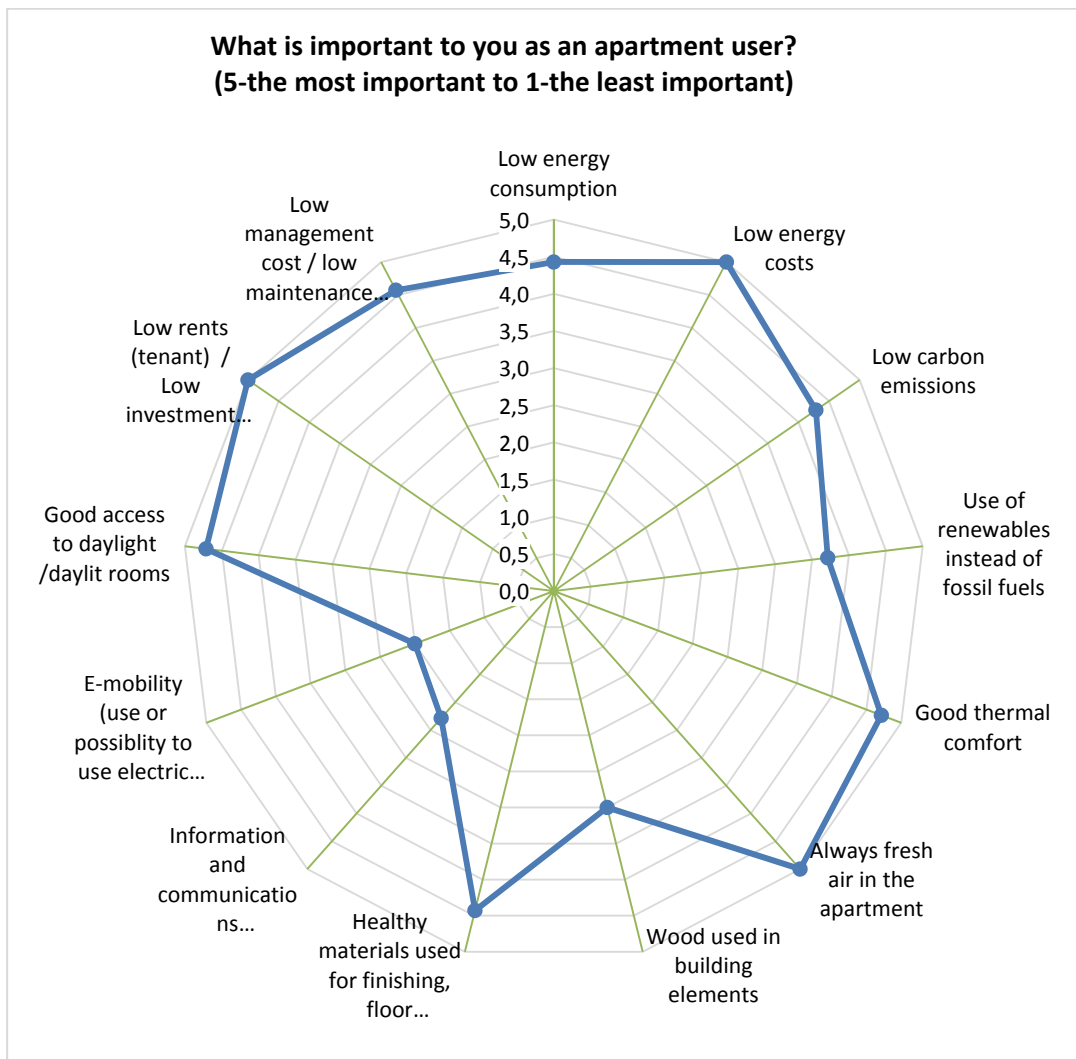
Figure 96: Mean values: "What is important for you as an apartment user?", QP2 (N=7, Slovenia)
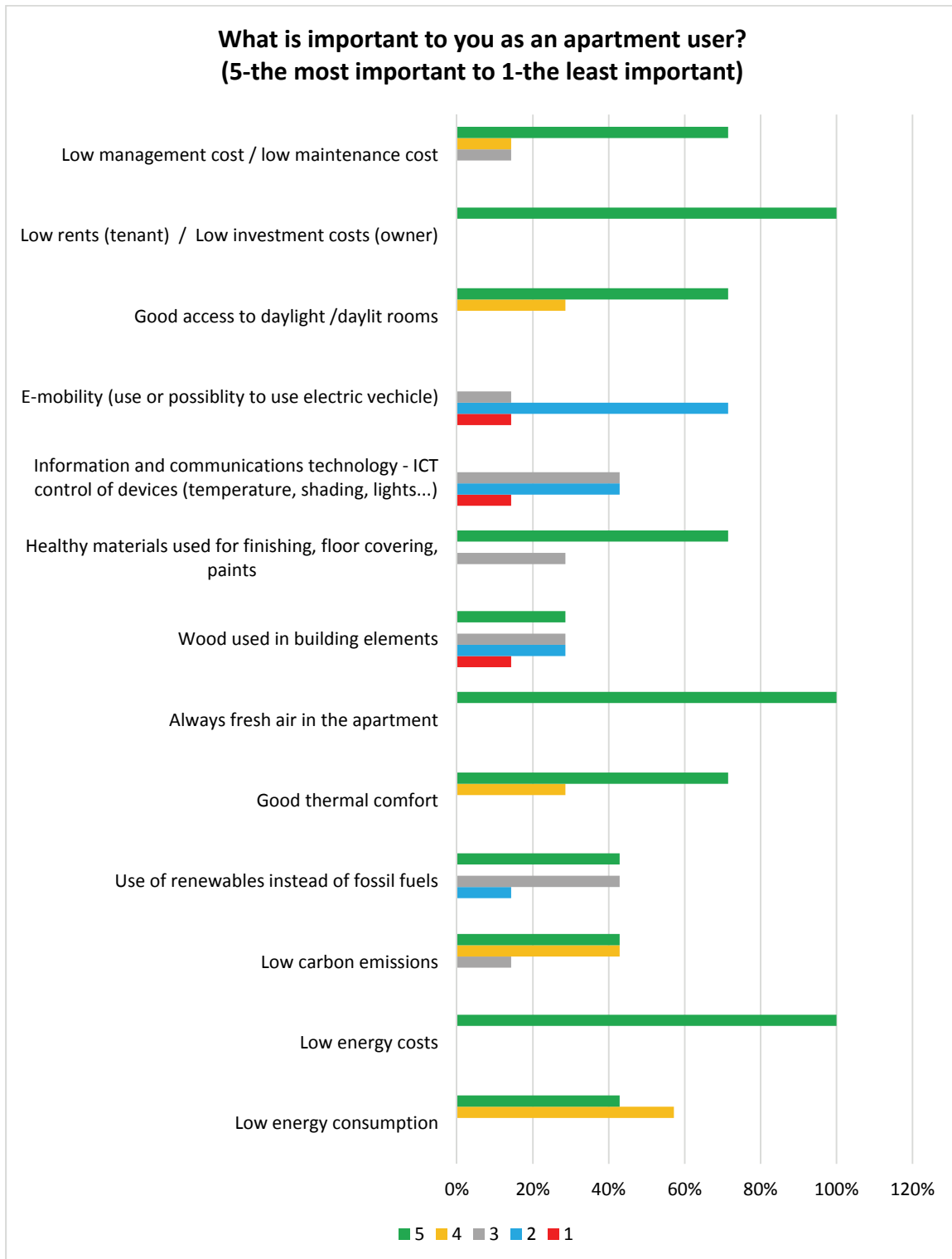
Figure 97: **Question: "What is important for you as an apartment user?", QP2 (N=7, Slovenia)**

According to our respondents who already live in NZEBs, they mainly do not have more maintenance costs, since 71% of them responded with "No" and 29% of respondents do not know whether they have higher maintenance costs or not, see Figure 98.
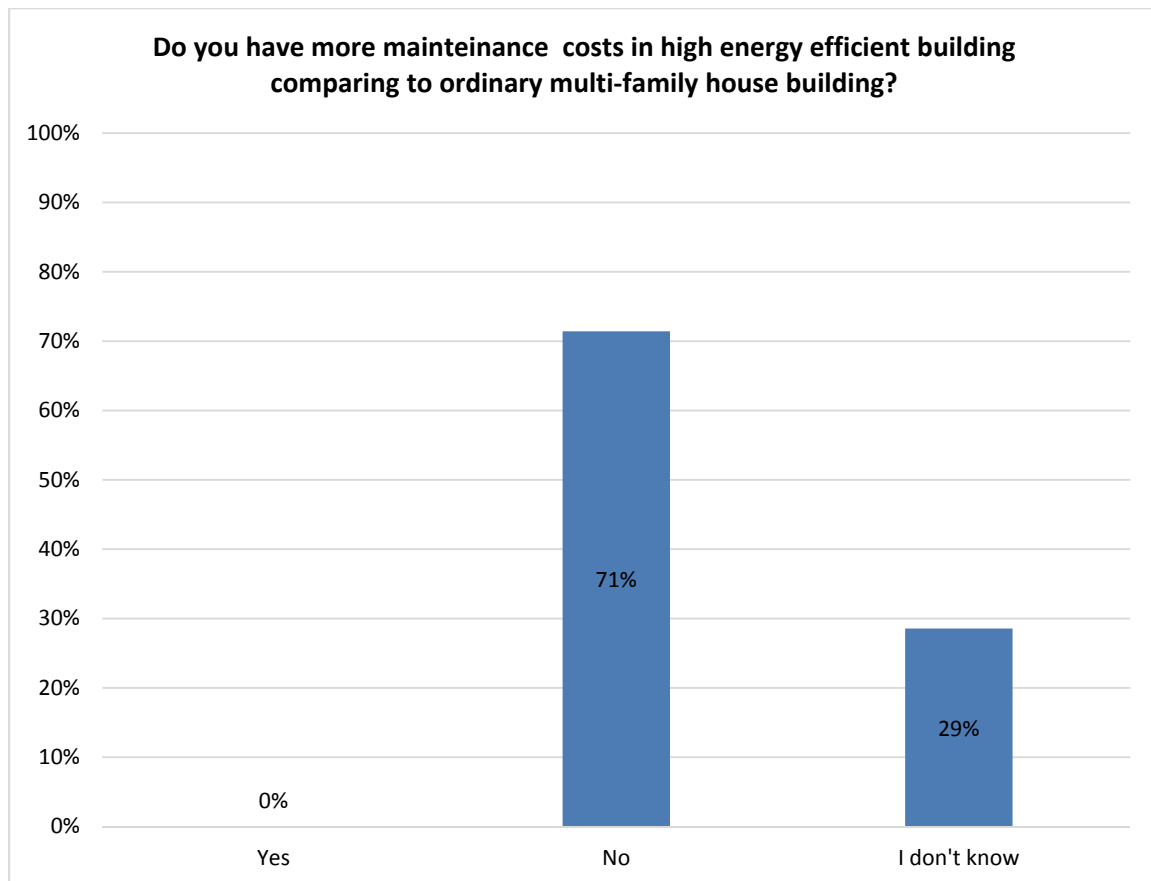
Figure 98: Questionnaire results for the question "In your opinion, do you have more maintenance costs in high energy efficient building comparing to ordinary multi-family house building?", QP2 (N=7, Slovenia)

Since six out of seven respondents live in the same NZEB, the results for technologies that characterize high energy efficient buildings are quite equally divided. They all use renewable energy sources, mechanical ventilation with heat recovery, have good airtightness, use windows with triple glazing and high thickness of insulation. 86% of respondents use domestic appliances with A++ energy level, 43% use LED lighting and 14% of them use smart technologies in the apartment. All of the mentioned ratios of used technology can be seen on Figure 99.
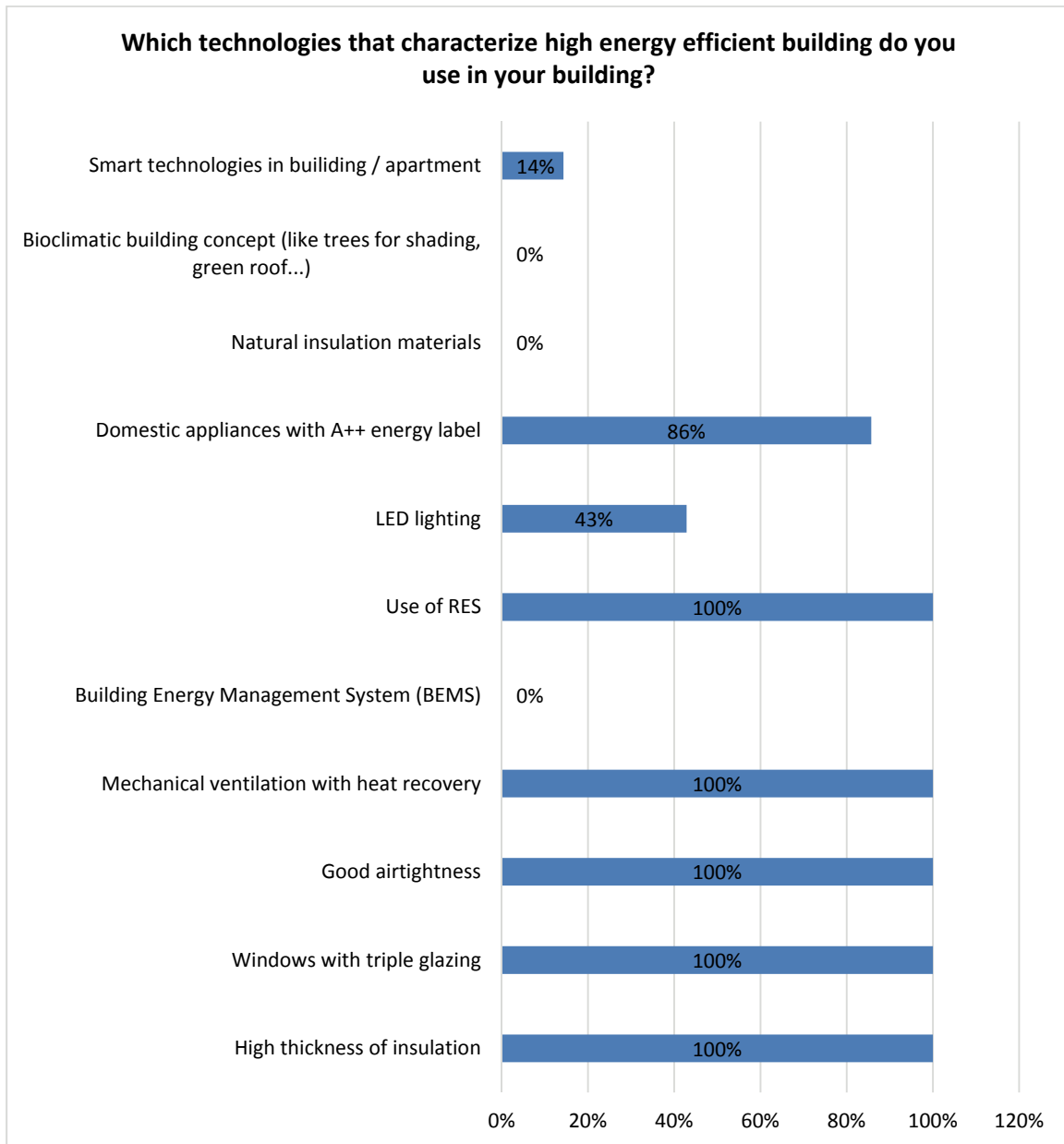
Figure 99: Questionnaire results for the question: "Which technologies that characterize high energy efficient buildings do you use in your building?", QP2 (N=7, Slovenia)

On the Figure 100 we can see which type of renewable energy sources (RES) our respondents use. They all use solar energy, 86% of them use heat pumps and 86% also use biomass. Other types of RES are not used by our respondents.
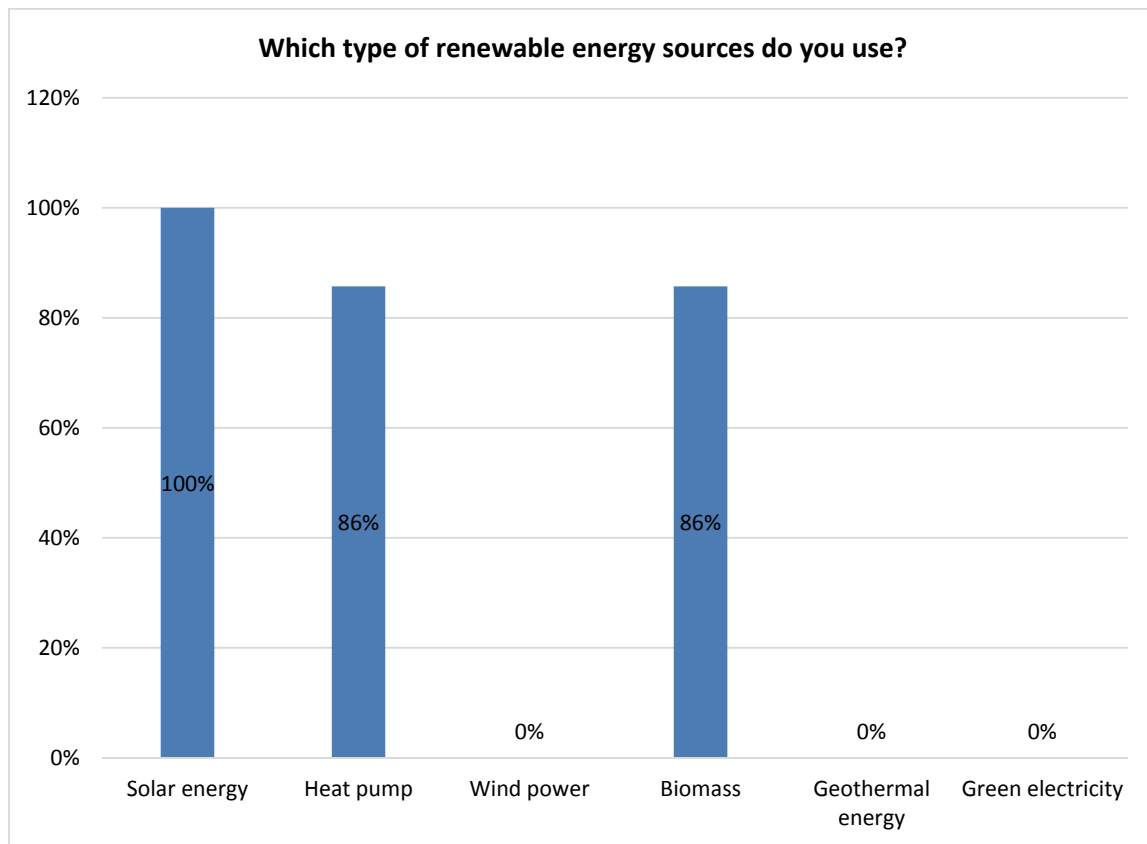
Figure 100: Questionnaire results for the question "Which type of renewable energy sources do you use?", QP2 (N=7, Slovenia)

