Social housing renovation: Can a transition towards sustainable development be achieved?

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Master thesis report

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Preface

This thesis is a problem based learning project and the research for this study was conducted during the 4th semester of the Master Programme Sustainable Cities, in the Department of Development and Planning at Aalborg University Copenhagen. This project accounts for 30 ECTS and was carried out from 1st of February 2016 to 2nd of June 2016. The author of this report is Olga Gaitani while Jesper Ole Jensen supervised the process and offered his advice.

This report aims to explore if a demonstration project like Ellebo is able to change the current renovation practices in the social housing sector. It aims to identify how the priorities are drawn in a social housing renovation case and what are the possible challenges. In addition, it tries to clarify the role of the stakeholders through the planning process and the grade of influence that they have. The Ellebo project was the outcome of the Nordic Built Challenge conducted for the first time and this report aims to understand what is different is this case, what is beneficial and what this project can offer to the existing system.

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Abstract

This study tries to identify how priorities are structured, what influences the decision process and if a holistic approach of sustainable development can be implemented in social housing renovation cases. In order to find answers a real renovation scenario is selected as a case study for this thesis; the project of Ellebo estate at Ballerup municipality (Denmark). This renovation project is the winner of the Nordic Built Challenge and aims to become a demonstration project of sustainable development. As the winner of the Nordic Built Challenge, conducted for the first time, generates questions if this case can be seen as a 'niche' and what possible changes can be occurred in the existing system.

A literature review has been conducted in order to gain a coherent overview of the problematic areas in relation to the social housing sector and the challenges of conducting a renovation. The social housing sector has to deal with social, functional and energy concerns in order to become attractive and antagonistic again in the housing market. The analysis of this report is mainly based on the data collected through interviews with the stakeholders of the project. In order to understand the case, the Multi-Level Perspective (MLP) and the Transition Theory (TT) are used to draw the analytical framework. A stakeholders analysis in relation to the decision making process is also part of the theories used for understanding the actual role of the stakeholders, their interaction and the degree of influence.

The analysis indicates that each social housing renovation case is unique, having different problems and challenges, and the priorities are affected by the different stakeholders' interests, technical problems and funding. In Ellebo case many different interests have to become aligned and the stakeholders try to keep a balance between the priorities as possible. The Ellebo case is able to change the existing practices especially by the new knowledge and experience offering. Nevertheless, the Ellebo project might not be able to change dramatically the existing system; it seems that it is quite difficult even in a demonstration project like this to change the focus of the social housing renovation agenda towards sustainability aspects.

Key words: social housing, renovation, demonstration project, Ellebo, sustainable development, holistic approach, priorities**.**

1. Introduction

More than half of the world's population lives today in towns and cities. UN-habitat expects that by 2050 70% of the population will be living in cities and as a result urban areas have to ensure that they will be liveable and provide high quality of life to the citizens (United Nations, 2011). Housing seems to be strongly connected with the welfare state of a community and the existing range in housing typology can often be used as indicator of social, financial and welfare dissimilarities within a society (Kristensen, H., 2007).

Environment's protection, climate change, reduction of energy consumption, reduction of greenhouse gas emissions, high quality of life and social inclusion are few of the challenges that cities deal with every day and will continue facing them in the future. A transition towards sustainability is quite challenging and in order to achieve it a lot of factors should be taken into account. Political inclusion in sustainability issues, social equity, economic growth and same opportunities to all are some of the key 'tools' in order to create sustainable cities (Mapes & Wolch, 2010).

Increasing the number of energy efficient buildings, sustainable buildings and retrofitting the existing ones is how the housing sector can contribute to a sustainable development of the cities (European Union, 2011). The existing building stock needs to be retrofitted and social housing estates are very interesting cases as most of them are in need of refurbishment and their potential of better results is high (Mapes & Wolch, 2010). Social housing refurbishments are interesting cases regarding planning, decision making and construction process as professionals and big engineering companies are often involved and affirm for the results. They are usually big estates with a variety of sustainability issues and with different stakeholders involved (Crawford et al., 2014). The sustainable development of the existing social housing estates is a significantly challenging procedure and usually the different priorities increase the complexity of it (Mapes & Wolch, 2010).

The social housing sector varies among the western European countries. There is not a certain definition of social housing concept as it is structured in relation to each country welfare state, social policies, social needs, funding etc. There are enormous differences

between the organisations and government systems being responsible for providing social houses in each country (European Union, 2011). Social housing differs regarding ownership, subsidies, setting rentals, dwelling types, age of the buildings and percentage of the social housing in each country (Whitehead & Scanlon, 2007).

Nevertheless, the main goal of social housing in each country is to provide a decent shelter and help people in need of a house and not having the purchase power to afford a private one (Whitehead & Scanlon, 2007). The challenges, however, that social housing faces today are a lot, quite complicated and similar among the Western European countries (Vestergaard, 2013). It is noticed that in social housing tent to leave ethnic minorities or minorities, especially because of poverty and this contributes in some cases in social segregation and transformation of the area where the estate is located to an area considered as distressed (Whitehead & Scanlon, 2007). In addition, it seems that there are many cases where the occupants represent especially the middle class, people with low income or people not active to the labour market (Whitehead & Scanlon, 2007). The social housing sector seems to be unable to attract wealthier citizens or families and as a result its future is questionable (Scanlon & Vestergaard, 2007). All these issues have become more and more popular in the political agenda during these years and solutions are considered essential (Kristensen, H.,2007) (Vestergaard, 2013).

In the Danish context the term social housing refers to three different types of housing; social family dwellings, social dwellings for the elderly and social dwellings for young people. The social housing sector is structured approximately by 700 social housing organisations. The 7.500 social housing estates represent the 20 per cent of the Danish housing stock and the majority of them was built approximately during 60s (Kristensen, 2007) (Danish Ministry of house and urban affairs, 2014).

In Denmark it became obvious pretty soon that these estates had to deal with a significant amount of problems. Soon enough the estates were linked with social problems and social segregation while the building performance seemed not to be the expected one. In 1980 a research regarding the distressed housing estates and valuation of the programmes and policies related to their renovation began leading in 2004 to the stigmatization of these estates as “ghettos”. These issues were and still are very high at the political agenda seeking for solutions. The renovation considered to be a solution; however the renovation of the estates only seemed not to be the appropriate approach of dealing with social issues and as a result an area-based approach was introduced regarding solving these problems (Vestergaard, 2013).

In addition, the last years there is an increasing emphasis in sustainable buildings as well as in zero carbon emission buildings (Whitehead & Scanlon,2007). The existing estates built on 60s/70s are not able to meet the requirements regarding the national and European energy policies as well as the stricter building regulations aiming for a high quality indoor climate and improvement of residents' health. European and Danish energy policies aim to the renovation of the existing building stock and the reduction of the energy consumption in the building sector in order to meet the goals of 2020 (European Union, 2011) (Danish Government, 2014).

To sum up, the drivers of social housing renovation seemed to be two basic problematic parts: the social part as well as its impact to the society and the estates' functionality. The estates have to be refurbished in order to get aligned with the current and future demands regarding quality of life, facilities and energy efficiency while social inclusion has to also be achieved.

2. Problem formulation

In the introduction some of the "problematic" areas related to social housing were presented. These areas are composing the reasons of why a renovation of social housing building is essential. Nevertheless, there are a lot of things connected to the renovation procedure that must be investigated and clarified further. The research regarding social housing and social housing renovation cases raised questions related to the decision making process, the planning process as well as the role and commitment of each different stakeholder involved in the project. The challenges regarding social housing renovation should be clarified while the available solutions proposed should be studied in this report.

2.1 Hypothesis

The research of this study is focused on these two problematic areas that a social housing renovation is called to solve 1) social issues and 2) energy efficient building issues. On one hand, regarding social problems linked with deprived estates, it is argued that only renovating the building without adopting a holistic approach of sustainable development of the estate and its surroundings is not the right strategy to follow. Providing spacious rooms, new kitchens and bathrooms, changing the facades and changing to the better the living conditions in an estate has surely an impact in tenants' lives and increases the quality of living; however it cannot be seen as a solution to social problems (social exclusion) of the estate. More things have to be taken into account; a high quality architecture design is not enough to change community's perception regarding an estate or an area within the society. Social housing organisations and municipalities aim to attract wealthier citizens and also families in estate, after a renovation, in order to achieve a better mix of different social groups; however this seems not to be working perfectly and it could also be argued that leads in sustaining the exclusion of some social groups.

On the other hand, the renovation projects are conducted especially in order to upgrade the existing estates and make them again functional. Close to this, solutions concerning the increase of the buildings' energy efficiency are usually implemented. Nevertheless, it is questionable of how actually the energy policies are integrated in the social housing renovation agenda. The literature review shows that the first priority is the social issues and less the energy efficiency of the buildings. There are a lot of challenges regarding this issue and barriers linked mostly with the available funding and its distribution.

Integrating high energy solutions in social housing estates is extremely difficult to be achieved.

These two aspects related to social housing renovation are in conflict even if they are considered as the main drives of conducting a renovation. A holistic approach is considered as a possible solution to this conflict. The social organisations aim to secure the future of the social housing sector and currently an approach combining more than one sustainability aspect seems to be the solution. It can be a possible strategy where social issues and energy efficiency goals can be aligned.

2.2 Research Question

Social housing renovation: Can a holistic approach of sustainable development be implemented? What are the challenges? What a demonstration project has to offer?

The Ellebo case at Ballerup was selected in order to investigate further a real renovation case conducted in Denmark. The project of Ellebo is a unique renovation case as the architectural and developing plan was selected through the Nordic Built Challenge. The goal is to become a demonstration project of a high quality sustainable development in social housing sector. The Ellebo estate is managed by KAB (social housing organisation in Denmark) and the case is interesting as it is a real life example where a lot of different stakeholders are involved. They all claim to have high expectations regarding sustainable development but also different priorities. A holistic approach of renovation is aimed to be implemented; however it is crucial to identify if this is actually achieved and to what extent. Can social and energy efficiency aspects co-exist in a holistic approach of sustainable development?