Figure 101 and Figure 102 present reasons, which led our respondents to decide for living in NZEBs. As we can see, low energy costs and good thermal comfort are the two most important reasons. Very important are obviously also good indoor air quality, the location of the building and comparable rent/price with other apartments. Also, we can notice that people do not tend to rely on other people's opinion, since the respondents rated very low the answer "Neighbours' experience about living in NZEBs". The latter can be connected with the fact that in Slovenia there are very few NZEBs. The least important reason are automated home appliances, which are obviously very often the subject of debate, since many respondents doubt in their added value. Their concerns about technologies used in NZEBs is expressed in question 6.
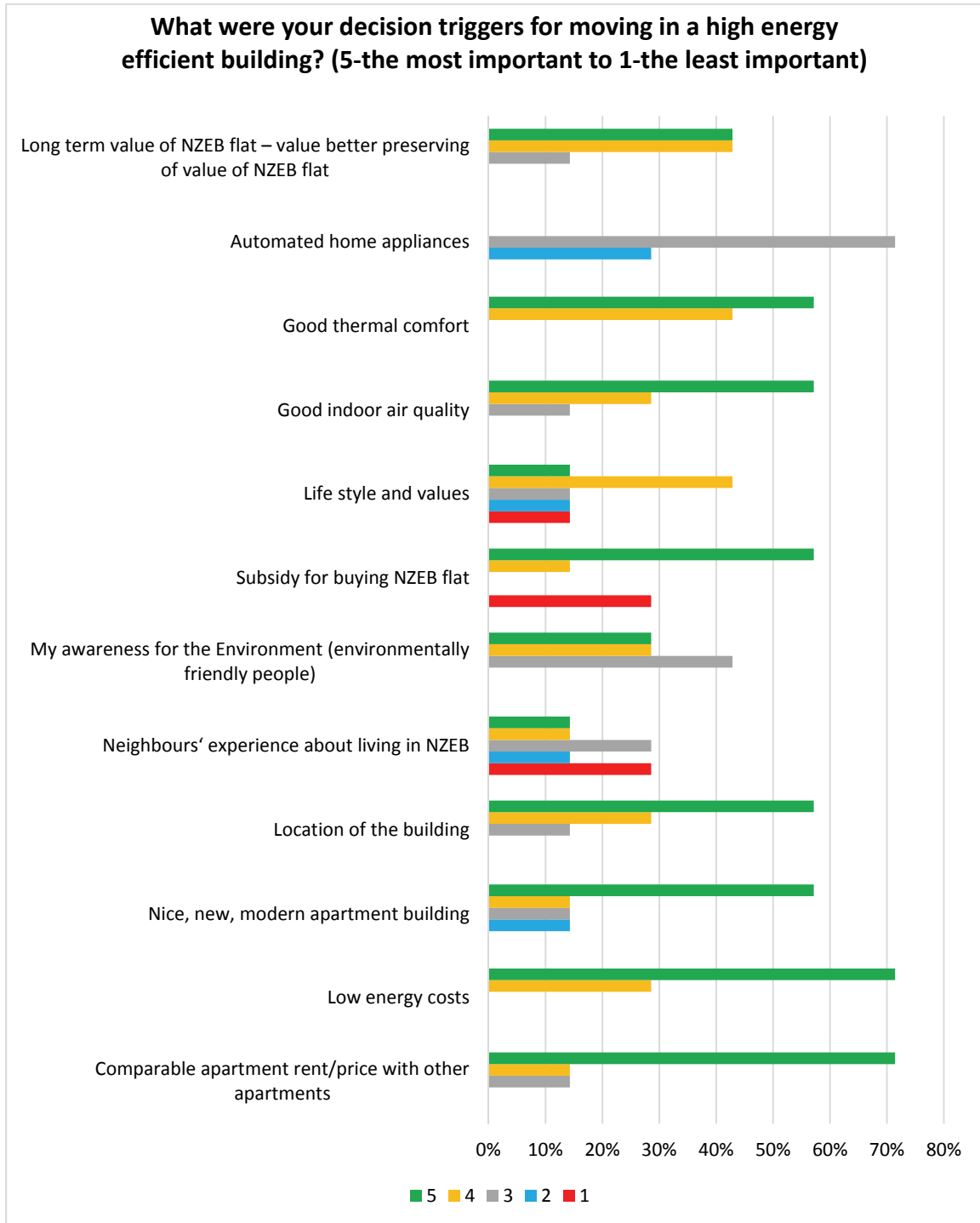
Figure 101: Question: "What were your decision triggers for moving in a high energy efficient building?", QP2 (N=7, Slovenia)
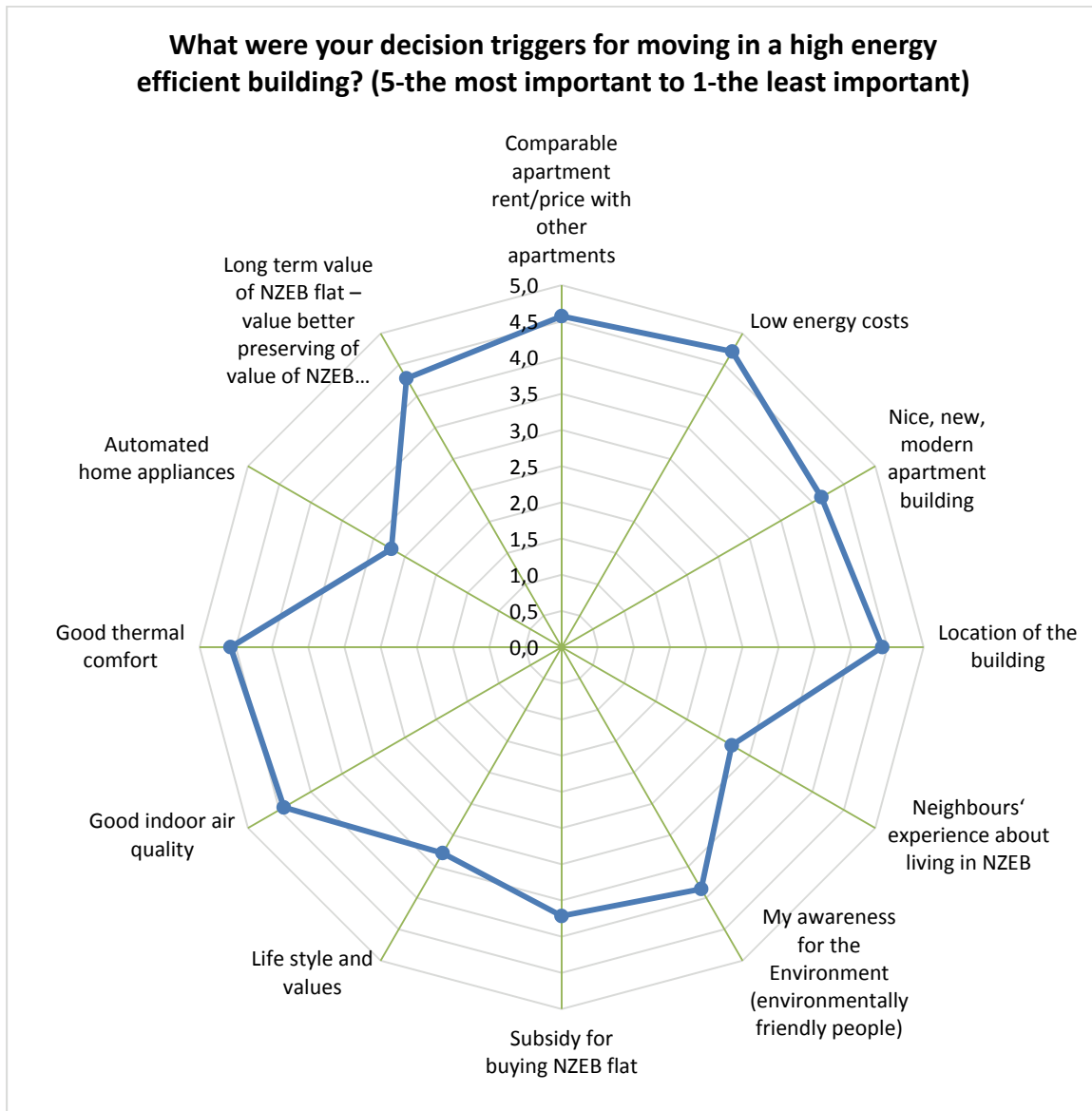
Figure 102: Mean values: "What were your decision triggers for moving in a high energy efficient building?", QP2 (N=7, Slovenia)

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In the next question (question 6) we asked respondents about their concerns and positive/negative experiences about living in NZEBs. Two respondents stated that they are not sure if the maintenance and management costs are low, but caretakers (should) have less work in NZEBs than in regular buildings. In their opinion the mentioned costs should be even lower.

Moreover, a complaint regarding mechanical ventilation with heat recovery was stated. Namely, the issue is that it forcibly cools with air condition system, when the outside temperature at night is 10 °C. Besides, in their opinion information and communications technology, which is often in regular life unimportant, increase investment costs. Also, one of the respondents issued that solar energy should be more widespread in Slovenia.

End-users are not asked often enough about materials and later they are the ones who have problems and additional costs with renovation or material change. In addition, one of the respondents claimed that construction companies have too much freedom when it comes to material choosing, with which they reduce their costs.

With the last question we checked the age group of our respondents, which is presented in Figure 103.
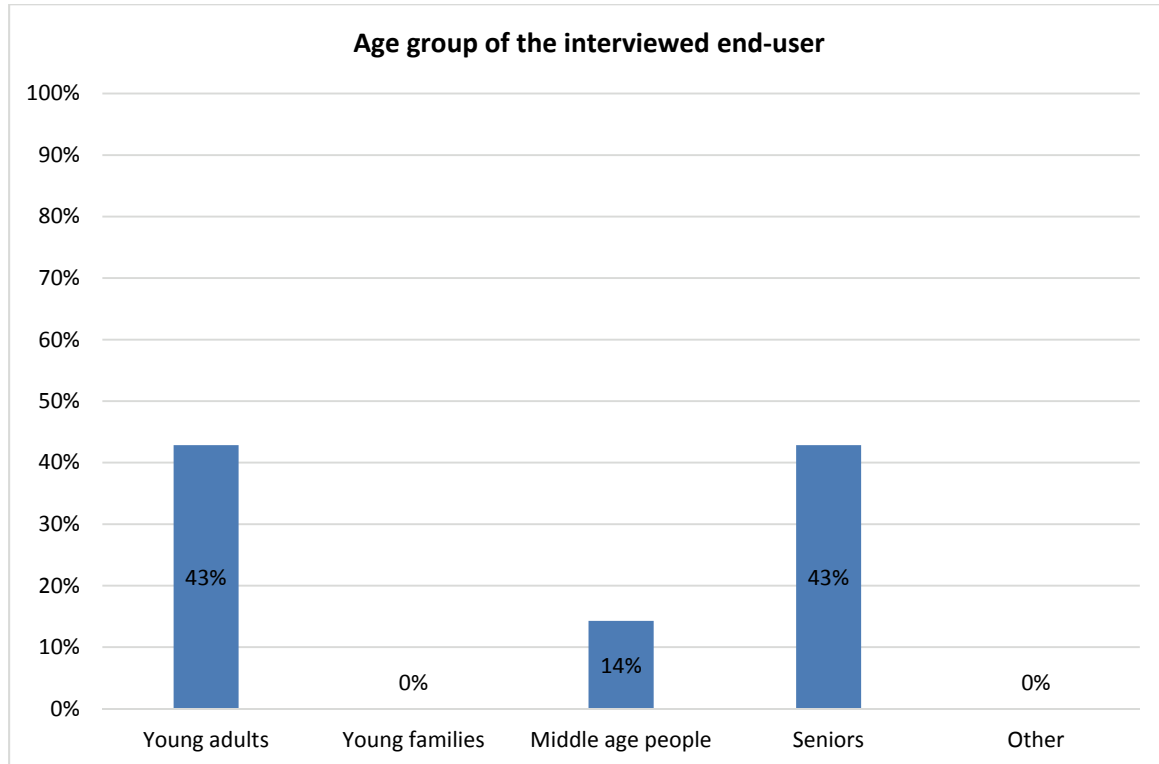
Figure 103: Questionnaire results for the question "Age group of the interviewed end-user?", QP2 (N=7, Slovenia)

5. Conclusions

This chapter summarizes the main findings from the interviews about the opinion of end-users regarding living in NZEBs and/or their expectations about living in NZEBs. The conclusions are presented per participating country in a way that the findings will facilitate the development of the guide for end-users regarding living in NZEBs.

5.1 Germany

A surprising part of the results of the questionnaire for the potential future NZEB users was that the respondents at the same time think they know what an NZEB is but admit in the next question that they on average don't have a reliable and easy to access source of information. This shows that the existing trustworthy information platforms should be more intensively promoted and more free information events should be hosted by independent organizers, in order to enable the further education of the future users. However this also has to be seen in connection of the still missing detailed NZEB definition in Germany.

The comparison in Figure 104 between the potential future and the current NZEB users about what is important for them as an apartment user shows, that for the potential future NZEB user all the answers concerning costs are slightly more important, indicating that their financial leeway influences their renting decision heavily. On the other hand the current NZEB users focus more on the use of renewable energy and the information and communications technology than the potential future users, indicating that they have a higher technology affinity. But nevertheless the cost-related answers, together with the comfort-related ones are for both groups the most important qualities of an apartment.

Concerning their opinion about the maintenance costs, the potential future and the current NZEB users have a clear difference in their take on the topic, as shown in Figure 105. While 56% of the potential users say that NZEBs may have higher maintenance costs, only 44% of the current NZEB users share that opinion. In contrast 53% of the current NZEB users think that the maintenance cost are lower in NZEBs, an opinion that just 11% of the potential NZEB users support. Thus, a clear positive shift in the opinion about maintenance cost from the potential to the actual user of NZEBs is noticeable, most likely because of positive experiences.

Interesting to evaluate are also the intersections of the opinions of both respondent-groups about the technologies that characterize NZEBs. Both groups think that good insulation levels, mechanical ventilation with heat recovery, good airtightness and the use of renewable energy characterize NZEBs the most, which summarizes the current understanding of NZEBs and other high performance buildings in science and politics pretty well. This shows that both groups are well informed and have a common understanding of what's necessary to achieve a nearly zero energy building stock. The potential future and the

current NZEB users also agree on the technologies that are not characterizing NZEBs as much, namely natural insulation materials and smart technologies.

Figure 104: Comparison of the questionnaire results for the question "What is important for you as an apartment user?" (Potential NZEB users: N=10, current NZEB users: N=36; Germany)

Figure 105: Comparison of the questionnaire results for the question "In your opinion, do you have more maintenance costs in NZEbs comparing to ordinary mulit-family house buildings?" (Potential NZEB users: N=10, current NZEB users: N=36; Germany)

One of the most interesting parts of the questionnaire has been the question about what the respondents had triggered or would trigger to move into an NZEB. The comparison between the potential future users and the current users of NZEBs is shown in Figure 106. The potential future NZEB users have more and stronger triggers for moving in an NZEB than the current users stated. This could probably originate from their current housing situation (compare Figure 31 in chapter 4.1.1) and the accompanying lack of satisfaction in precisely these triggers (like good thermal comfort, good indoor air quality and low energy costs).

What were/are your decision triggers for moving in high energy efficient building? (5 – most important to 1 – least important)

Figure 106: **Comparison of the questionnaire results for the question "What were/are your decision triggers for moving in high energy efficient building?" (Potential NZEB users: N=10, current NZEB users: N=36; Germany)**

The distribution of the age groups of the participants of the questionnaire, shown in Figure 107, indicates that there is a lack of representation of respondents in their senior-years, which should be prioritized in future surveys due to their further growing relevance.

Age group of the interviewed end-user

Figure 107:   Comparison of the questionnaire results for the question "Age group of the interviewed end-user?" (Potential NZEB users: N=10, current NZEB users: N=36; Germany)

The conclusion of the questionnaire is that in Germany the respondents seem, as a result of their answers to the questions, to be well informed about NZEBs. Beside the location and the financial aspects of housing including the energy costs, the most important aspects and triggers are related to comfort (daylight, thermal comfort and air quality). The air quality, especially the dry air during winter is an ongoing point of concern, which should be solved as fast as possible to prevent negative associations with NZEBs (and other high-performance buildings). The questionnaire also showed that NZEBs are able to deliver all necessary properties to satisfy the end-user. Since low costs (rent, energy and maintenance) are still the most important decision parameters for the end-user, the cost reduction of NZEBs is an important way to increase their share in the building stock also required in the context of the German energy transition.

5.2   Denmark

In general, residents in Danish NZEBs are happy about living in a NZEB and would choose a NZEB again if they had to move to another apartment. Generally, the residents' do care about the environment and their energy consumption. However, residents in Danish social housing do not have much knowledge about what an NZEB is and of the special energy features in this kind of buildings.

When asked about their knowledge about special technical installations that are common in NZEBs, the residents show very little knowledge about this (see Figure 52). The only two exceptions from this is presence of solar cells (PV) that are visible from the street and mechanical ventilation. The mechanical ventilation system is visible in the flats and is sometimes the source of noise and/or draughts in the flats.

In an ongoing study, in a small owner-occupied block of flats, we have asked the owners about their perception of the indoor climate and the answers are depicted in Figure 108. In general the owners would prefer to live in a NZEB again if they had to move and they would recommend living in a NZEB to others.
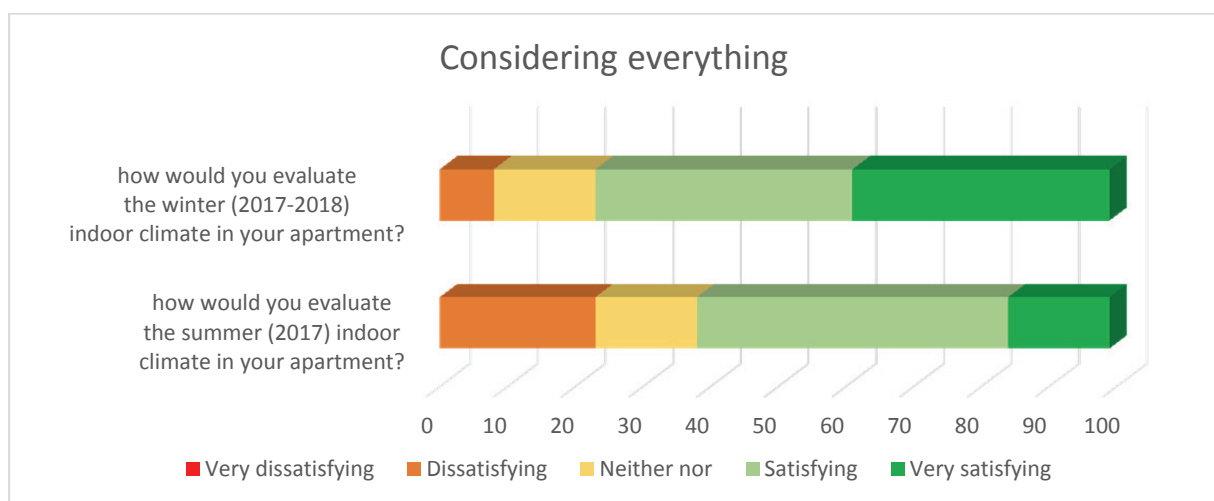
Figure 108: **Owners' satisfaction with the indoor climate in the summer of 2017 and the winter 2017-2018 in a small block of NZEB flats (N=19, Denmark).**

In a previous study [DK 2] among owners of single-family houses it was shown that the residents were satisfied with their new low-energy houses. They would recommend others to live in a low-energy house, and they perceived the indoor climate as satisfactory, and better than in their former (older and not low-energy) dwelling.

5.3   Italy

As shown in Figure 55 - Figure 57 most of non-NZEBs users are aware of what an NZEB is but at the same time they answered that they do not have a reliable and easy-to-access source of info about NZEBs, since in average they rated all the sources quite low. This suggests that updated and open sources should be developed, providing detailed data about NZEBs, in order to improve knowledge and enable further education of the future users.

In the following charts, comparisons between the answers given by current and potential NZEB users are presented. The answers about what is important for them as apartment users are compared in Figure 109.
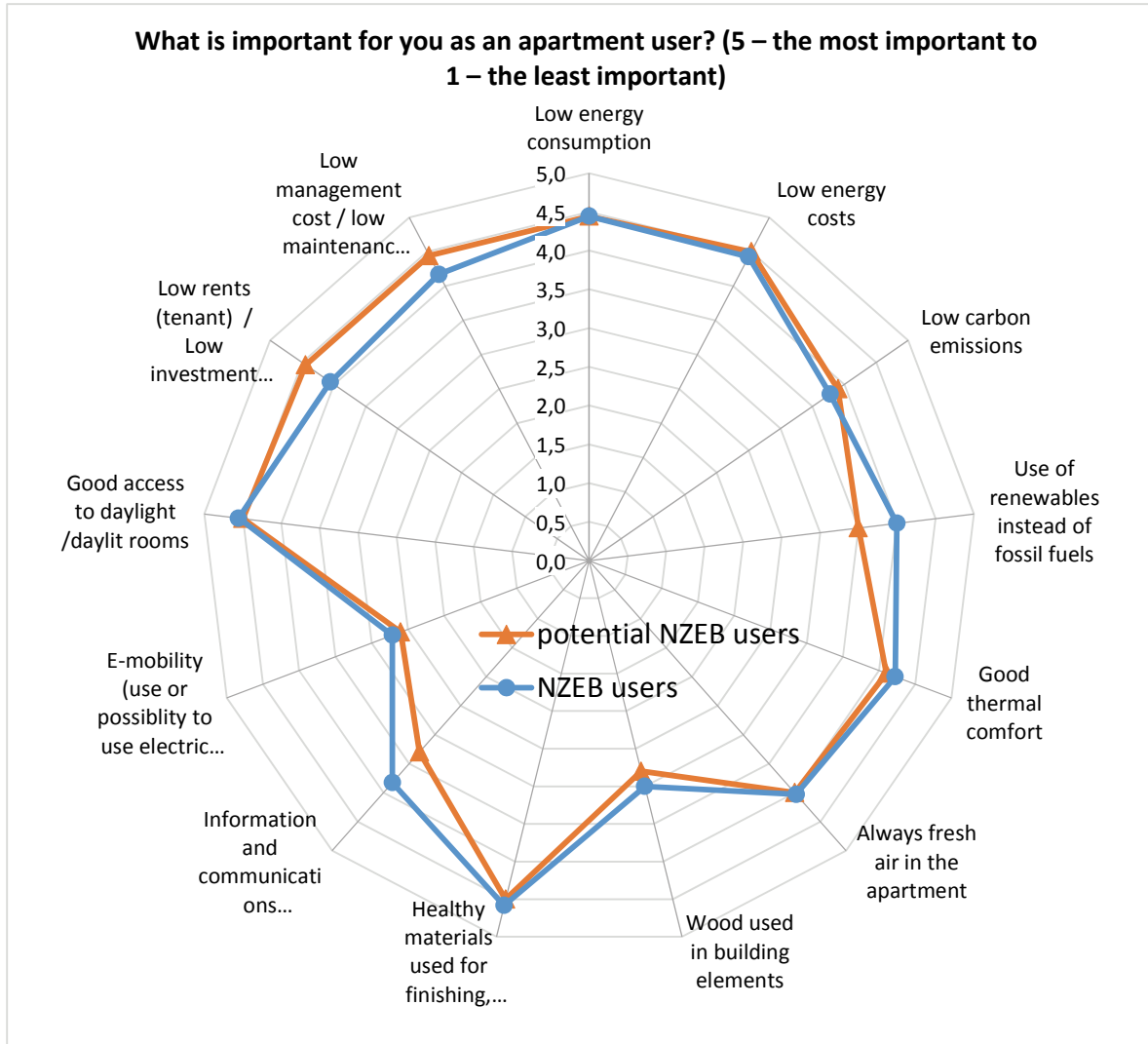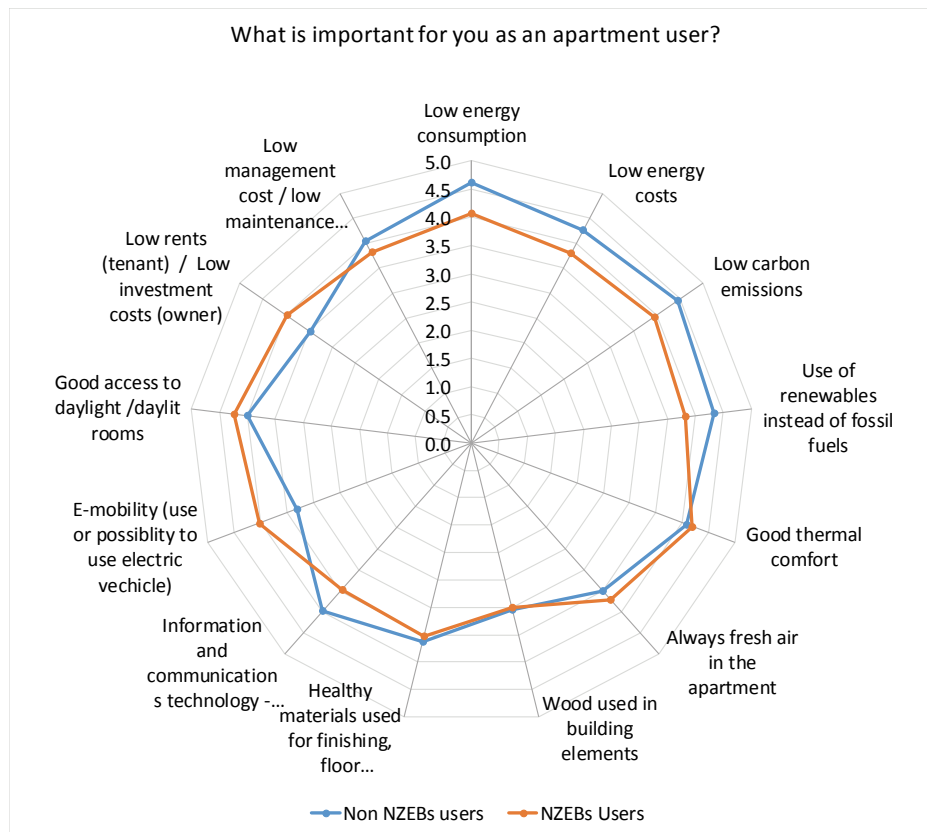

Figure 109: Comparison of the questionnaire results for the question "What is important for you as an apartment user?" (Potential NZEB users: N=81, current NZEB users: N=50; Italy)

Potential NZEB users give more importance to low energy consumption, costs, emissions and use of renewable source compared to current NZEB users, which surprisingly consider more valuable the possibility of having good access to daylight, low rents and investment costs and the use of electric vehicles. The comfort-related answers (good thermal comfort, fresh air, use of healthy materials) are instead very important for both the typologies of people and the results are aligned. Also ICT is not considered very important for real users compared to how it appears for potential users.

A clear difference between users and non-users about the maintenance costs is shown in Figure 110. While only 16% of the potential users say that NZEBs may have higher maintenance costs, 32% of the current NZEB habitants have an opposite opinion. In contrast, 58% of the potential NZEB users think that the maintenance costs might be lower in NZEBs, an opinion that only the 28% of the potential NZEB users share. It shows that future users have optimistic expectations about the impact of high energy performance on maintenance costs, on the contrary, it seems that people living in NZEBs are not experiencing this benefit.

Additionally, 40% of NZEB users do not have an idea about the increase or decrease of maintenance costs. Both Figure 109 and Figure 110 show that there is a misalignment between perceptions and ideas about NZEBs and real experiences.
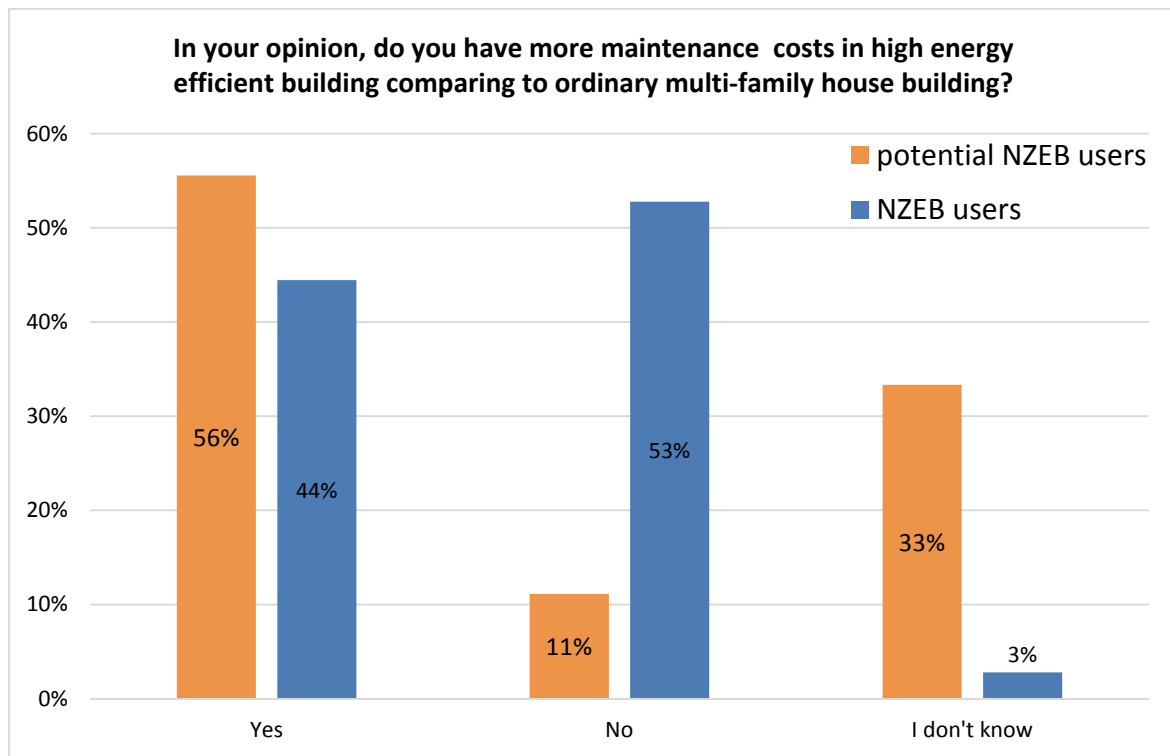

Figure 110: **Comparison of the questionnaire results for the question "In your opinion, do you have more maintenance costs in NZEBs comparing to ordinary multi-family house buildings?" (Potential NZEB users: N=81, current NZEB users: N=50; Italy)**

It is interesting to compare also opinions of both respondent groups about the decision triggers for moving in high energy efficient buildings shown in Figure 111. On average, all the aspects characterizing NZEBs were considered less important for current NZEBs users than for potential users, except for the possibility of having a nice, modern and new apartment which is highly valued by current NZEBs users. It is in line with results showed in paragraph 2.3.2, where it was inferred that end-users were more interested in buying houses according to buidling location and quality of finishes than to energy performances. The highest difference regards the "subsidy for buying flats in NZEB" which would be an important decision trigger for non-NZEB users (average score 4.5) and was considered quite irrelevant by people living in NZEBs. Also "life style" and "low energy costs" are more desirable by future users than by real users. Good level of comfort and building location are equally important for both groups.

From this analysis it emerges that potential future NZEB users have stronger triggers for moving in an NZEB than the current users perceive as advantages of living in it. This could probably originate from their current housing situation and the desire of improving some aspects of their life like for example the prediction of lower energy costs.
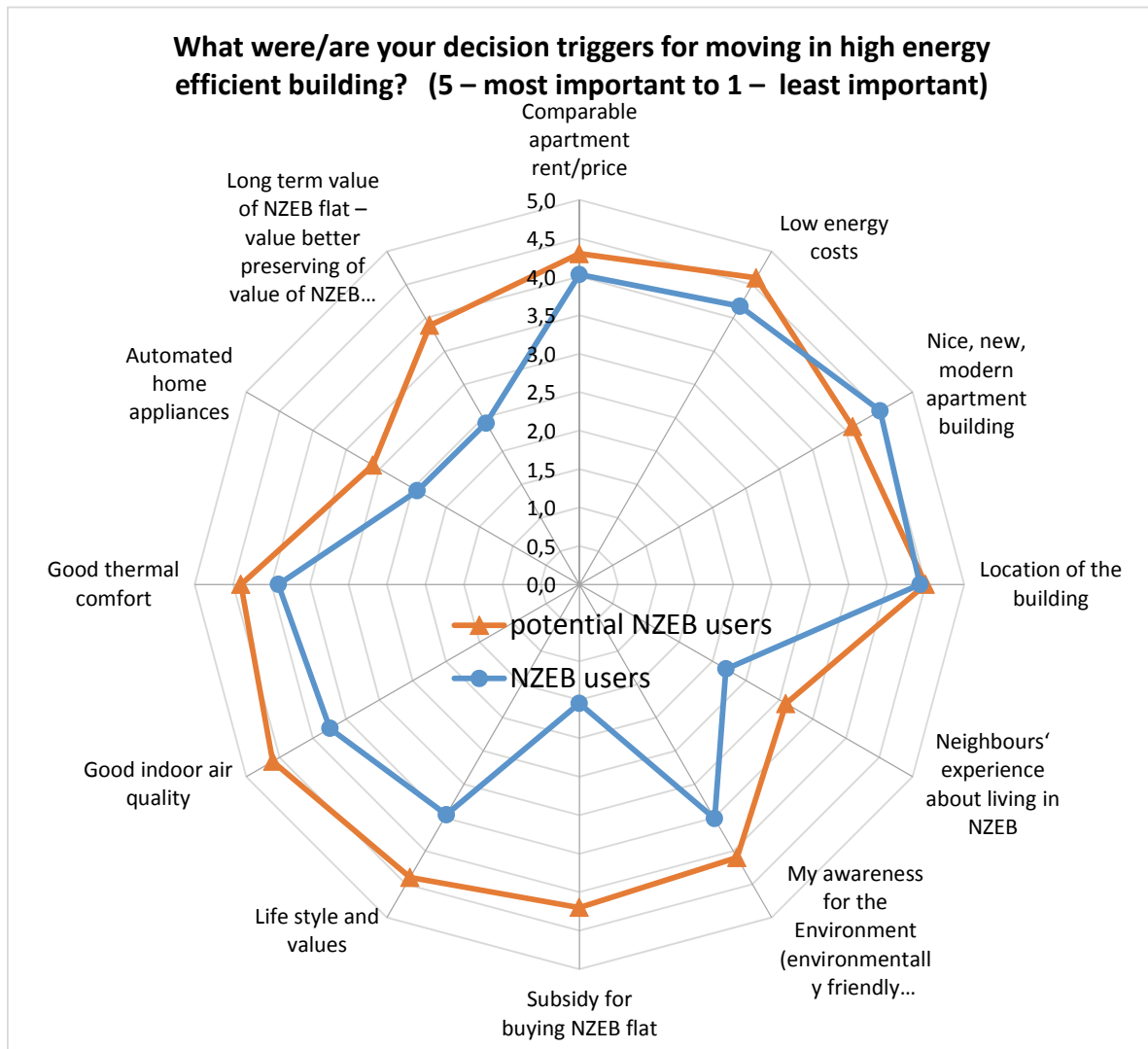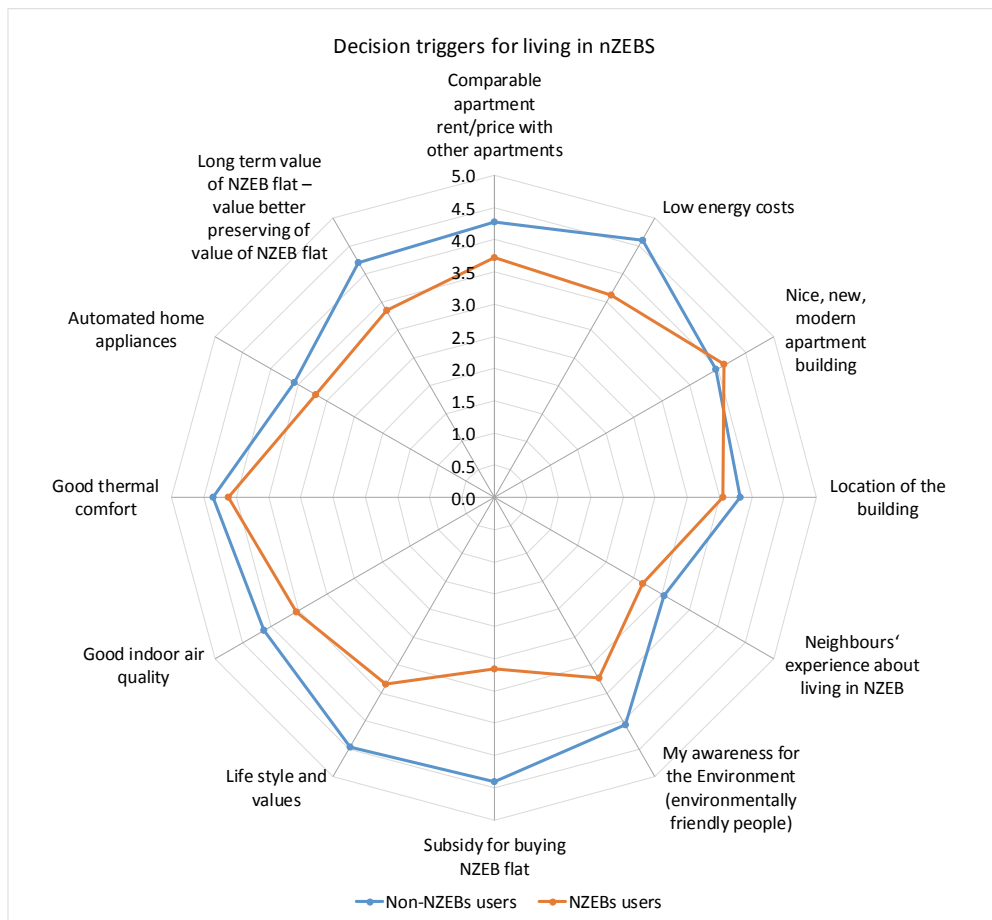
Figure 111 Comparison of the questionnaire results for the question "What were/are your decision triggers for moving in high energy efficient building?" (Potential NZEB users: N=81, current NZEB users: N=50; Italy)
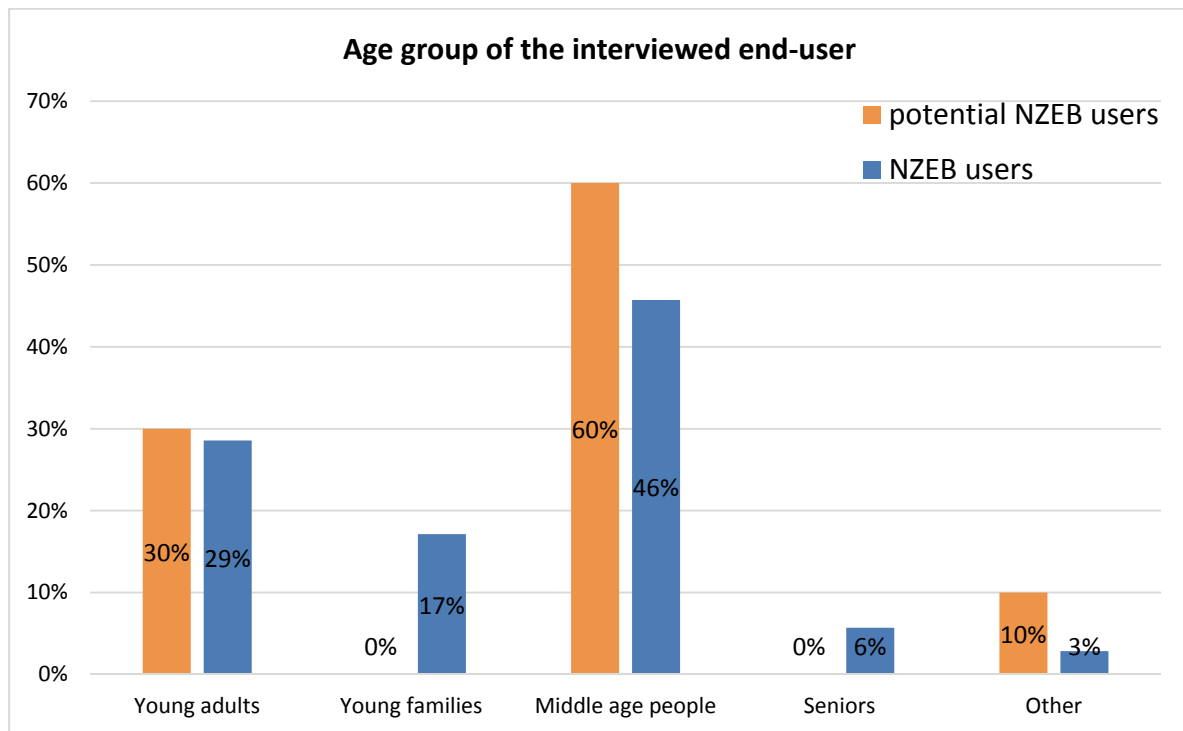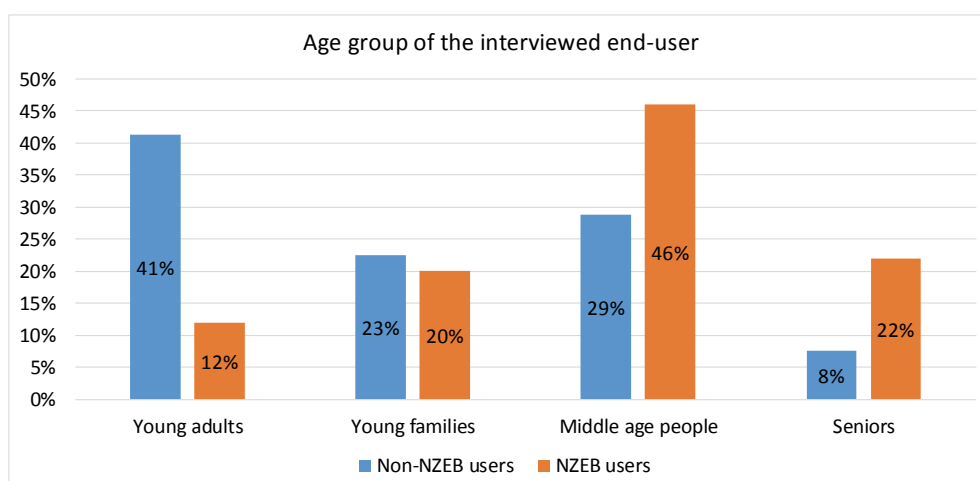