In addition to the architectural design, the implementation of the Lacaton & Vassal concept is actually attempted for the first time in Denmark. The Nordic Built Challenge is a competition conducted for first time within the Nordic Countries and aims to create projects to be used as show cases of sustainable development in the future. The competition was structured in two stages: an open multidisciplinary design competition followed by a negotiated procedure with the winners of the design competition. This was an opportunity that other renovation cases never had and raised the potential of better results regarding sustainability. It was the first time that KAB and tenants have had the option to select among many different proposals and take part in the design finalisation

(Nordic Built, 2012). The goals that they have to fulfil are high and the challenges are many.

The focus of this report is initially to clarify the process of conducting a social housing renovation project until now. The next step is to identify under which circumstances the Nordic Built Challenge and Ellebo project were created. The next step of the research is to further understand the factors that have to be taken into account in order to achieve a holistic approach for the problem and a strategy that can contribute to a sustainable development (environmental, economic and social) of social housing estates. It is essential to identify what the stakeholders did differently in this case and how this case can potentially affect the existing planning and decision making process. It is very interesting to clarify how this demonstration project can be beneficial. What this new approach will offer and how this case can create a new model for social housing retrofitting, if it is actually creating a new model.

This report aims to address, through Ellebo case, the following issues in order to answer the Research Question:

- Who decided and prioritized the sustainable aspects of developing Ellebo?
- What role plays each stakeholder and how they influence the process?
- Is energy efficiency or social issues higher prioritized and why?
- What is different in this case and in the planning process?
- What are the challenges?
- How a holistic approach is defined? Can a social housing renovation case be seen also as an area based intervention? Is this an aspect of Ellebo case or not? And Why?
- Can this case change the current planning process?

3. Methodology

In this chapter the reasons why Ellebo was selected as a case study and the strategy of research will be clarified. It is necessary in order to understand in depth the aim of this study to explain the structure of the research and the procedure followed. The study starts from an empirical stage trying to collect the appropriate data in order to study and analyse them. This contributes to interpret the possible patterns in order to provide an answer to the research question and to gain new knowledge about the planning process and the challenges in social housing renovation projects.

This study can be considered as a problem based learning process. This type of research is not focused only in finding answers regarding a certain problem/research question; it also aims to make further suggestions regarding possible improvements. As a result this report aims to initially identify the challenges and the current practices regarding social housing renovation and on a second stage to propose how improvements might be achieved or how the identified barriers can be avoided in the future. Is it possible for Ellebo to change the current situation of social housing renovations? Figure 1 below provides a visualisation of the main steps followed in this research.

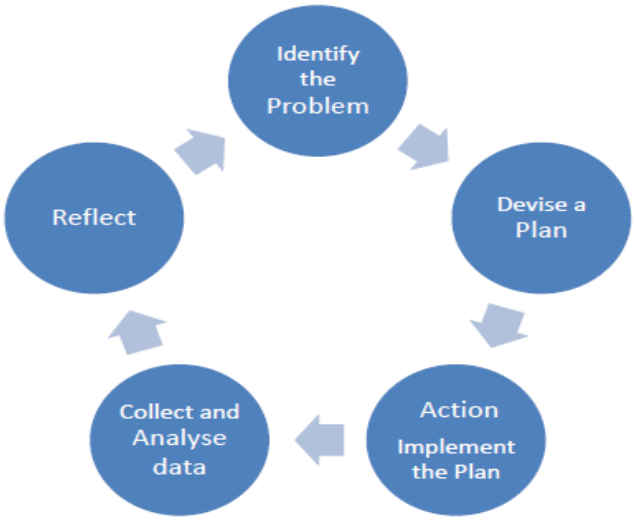

Figure 1: The steps followed in this study.

3.1 Identifying the Problem

The initial focus of the author was to study the social housing renovation methods, solutions and identify the challenges regarding sustainability as well as technical issues. The research of finding a possible case study led to the Ellebo case; a social housing renovation being currently in the planning phase. A project in this stage was not the ideal case as data regarding building performance would not have been available and the renovation would not be finished within the timeline of this research. The uncertainty of the actual renovation results is a significant limitation of the study; however the case was selected as it claims to follow a new approach of social housing retrofitting and sustainable development issues. Understanding the challenges and identifying what new and perhaps better additions can this case offer to future renovations cases is extremely interesting.

3.1.1 Why was Ellebo selected as a case study?

In early stage was clear that it would be wise to select a social housing renovation instead of a private one. In social housing renovation cases the estates being refurbished are much bigger, the money spent is significantly more and usually for these reasons the procedure is much more professional oriented. It was assumed that it would be easier to find the essential data for this report if the case would have been about social housing. In these cases is more usual to conduct an analysis regarding costs, environmental impact, energy consumption etc. than in private households. Initially the thought was about studying a renovation case that had been already completed. This would be a great advantage of the study as the essential material would be more easily collected and more coherent data would have been available. The focus was on finding renovation cases where except for the challenges and information regarding the planning process they would have been able to provide data regarding the energy performance of the building before and after the renovation.

Nevertheless, after a brief literature review and contacts with social housing organisations and the municipality, it was revealed that finding a case where data regarding the energy performance of the building would be quite challenging to be found. Monitoring the performance after the renovation is not a widespread procedure and few data are available. "*It is true that we do not conduct measurements after the renovation. It should be done actually because a lot of money is spent for this reason"* (KABa, 2016). This

affected the scope of the study in some extent and opened a "window" for cases not necessary completed. Within this framework Ellebo case was found and selected as a case study for this report. Of course, before ending up to Ellebo also other projects were briefly investigated such as: "Højbo, Frederikshavn Boligfor" and "PAB 4 Kagshusene stage 1&2 Brønshøj"; however getting in contact with stakeholders in relation to these projects was difficult.

In the first meeting with KAB two of the organisation's projects were discussed; however Ellebo case was much more challenging and consequently more interesting. Ellebo's renovation plan is the winner of the Nordic Built Challenge where the sustainability aspects regarding design and solutions are highly prioritised. The Nordic Built Challenge was conducted among the Nordic countries and one project was selected for further development out of each country. In Denmark the selected project was Ellebo. The case is currently on-going and the construction is about to start in 2017. KAB, Akam Architects, Rambøll, Kristine Jensen Tegnestue, the board of tenants and KAB's consultants are currently working on deciding the materials, technologies, available solutions and costs and finalising the renovation plan. The case is also quite challenging due to the fact that a lot of important decisions are made now or are going to be made later. "*A lot of decisions seem to be very late to the project procedure and we must do it now" (Client meeting, 2016)*. KAB concerns about the fact that the architects should make some decision (regarding facades etc,). As a result this case was an opportunity for the author to be part of this decision process, follow it step by step and understand in depth how priorities are made and what role each stakeholder plays. A lot of parameters affect the final result and this study aims to clarify these.

This case is also interesting because most of the stakeholders are involved in such a huge renovation project for the first time, setting high goals regarding sustainability. Consequently there are many challenges and this case provides an opportunity to follow step by step all the emerged problems and the solutions to be found. How a solution is selected and what criteria are taken into account in order to make a decision. How they prioritise the needs and the demands that must be met and how the tenants are involved in this process. Further information regarding Ellebo's renovation programme will be presented in the Case study Chapter.

3.2 Devise a plan/Strategy of the research

In order to answer the research question, the following research strategy was used: The first part of the study is related to the general framework within which a renovation takes place. It was important to gain knowledge regarding the Danish building and energy regulations as well as EU directives so to identify the possible reasons leading to renovate the buildings. The second part was narrowed down to identify general challenges of retrofitting social houses and the reasons for conducting the Nordic Built Challenge. Problems, possibilities, benefits and barriers are investigated in order to draw a clear picture of the "problem". In the last part Ellebo is used as an example of a real case scenario where all the challenges, benefits and barriers can be found and maybe solved.

This study is an explorative case study; it aims to understand if Ellebo case can be seen as an example or a guide of implementing a holistic approach. The research is a combination of qualitative and quantitative data. Qualitative data in relation to sustainability regulations, planning process, residents' involvement in the process, decision making process etc. Quantitative data: demographic data regarding the social housing sector, criteria that have to be fulfilled in Ellebo project, energy consumption, costs etc.

The problem formulation and the research question of this report, as explained previously, were the main drivers for choosing the suitable theories. Understanding how the Nordic Built Challenge was emerged and if Ellebo case is able to achieve a transition towards a holistic sustainable development led to the selection of the transition theory (TT) & multi-level perspective (MLP). The theories will draw the framework within which this study aims to understand the Ellebo case and how transitions might take place. Can Ellebo case be seen as niche and what is the potential of putting pressure on the existing regimes towards sustainability? A stakeholders analysis in combination with the decision making process is also used as tools to comprehend the different stakeholders' interests, their interactions and their role in the decision making process. The Area based intervention theory was selected to examine the holistic approach of the Ellebo project. The architects and engineers argue that they aim to a holistic approach of sustainable development. This theory made possible to think how social housing retrofitting can be seen as a renewal of the surrounding area also. Is this the point of Ellebo case? And if not, why?

Primary and secondary data were collected in order to gain knowledge about the social housing renovations in general and the Ellebo case particularly so to conduct a proper

analysis. Interviews with the key actors involved, observations of the area and documentary material (photos) are the primary data of this research. The secondary data were based on a literature review conducted in order to obtain more information in order to outline the framework within this project takes place and also gain knowledge about the case itself.