Figure 112: Comparison of the questionnaire results for the question "Age group of the interviewed end-user?" (Potential NZEB users: N=81, current NZEB users: N=50; Italy)

Figure 112 shows that there is a lack of respondents in the senior-years for non-NZEB users and young adults for the category of NZEB users.

5.4 Slovenia

The majority of respondents (93%) do not yet live in any type of high energy efficient building. Most of them stated that they do know at least partly what an NZEB is. However, as it can be seen in Figure 83 and Figure 84, they do not have proper access to information about NZEBs, since in average they rated the quality of all sources quite low.

Looking at Figure 113 which shows the comparison between potential and current user desires, it can be noted that they all consider similar parameters as most important. An interesting fact is that current users consider answers concerning costs slightly more important than potential users, who focus more on wood use, e-mobility and the information and communication technology.
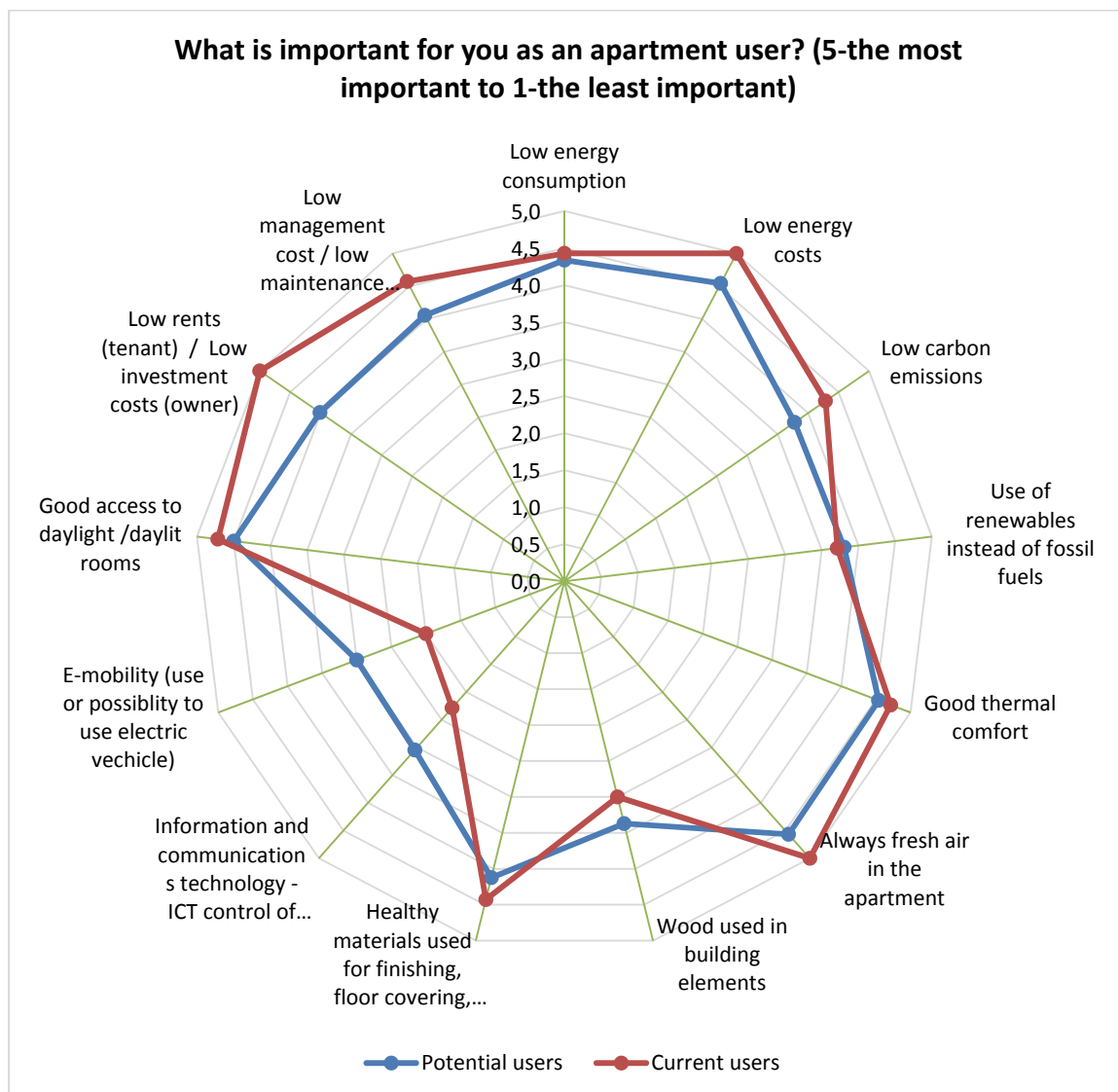
Figure 113: Comparison of the questionnaire for the question "What is important for you as an apartment user?" (Potential NZEB users: N=90, current NZEB users: N=7; Slovenia)

Regarding the maintenance costs current and potential users have notable differences in their opinion, as shown in Figure 114. Namely none of the current users expressed the opinion that they have higher maintenance costs, 71% of them respondent with "no" and the others could not tell. On the other hand, the 32% of potential users believe that they would have higher maintenance costs, 50% of them stated that the maintenance costs would not be higher. So, it can be concluded that current NZEBs users probably have a positive experiences with living in NZEBs, especially concerning the maintenance costs.
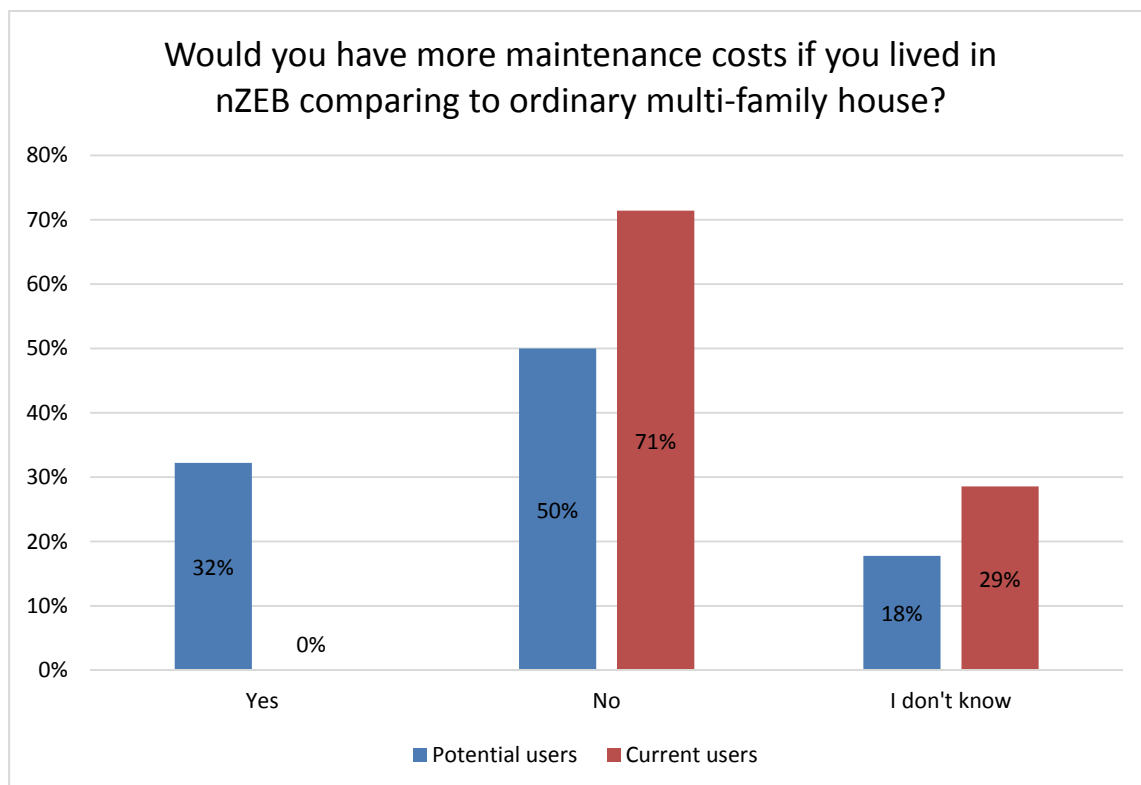
Figure **114: Comparison of the questionnaire for the question "In your opinion, do you have more maintenance costs in NZEBs comparing to ordinary multi-family house buildings?" (Potential NZEB users: N=90, current NZEB users: N=7; Slovenia)**

Concerning the technologies that characterize NZEBs, all of the current users use mechanical ventilation with heat recovery, windows with triple glazing, high thickness of insulation, renewable energy sources and the majority of them also uses domestic appliances with A++ energy label. A similar situation was found with the potential users, who consider all the mentioned technologies that current users are using, as the most important technologies that characterize NZEBs. This indicates that all of the respondents have good information about requirements for achieving NZEB.

With the next question it has been discovered, what triggered the respondents or would trigger them to move into an NZEB (Figure 115). The potential users have in general more, stronger and constant triggers for moving into an NZEB, which can probably be related to

their current accommodation and imperfections connected with it. On the other hand, current users appreciate more smart technologies and a bioclimatic building approach and much less the use of RES, which can probably be understood that nowadays the awareness for RES is higher than it was before.
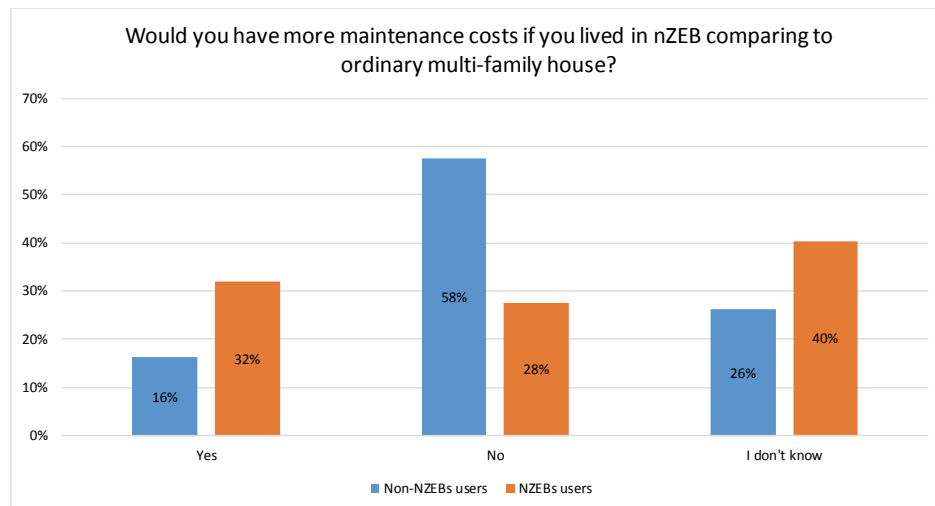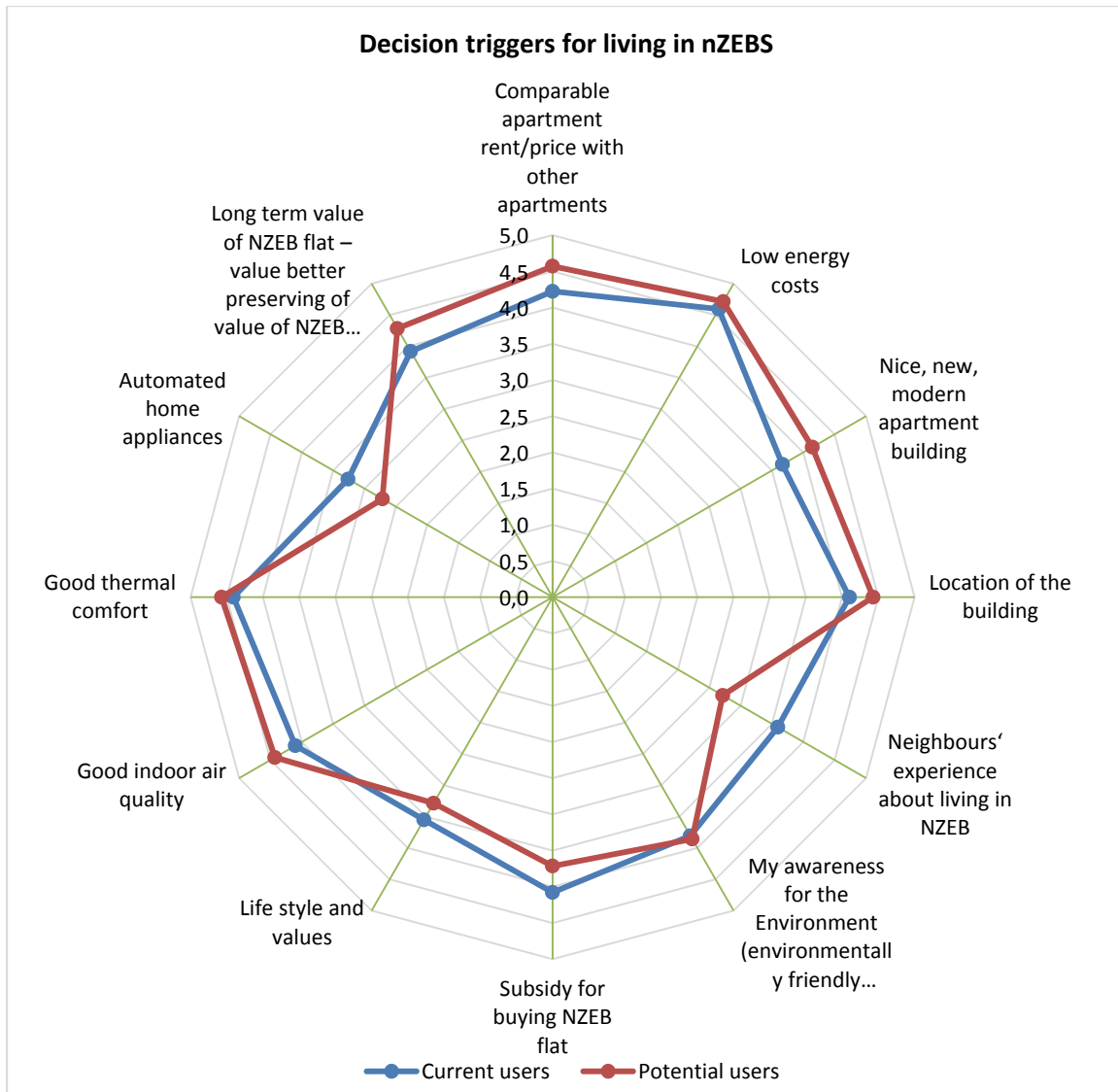

Figure 115: Comparison of the questionnaire results for the question "In your opinion, do you have more maintenance costs in NZEBs comparing to ordinary multi-family house buildings?" (Potential NZEB users: N=90, current NZEB users: N=7; Slovenia)

In Figure 116 the distribution of the age groups of the participants can be seen.

Age group of the interviewed end-user
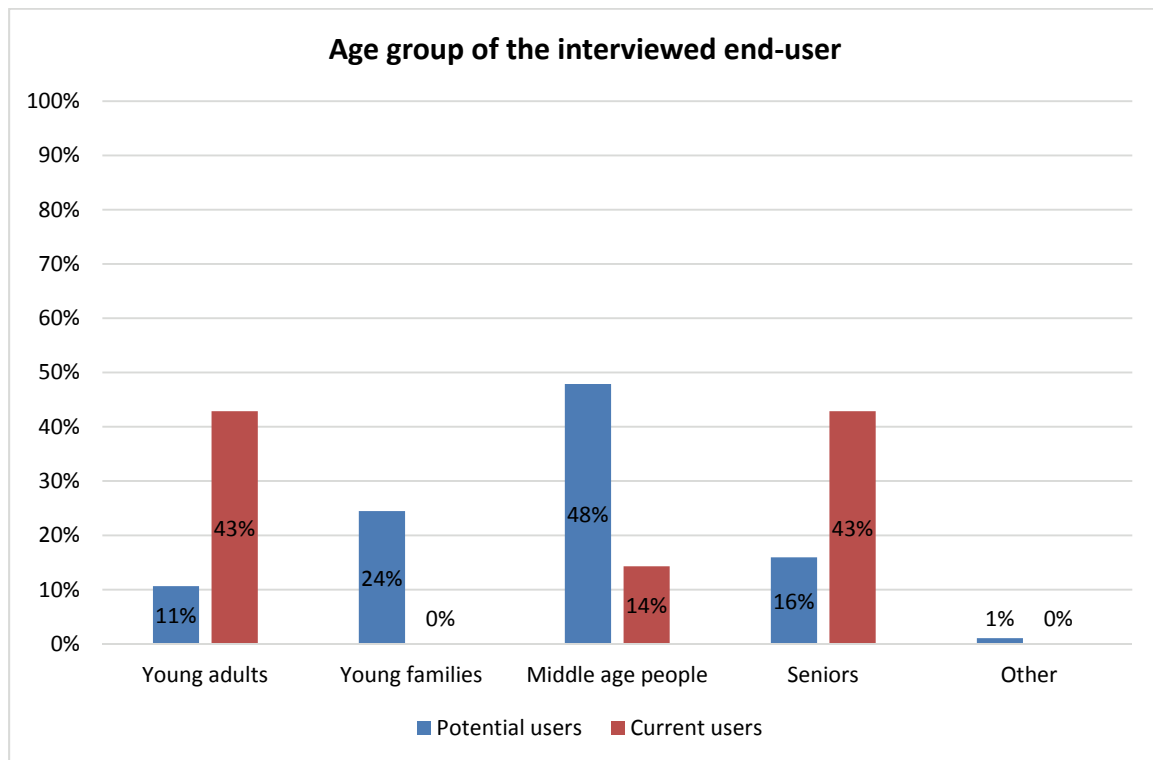
Figure 116: Comparison of the questionnaire results for the question "Age group of the interviewed end-user?" (Potential NZEB user: N=10, current NZEB users: N=36; Slovenia)

To sum up, respondents in Slovenia seem to be quite well informed about NZEBs. They highly appreciate the low energy costs and low energy consumption. Besides the cost aspect, the respondents value also good thermal comfort, fresh air in the apartments and good access to daylight. However, they issued some concerns, especially regarding building systems in NZEBs and their performance. Namely, they do not appreciate too many electrical devices inside the apartment, which in their opinion worsen life in NZEBs for an average user and actually increase investment and maintenance costs. Also, mechanical ventilation and its performance during the summer season was one of the common constraints.