3.2.1 Interviews

When the research question was clarified it was important to gather as much information as possible regarding the project and its planning process. This made clear that there was a need to get in contact with as many stakeholders involved as possible. It was essential to conduct interviews with them in order to understand as much as possible each and everyone's perspective. Hence, the stakeholders identified as crucial to contact were:

- KAB (social housing organisation)
- Rambøll
- Adam Khan Architects
- Ballerup municipality
- Ballerup Ejendomsselskab (housing association managed by KAB)
- Board of the tenants
- Kristine Jensen Tegnestuen
- Expertises/Professionals related to this topic

These stakeholders were selected as the most important to contact as they all work on finalising the renovation plan and cooperate to find the appropriate strategies and solutions to problems occurred. In addition, these stakeholders are part of the existing system and it is interesting to identify how this demonstration project has affected them and what can be its impact to the system. Other stakeholders like LBF and Nordic Built are related to the project and one could argue that their point of view should be included in this study; however they both do not play a key role in finalising and constructing the project, meaning that Nordic Built was the one conducting the competition and setting the basic ambitions but their influence was restricted especially in this competition phase. The selected interviewees were most of them represented in the Jury of the Challenge and are all still working on Ellebo's renovation plan. For example, some of them, like Ballerup municipality had to make political decisions and investments in order to help towards the implementation of the renovation plan. LBF is also an important actor as it funds the renovation; however this report is not going to investigate the funding process in depth.

The interviews were conducted with the following representatives of each stakeholder/ organisation: 1) Pernille Egelund Johansen/ Project manager (KAB), 2) Sidsel Blegvad Seier/ Architect. maa.(Rambøll), 3) Annegitte Hjort/ Architect.maa.(Ballerup Municipality), 4) Claus Bech-Danielsen/ Architect.maa. (Aalborg University-Danish Building Research Institute), 5)Daniel Pihl. Phd Fellow at Aalborg University- Copenhagen, 6) Susann Taha representing the Ballerup Ejendomsselskab. Unfortunately, the Adam Khan Architects and Kristine Jensen Tegnestuen were not available for a meeting due to lack of time. Their point of view was very important for this study as they were the ones conceiving the design. It was essential to know and understand how these architects define sustainable development; however the research was conducted based on a list of publication regarding the Ellebo case and the concept followed by the architects.

3.2.2 Observations

Observing the area of Ellebo, its surroundings and the estate itself was also part of the research. Also, taking photos was helpful in order to get a better overview of the estate's problems. Nevertheless, taking photos was quite challenging as suspicious residents were afraid of being filmed and they had to be informed about this study and the reasons for research.

The observations took place after the research regarding Ellebo case and information gathered related to the architectural design that will be implemented in the estate. It was decided that an observation after all the information gathered would be of great help in order to understand the reasons Ellebo is in need of a renovation. It was easier to identify the current problems/ issues by having in mind the future plans to renovate the social housing estate.

3.2.3 Participating in 'Client meeting'

The Kube Management Company revises the work of Adam Khan Architects, Kristine Jensen Tegnestuen and Rambøll by providing their client (KAB) a group of specialists (architects, engineers etc.). Moreover, their role is to coordinate the whole procedure and organise these 'client meetings' where the different stakeholders can discuss upon possible problems and solutions. However, Kube Management is not the project manager of the renovation project. Their role is to administrate the cooperation among the different stakeholders. The chance of participating in one of these meetings was extremely helpful in order to realise the grade of complexity occurred when so many stakeholders are

involved. It was a chance to better understand which stakeholder has a more leading role and how this affects the procedure. Also, how negotiations take place and what problems have to be addressed and the reasons the process can occasionally become time-consuming.

3.3 Action/ Implementing the plan

This subchapter will present the focus of the literature review and the topics discussed with the interviewees.

3.3.1 Literature review / Previous research

A literature review related to social housing in Denmark has been conducted in order to obtain a better picture of the problematic areas and possible challenges. Furthermore, a research about other similar projects in Denmark was carried out. The research aimed also to gather relevant information regarding EU regulations, Denmark's policies, the Danish building regulation and housing market trends. In addition, data in relation to the Nordic Built and the Ellebo project were collected. The webpage of the Landsbyggefonden (LBF) was also used in order to collect the necessary quantitative data (statistics about the number of households, their size, type, resindents etc,)

3.3.2 Interviews

Semi-structured interviews based on a list of questions were conducted in order to gain further knowledge of the involved stakeholders and to help answer the research question of the study.

Three interviews were conducted with Pernille Engelund Johansen (project manager of Ellebo project) representing KAB. The main topic of the interviews was Ellebo case itself. The interest was on understanding the project, how Ellebo estate was selected, how the competition was conducted and KAB’s role in that. In addition, technical solutions, sustainability issues and problems during the process have been discussed. It was initially essential to gain general knowledge of the renovation projects, the stakeholders involved as well as their ambitions and interactions. Residents’ involvement in the planning process was also another topic of discussion. The interview aimed to obtain answers regarding KAB’s ambitions when a renovation case is conducting and especially in this case that is

considered as unique. It was also important to understand if KAB's interests were aligned with the other stakeholders' plans and what issues are taken into account in a project like this.

On the 6th of April 2016, Annegitte Hjort/ Architect.maa. of Ballerup municipality was interviewed. The main subject of the interview was to understand why the municipality supports this project, what benefits they expect to have out of that and what this project has already offered them. It was also important to understand if the municipality sees this project as area based intervention able to improve the quality of life of the whole area where the estate is located. In addition, the future plans of the municipality had to be clarified in order to understand the possibility of supporting similar projects in the future.

The interview with Rambøll took place on 12th of April 2016. The interviewee was Sidsel Blegvad Seier/ Architect. Maa. The aim of the interview was to understand the role of Rambøll in the process and their degree of influence to it. It was important to identify their point of view regarding sustainability aspects and especially regarding uniqueness of Ellebo case. In addition, questions related to the challenges, their opinion about the planning process and improving proposals of the process, were also posed.

To continue with, on April 15th 2016 Claus Bech- Danielsen Architect maa and professor at Aalborg University was interviewed. As it is already mentioned it was not possible to set a meeting with Adam Khan and Kristine Jensen. Hence, it was essential to understand the concept, of Lacaton & Vassal on social housing renovation and hence another source had to be found. The interviewee had conducted, in the past, studies on this specific architectural concept investigating its potential, the advantages and disadvantages of it. As a result it was the appropriate source of information. Other issues were also discussed such as the main reasons behind social housing renovation, mostly technical and social oriented.

It was mentioned previously that the tenants are considered a crucial stakeholder in the Ellebo project and actually the Danish social housing sector is characterised by the tenants' dominance. Unfortunately, language barriers and the limited time of the tenants' steering group made it impossible to arrange a meeting with them. The only available option to gather more data about the decision making process and the tenants role in this was through the Phd student Daniel Pihl. He is currently studying the Ellebo case and he was able to offer information regarding the planning process, the structure of priorities (energy, social, structural aspects etc.) and the role of the tenants.

The last interview, with Susann Taha from Ballerup Ejendomsselskab, was conducted on 19th of May 2016. The focus on the interview was to identify what Ellebo project has offered the housing association, what are their interests and what challenges had to overcome during the planning process.

As it is already mentioned the collected materials related to Ellebo case and the renovation process in social housing in general are distinguished in primary and secondary data. The primary data were obtained by conducting the interviews, observations and by participating to the 'client meetings'. The analysis of this report will be based especially on these data and the new knowledge gained will be used as a tool for analysing and understanding in depth the planning process of Ellebo case and its challenges. As the renovation case is currently in the planning phase, there were limited secondary data available. The main sources for them were the Nordic Built documents about the description of the project and the Nordic Built Jury's pronouncement. Moreover, COWI's report about the 30 most Sustainable Buildings was also a source of information. Nevertheless, all the secondary data were focused on describing the project and the sustainability goals that has to meet while the reasons of winning the Challenge were not clarified in detail.

4. Literature review

This subchapter provides an overview of the existing literature in social housing, renovation focus, planning process, architectural design and challenges. Many researchers have approached the problems related to social housing renovation. Most of the studies reveal that renovation projects occur especially because of the need to increase the quality of life and update the existing estates built around 60s and 70s. Nevertheless, it is argued that the renovation projects do not always achieve their goals and the process became more challenging the last decades where there is also focus on energy efficient buildings.

4.1 Social housing challenges

Scanlon et al. (2015) studied the different social housing systems and structures among the European countries. According to the study social housing was a crucial part of European housing sector and during the last decades the pressure regarding funding, regeneration, living conditions and affordability has been increased. There are a lot of issues related to accommodation of excluded households, quality of living condition, maintenance of the estates etc.

The research of Scanlon & Vestergaard (2013) concludes that the social housing sector, these days, is unable to provide affordable and decent housing for all and this is a great challenge that has to be faced. In addition, the study regarding the Danish social housing supports that a great challenge is that the percentage of people willing to live in is decreasing. The current housing market trends have achieved to build a strong link between the ownership and the welfare status and as a result more and more people prefer to buy their own house than to live in social housing.

4.2 Challenges of social housing renovation

Vestergaard (2013) studied the challenges regarding large social housing estates of Denmark. The study focused on the social problems linked to the estates being drivers of renovation programmes, policies and funding. An evaluation, of local renovation cases where different approaches were implemented, was conducted. It is argued that only an

architectural renovation cannot solve the social issues that the estates deal with and other approaches of the problems as well as funding solutions should be investigated.

The study of Crawford et al (2014), was oriented towards the crucial discussion regarding the demolition or renovation of a social housing estate. Technical assessments were followed in order to compare the two scenarios and other factors such social sustainability, health improvements and job creation were also taken into account. The study argues that refurbishment of social housing actually has potential and is able to deliver great results in less time than demolition.

Researches have also shown that there are often differences between the predicted and actual performance of buildings (performance gaps) (Crawford et. al, 2014). This issue is also mentioned by the municipality of Copenhagen as well as by the Social housing organisations, where after the renovation there is no data collected in order to see the actual results or the retrofitting regarding energy efficiency of the buildings. In fact there were cases where the building ended up not having the expected energy performance so improvements had to be done. The authorities are quite concerned about this as the money spent on renovation projects are significantly a lot and the results should be as successful as possible (Copenhagen Municipality, 2016) (KABa, 2016). In addition in some cases residents adopt their behaviour in such a way that after the renovation the energy consumption eventually increases (Crawford et. al, 2014)

In STBA (2012) key aspects of the responsible retrofit of traditional buildings in UK are studied. Different assessment procedures are required for traditional buildings based on an understanding of the performance. It is argued that traditional buildings perform differently and until now retrofitting measure policies often provides incorrect results.