6. Common findings and next steps

Common findings summarize the outcomes of the interviews made in 4 participating countries of CoNZEBs project: Germany, Denmark, Italy and Slovenia.

Altogether the interviews covered 293 end-users of which 112 are currently living in an NZEB and 181 can be seen as potential future users of NZEBs.

Despite different national terms and definitions of the NZEB (and in one country a not yet legally fixed definition), one can conclude from the report that respondents in Germany, Italy and Slovenia believe that they have a decent knowledge about NZEBs. On the other hand, residents in Danish social housing do not have much knowledge about what NZEB is and any of the special energy features in this kind of buildings. The interesting fact is that in Germany, Italy and Slovenia, despite the good NZEB knowledge, respondents mainly answered that they do not have a reliable and easy-to-access source of information about NZEBs. The results of the questionnaire indicate that the cost and comfort related benefits (i.e. Low energy costs, low energy consumption, good thermal comfort…) are the most important for both groups of respondents, i.e. for current users of NZEBs and for potential future NZEB users. Also, the questionnaire results point out that most of the respondents are well informed about NZEB criteria and technologies, since the majority of them think that good insulation, mechanical ventilation with heat recovery, good airtightness and the use of renewable energy sources characterize NZEBs.

The current NZEB users in Germany and Slovenia have obviously encouraging experiences, since a clear positive shift in the opinion about maintenance cost from the potential to the actual user of NZEBs is noticeable. Namely the potential users have fierce of higher maintenance costs, while the current users reported that the actual costs are lower. The latter should be emphasized in the future NZEB promotion, to show the feedback from the actual NZEB users. On the contrary, in Italy the current NZEB users do not have such good experience, since more current NZEB users stated that they have higher maintenance costs. The latter shows that future potential users in Italy have optimistic expectations about the maintenance costs.

An important closure from the Danish answers, is that the current NZEB users are happy living in NZEB and 84% of them would prefer moving in a NZEB again.

Interviews show that the potential future NZEB users have slightly stronger triggers for moving into an NZEB comparing to the current NZEB users' reasons for moving into NZEBs. The attitude and enthusiasm of potential future NZEB users for living in NZEBs can probably be related to their current accommodation and imperfections connected with it.

One of the most important parts of the questionnaire addressed respondents' concerns and doubts about living in NZEBs, which are in general connected to:

- the indoor air quality (especially the dry air in connection to ventilation systems with heat recovery during the winter),
- the long-term performance of technical building systems in NZEBs,
- the user friendliness of control systems and ICT appliances,
- the cost benefit of numerous technologies and their actual usefulness

As mentioned, most of the respondents rated quite low the quality of the available information about NZEB, regardless on the source of information. Therefore, in the future reliable information platforms should be established and widely promoted, as well as free information events should be hosted by independent organizers in order to spread the knowledge, break the stereotypes regarding NZEBs and to enable further education of the future users. The planned CoNZEBs guide to motivate people to live in multi-family NZEBs, another project deliverable, will contribute to the different dissemination activities and to the public acceptance of the importance of reducing the energy use in buildings. It will take into account the identified triggers for moving in NZEBs and the gathered experiences and concerns.

In the Figure 117 the comparison of decision triggers for living in NZEBs is presented for potential future users.
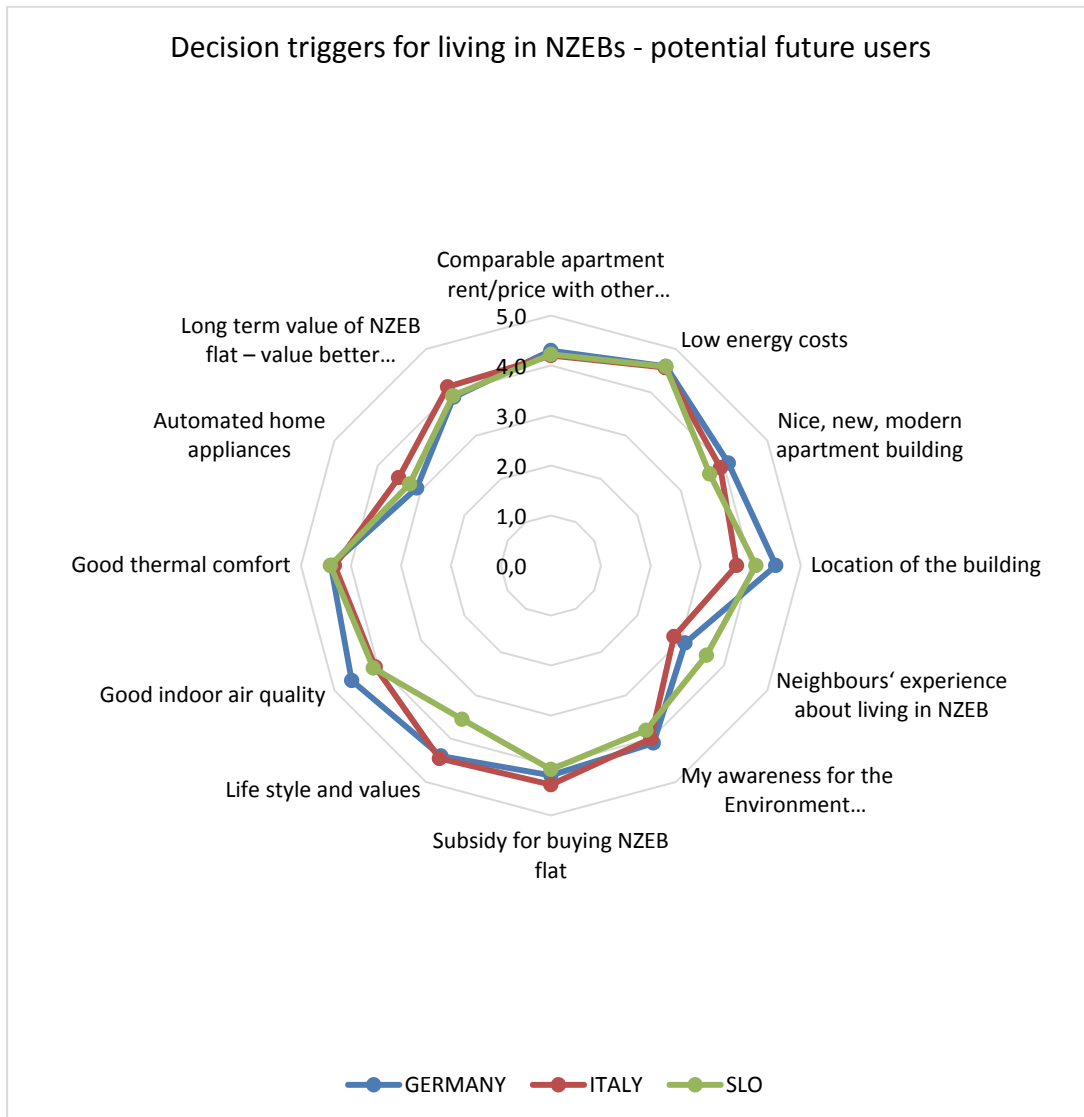
Figure 117:   **Comparison of decision triggers for living in NZEBs – potential future users**

In the Figure 118 the comparison of decision triggers for living in NZEBs is presented for current users.
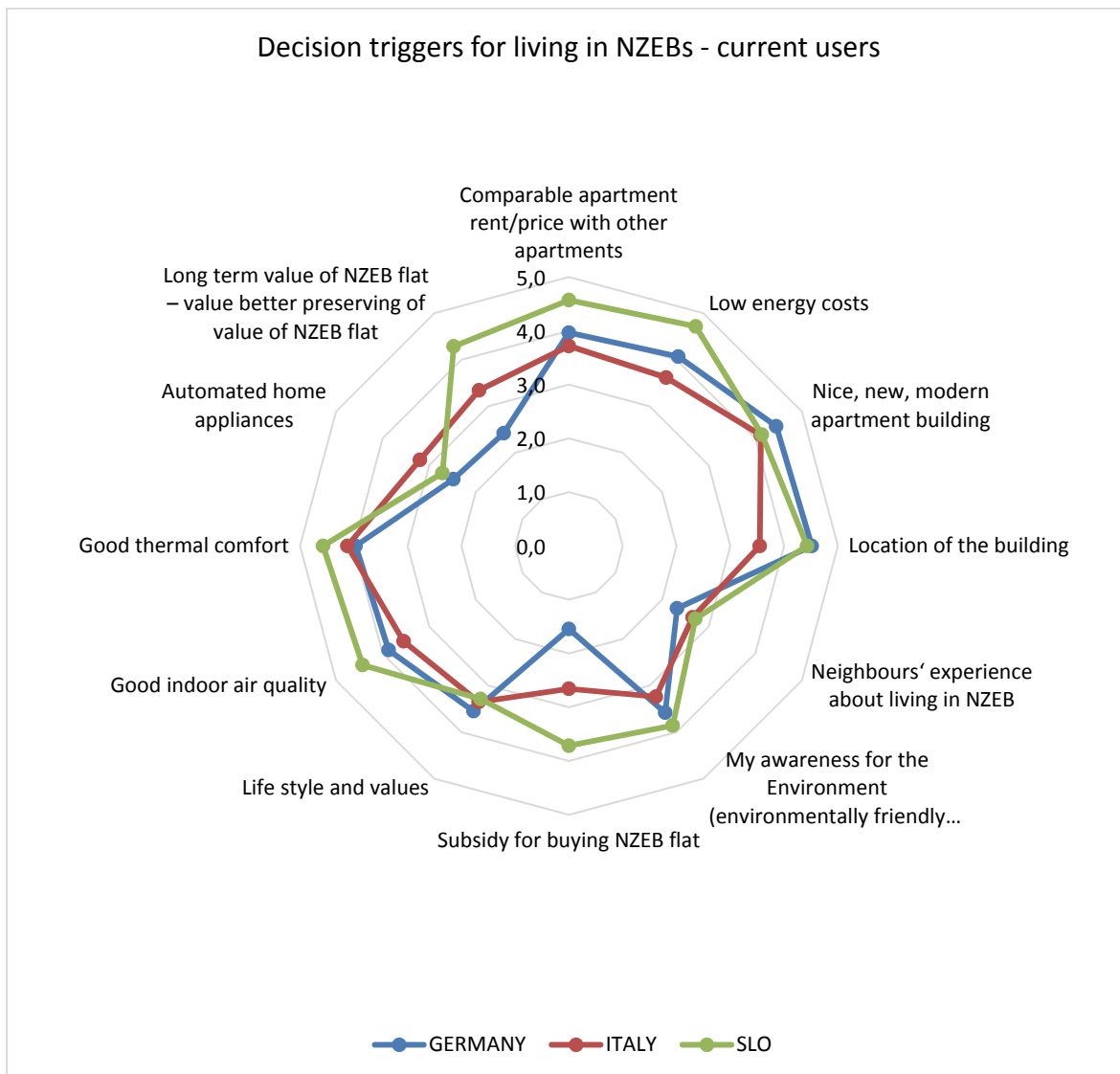
Figure 118: **Comparison of decision triggers for living in NZEBs – current users**

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In the Figure 119 the comparison of the technologies that respondents consider as characteristic in their countries is shown. As it can be seen, the distribution of the answers among the countries is quite similar.
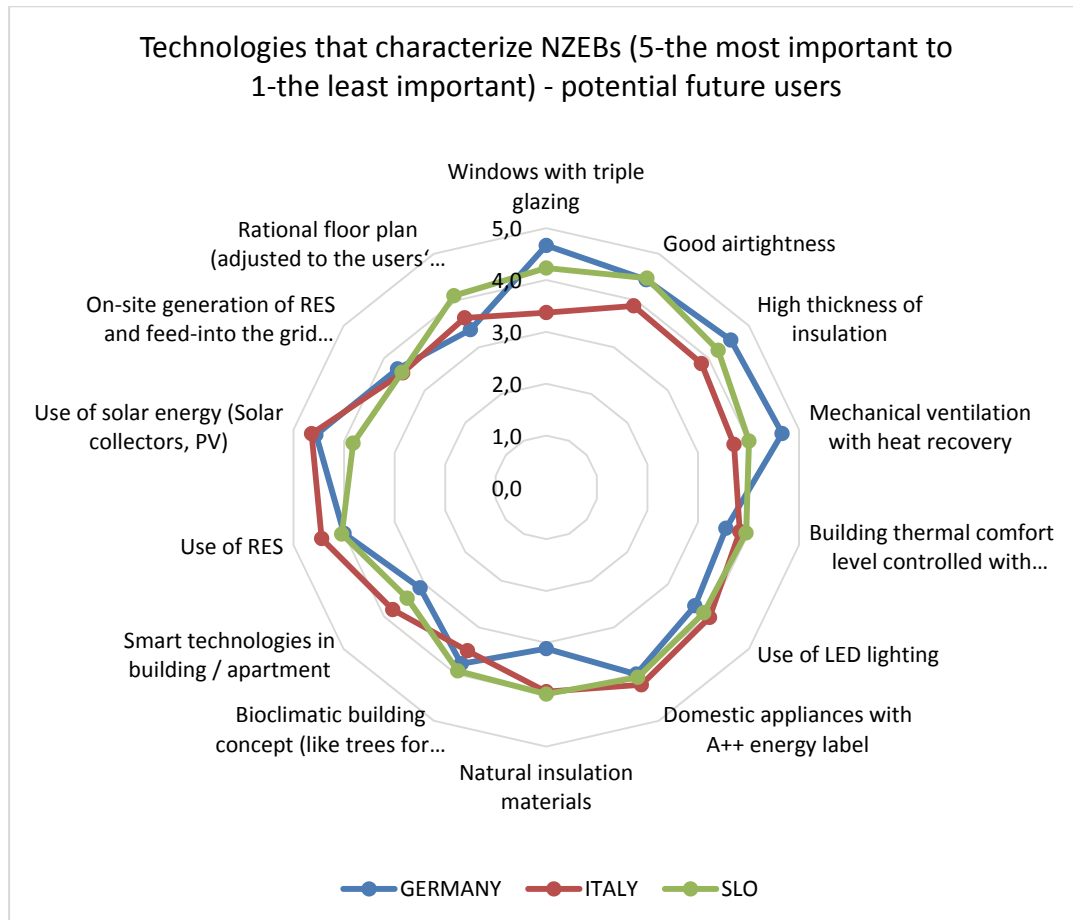
Figure 119: **Comparison of answers of the question: "What do you think which technologies characterize most NZEBs?" – potential future users**

The comparison of ratio of technologies that current respondents use in their buildings is presented in the Figure 120. It can be noted that good airtightness is widely spread among participating countries, together with domestic appliances with A++ energy label, LED lighting and windows with triple glazing (especially in Germany and Slovenia).
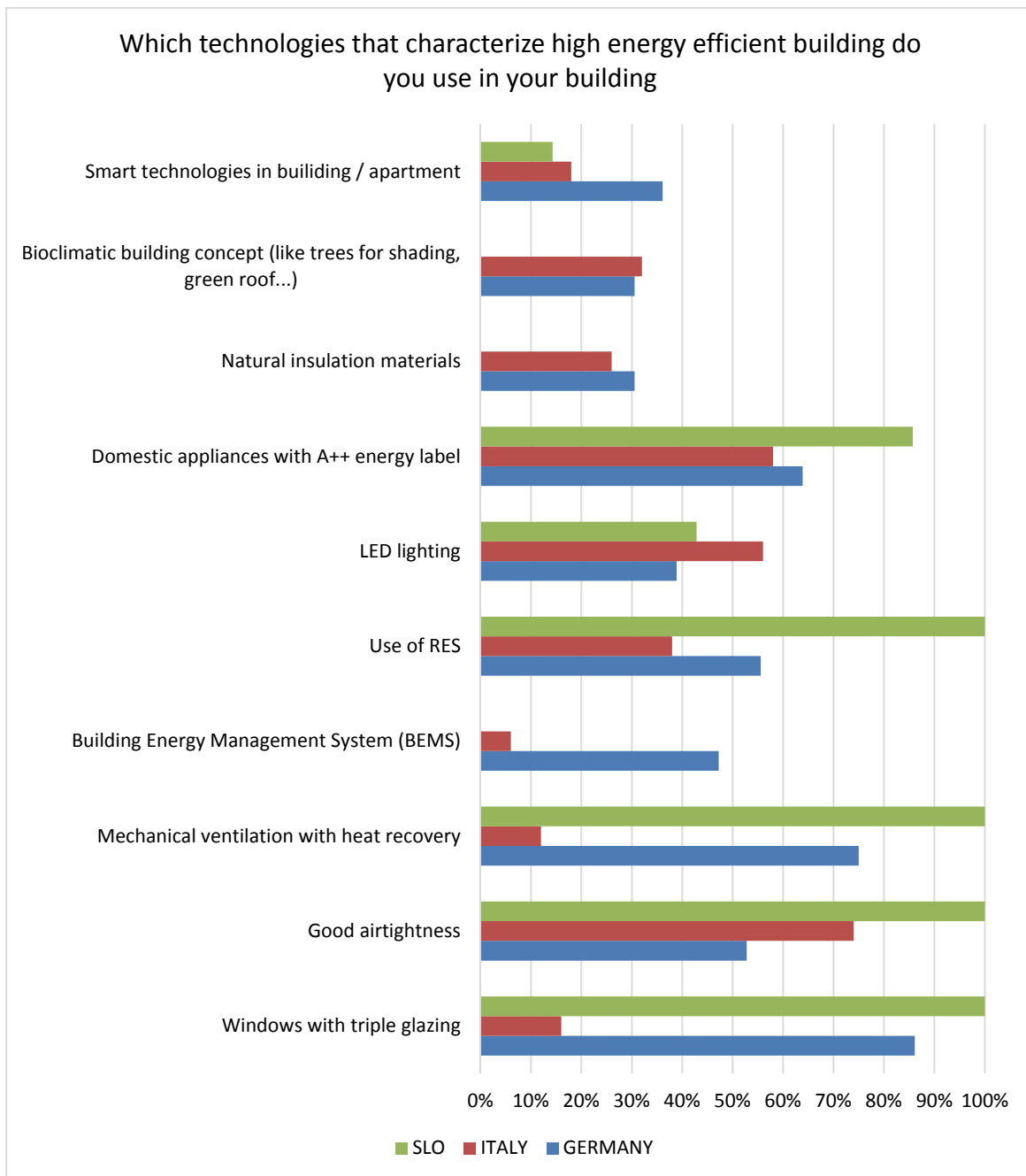
Figure 120: **Comparison of answers of the question: "Which technologies that characterize high energy efficient buildings do you use in your building?" – current users**