Jensen et al. (2013) studied the barriers and challenges of building renovation in Denmark. This study aimed to propose an assessment tool that can support the initial phase of decision making process of a renovation. The study revealed the lack of simple and holistic tools being able to help the stakeholders involved in the decision making process. The stakeholders need to have a simple guideline for setting priorities and goals regarding the renovation project.

In Ma et al. (2012). it was identified that a significant issue in renovation projects is how the stakeholders can find the most cost-effective solution. In addition, it is argued that for

the decision makers is quite challenging to find the best retrofitting and sustainable solutions. The paper tried to present a systematic approach of an effective building renovation.

Outrequin P. et al. (2008) studied the barriers that the social housing owners have to overcome in order to implement “factor 4 programme”. In this programme a number of European countries participate and Denmark is among them. The goal of the programme is to help social housing organisations optimise their retrofitting process as much as possible and to draw sustainable and energy efficiency strategies. Technical barriers, market risks, behaviours as well as institutional barriers were identified for each of the participant countries. The study revealed that there is lack of knowledge regarding some new technologies and sustainable solutions and also lack of specialists’ cooperation that has to be confronted.

4.3 Ellebo- ‘Winter garden room’ project

The COWI A/S (2015) report presents the 10 principles of the Nordic Built regarding sustainable development. This study analyses each one of the Nordic Built winner-projects in order to identify to what extent they managed to meet the goals of the 10 principles. According to the authors the renovation plan/ proposal of Ellebo is the only one that meets all the goals and adopt a holistic approach of sustainable development.

In the Nordic Built (2013) report, the Jury’s conclusion about the winner project of the Nordic Built Challenge in Denmark was presented. The reasons for selecting ‘winter garden room’ renovation proposal among other candidates are also clarified. This report also supports that this proposal was the only one able to meet all 10 principles.

The winner renovation proposal follows the architectural design of Lacaton & Vassal regarding renovation. The description of Ellebo project did not provide a lot of information in relation to the architectural renovation concept and its advantages or disadvantages. As a result it was important to conduct a research and collect material that can be used to comprehend the architectural design and its potential in more deepth.

Lacaton & Vassal (2009) support that the idea behind the architectural concept was that architecture should be able to provide people with the possibility of freedom. It must serve their needs and their different abilities and wishes. The social housing estates of the

60s/70s were constructed on the base that all families have the same needs. Lacaton & Vassal aim to change this perception by examining the possibilities of the estate to provide a design close to the idea of a villa. This approach is argued to be less expensive and the construction works can be conducted while the residents remain to their apartments.

Bech Danielsen (2015) studied three different architectural approaches of social housing renovation. The first two strategies aim to transform the existing buildings as much as possible such as after the renovation buildings will have nothing in common with their previous design and style. On the contrary, the third strategy adopted by Lacaton & Vassal, perceives the existing post-war building as heritage that must be protected. As a result this strategy tries to identify the potential of the building and renovate it without changing the main tectonics or style. The author does not distinguish one of the strategies as best; however it is mentioned that the third strategy has offered some great results during the last years.

5. Theories

5.1 Transition Theory and Multi-level perspective

Creating smarter and more sustainable cities requires significant technological transformation able to influence the current system and push the limits towards a transition. As a result, new technologies and practices, called 'niches', are needed. These 'niches' try to establish themselves in the market/ current system by facing the reaction of the existing actors refusing a transition. The dominant actors often react against the transition as there are unexpected costs and uncertainties regarding new technologies or new practices. Usually the 'niches' are initially developed in protected environments or under certain circumstances before launched to the market and transform the current system (Geels, F. W., 2002).

Sociotechnical transitions are usually approached and studied using a multi-level perspective (MLP), arguing that the transitions are the result of interaction between developments and social groups at multiple levels. According to MLP the transitions emerge from the interaction between three analytical levels and they are not considered to be linear processes (Geels & Schot, 2007)(Geels, 2011).

5.1.1 Transitions towards sustainability

Sustainable development is considered to be a quite recent concept and it can be argued that transitions towards sustainability are in their initial phase (Smith et al., 2010). Nevertheless, many studies have utilised the MLP in order to approach and comprehend how transitions to sustainability occur. In the case of socio-technical transitions, it is more complex and difficult to study, analyse and understand them. The different social groups interpret sustainability differently and the changes need a lot of time to emerge (Geels, 2011).

The current landscape within which the sustainable development takes place and is affected by, is quite stable and normative. "*The challenge of sustainable development demands policies to promote a change in what has been called the momentum of socio-technical systems." (Smith et al., 2010, p.437).* Hence, enhancing the change of the current landscape is essential in order to obtain more sustainable systems (Smith et al.,2010).

Nevertheless, the new technologies and practices have to overcome the inertia of the existing regime trajectory in order to be established in the market (Geels, 2002). Within this framework the sustainable 'niches' find it challenging to compete with less sustainable alternatives which are already established and accepted (Smith et al., 2010). If a 'niche' manages to be competitive and established, it can influence the function of the system and redefine the relation between the components. A new reality then is formulated (Geels, 2005).

At this point, after presenting the MLP as an approach of sustainability transitions, it is important to clarify the MLP as much as possible. The following figure is a visualisation of MLP in order to better understand the three levels and how the transition takes place.

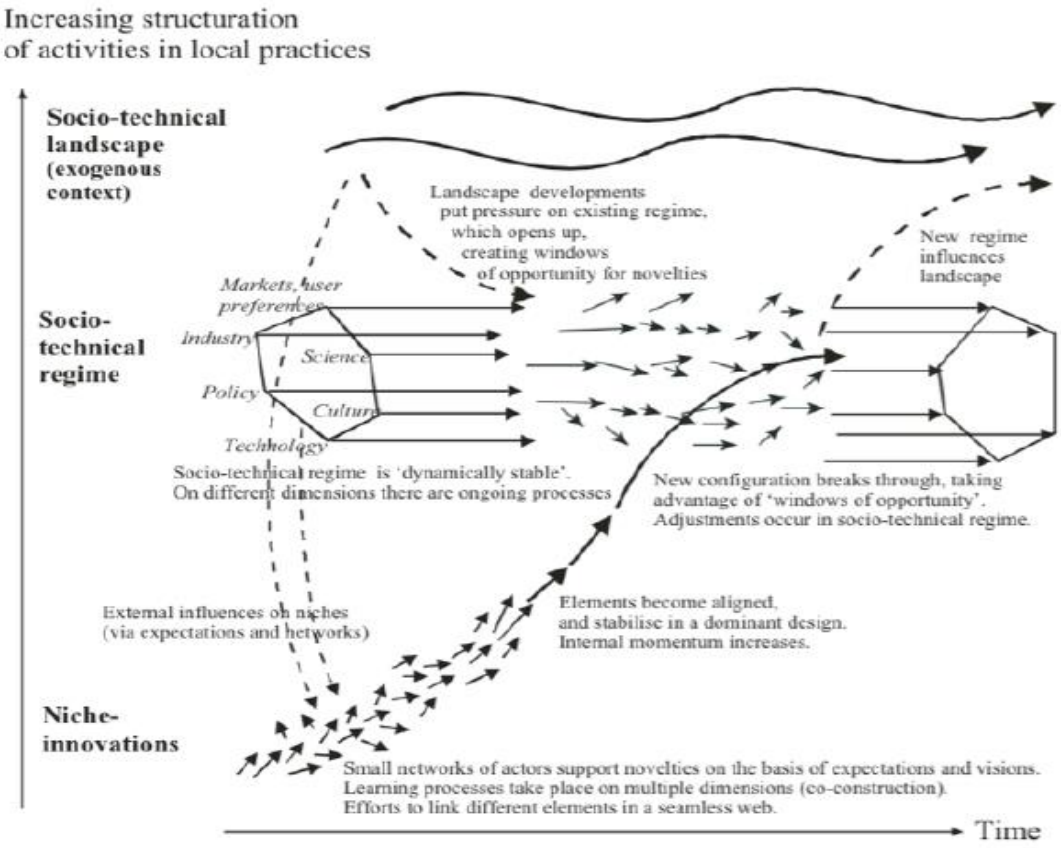

Figure 2: Multi-level perspective on transitions (Geels, 2002).

Socio technical niches

The lower level represents the 'niches', the protected environments, where new technologies and alternative practices are developed. This level is essential for a transition because it provides the appropriate space where new networks can be formulated and the actors can experiment and gain new knowledge. It is a learning process stage which is very difficult to exist outside a protected environment in the existing regime level. In this stage the 'niches' are not considered as competitors of the dominant technologies/practices in the regime (Smith et al., 2010). In Ellebo case the holistic approach of the social housing renovation can be seen as 'niche' which has the potential to achieve a transition towards sustainable development of social housing. However, this new approach has to be tested (Smith et al., 2010).

Socio-technical regimes

In this intermediate level the stable and dominant regimes of a societal system are represented. Regimes such as existing actors and practices are responsible for sustaining the existing systems. It is understood as the interaction and co-evolution of knowledge, infrastructure, values etc. forming the shape and function of the existing systems (Smith et al., 2010).

The socio-technical regimes are dynamic. This means that they change by new entities, developments and other components of the existing systems. In order for a 'niche' to succeed it is important to be further developed within the level of the existing regimes (Geels, 2002). The regimes change in order to be able to ensure stability and offer to 'niches' space so to be established (Smith et al., 2010).

Socio-technical landscapes

The higher level represents the socio-technical landscape and it is the most stable level. Nevertheless, within this framework the regimes and niches interact, and changes at this level can put pressure on the existing regimes creating spaces for 'niches' to emerge (Geels, 2002). As a result, the landscape is able to put pressure on the existing regimes towards a transition or reinforce their existing trajectory (Smith et al., 2010)(Geels & Schot, 2007). As it can be suspected the three levels vary regarding stability. The

upper levels are more complex and stable with many actors involved and interact with the lower levels (Geels & Schot, 2007).

5.1.2 Transition pathways

There are different routes and linkages between the elements of a sociotechnical system that can lead to a transition. Two routes are identified in relation to the interaction of the three levels in MLP: the 'technological substitution route' and the 'wider transformation route' (Geels, 2005).

Technological substitution route

In this case the existing regime level is characterised by stability, and the developments take place in a low rate. A novelty can emerge in the existing regime level under certain circumstances. First, the novelty has to already be antagonistic enough and to be supported in order to be established in the current system. It is also important the current landscape to pressure the existing regimes towards a transition. This new entry obligates the current sociotechnical regimes to become more adaptive to the new reality (Geels, 2005).

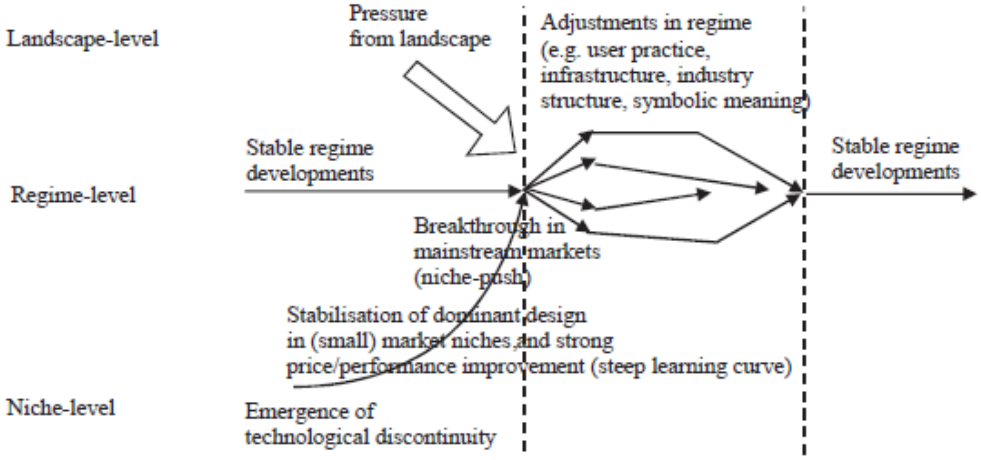

Figure 3: Technological substitution route (Geels, 2005)

Wider transformation route

In this scenario the novelty occurs because the existing regime level is quite unstable and persistent problems are seeking for solution. As a result the existing actors have to identify new approaches to the problems and to experiment with alternatives. The first

step in this route is a period of 'heating up', where all possible alternatives are taken into account and examined. Afterwards, 'a cooling down' period follows which narrows down the possibilities resulting to novelty's breakthrough.

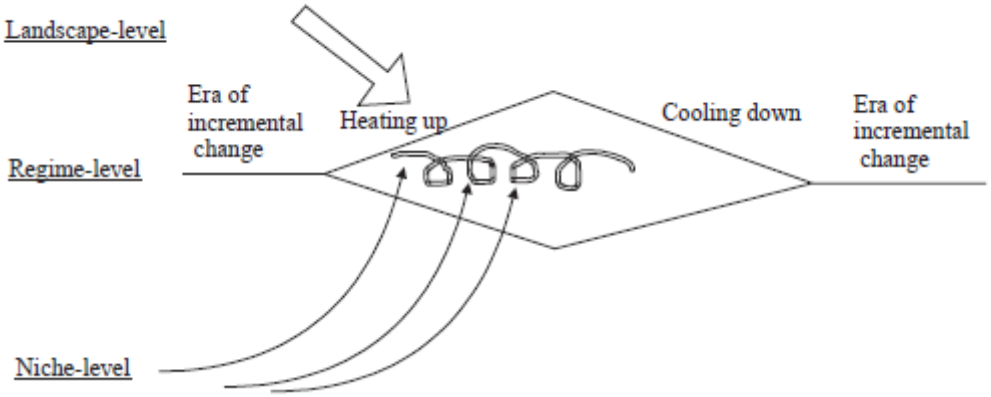

Figure 4: Wider transformation route (Geels, 2005).

In this study the transition theory will be used to guide the analysis and understand if Ellebo project is a novelty and how it can change the current practises in social housing renovation. It will also help to identify what route this new approach followed in order to become part of the current system.

5.2 Decision making & Stakeholders analysis

Understanding the planning process means simultaneously the need to analyse and understand how the decisions are made. The different stakeholders involved in the planning process, having harmonious or antagonistic interests, try to influence the decision making process in favour of them. In most cases the decision makers try to consider all the possible alternatives as well as their consequences in order to make a rational decision resulting in the best available solution. Nevertheless, other factors can pressure the decision makers and lead them to take quick decisions which often are considered as irrational (March, 1994).

A Stakeholders analysis can be seen as a useful tool in order to identify, analyse the intentions and map the interests of the stakeholders involved. Varvasovszky and Brugha (2000) argue that a stakeholders analysis can be seen as *"an approach, a tool or set of tools for generating knowledge about actors … to understand their behaviour, intentions, interrelations and interests; and for assessing the influence and resources they bring to bear on the decision-making or implementation processes"* (p. 338).

The analysis aims to gain knowledge about the different stakeholders' role and understand how they influence the decision process. Different types of stakeholders can be found involved in the process such as individuals or organisations that are part of different governance levels (local, regional, national, international). It is important to mention that the stakeholders considered and the data collected in relation to them, affect the result of the analysis (Varvasovszky & Brugha, 2000).

This report will use the Stakeholders Analysis as a tool to understand how the different stakeholders involved interpret sustainability, what goals they want to achieve through this renovation case and if these goals are aligned or in conflict. It is also important to identify how the social housing renovation agenda is structured and how priorities are set.

In a meta-governance scenario the citizens' active participation in the decision making process is proposed in order to have a more functional administration system, fair decisions and outcomes accepted by the majority of the society (Peters, 2010). In Denmark the social housing system is considered quite democratic, especially regarding decision making processes and the residents' involvement in the planning process of a renovation project. The initiative for a renovation should start from the tenants and be further developed by a close collaboration with social housing organisations, architects and engineers. The tenants have to vote for the plan and if they do not accept it the renovation project must be cancelled. Hence, it can be argued that the tenants are the ones in charge (KAB, 2016) (Interview 1). This report based on this fact will try to investigate to what extent the residents were involved and how they contributed in the decision making process in Ellebo case.

5.3 Area Based Interventions

The last decades Western Europe communities deal with significant issues of segregation within the cities. Cities have to face and find solutions for issues regarding social and economic exclusion of some social groups. *"The growing gap between the 'included' and the 'excluded' is believed to be caused by social mechanisms that reinforce social exclusion, limit opportunities and ultimately trap individuals"* (Wouter *et al.*, 2009, p. 53). As a result there are urban areas slightly forgotten or mismanaged, considered in end as distressed districts.

Today, finding beneficial proposals with regards to the renewal of these urban areas is high to the political agenda, and policy makers try to approach the problem in a different way in order to inverse the tendency towards exclusion. A quite efficient approach to the problem is to deal with it in a local framework, and as a result a lot of policies and projects aiming to the renewal of specific urban areas are developed (Wouter *et al.*, 2009). In the Danish society this approach was introduced by the ministry of Housing Affairs as a "democratic experiment' (Munk, 1998).

The main idea behind the area based interventions approach is that a specific planning for each of these areas within a city can point out the advantages and disadvantages of the area, and achieve more efficient solutions. Through this approach the planners try to create more liveable urban areas as integral parts of the city. Nevertheless, the results of this approach are not able to be calculated and to some extent it is not easy to measure the effectiveness of this strategy in terms of cultural, economic and social exclusion. In the Danish context it has been noticed that in some cases the changes in the distressed districts did not focus on improving the quality of life but on citizens' displacement (Larsen, 2013).

This report will try to identify if the retrofitting of a social housing estate can also be used as a tool to develop the surrounding area. It will be important to see how Ellebo case is expected to affect the area where it is located, while the role of Ballerup Municipality will also be investigated. It is interesting to understand if the local authorities see a potential for the whole area in this case, except for renovating the estate itself and increase the quality of life.

6. Ellebo-Garden Room case

6.1 The project

The current design of the Ellebo case was a proposal by Adam Khan Architects at the Nordic Built Challenge conducted on 2012. The Nordic Built challenge was a design competition regarding the refurbishment of a specific building in each of the five Nordic countries. The goal of the Challenge and the Nordic Built organisation is to promote the sustainable development and viable building refurbishment through real cases and practices. It also aims to spread the knowledge regarding development of sustainable Nordic building concepts (Nordic Built ,2012).

The concept of the Nordic Built Challenge was defined by the Nordic Built Character. The Nordic Built Character sets the ten core principles formulating the ambitions, values, challenges and opportunities related to the Nordic building sector. According to the Nordic Built Challenge these 10 principles define the holistic approach of sustainable development. The participants of the Challenge had to propose an eco-efficient and innovative renovation design utilising modern technologies while at the same time being financially feasible and a viable (Nordic Built, 2012).

To better understand the Ellebo case and its goals, it is required to identify the principles that had to be met in order to win the competition. The basic principles defining the concept of the Nordic Built initiative are:

1. *Is made for people and promotes quality of life*
2. *Pushes the limits of sustainable performance, as a result of our innovative mind-set and high level of knowledge*
3. *Merges urban living with the qualities of nature*
4. *Achieves zero emissions over its lifecycle*
5. *Is functional, smart and aesthetically appealing, building on the best of the Nordic design tradition*
6. *Is robust, durable, flexible and timeless - built to last*
7. *Utilises local resources and is adapted to local conditions*
8. *Is produced and maintained through partnerships founded on transparent collaboration across borders and disciplines.*
9. *Employs concepts that are scalable and used globally*
10. *Profits people, business and the environmen*t (Nordic Built, 2012).