In the Figure 121 the comparison of users' desires among the countries is presented.
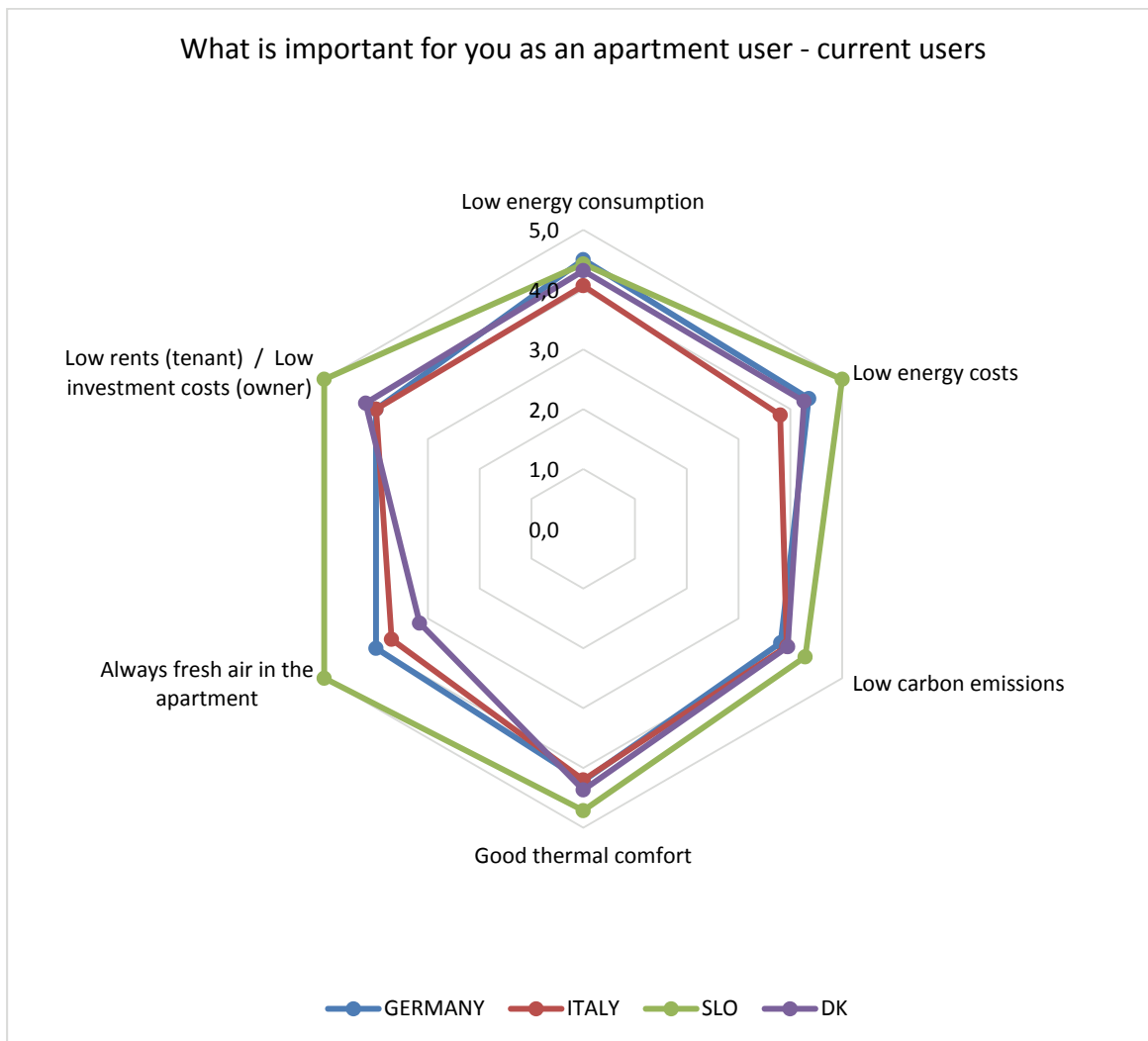
Figure 121:   **Comparison of answers of the question: "What is important for you as an apartment user?" – Current users**

In the Table 2 is listed the overview of commonly issued experiences and concerns stated by the respondents.

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Table 2: Respondents' experiences and concerns about living in NZEBs

Positive experiences	Negative experiences	Concerns
Good noise insulation, both from the street and neighbours.	Humidity is too low and in the summer too warm. Problems with mobile network and WLAN due to high building density.	Concerns regarding usage in case of power outage – photovoltaics doesn't work.
No additional electricity due to solar supply; Quality energy saving equipment.	Very common technical equipment failures.	Possible feeling of consternation and discomfort.
Good room climate; Absolute peace with the windows closed; Good control over own consumption.	Quite dry air, consequently assumed increase in respiratory tract infections in children and adults	Actual increase of construction costs; Quality of indoor life.
Very high quality of living.	Frequent change of air filters; Questionable ventilation usage when the outside temperature is too cold; Very low humidity.	High construction/renting costs; Smart systems don't work when there is a power outage.
Very good thermal comfort and low energy consumption.	Because of Information and communication technologies, which are often for regular usage unimportant, investment and maintenance costs are higher.	Restrains about the enclosure of the building and mechanical ventilation.
Raising awareness of energy-efficient living; Transparency in personal energy consumption through user display.	Problems with mechanical ventilation at lower outside temperatures; Very dry air during the winter period.	Various radiations when installing a number of smart devices, photovoltaics; Too many devices installed in houses, which is burdensome for the average user - if the systems and devices are already used, they should be user friendly.

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CoNZ€Bs
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8.   ANNEX

Examples of questionnaires from countries

8.1   German questionnaire

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of new Nearly Zero-Energy Buildings

EU H2020 CoNZEBs
GA no. 754046

Fraunhofer
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ABG FRANKFURT
HOLDING
Wir machen Räume wahr.

EU-Projekt "CoNZEBs – Solution sets for the Cost reduction of new „Nearly Zero Energy Buildings"

Projekt der Europäischen Union: Lösungsansätze zur Kostensenkung von Niedrigstenergie-gebäuden"

Für Gebäude, mit einem besonders niedrigen Energiebezug aus den Versorgungsnetzen werden in Deutschland verschiedene Begriffe verwendet: Passivhäuser, Energie-Plushäuser, Aktivhäuser, KfW Effizienzhaus 55 oder 40, etc.

Auf europäischer Ebene wird dafür der Begriff „Nearly Zero Energy Building" (Kurzform: NZEB, offizielle deutsche Übersetzung: Niedrigstenergiegebäude) benutzt.

Ab 2021 wird in der Europäischen Union der NZEB-Standard für Neubauten zur Pflicht. Allerdings ist es in Deutschland gesetzlich noch nicht definiert, welchen Anforderungen ein NZEB genau erfüllen müssen. Einige der oben angeführten Gebäudetypen (z.B. Energie-Plushäuser) gehen aber über die derzeit in Deutschland angedachten energetischen NZEB-Anforderungen noch hinaus.

Die Europäische Union möchte mit einem aktuellen Forschungsprojekt namens CoNZEBs Informationen in Mitgliedsstaaten sammeln, zur Akzeptanz und Kenntnisstand bei den Bewohnern, aber auch zu geeigneten Technologien und Kosteneinspar-Potentialen.

Die ABG FRANKFURT HOLDING GmbH unterstützt das europäische Forschungsprogramm CoNZEBs und bringt seine Erfahrungen im Bau energieeffizienter Gebäude mit ein.

Der nachfolgende Fragebogen richtet sich an alle, die bereits in solchen Häusern wohnen, oder die sich dafür interessieren in so einem Haus einmal zu wohnen.

Wir möchten Sie bitten, dass Sie sich etwas Zeit zu nehmen, um die folgenden Fragen zu beantworten.

Mit Hilfe Ihrer Antworten, soll ein Verständnis gewonnen werden, über das Interesse der Bewohner an hocheffizienten Gebäuden, über offene Fragen und allgemein zur Interessenslage von Bewohnern.

Herzlichen Dank!

Ansprechpartner: Bernd Utesch, ABGnova GmbH, Ginnheimer Straße 48, 60487 Frankfurt/M., ▮▮▮▮▮▮▮ ▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮

Dieses Projekt wird unterstützt von der Europäischen Kommission im Rahmen des Horizon 2020 Programms unter der Projektnummer 754046. Ein weiterer deutscher Partner im Projekt ist das Fraunhofer-Institut für Bauphysik (www.ibp.fraunhofer.de), das den Fragebogen auch auswerten wird.

1

GI ZRMK / Task 4.1

EINFÜHRUNGSFRAGE

1. Leben Sie derzeit in einem Gebäude, mit einem besonders niedrigen Energiebezug aus dem Versorgungsnetz (z.B. Passivhäuser, Energie-Plushäuser, Aktivhäuser, KfW Effizienzhaus 55 oder 40, etc.), hier als NZEB (Niedrigstenergiegebäude) bezeichnet?*

   ⌂ Nein   (weiter mit Teil 1)

   ⌂ Ja   (weiter mit Teil 2)

TEIL 1 – Fragen für potentielle zukünftige Bewohner von NZEB

2. Wissen Sie was ein NZEB (Niedrigstenergiegebäude) ist?

   ⌂ Ja

   ⌂ Teilweise

   ⌂ Nur sehr ungenau

   ⌂ Nein

3. Was am Haus ist wichtig für Sie als Bewohner?

   (Bitte bewerten Sie: 1 – für wenig wichtig; 5 – für sehr wichtig)

⌂ Geringer Energieverbrauch	1	2	3	4	5
⌂ Niedrige Energiekosten	1	2	3	4	5
⌂ Niedrige Kohlendioxid-Emissionen	1	2	3	4	5
⌂ Verwendung erneuerbarer statt fossiler Energieträger	1	2	3	4	5
⌂ Guter Wärmekomfort	1	2	3	4	5
⌂ Kontrollierte Frischluftversorgung in der Wohnung	1	2	3	4	5
⌂ Verwendung von Holz als Baumaterial	1	2	3	4	5
⌂ Nicht-Gesundheitsgefährdende Innenmaterialien	1	2	3	4	5

2

GI ZRMK / Task 4.1

⌂ Moderne Regelungstechnik (z.B. zur Temperatur-, Verschattung- und Lichtsteuerung)	1	2	3	4	5
⌂ E-Mobilität, Stromladen bzw. Leihen von E-Autos	1	2	3	4	5
⌂ Hoher Tageslicht-Anteil, große Fenster	1	2	3	4	5
⌂ Niedrige Mieten (für Mieter) bzw. Niedrige Investitionen (für Gebäudeeigentümer)	1	2	3	4	5
⌂ Niedrige Betriebs- und Wartungskosten	1	2	3	4	5
⌂ Anderes (bitte beschreiben:):	1	2	3	4	5

....

4. **Haben Sie bereits Informationen zu NZEB / Niedrigstenergiegebäuden erhalten und wie gut (nützlich, verständlich) waren diese Informationen für Sie?**

(Bitte beurteilen Sie jede Informationsquelle: 1 - keine Information, 2 – schwach, 3 - gut, 4 - sehr gut, 5 - exzellent)

⌂ Medien (Zeitungen, TV, Radio)	1	2	3	4	5
⌂ Fachmagazine, -artikel	1	2	3	4	5
⌂ Nichtregierungsorganisationen (NGOs), Institute, Verbände (wie Passivhaus-institut…)	1	2	3	4	5
⌂ In der Schule / als Teil meiner Ausbildung	1	2	3	4	5
⌂ Von Architekten, Ingenieuren , Energieberater	1	2	3	4	5
⌂ Messen, Events, Tag der offenen Tür, Führungen	1	2	3	4	5
⌂ Energieversorgungsunternehmen	1	2	3	4	5
⌂ Hersteller von Geräten/Technologien	1	2	3	4	5
⌂ Spezialisierter Fachhandel	1	2	3	4	5
⌂ Wohnungsunternehmen	1	2	3	4	5
⌂ KfW, BAFA	1	2	3	4	5
⌂ Broschüren, Flyer,...	1	2	3	4	5
⌂ Internet, Webportale	1	2	3	4	5

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△ Veranstaltungen (z.B. ABGnova SophienHofAbende)	1	2	3	4	5	
△ Andere Quellen (bitte beschreiben):	1	2	3	4	5	

....

5. **Denken Sie, dass in einem Mehrfamilienhaus mit NZEB (Niedrigstenergiegebäude) Standard höhere Wartungskosten anfallen gegenüber einem "normalen" Mehrfamilienhaus, das nach dem gesetzlichen EnEV-Standard errichtet wurde? ***

   △ Ja

   △ Nein

   △ Ich weiß nicht

6. **Welche Technologien charakterisieren ein NZEB (Niedrigstenergiegebäude)?**

   (Bitte bewerten Sie: 1 – für wenig wichtig; 5 – für sehr wichtig)

△ Fenster mit 3-fach Verglasung	1	2	3	4	5
△ Hohe Luftdichtheit	1	2	3	4	5
△ Starke Wärmedämmung	1	2	3	4	5
△ mechanische Lüftung mit Wärmerückgewinnung	1	2	3	4	5
△ Gebäudemanagement-Systeme zur Steuerung und Regelung	1	2	3	4	5
△ Effiziente Beleuchtung (z.B. mit LED)	1	2	3	4	5
△ Effiziente Haushaltsgeräte mit A++ Energielabel	1	2	3	4	5
△ "Natürliche", erneuerbare Dämmmaterialien	1	2	3	4	5
△ Klimagerechtes Gebäudekonzept (Verschattung mit Bäumen, Begrünung)	1	2	3	4	5
△ Smart home-Technologien	1	2	3	4	5
△ Verwendung von Erneuerbaren Energieträgern allgemein	1	2	3	4	5
△ Nutzung von Sonnenenergie (PV, Solarthermie)	1	2	3	4	5

4

⌂ Gewinnung und Nutzung von PV-Strom im gleichen Gebäude (Mieterstrom)	1	2	3	4	5
⌂ Flexible Grundrisse (anpassbar an geänderte Mieterbedürfnisse)	1	2	3	4	5
⌂ Anderes (bitte beschreiben):	1	2	3	4	5

....

7. Was würde Sie besonders motivieren in einem NZEB (Niedrigstenergiegebäude) zu wohnen?

(Bitte bewerten Sie: 1 – für wenig wichtig; 5 – für sehr wichtig)

⌂ Vergleichbare Miete zu anderen "normalen" Wohnungen	1	2	3	4	5
⌂ Geringe Energiekosten	1	2	3	4	5
⌂ Gesamteindruck des Gebäudes (schön, neu, modern)	1	2	3	4	5
⌂ Lage des Gebäudes	1	2	3	4	5
⌂ Erfahrungen von Nachbarn, Freunden mit NZEB	1	2	3	4	5
⌂ Mein Umweltbewusstsein	1	2	3	4	5
⌂ (beim Kauf) Zuschüsse beim Kauf einer Wohnung	1	2	3	4	5
⌂ meine allgemeinen Werte und Überzeugungen	1	2	3	4	5
⌂ Gute Luftqualität in den Räumen	1	2	3	4	5
⌂ Guter thermischer Komfort	1	2	3	4	5
⌂ Smart home, automatische Steuerung (Lüftung etc.)	1	2	3	4	5
⌂ (beim Kauf) hoher Wert einer NZEB Wohnung über die Lebensdauer (Wiederverkaufswert)	1	2	3	4	5
⌂ Anderes (bitte beschreiben):	1	2	3	4	5

....

8. Haben Sie Bedenken oder offene Fragen zum Wohnen in einem NZEB (Niedrigstenergiegebäude) oder anderen hocheffizienten Gebäuden? Bitte beschreiben Sie diese.
Bitte nennen Sie Ihre Bedenken oder offenen Fragen:

....

....

9. Welcher Personengruppe würden Sie sich zuordnen?

⌂ Jugendlich / junger Erwachsener

⌂ Junge Familien

⌂ Mittleres Alter

⌂ Senior/in

⌂ Anderes (bitte beschreiben):

10. Wie alt ist das Gebäude, in dem Sie wohnen?

⌂ Vergleichsweise neues Gebäude nach dem gesetzlichen EnEV Standard (2002 – heute)

⌂ Gebäude (Baujahr 1981 – 2001)

⌂ Älteres Gebäude (gebaut vor 1980)

⌂ Anderes (bitte beschreiben): ....

11. Wurde Ihr Gebäude kürzlich renoviert /saniert?

⌂ Ja

⌂ Teilweise

⌂ Nein

12. Beabsichtigen Sie in eine neue Wohnung in den ca. nächsten 5 Jahren zu ziehen?

⌂ Ja

⌂ Nein

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Teil 2 – Fragebogen für Mieter in hocheffizienten Gebäuden

13. Was ist für Sie als Bewohner eines NZEB (Niedrigstenergiegebäude) besonders wichtig?

   (Bitte bewerten Sie: 1 – für wenig wichtig; 5 – für sehr wichtig)

⌂ Geringer Energieverbrauch	1	2	3	4	5
⌂ Niedrige Energiekosten	1	2	3	4	5
⌂ Niedrige Kohlendioxid-Emissionen	1	2	3	4	5
⌂ Verwendung erneuerbarer statt fossiler Energieträger	1	2	3	4	5
⌂ Guter Wärmekomfort	1	2	3	4	5
⌂ Ständige Frischluftversorgung in der Wohnung	1	2	3	4	5
⌂ Verwendung von Holz als Baumaterial	1	2	3	4	5
⌂ Nicht-Gesundheitsgefährdende Innenmaterialien	1	2	3	4	5
⌂ Moderne Regelungstechnik (z.B. zur Temperatur-, Verschattung- und Lichtsteuerung)	1	2	3	4	5
⌂ E-Mobilität, Stromladen bzw. Leihen von E-Autos	1	2	3	4	5
⌂ Guter Zugang zu Tageslicht / Tageslichträumen	1	2	3	4	5
⌂ Niedrige Mieten (Mieter) / Niedrige Investitionen (Gebäudeeigentümer)	1	2	3	4	5
⌂ Niedrige Betriebskosten	1	2	3	4	5
⌂ Anderes (bitte beschreiben:):	1	2	3	4	5

   ....

14. Denken Sie, dass Sie in einem NZEB- (Niedrigstenergie-) Gebäude mehr Wartungskosten
    haben, als in einem "normalen" neuen Mehrfamilienhaus?

   ⌂ Ja

   ⌂ Nein

   ⌂ Ich weiss es nicht

7

GI ZRMK / Task 4.1

15. Welche Technologien, die Ihrer Meinung nach charakteristisch für NZEBs (Niedrigstenergiegebäude) sind, werden in dem Gebäude, in dem Sie wohnen Ihres Wissens eingesetzt?

⌂ Fenster mit 3fach Verglasung

⌂ Hohe Luftdichtheit

⌂ Mechanische Lüftung mit Wärmerückgewinnung

⌂ Gebäudemanagement-Systeme zur Steuerung und Regelung

⌂ Nutzung von Erneuerbaren Energien

⌂ LED Beleuchtung

⌂ Effiziente Haushaltsgeräte mit A++ Energielabel

⌂ "Natürliche", erneuerbare Dämmmaterialien

⌂ Klimagerechtes Gebäudekonzept (Verschattung mit Bäumen, Dach-Fassaden-/Begrünung)

⌂ Smart home-Technologien

⌂ Anderes:

16. Welche Erneuerbaren Energien werden im oder am Gebäude genutzt?

⌂ Solarenergie (PV, Solarthermie)

⌂ Wärmepumpe

⌂ Wind

⌂ Biomasse

⌂ Geothermische Energie

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17. Was war für Sie eine wichtige Motivation in ein NZEB (Niedrigstenergiegebäude) zu ziehen?