Within this framework the proposal for Ellebo case had to be developed; but **what is the Ellebo case?** Ellebo is a housing estate located in Ballerup, Denmark. The municipality of Ballerup has 48.211 inhabitants and is located 16 kilometres northwest of Copenhagen, the Danish capital (Ballerup Kommune, 2016).

The estate was constructed in 1963 and it is used for social housing. The buildings are surrounded by grounds featuring parking plots,playing fields and green recreational areas. The estate is owned by Ballerup Ejendomsselskab and it is managed by KAB (Nordic Built, 2012). KAB is a public organisation founded in 1920 by the so-called middle class aiming to find solutions about a significant problem: the lack of housing. Today the organisation is owned by a number of housing associations and manages approximately 50.000 properties. KAB cooperates with both housing associations and municipalities in order to build, rent and manage housing and residential areas while creating at the same time a democratic feeling among the occupants. In addition, they try to provide good housing and living conditions and increase the well-being (KAB,2015).

Figure 5 : The surrounding area and the parking plot today.

Going back to the Ellebo case, the estate is characterised by a typical building damage related to the age of it. The estate is considered to be out-dated regarding current building regulations and is in great need of renovation. According to the competition the reasons for renovating the estate were to ensure a good indoor climate in housing units and to minimise the energy consumption while at the same time make the estate adaptable to future needs and demands (Nordic Built, 2012).

6.1.1 The existing situation

The municipal plan of the area where the estate is located permits a four-storey residential building and a maximum plot ratio 6. This was a limitation for the architects since any additional new buildings require a new local plan and for that reason it would be a better to add new facilities in the form of penthouses (Nordic Built, 2012).

The buildings are in a need of insulation, roof construction, new facades, new window implementation and improvement of the housing facilities and of the indoor climate. The energy consumption of the estate is 136 kWh/m2 while the heating demands are covered by district heating system. There is a potential for implementation of other renewable sources for energy supply such as solar panels; however the geothermal energy is not an option. Another issue for the architects was that there is a 200-seats parking at the site that had to be retained (Nordic Built, 2012).

Figure 6: Existing situation of Ellebo estate (Khan Architects et al., 2013).

With regards to the competition and KAB wishes, the estate needs to become attractive and functional again. It is essential to provide larger apartments for families and as a result it is necessary to renovate and extend the building envelope (Nordic Built, 2013). In addition, for KAB it is important that the buildings become easily accessible to residents with special needs (KAB, 2016). The project manager of KAB mentioned *"We have already today 2 tenants that they cannot come out of their apartments and this is sad. We have to solve this."* Another issue is that a strategy regarding the decrease of the energy consumption has to be proposed, and sustainable solutions should be implemented in order to achieve a holistic approach of the problem (Nordic Built, 2012).

6.1.2 The vision

The Architects' vision is to make Ellebo a place where young people and young families want to live and engage with it; a place where the residents will create their own bonds and enjoy living; also, a place where residents will feel secure and part of the community. For the architects of this project it was also clear that in order to achieve their goal they had to offer an affordable and at the same time high quality accommodation (Khan Architects et al., 2013). As a result and also because of the Nordic Built Challenge, the architects' focus was not only in the building renovation but it was important to adopt a holistic approach to the problem and deal with the outside landscape of the buildings (KAB, 2016).

Landscape

The design of the estate's landscape was formulated and based around this main idea: having a shared garden as the heart of the estate. Within this central garden there will be a diverse range of spaces with different characteristics able to cover several of the residents' needs. In addition, each corner of the estate's landscape will have a different utility, its own character where different facilities will be available.

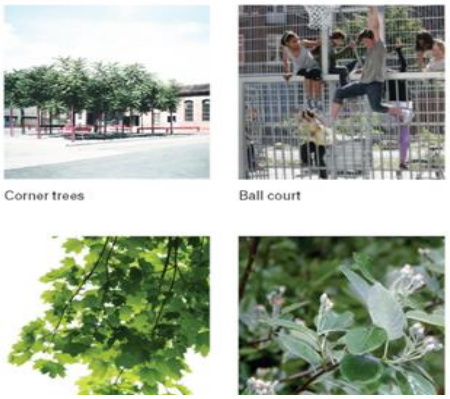

Figure 7: Proposal for the future landscape (Khan Architects et al., 2013)

However they will not be separated parts of the main garden but close linked extensions of it. This design aims to offer the residents the possibility of spending their free time at the shared garden, be part of a local community and enhance the pleasure of coexistence (Khan Architects et al., 2013).

Moreover, the design proposes that the ground floor will have small gardens where the residents will be able to grow their own food and through this influence the feeling of ownership. The residents will have to take care of their own gardens and as a result they will also feel committed to take care of the estate as a whole. A natural pond will also be constructed in the middle of the garden providing residents with green and blue areas. In there the residents will have the opportunity to participate in different social activities depending on seasons (Khan Architects et al., 2013).

Figure 8**:** The private gardens (Khan Architects et al., 2013).

Buildings

A basic aspect of the architecture design was to increase the accessibility of the buildings. All the buildings will have direct access points to the shared garden while the lifts to be implemented will be in the site of the garden. This aims to solve firstly practical problems by making the building easily accessed by elderly people or people with special needs. Secondly, this spatial structure will ensure the daily use of the shared garden and will give the chance to residents for socialising and interaction.

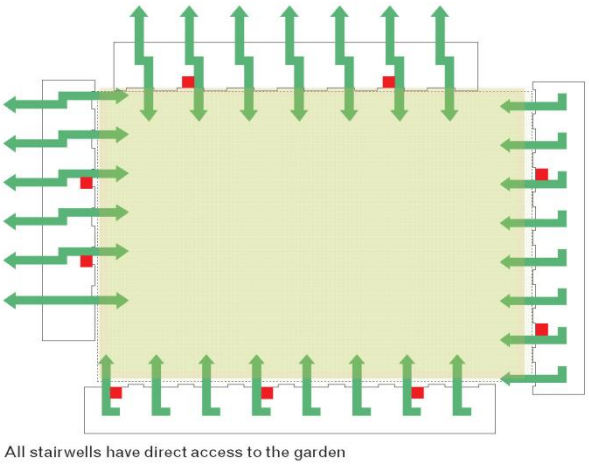

Figure 9: Access to the buildings (Khan Architects et al 2013)

According to the design, Block 1 will have a new built extension so to become larger while Blocks 2 & 3 will have an envelope extension containing only winter gardens and balconies while new penthouses will be built on the rooftops of each building. Following residents' desires, the winter gardens aim to be the heart of the house in order to have multifunctional and seasonal use. On one hand, the winter garden rooms will invite the residents to enjoy the light and the view and experience their surroundings. On the other hand, the construction of rooftop penthouses and the extension of Block 1 aim to increase the sense of enclosure to the inner garden. (Khan Architects et al., 2013)

To sum up, the overall goal of the architecture design is to achieve a radical transformation of the existing building structure, by taking advantage of the current potential, and offer a new strong identity that enhances the quality of life (Khan Architects et al., 2013).

Figure 10: Ellebo today & Ellebo view as proposed (Khan Architects et al.,2013)

6.1.3 Construction and Technical details

In this subchapter more technical details will be presented with regards to sustainability initiatives and the construction method of the building envelope that contains the winter gardens.

Landscape

The shared garden in the middle of the estate except being used for social activities is also a protection measure against flood. The wildflower meadow can be used most of the year as flood meadow in order to increase drainage capacity in case of cloudburst. In addition the natural pond in the middle of the shared garden will be used to store the rainwater of the buildings and water the garden (Khan Architects et al., 2013).

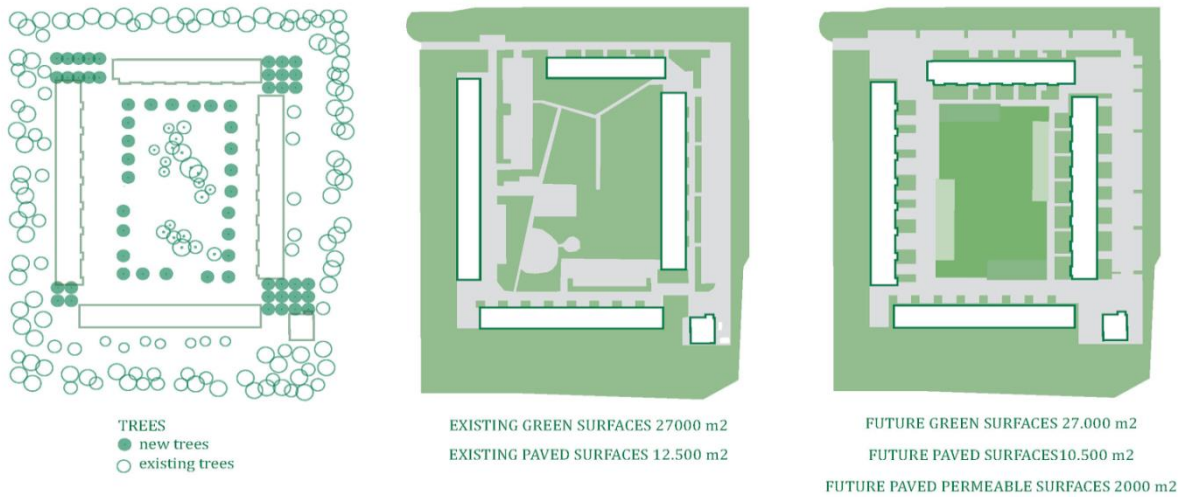

Figure 11: Existing & future landscape (Khan Architects et al., 2013)

Buildings

A great challenge of this project is that construction works will take place while the tenants will be staying at their apartments. This was decided in order to save money and avoid great losses in case of moving the tenants somewhere else (KAB, 2016). As a result the architects came up with the following proposal that minimises as much as possible the cost and the distribution of the tenants (Khan Architects et al., 2013).

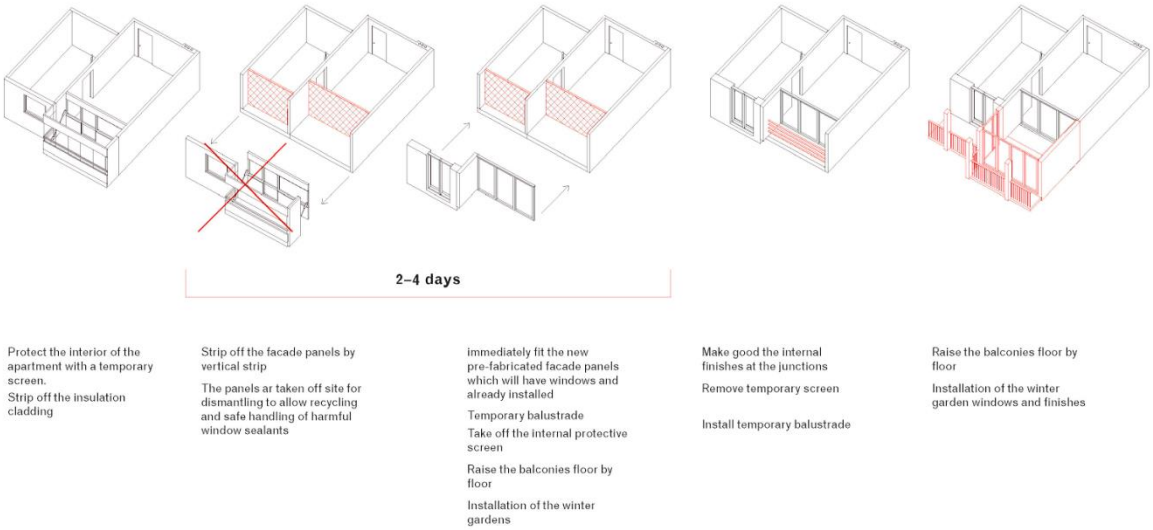

Figure 12**:** Construction of the winter garden room (Khan Architects et al., 2013)

The plan is to construct and complete one building block at a time and have the landscape construction as the final step of the renovation. This strategy is proposed so to involve the residents in the transformation process and create the basis for the residents' commitment to Ellebo (Khan Architects et al., 2013).

Energy Efficiency measures

The goal of Ellebo project is the estate to be able to reduce its operational costs, energy consumption and CO_2 emissions. The architects and engineers aim to achieve the energy class 2015 of the Danish Building Code regarding the existing buildings and new ones. They support that this will bring better outcomes for the whole estate than by following the requirements of buildings regulations BR10 (Khan Architects et al., 2013).

As a result the new facades will be prefabricated with 400mm insulation and a U-value of 0.09 w/m2K. This type of facades aims to be air-tight, reduce cold bridges and eliminate the growth of mould. The reduction of the buildings' air-tightness will be less than 1.0

l/sm2. In addition, 3-layers glazing with U-value 0.53 w/m2k will be implemented and placed at the centre of the insulation in order to minimise line losses between the outer wall and the windows. The winter garden will also contribute to reducing heat losses, as it will act as a warm buffer zone during winter. (Khan Architects et al., 2013).

The figure above shows how the winter garden will act during the different seasons of the year. The winter garden will be activated according to the external conditions and will be adapted to the needs of each season. For example during spring/autumn it can be transformed to an extension of the living room while during summer to a semi-closed balcony (Khan Architects et al., 2013).

The roofs of the buildings as well as the basements will also be insulated with an additional insulation of 250 mm. The foundation will be insulated up to 250mm from the ground (insulation thickness~200mm) while the roof basement will be insulated by a 200mm layer (Khan Architects et al., 2013).

Additionally, an efficient ventilation system with heat recovery and electricity use below 1.0 kj/m3, will be implemented while the heating system will continue to be supplied by District Heating (Khan Architects et al., 2013). All these measures result to a reduction of 103 khW/h in energy demand regarding space heating, ventilation and hot water (KAB, 2016).

6.2 The concept followed for the renovation- Lacaton & Vassal

The design concept followed for renovating the Ellebo estate by Adam Khan Architects was based on Lacaton & Vassal concept regarding social housing retrofitting. For Lacaton & Vassal an architect has to work by taking advantage of the existing substance and never creating from the scratch. This point of view adopted by them led to the conclusion that demolishing is not a good solution; it is just necessary to use architecture for reprocessing it (Lacaton & Vassal, 2009).

In 2004 Lacaton & Vassal conducted a research in order to identify the potential of refurbishing the existing post-war buildings and provide better living areas in a most cost-effective way. Initially, the architects realised that in the case of social housing, the housing organisations and engineers aim to a mass production of apartments/houses assuming that all families have similar needs. It is obvious that today this way of thinking

cannot cover the needs of differently structured families (two families in a house, families with children, no children in the week, more children in the weekend, people with special needs, elder members etc.). Lacaton & Vassal observed that when one offers families the possibility of having more space they use it in many different ways (Lacaton & Vassal, 2009).

This conclusion was the first fact based on which their design concept was developed. It made them think that the needs and wishes of people living in a social housing building are more important than architecture itself. Instead, architecture has to be used as a tool to cover these needs and find solutions to increase comfort and quality of life. The idea of a villa came up as a good example of good living condition and by then they worked on providing/ integrating the same facilities in a social housing building. Their plan was not to demolish the buildings and vanish the established community in each case, but to keep inhabitants in their places and with the existing quality and atmosphere develop the project “around” them. Thus, the heritage of the building will be kept and just add what is missing (Lacaton & Vassal, 2009)

Another finding of their research that led them to this specific social housing renovation concept was the fact that if the refurbishment of a building is considered only from a technical or energy saving perspective it usually is insufficient to improve the living conditions. As a consequence at some point the need for a new renovation will arise. Thus, there is a need of a holistic approach to the problem. The goal is to achieve a building where performance and pleasure are efficiently combined.

Briefly the design concept of Lacaton & Vassal regarding social housing refurbishments aims to the following:

- Provide spacious dwellings
- Double the available living area of each apartment
- Increase quality of living and comfort
- Floor to ceiling glazing: more daylight, panoramic view of the landscape surroundings
- Winter gardens: more space, privacy but also part of the city context
- Indoor quality
- Energy savings with bioclimatic approach (Lacaton & Vassal, 2009).

From a construction point of view, the proposal is basically all the new constructions to be steel structures built on piles so they can be attached to the floor with the minimum impact. This way the existing public spaces, common spaces or the atmosphere of the gardens will be less affected. The new floors to be built as self-supporting structures will be added on the periphery of the existing building at every floor. As a result the living rooms will be extended in order to create closable terraces and balconies. In addition, the existing facades will be removed and replaced by large transparent openings (Lacaton & Vassal, 2009).

At this point it is important to mention that this concept focuses especially on the buildings themselves and the way they can be improved in order to make peoples' lives better and easier. The architects claim that "*Starting from this inside improvement of quality, it creates an immediate transformation of the image of the building. What we propose is not to do it just by changing the skin, but by a long-term transformation which comes from the inside"* (Lacaton & Vassal, 2009, p.9); however they are not very focused in the surrounding of each estate and how these areas can be improved and cover current and future needs (The Architect's Journal, 2015).

In the case of Ellebo the renovation concept follows the Lacaton & Vassal concept; however Adam Khan Architects in cooperation with Kristine Jensen's Tegnestue, KAB and tenants also focused on the transformation of the common areas of the estate and the public spaces in order to make the space livable and to enhance the local community (KAB, 2015) (The Architect's Journal, 2015).

7. Analysis

Social housing renovation planning process, in most of the cases, seems to be less complex than in Ellebo case. In this chapter, the initial planning process until the selection of the design concept will be examined and analysed step by step. Afterwards, the decision process and the challenges that the stakeholders confronted will also be analysed further. The aim is to identify and analyse what is different in Ellebo case, how different it is and if it was beneficial for the process. It is important to investigate if Ellebo project can actually change the existing practises of social housing renovation and how.

7.1 How Ellebo occurred?

This report will try to identify if the Ellebo case follows the pattern suggested by TT and MLP. The theories will be a help in order to identify if Ellebo can be seen as 'niche' and if it possible to contribute towards a transition of the current social housing renovation practises. According to TT, the existing regimes and the current landscape influence the emergence of 'niches'. The theory explains both the process, until the emergence of a 'niche', and the process after where its impact to the regimes' level is investigated. This report follows the same approach as the TT. Firstly, it will try to understand how Ellebo was occurred so to provide a more coherent point of view regarding processes. In order to further investigate what changes Ellebo can bring to the existing system, it is essential to understand under what circumstances this project was created. Was there a gap in the existing market? Did the existing regimes provide support and how? The analysis will start with clarifying what factors formulate the current sociotechnical system for social housing renovation, how they interact and if they push towards a sustainable development of social housing estates.

During the last decades there is a lot of discussion regarding social housing renovation projects and how these can lead to a sustainable development of the estates and their surroundings.