(Bitte bewerten Sie: 1 – für wenig wichtig; 5 – für sehr wichtig)

	1	2	3	4	5
◌ Vergleichbare Miete zu anderen "normalen" Wohnungen	1	2	3	4	5
◌ Geringe Energiekosten	1	2	3	4	5
◌ Gesamteindruck des Gebäudes (schön, neu, modern)	1	2	3	4	5
◌ Lage des Gebäudes	1	2	3	4	5
◌ Erfahrungen von Nachbarn, Freunden mit NZEB	1	2	3	4	5
◌ Mein Umweltbewusstsein	1	2	3	4	5
◌ (beim Kauf) Zuschüsse beim Kauf einer Wohnung	1	2	3	4	5
◌ meine allgemeinen Werte und Überzeugungen	1	2	3	4	5
◌ Gute Luftqualität in den Räumen	1	2	3	4	5
◌ Guter thermischer Komfort	1	2	3	4	5
◌ Automatisierte Geräte / Smart home	1	2	3	4	5
◌ Hoher Wert einer NZEB Wohnung (über die Lebensdauer, auch Wiederverkaufswert)	1	2	3	4	5
◌ Anderes (bitte beschreiben):	1	2	3	4	5

18. Bitte beschreiben Sie Ihre positiven oder negativen Erfahrungen beim Bewohnen eines NZEB (Niedrigstenergiegebäude)

....

....

....

9

GI ZRMK / Task 4.1

19. Welcher Personengruppe würden Sie sich zuordnen?

⌂ Jugendlich / junger Erwachsener

⌂ Junge Familien

⌂ Mittleres Alter

⌂ Senior/in

⌂ Anderes (bitte beschreiben):

GI ZRMK / Task 4.1

8.2   Danish questionnaire

BEBOERUNDERSØGELSE

HVORDAN ER DET AT BO I ET 2020-BYGGERI?

INTRO

3B og BL – Danmarks Almene Boliger vil i forbindelse med et EU-projekt gerne stille dig nogle spørgsmål om, hvordan det er at bo i et lavenergibyggeri, som din lejlighed ligger i. Blandt andet vil vi gerne høre hvordan indeklimaet er i lejligheden. EU projektets formål er at gøre det billigere at bygge lavenergi byggeri, også kaldet 2020-byggeri.

Ved at deltage i denne undersøgelse er du med i lodtrækningen om et gavekort til Netto på 300kr.

Et 2020-byggeri, er et lav energibyggeri, der lever op til særlige energikrav. Blandt andet bruger det næsten ingen energi sammenlignet med traditionelt byggeri. Dog viser tal, at det er dyrere at bygge, og projektets formål er derfor at finde metoder, ideer, materialer eller løsninger, der kan gøre det billigere at bygge byggerier efter 2020-standarden for dermed at øge incitamentet til at bygge efter 2020-standard.

Hvis I er flere i husstanden, må I gerne sende flere besvarelser og dermed øge chancen for at vinde. Husk at benytte forskellige mailadresser.

SPØRGSMÅL 1

Hvad er dit køn?

- ☐ Kvinde

- ☐ Mand

SPØRGSMÅL 2

Hvilken aldersgruppe tilhører du?

- ☐ Under 19 år

- ☐ 20-29 år

- ☐ 30-39 år

- ☐ 40-49 år

- ☐ 50-59 år

- ☐ Over 60 år

SPØRGSMÅL 3

Ved du, at du bor i et 2020-byggeri? (2020-byggeri er et lav energibyggeri)

◻ Ja

◻ Nej

SPØRGSMÅL 4

Hvor tilfreds er du med at på i et 2020-byggeri?

◻ Meget tilfreds   ◻ Tilfreds   ◻ Neutral   ◻ Utilfreds   ◻ Meget utilfreds

SPØRGSMÅL 5

På en skala fra 1-5, hvad er vigtigst for dig angående din bolig?

- **Lav husleje**   Ikke vigtigt ① ② ③ ④ ⑤ Meget vigtigt
- **Lave energiudgifter**   Ikke vigtigt ① ② ③ ④ ⑤ Meget vigtigt
- **Lavt energiforbrug**   Ikke vigtigt ① ② ③ ④ ⑤ Meget vigtigt
- **At byggeriet er miljørigtigt** Ikke vigtigt ① ② ③ ④ ⑤ Meget vigtigt
- **At der er et godt indeklima** Ikke vigtigt ① ② ③ ④ ⑤ Meget vigtigt
- **Automatisk udluftning**   Ikke vigtigt ① ② ③ ④ ⑤ Meget vigtigt
- **Lav CO2-udledning**   Ikke vigtigt ① ② ③ ④ ⑤ Meget vigtigt

SPØRGSMÅL 6

Hvordan er det at bo i 2020-byggeri?

- **Komfortmæssigt**

  ◻ Meget godt   ◻ Godt   ◻ Neutral   ◻ Dårligt   ◻ Meget dårligt

- **Prismæssigt**

  ◻ Meget godt   ◻ Godt   ◻ Neutral   ◻ Dårligt   ◻ Meget dårligt

- **Indeklimaet**

  ◻ Meget godt   ◻ Godt   ◻ Neutral   ◻ Dårligt   ◻ Meget dårligt

- **Frisk luft**

  ◻ Meget godt   ◻ Godt   ◻ Neutral   ◻ Dårligt   ◻ Meget dårligt

SPØRGSMÅL 7

Hvis du skal flytte til en ny bolig vil du så vælge et 2020-byggeri, hvis det var muligt?

- ☐ Ja
- ☐ Nej

SPØRGSMÅL 8

Ved du om det lavenergibyggeri, du bor i, har følgende:

- Solceller   ☐ Ja   ☐ Nej
- Automatisk ventilation   ☐ Ja   ☐ Nej
- LED-belysning   ☐ Ja   ☐ Nej
- Lavenergi køleskabe   ☐ Ja   ☐ Nej
- Intelligent energistyring   ☐ Ja   ☐ Nej

SPØRGSMÅL 8

Hvor ofte sorterer du affald?

- ☐ Altid
- ☐ Nogle gange
- ☐ Sjældent
- ☐ Aldrig

SPØRGSMÅL 9

Hvor miljøbevidst opfatter du dig selv?

- ☐ Meget
- ☐ Middel
- ☐ Lidt
- ☐ Slet ikke

SPØRGSMÅL 10

Tænker du over, hvordan du bruger elektricitet, varme og vand?

- ☐ Ja
- ☐ Nej

SPØRGSMÅL 11

Hvor ofte lufter du ud?

- ☐ Dagligt

- ☐ Flere gange om ugen

- ☐ En gang om ugen

- ☐ Et par gange om måneden

- ☐ Sjældnere

- ☐ Aldrig *(hvis denne er krydset af, bliver spørgeskemaet afsluttet)*

SPØRGSMÅL 11.A

Hvor længe lufter du ud af gangen?

- ☐ 1-5 minutter

- ☐ 6-10 minutter

- ☐ 11-20 minutter

- ☐ 21-40 minutter

- ☐ 40-60 minutter

- ☐ Mere end en time

- ☐ (Fri tekst)

TAK FORDI DU VILLE VÆRE MED I UNDERSØGELSEN

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8.3 Italian questionnaire

Introduzione

Questo questionario è indirizzato a tutti coloro che vivono attualmente in complessi residenziali multifamiliari. Gli edifici, dal punto di vista delle prestazioni energetiche, possono essere di tipo ordinario o molto performanti. Gli edifici caratterizzati da elevate performance energetiche, che prevedono l'installazione e l'uso di risorse rinnovabili, sono ad oggi conosciuti con il nome di NZEB (Nearly Zero Energy Buildings) e sono inclusi in questa categoria sia edifici passivi che attivi. Dopo il 2020, secondo quanto previsto dalle normative europee, tutti i nuovi edifici dovranno essere NZEB ed alcuni degli edifici costruiti negli ultimi anni già lo sono.

Benchè residente in un edificio ordinario, con il presente questionario le chiediamo di contribuire alla nostra indagine fornendoci il suo punto di vista sulla qualità della vita in edifici ad elevate prestazioni energetiche.

La sua opinione può essere basata sia su esperienze personali, che conversazioni con amici e conoscenti, mass media e social o letteratura tecnica. Se ha dubbi o domande in merito all'argomento proposto (qualità della vita negli Nzeb) non esiti a condividerle con noi.

La compilazione del questionario non le ruberà più di 10 minuti di tempo.

La sua opinione sarà molto utile per sviluppare una piattaforma informativa nell'ambito del progetto CoNZEBs mirata a fornire informazioni a futuri utenti di edifici NZEB.

Grazie per la sua preziosa collaborazione.

Il Team CoNZEBs

Questo progetto è finanziato dalla comunità Europa nell'ambito del programma Horizon 2020.

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H2020 CoNZEBs project (2017-2019)

L'obiettivo del progetto H2020 CoNZEBs è la riduzione dei costi di realizzazione dei nuovi Edifici residenziali multifamiliari ad energia quasi zero (NZEB). Il focus del progetto è la semplificazione dei processi di pianificazione e costruzione, l'ottimizzazione delle soluzioni tecnologiche e la riduzione dei costi complessivi. In aggiunta l'esecuzione di una indagine sull'esperienza e le aspettative degli utenti finali e la redazione di una guida che fornisca informazioni sui benefici degli NZEBs aiuteranno a promuovere la scelta di abitare in questi edifici. Grazie al comportamento virtuoso degli utenti, anche le performance energetiche degli edifici potranno essere incrementate.

1. **Lei sa cosa è un Edificio ad elevate prestazioni energetiche?**

⌂ Si

⌂ Parzialmente

⌂ Molto sommariamente

⌂ No

2. **Quali sono secondo lei gli aspetti più importanti di un edificio ad elevate prestazioni energetiche?**

(Classifichi le sue scelte da 5 – più importante- a 1 – meno importante)

⌂ Bassi consumi energetici	1	2	3	4	5
⌂ Bassi costi energetici	1	2	3	4	5
⌂ Basse Emissioni	1	2	3	4	5
⌂ Uso di fonti rinnovabili anzichè fossili	1	2	3	4	5
⌂ Buon comfort termico	1	2	3	4	5
⌂ Aria fresca semore presente in ambiente	1	2	3	4	5
⌂ Uso del legno per componenti costruttivi	1	2	3	4	5
⌂ Uso di materiali naturali per finiture, pavimenti e pitture	1	2	3	4	5
⌂ Uso di tecnologie per il controllo dell'appartamento (temperatura, ombreggiamento, illuminazione...)	1	2	3	4	5
⌂ Possibilità di ricaricare i veicoli elettrici	1	2	3	4	5

⌂ Disponibilità di luce diurna in ambiente   1 2 3 4 5

⌂ Affitti bassi (conduttori) / Bassi costi di investimento (proprietari)   1 2 3 4 5

⌂ Bassi costi di gestione / bassi costi di manutenzione   1 2 3 4 5

⌂ Altro (descrivere):   1 2 3 4 5

3. Dove e in che modo ha ottenuto informazioni in merito agli edifice ad elevate prestazioni energetiche e fino a che punto erano soddisfacenti, utili e comprensibili?

(5- Eccellente, 4-Molto buono, 3-Buono, 2-Scarso, 1-Nessuna informazione)

⌂ Media (riviste, TV, radio)   1 2 3 4 5

⌂ Giornali tecnici, articoli   1 2 3 4 5

⌂ Organizzazioni non governative   1 2 3 4 5

⌂ A scuola / parte integrante della mia educazione professionale   1 2 3 4 5

⌂ Architetti, ingegneri   1 2 3 4 5

⌂ Fiere ed eventi   1 2 3 4 5

⌂ Consulenti energetici   1 2 3 4 5

⌂ Produttori/fornitori tecnologici   1 2 3 4 5

⌂ Negozi specializzati di materiali e prodotti per l'edilizia   1 2 3 4 5

⌂ Cooperative edilizie   1 2 3 4 5

⌂ Incentivi per l'efficienza energetica   1 2 3 4 5

⌂ Brochures   1 2 3 4 5

⌂ Internet o portal web specializzati   1 2 3 4 5

⌂ Altro (descrivere):   1 2 3 4 5

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4. Secondo lei, se vivesse in un edificio ad elevate prestazioni energetiche avrebbe costi di mantenimento più alti rispetto ad un edificio tradizionale multi-familiare?

⌂ Si

⌂ No

⌂ Non so

5. Quali ritiene che siano le tecnologie caratterizzanti un edificio ad elevate prestazioni energetiche?

(Classifichi le sue scelte da 5 – più importante- a 1 – meno importante)

⌂ Finestre con triplo vetro	1	2	3	4	5
⌂ Buona tenuta all'aria	1	2	3	4	5
⌂ Elevato spessore dell' isolante	1	2	3	4	5
⌂ Ventilazione meccanica con recupero di calore	1	2	3	4	5
⌂ Comfort termico dell'edificio controllato con Sistema di gestione energetica integrato	1	2	3	4	5
⌂ Uso di lampade a LED	1	2	3	4	5
⌂ Apparecchi domestici con etichetta energetica A ++	1	2	3	4	5
⌂ Isolamento con material naturali	1	2	3	4	5
⌂ Uso di strategie bioclimatiche (Alberi per ombreggiamento, tetti verdi…)	1	2	3	4	5
⌂ Tecnologie Smart nell'edificio/appartamento	1	2	3	4	5
⌂ Uso di fonti rinnovabili	1	2	3	4	5
⌂ Uso di energia solare (Collettori solari, Fotovoltaico)	1	2	3	4	5
⌂ Generazione in sito di risorse rinnovabili e immissione in rete (nota:non applicabile ovunque)	1	2	3	4	5
⌂ Planimetria razionale degli appartamenti (definite sulla base delle necessità degli utenti)	1	2	3	4	5
⌂ Altro (descrivere):	1	2	3	4	5

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6. Quale potrebbe essere il fattore determinante che potrebbe spingerla a vivere in un edificio ad elevate prestazioni energetiche?

(Classifichi le sue scelte da 5 – più importante- a 1 – meno importante)

⌂ Prezzo di affitto/acquisto dell'appartamento comparabile con quello di altri appartamenti	1	2	3	4	5
⌂ Bassi costi energetici	1	2	3	4	5
⌂ Appartamento nuovo, moderno ed esteticamente bello	1	2	3	4	5
⌂ Posizione dell'edificio	1	2	3	4	5
⌂ Esperienza dei vicini che vivono in edifice ad elevate prestazioni energetiche	1	2	3	4	5
⌂ Attenzione alle questioni ambientali	1	2	3	4	5
⌂ Sovvenzione per l'acquisto di un appartamento ad elevate prestazioni energetiche	1	2	3	4	5
⌂ Qualità della vita	1	2	3	4	5
⌂ Buona qualità dell'aria all'interno dell'appartamento	1	2	3	4	5
⌂ Buon comfort termico	1	2	3	4	5
⌂ Elettrodomestici automatizzati	1	2	3	4	5
⌂ Mantenimento a lungo termine del valore dell'appartamento	1	2	3	4	5
⌂ Altro (descrivere):	1	2	3	4	5

7. Ha dubbi o domande aperte sulla vita negli edifici ad elevate prestazioni energetica? Se sì li descriva nella sezione sottostante.

....
....
....
....

8. Età dell'intervistato:

⌂ Giovane adulto

⌂ Giovane coniugato

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⌂ Persona di mezza età

⌂ Anziano

⌂ Altro (descrivere):

9. In quale tipo di edificio sta vivendo in questo momento?

⌂ Edificio contemporaneo (2002 – oggi)

⌂ Edificio regolare (1981 – 2001)

⌂ Edificio antico (costruito prima del 1980)

⌂ Altro (descrivere):

10. L'edificio in cui vive è stato recentemente ristrutturato?

⌂ Sì

⌂ Parzialmente

⌂ No

11. Sta pensando di trasferirsi in un altro appartamento entro i prossimi 5 anni?

⌂ Sì

⌂ No

Introduzione

Questo questionario è indirizzato a tutti coloro che vivono attualmente in complessi residenziali multifamiliari. Gli edifici, dal punto di vista delle prestazioni energetiche, possono essere di tipo ordinario o molto performanti. Gli edifici caratterizzati da elevate performance energetiche, che prevedono l'installazione e l'uso di risorse rinnovabili, sono ad oggi conosciuti con il nome di NZEB (Nearly Zero Energy Buildings) e sono inclusi in questa categoria sia edifici passivi che attivi. Dopo il 2020, secondo quanto previsto dalle normative

europee, tutti i nuovi edifici dovranno essere NZEB ed alcuni degli edifici costruiti negli ultimi anni già lo sono.

In quanto residente in edifici multifamiliari ad elevate prestazioni energetiche, con il presente questionario le chiediamo di contribuire alla nostra indagine fornendoci il suo punto di vista sulla qualità della vita nel suo edificio.

La compilazione del questionario non le ruberà più di 10 minuti di tempo.

La sua opinione sarà molto utile per sviluppare una piattaforma informativa nell'ambito del progetto CoNZEBs mirata a fornire informazioni a futuri utenti di edifici NZEB.

Grazie per la sua preziosa collaborazione.

Il Team CoNZEBs

Questo progetto è finanziato dalla comunità Europa nell'ambito del programma Horizon 2020.

H2020 CoNZEBs project (2017-2019)

L'obiettivo del progetto H2020 CoNZEBs è la riduzione dei costi di realizzazione dei nuovi Edifici residenziali multifamiliari ad energia quasi zero (NZEB). Il focus del progetto è la semplificazione dei processi di pianificazione e costruzione, l'ottimizzazione delle soluzioni tecnologiche e la riduzione dei costi complessivi. In aggiunta l'esecuzione di una indagine sull'esperienza e le aspettative degli utenti finali e la redazione di una guida che fornisca informazioni sui benefici degli NZEBs aiuteranno a promuovere la scelta di abitare in questi edifici. Grazie al comportamento virtuoso degli utenti, anche le performance energetiche degli edifici potranno essere incrementate.

1. **Quali sono per lei gli aspetti più importanti caratterizzanti il suo edificio?**

    (Classifichi le sue scelte da 5 – più importante- a 1 – meno importante)

    △ Bassi consumi energetici   1   2   3   4   5

    △ Bassi costi energetici   1   2   3   4   5

    △ Basse Emissioni   1   2   3   4   5

⌂ Uso di fonti rinnovabili anzichè fossili   1   2   3   4   5

⌂ Buon comfort termico   1   2   3   4   5

⌂ Aria fresca semore presente in ambiente   1   2   3   4   5

⌂ Uso del legno per componenti costruttivi   1   2   3   4   5

⌂ Uso di materiali naturali per finiture, pavimenti e pitture   1   2   3   4   5

⌂ Uso di tecnologie per il controllo dell'appartamento (temperatura, ombreggiamento, illuminazione...)   1   2   3   4   5

⌂ Possibilità di ricaricare i veicoli elettrici   1   2   3   4   5

⌂ Disponibilità di luce diurna in ambiente   1   2   3   4   5

⌂ Affitti bassi (conduttori) / Bassi costi di investimento (proprietari)   1   2   3   4   5

⌂ Bassi costi di gestione / bassi costi di manutenzione   1   2   3   4   5

⌂ Altro (descrivere):   1   2   3   4   5

2. Secondo lei il fatto di vivere in un edificio ad elevate prestazioni energetiche comporta costi di manutenzione più alti rispetto ad un edificio di tipo tradizionale?

⌂ Si

⌂ No

⌂ Non so

3. Quali tecnologie sono presenti nel suo edificio?

⌂ Finestre con triplo vetro

⌂ Buona tenuta all'aria

⌂ Elevato spessore dell' isolante

⌂ Ventilazione meccanica con recupero di calore

⌂ Comfort termico dell'edificio controllato con Sistema di gestione energetica integrato

⌂ Uso di lampade a LED

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⌂ Apparecchi domestici con etichetta energetica A ++

⌂ Isolamento con material naturali

⌂ Uso di strategie bioclimatiche (Alberi per ombreggiamento, tetti verdi…)

⌂ Tecnologie Smart nell'edificio/appartamento

⌂ Uso di fonti rinnovabili

⌂ Uso di energia solare (Collettori solari, Fotovoltaico)

⌂ Generazione in sito di Risorse rinnovabili e immissione in rete (nota:non applicabile ovunque)

⌂ Planimetria razionale degli appartamenti (definite sulla base delle necessità degli utenti)

⌂ Altro (descrivere):

4. **Quali tipi di sorgenti rinnovabili sono usate nel suo edificio** (sull'edificio o in edifici vicini)**?**

⌂ Energia Solare

⌂ Pompa di calore

⌂ Energia Eolica

⌂ Biomasse

⌂ Energia Geotermica

⌂ Elettricità verde

⌂ Altro (descrivere)

5. Quali sono stati i fattori determinanti che l'hanno spinta a scegliere un edificio ad elevate prestazioni energetiche?

(Classifichi le sue scelte da 5 – più importante- a 1 – meno importante)

△ Prezzo di affitto/acquisto dell'appartamento comparabile con quello di altri appartamenti	1	2	3	4	5
△ Bassi costi energetici	1	2	3	4	5
△ Apprtamento nuovo, moderno ed esteticamente bello	1	2	3	4	5
△ Posizione dell'edificio	1	2	3	4	5
△ Esperienza dei vicini che vivono in edifici ad elevate prestazioni energetiche	1	2	3	4	5
△ Attenzione alle questioni ambientali	1	2	3	4	5
△ Sovvenzione per l'acquisto di un appartamento ad elevate prestazioni energetiche	1	2	3	4	5
△ Qualità della vita	1	2	3	4	5
△ Buona qualità dell'aria all'interno dell'appartamento	1	2	3	4	5
△ Buon comfort termico	1	2	3	4	5
△ Elettrodomestici automatizzati	1	2	3	4	5
△ Mantenimento a lungo termine del valore dell'appartamento	1	2	3	4	5
△ Altro (descrivere):	1	2	3	4	5

6. Vivere in un edificio ad elevate prestazioni energetiche può:

⌂ Migliorare i rapporti tra gli abitanti del condominio

⌂ Peggiorare i rapporti tra gli abitanti del condominio

⌂ E' Indifferente per i rapporti tra condomini

7. Un edificio ad elevate prestazioni energetiche è :

⌂ Più sicuro

⌂ Meno sicuro

⌂ Sicuro quanto un edificio tradizionale

8. Un edificio ad elevate prestazioni energetiche:

⌂ Può essere utilizzato dagli utenti senza conoscenze tecnologiche, essendo sufficiente la normale manutenzione eseguita da tecnici specializzati; la regolazione del sistema non può essere modificata dall'utente.

⌂ Può essere utilizzato dagli utenti senza conoscenze tecnologiche, ma il comportamento dell'utente corretto e informato rispetto alle tecnologie installate può migliorare le prestazioni.

⌂ Può essere utilizzato da utenti con conoscenze di base sulle tecnologie installate, necessarie per la gestione e il controllo manuali dei sistemi

9. La dipendenza nazionale dell'Italia dai combustibili fossili importati è un problema principalmente:

⌂ Economica

⌂ Politica

⌂ Ambientale

⌂ Non è un problema

10. Cortesemente descriva gli aspetti positivi/negativi dell'abitare in un edificio ad elevate prestazioni energetiche:

……………………………………………………………………………………………
……………………………………………………………………………………………

……………………………………………………………………………………………
……………………………………………………………………………………………

11. Età dell'intervistato:

⌂ Giovane adulto

⌂ Giovane coniugato

⌂ Persona di mezza età

⌂ Anziano

⌂ Altro (descrivere):

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8.4   Slovenian questionnaire

DEL 1 Vprašalnik za potencialne bodoče uporabnike SNES

1. **Ali poznate pojem »skoraj nič energijska stavba« (na kratko sNES)?**
    Take stavbe bomo morali graditi tudi pri nas po letu 2020. Tudi 1/3 prenovljenih stavb
    bo morala v prihodnje ustrezati skoraj nič-energijskim merilom.

    ⌂ Da

    ⌂ Delno – brez tehničnih podrobnosti

    ⌂ Zelo skromno

    ⌂ Ne

2. **Kje ste prejeli informacije o sNES in kako dobra (uporabna, razumljiva) je bila ta
    informacija za vas?**

(Prosimo, ocenite vsak vir: 5 – odlično, 4 - zelo dobro, 3 – dobro, 2 – slabo, 1 – brez info)

⌂ Mediji (revije, TV, radio)	1	2	3	4	5
⌂ Strokovne revije, članki	1	2	3	4	5
⌂ Nevladne organizacije (GBC, Passive house,…)	1	2	3	4	5
⌂ V šoli / kot del mojega strokovnega izobraževanja	1	2	3	4	5
⌂ Arhitekti, inženirji	1	2	3	4	5
⌂ Sejmi, prireditve, dnevi odprtih vrat	1	2	3	4	5
⌂ Energetski strokovnjaki (izvajalci energetskih rpegledov)	1	2	3	4	5
⌂ Proizvajalci / dobavitelji	1	2	3	4	5
⌂ Specializirane trgovine z gradbenimi materiali / produkti	1	2	3	4	5
⌂ Stanovanjska združenja, stanovanjski skladi	1	2	3	4	5
⌂ Eko sklad in ENSVET	1	2	3	4	5
⌂ Borzen-ov portal Trajnostna energija	1	2	3	4	5
⌂ Brošure, prospekti…	1	2	3	4	5
⌂ Specializirana strokovna usposabljanja	1	2	3	4	5
⌂ Internet, specializirani spletni portali	1	2	3	4	5
⌂ Upravniki	1	2	3	4	5

⌂ Drugo (opišite): 1 2 3 4 5

3. Kaj je za vas kot uporabnika stanovanja pomembno?

(Ocenite vsak izbor posebej: od 1 – najmanj pomembno do 5 – najpomembneje)

	1	2	3	4	5
⌂ Nizka raba energije	1	2	3	4	5
⌂ Nizki stroški energije	1	2	3	4	5
⌂ Nizke emisije CO2	1	2	3	4	5
⌂ Uporaba obnovljivih virov energije namesto fosilnih goriv	1	2	3	4	5
⌂ Dobro toplotno udobje	1	2	3	4	5
⌂ Svež zrak v stanovanju	1	2	3	4	5
⌂ Čim več uporabljenega lesa v stavbi	1	2	3	4	5
⌂ Zdravi materiali za zaključne površine, talne obloge, barve	1	2	3	4	5
⌂ Informacijsko-komunikacijska tehnologija - IKT za kontrolo naprav (temperatura, senčenje, razsvetljava,…)	1	2	3	4	5
⌂ E-mobilnost (uporaba oz. možnost uporabe električnega vozila)	1	2	3	4	5
⌂ Dobra osvetljenost prostorov / dnevna svetloba	1	2	3	4	5
⌂ Nizke najemnine (najemnik) / Nizki investicijski stroški (lastnik)	1	2	3	4	5
⌂ Nizki stroški upravljanja / vzdrževanja	1	2	3	4	5
⌂ Dober energijski razred v energetski izkaznici	1	2	3	4	5
⌂ Drugo (opišite):	1	2	3	4	5

4. Ali menite, da bi se morali, če bi kot stanovalec živeli v skoraj nič energijski večstanovanjski hiši, več ukvarjati z posli rednega in investicijskega vzdrževanja, kot v običajni večstanovanjski hiši?

⌂ Da

⌂ Ne

⌂ Ne vem

5. Katere tehnologije so po vašem mnenju značilne za sNES?

(Ocenite vsak izbor posebej: od 1 – najmanj pomembno do 5 – najpomembneje)

⌂ Debelejši sloji toplotne izolacije na ovoju   1   2   3   4   5

⌂ Okna s trislojno zasteklitvijo   1   2   3   4   5

⌂ Dobra zrakotesnost   1   2   3   4   5

⌂ Mehansko prezračevanje z rekuperacijo   1   2   3   4   5

⌂ Toplotno ugodje kontrolirano s sistemi za upravljanje energije   1   2   3   4   5

⌂ Prevladujoča raba obnovljivih virov energije   1   2   3   4   5

⌂ Raba sončne energije (sončni kolektorji, fotovoltaika) za pokrivanje lastnih potreb stavbe   1   2   3   4   5

⌂ Proizvodnja elektrike na stavbi in oddaja v omrežje (fotonapetostna elektrarna, naprava za soproizvodnjo toplote in elektrike)   1   2   3   4   5

⌂ Priklop na energijsko učinkovito daljinsko ogrevanje   1   2   3   4   5

⌂ Uporaba LED razsvetljave   1   2   3   4   5

⌂ Gospodinjski aparati z A++ energijskim razredom   1   2   3   4   5

⌂ E-mobilnost (Uporaba električnih avtomobilov, lastna polnilna postaja z možnostjo lastnega napajanja iz fotonapetostne elektrarne)   1   2   3   4   5

⌂ Racionalna zasnova tlorisa (prilagojena potrebam uporabnika)   1   2   3   4   5

⌂ Bioklimatsko načrtovanje (uporaba dreves za senčenje, zelene strehe,…)   1   2   3   4   5

⌂ Naravni izolacijski materiali   1   2   3   4   5

⌂ Pametne tehnologije v stavbi / stanovanju   1   2   3   4   5

⌂ Drugo (opišite):   1   2   3   4   5

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6. **Kaj bi bili za vas odločujoči dejavniki, da bi se odločili za bivanje v skoraj nič-energijski stavbi (sNES)? (nakup ali najem)**

(Ocenite vsak izbor posebej: od 1 – najmanj pomembno do 5 – najpomembneje)

⌂ Primerljiva najemnina/cena stanovanj z drugimi stanovanji 1 2 3 4 5

⌂ Nizki stroški za energijo 1 2 3 4 5

⌂ Lepo, novo, moderno stanovanje 1 2 3 4 5

⌂ Lokacija stavbe 1 2 3 4 5

⌂ Dobre izkušnje sosedov glede bivanja v sNES 1 2 3 4 5

⌂ Ozaveščenost glede varovanja okolja - moj prispevek k varovanju okolja 1 2 3 4 5

⌂ Subvencija za nakup sNES stanovanja 1 2 3 4 5

⌂ Življenjski stil in vrednote, trend 1 2 3 4 5

⌂ Boljša kakovost notranjega zraka 1 2 3 4 5

⌂ Dobro toplotno ugodje 1 2 3 4 5

⌂ Avtomatizirano delovanje naprav v stanovanju 1 2 3 4 5

⌂ Dolgoročna vrednost sNES stanovanja – boljše ohranjanje vrednosti sNES stanovanja 1 2 3 4 5

⌂ Drugo (opišite): 1 2 3 4 5

7. **I**n še za nas ključno vprašanje:
Ali imate zadržke, dvome ali neodgovorjena vprašanja glede bivanja v sNES (skoraj nič-energijskih ali pasivnih stavbah, v visoko energijsko učinkovitih stavbah, pametnih hišah…)?

⌂ Prosimo, opišite: …………………………………………………………………….

⌂ …………………………………………………………………………………………….

⌂ …………………………………………………………………………………………….

⌂ …………………………………………………………………………………………….

8. **Uporabniški profil vašega gospodinjstva:**

⌂ Mladi odrasli

⌂ Mlade družine

⌂ Osebe srednjih let ali družine z odraščajočimi otroki

⌂ Starejše osebe

⌂ Drugo (opišite):

9. **Iz katerega obdobja je stavba, v kateri sedaj živite?**

⌂ Nadstandardna, visoko energijsko učinkovita večstanovanjska stavba (npr.: pasivna ali skoraj nič-energijska, stavba, ki v veliki meri izkorišča OVE)

⌂ Novejša (iz obdobja 2002 – do danes)

⌂ Starejša stavba (1981 – 2001)

⌂ Stara stavba (zgrajena pred 1980)

⌂ Drugo (opišite):

10. **Je bila vaša stavba pred kratkim deležna energijske prenove?**
 (npr. menjava oken, fasada, ogrevalni sistem, mehansko prezračevanje z rekuperacijo, izolacija podstrešja, prehod na obnovljive vire, sprejemniki sončne energije ali TČ za pripravo sanitarne tople vode, menjava energenta…)

⌂ Da (celovita prenova, najmanj 3 ukrepi)

⌂ Delno (en ali dva izvedena ukrepa)

⌂ Ne

11. **Ali morda razmišljate o preselitvi v novo stanovanje v prihodnjih 5 letih?**

⌂ Da

⌂ Ne

DEL 2 Vprašalnik za uporabnike SNES

1. **Ali poznate pojem »skoraj nič energijska stavba« (na kratko sNES)?**
   Take stavbe bomo morali graditi tudi pri nas po letu 2020. Tudi 1/3 prenovljenih stavb bo morala v prihodnje ustrezati skoraj nič-energijskim merilom.

   ⌂ Da

   ⌂ Delno – brez tehničnih podrobnosti

   ⌂ Zelo skromno

   ⌂ Ne

2. **Kje ste prejeli informacije o sNES in kako dobra (uporabna, razumljiva) je bila ta informacija za vas?**

(Prosimo, ocenite vsak vir: 5 – odlično, 4 - zelo dobro, 3 – dobro, 2 – slabo, 1 – brez info)

⌂ Mediji (revije, TV, radio)	1	2	3	4	5
⌂ Strokovne revije, članki	1	2	3	4	5
⌂ Nevladne organizacije (GBC, Passive house,…)	1	2	3	4	5
⌂ V šoli / kot del mojega strokovnega izobraževanja	1	2	3	4	5
⌂ Arhitekti, inženirji	1	2	3	4	5
⌂ Sejmi, prireditve, dnevi odprtih vrat	1	2	3	4	5
⌂ Energetski strokovnjaki (izvajalci energetskih rpegledov)	1	2	3	4	5
⌂ Proizvajalci / dobavitelji	1	2	3	4	5
⌂ Specializirane trgovine z gradbenimi materiali / produkti	1	2	3	4	5
⌂ Stanovanjska združenja, stanovanjski skladi	1	2	3	4	5
⌂ Eko sklad in ENSVET	1	2	3	4	5
⌂ Borzen-ov portal Trajnostna energija	1	2	3	4	5
⌂ Brošure, prospekti…	1	2	3	4	5
⌂ Specializirana strokovna usposabljanja	1	2	3	4	5
⌂ Internet, specializirani spletni portali	1	2	3	4	5
⌂ Upravniki	1	2	3	4	5
⌂ Drugo (opišite):	1	2	3	4	5

3. Kaj je za vas kot uporabnika stanovanja pomembno?

(Ocenite vsak izbor posebej: od 1 – najmanj pomembno do 5 – najpomembneje)

	1	2	3	4	5
⌂ Nizka raba energije	1	2	3	4	5
⌂ Nizki stroški energije	1	2	3	4	5
⌂ Nizke emisije CO2	1	2	3	4	5
⌂ Uporaba obnovljivih virov energije namesto fosilnih goriv	1	2	3	4	5
⌂ Dobro toplotno udobje	1	2	3	4	5
⌂ Svež zrak v stanovanju	1	2	3	4	5
⌂ Čim več uporabljenega lesa v stavbi	1	2	3	4	5
⌂ Zdravi materiali za zaključne površine, talne obloge, barve	1	2	3	4	5
⌂ Informacijsko-komunikacijska tehnologija - IKT za kontrolo naprav (temperatura, senčenje, razsvetljava,…)	1	2	3	4	5
⌂ E-mobilnost (uporaba oz. možnost uporabe električnega vozila)	1	2	3	4	5
⌂ Dobra osvetljenost prostorov / dnevna svetloba	1	2	3	4	5
⌂ Nizke najemnine (najemnik) / Nizki investicijski stroški (lastnik)	1	2	3	4	5
⌂ Nizki stroški upravljanja / vzdrževanja	1	2	3	4	5
⌂ Dober energijski razred v energetski izkaznici	1	2	3	4	5
⌂ Drugo (opišite):	1	2	3	4	5

4. Po vašem mnenju, imate sedaj več rednega in investicijskega vzdrževanja, kot ste ga imeli v običajni večstanovanjski hiši?

⌂ Da

⌂ Ne

⌂ Ne vem

5. Katere tehnologije, ki so značilne za visoko energijsko učinkovite stavbe, uporabljate v vaši stavbi?
(Obkrožite lahko več odgovorov)

⌂ Debelejši sloji toplotne izolacije na ovoju

⌂ Okna s trislojno zasteklitvijo

⌂ Dobra zrakotesnost

⌂ Mehansko prezračevanje z rekuperacijo

⌂ Toplotno ugodje kontrolirano s sistemi za upravljanje energije

⌂ Raba obnovljivih virov energije

⌂ Uporaba LED razsvetljave

⌂ Gospodinjski aparati z A++ energijskim razredom

⌂ Naravni izolacijski materiali

⌂ Bioklimatsko načrtovanje (uporaba dreves za senčenje, zelene strehe,…)
⌂ Pametne tehnologije v stavbi / stanovanju

6. Katere obnovljive vire uporabljate?

⌂ Solarno energijo   ⌂ Biomasa

⌂ Toplotna črpalka   ⌂ Geotermalna energija

⌂ Vetrna energija   ⌂ Zelena električna energija

7. **Kaj so bili za vas odločujoči dejavniki, da ste se odločili za bivanje v skoraj nič-energijski stavbi (sNES)? (nakup ali najem)**

(Ocenite vsak izbor posebej: od 1 – najmanj pomembno do 5 – najpomembneje)

⌂ Primerljiva najemnina/cena stanovanj z drugimi stanovanji   1   2   3   4   5

⌂ Nizki stroški za energijo   1   2   3   4   5

⌂ Lepo, novo, moderno stanovanje   1   2   3   4   5

⌂ Lokacija stavbe   1   2   3   4   5

⌂ Dobre izkušnje sosedov glede bivanja v sNES   1   2   3   4   5

⌂ Ozaveščenost glede varovanja okolja - moj prispevek k varovanju okolja   1   2   3   4   5

⌂ Subvencija za nakup sNES stanovanja   1   2   3   4   5

⌂ Življenjski stil in vrednote, trend   1   2   3   4   5

⌂ Boljša kakovost notranjega zraka   1   2   3   4   5

⌂ Dobro toplotno ugodje   1   2   3   4   5

⌂ Avtomatizirano delovanje naprav v stanovanju   1   2   3   4   5

⌂ Dolgoročna vrednost sNES stanovanja – boljše ohranjanje vrednosti sNES stanovanja   1   2   3   4   5

⌂ Drugo (opišite):   1   2   3   4   5

8. **I**n še za nas ključno vprašanje:
   Ali imate zadržke, dvome ali neodgovorjena vprašanja glede bivanja v sNES (skoraj nič-energijskih ali pasivnih stavbah, v visoko energijsko učinkovitih stavbah, pametnih hišah…)?

⌂ Prosimo, opišite: …………………………………………………………………………….

⌂ ……………………………………………………………………………………………………

⌂ ……………………………………………………………………………………………………

⌂ ……………………………………………………………………………………………………

9. **Uporabniški profil vašega gospodinjstva:**

⌂ Mladi odrasli

⌂ Mlade družine

⌂ Osebe srednjih let ali družine z odraščajočimi otroki

⌂ Starejše osebe

Drugo (opišite):

Hvala za sodelovanje