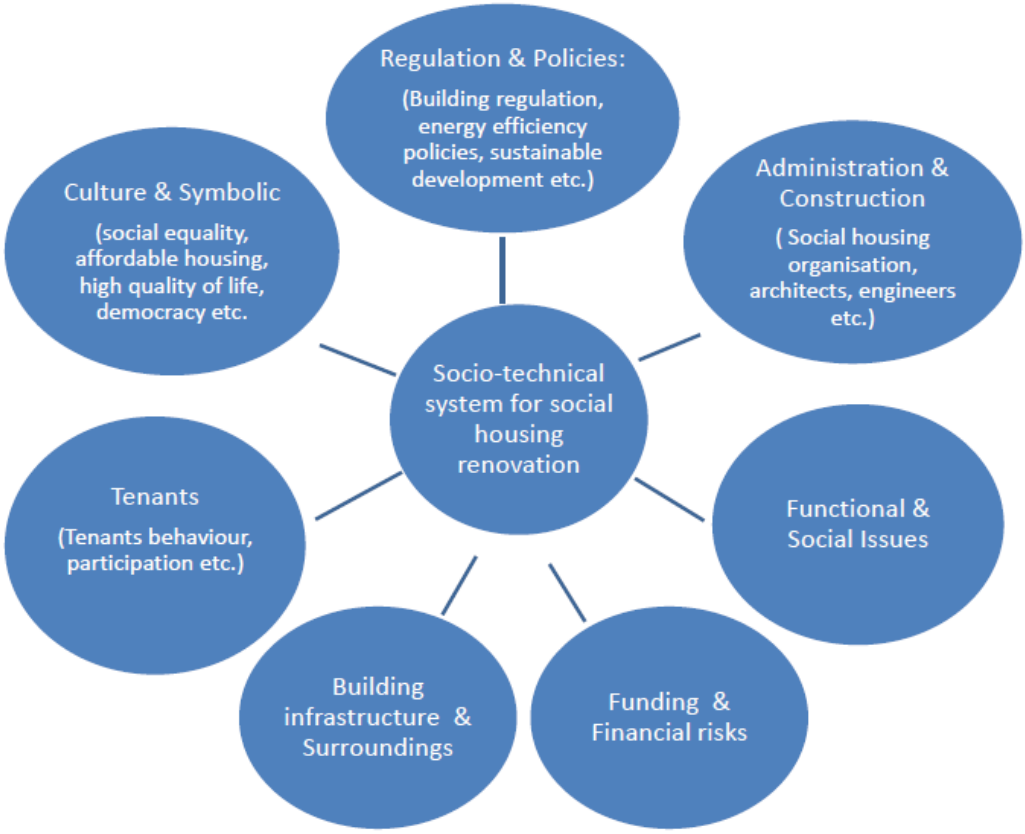

Figure 13: Elements from the sociotechnical configuration in social housing renovation (based on Geels,2002)

The above Figure 15 shows the configuration of the existing socio-technical system for the social housing renovation. It was structured following Geels perception of the elements that can formulate a sociotechnical system and the identification of them was based on that. Geels examines the socio technical configuration of the transportation system (Geels, 2005). There are a lot of factors defining this system and the reconfiguration of it is not an easy process. All these factors interact to each other and formulate the existing sociotechnical system. The different regimes represent different interests and it is quite challenging to achieve an alliance able to support a new approach and stabilize it. For example social housing organisations aim to solve social issues and increase the value of the existing estates while the tenants want to achieve a fair balance between the results of a renovation and the increase of their rent. In addition, the building and energy regulations regarding more energy efficient buildings and better indoor quality represent another aspect that has to be taken into account. As a result, the selection of sustainable solutions is affected by extremely different aspects. The case of Ellebo tries to combine all these different aspects by adopting a holistic approach of sustainable development. It aims to deliver a project where the majority of the different interests will be satisfied. This study tried to identify the three levels of the MLP in Ellebo case. According to the theory, the landscape and regime level are quite broad and many different elements can be

included. In this report, however, it is not possible to address them all. As a result it was decided by the author to focus especially in elements considered to be more related to social housing renovations.

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7.1.1 Existing landscape

According to MLP, the landscape level represents policies, legislations, market trends etc. It is a broad level which can include a variety of different factors that can push the existing regimes towards a transition. Policies and goals at an EU as well as national level will be identified, together with market demands that affect the social housing sector. It is a fact that the EU as well as Denmark have a great amount of policies that affect the social housing sector and the renovations. The research and the review of the literature revealed that mostly social concerns and concerns about the future of the social housing sector are part of the social housing renovation agenda, while for Ellebo project also sustainability issues had to be taken into account. As a result this subchapter will present the landscape elements assumed to influence more the renovation agenda of the social housing and of Ellebo project.

European Union goals. By 2050, CO_2 emissions have to be reduced by 80–95% below 1990 levels in order to reach this goal (European Commission, 2011a). The European Union (hereafter EU) has to be able to manage the energy demand and decrease its energy dependency in order to influence the global market while securing the energy supply. The aim is to achieve a 30% use of renewable energy sources by 2020 (EU, 2010). Each member state has to follow the directives related to environment protection and present results of the changes (European Commission, 2011a).

The building sector in the EU is considered to be responsible for the 40% of the total energy consumption and the sector tends to expand. As a result the EU and its State members should reduce the energy consumption while increasing the use of renewable energy (EU, 2010). For this reason the EU published an energy strategy under the 2010/31/EU directive, where it promotes the improvement of the energy building performance. In this directive, the outdoor and indoor climate requirements, the local conditions as well as cost-effectiveness of the energy solutions are taken into account.

In order to address the energy building performance successfully, the EU identifies the need of more coherent actions with the goal to increase the energy saving potential (EU, 2010) . For this reason, the directive 2010/31/EU takes into account the renovation of the

existing building stock, declaring that a “major” renovation has the potential of providing cost-effective energy solutions. A renovation can be characterised as “major” by the size of the building envelope or by the value of the building. When a “major” renovation is conducted there should be more focus on building elements that have a significant impact in the energy performance, and the member states have to ensure that the energy performance of the building is technically, functionally and economically feasible. In addition, the states are obligated to consider high-efficiency potential alternative solutions to be implemented (EU, 2010).

Denmark’s goals. Social cohesion is also an important political issue for Denmark. The Danish cultural policy emphasises on the Danish cultural heritage in order to understand better the individuals, the different cultures, needs etc. and to create a multicultural, coherent society (culturalpolicies.net). Another political issue for Denmark is the existence of parallel societies that transform areas into deprived neighbourhoods. This problem is generally linked with social housing estates where groups of residents have difficulties to be integrated into the Danish society. Thus, one can find estates with limited issues regarding social integration whereas other estates are characterized as ‘ghettos’. The Danish government lately addresses this problem by conducting renovations, making the areas attractive, increasing safety, and providing a better educational system in these areas. In a few cases even the demolition of these estates is considered (Johansen H., 2011).

Apart from social issues, the climate adaptation and energy concerns are high to the political agenda. The Danish government has set a goal of 100% renewable energy supply by 2050. This energy policy is aligned with the EU directives aiming in an 80-95% reduction of greenhouse gas emissions by 2050 (Danish Government, 2014). To achieve this goal, the country needs a green transition which requires initiatives towards the reduction of energy consumption in all possible sectors.

The existing building block in Demark has been identified as a sector with a great potential for reducing energy consumption. By conducting energy renovations the government found a strategy in order to reduce energy consumption and achieve the long-term goals of renewable energy supply (Klima og Energiministeriet, 2013). For the Danish government it is also significant to identify and implement the most cost-effective solutions proposed. This does not imply that the quality and architectural values are not prioritised. As a result finding cost-effective solution while combining architectural values led to the

conclusion that the energy renovation should be conducted concurrently with the regular renovation maintenance of the building (Klima og Energiministeriet, 2013).

The housing market demand is also part of the landscape level. Housing almost in all societies is related to the social status of the citizens and indicates welfare as well as financial dissimilarities. The trend in relation to housing has changed and the housing market demands bigger apartments, attractive architectural designs and better living conditions. In addition, the Danish winter does not encourage outdoor activities and the Danes have to spend many hours indoors. For this reason there is a need to provide residents more space and flexibility (Kristensen, H., 2007). Studies regarding the social housing in Denmark support that even if the estates are well maintained the trend indicates that the percentage of the population especially families and young people, that prefers living in social housing is declined (Scanlon & Vestergaard, 2007). The social housing sector in Denmark has to face this challenge and become more antagonistic.

All the above issues and concerns formulate the current landscape level and according to the theory, affect the regime level. As a result it could be assumed that the EU and Danish goals as well as the problematic areas are the ones pushing the social housing sector towards a transition. Nevertheless, it is quite difficult in the Ellebo case to clarify this fact and the degree of pressure that the existing regimes receive by the current landscape. The research conducted declares that the stakeholders of Ellebo project are all aware of these national and international policies; however they are not the main pressure source. It can be said that the national policy regarding social cohesion affects remarkably the social housing renovation agenda; still the role of EU policies cannot be identified easily. Further down in the analysis, it will be seen that the regimes aim to find alternative solutions not only because of the landscape pressure but also because of issues within the regimes level. This report though will not investigate and analyse in depth the degree of pressure. This study focuses on identifying how the Ellebo case is different and what changes can generate in the existing system.

7.1.2 Existing regimes & the niche

In this part the elements of the regime level, regarding Ellebo, will be investigated and presented. At the regime level many different actors, networks, practises that are able to formulate it can be identified. However, this study addresses only the regimes related to the Ellebo project. Studying all the possible regimes regarding the social housing renovation was not the aim of this research since this would not provide any help to

understand the case and answer the research question. This decision was also affected by limitations in terms of time, available data and language. As a result by the term regimes, this report refers especially to the regimes (stakeholders) connected to Ellebo case and that can be seen as a small sample representing the regime level. The stakeholders identified as crucial for the Ellebo case will be presented. Their role and interactions will be analysed to get a clear picture of the system's structure.

Landsbyggefonden (LBF)

The National Building Fund of Denmark was founded in 1966. The fund collects money by the rent payments from social housing estates. The organisation has adopted a system of solidarity where all the estates having got a loan will continue to pay the increased rent also after they have paid out the depth (Bech-Danielsen, 2016). As a result the deposit in this fund is increasing drastically. This makes the fund able to finance renovation of deprived estates, significant maintenances of the estates or to invest in other types of non-profit housing as housing for elderly, students, nurses etc. (lbf.dk)

"The money that LBF has is actually owned by all the social housing estates in Denmark. It is not linked directly to the ones paying. It is a solidarity system meaning that the ones in need of money for renovating their estate in the future they can apply for funding."

Claus Bech- Danielsen Architect maa.

More than 100 distressed housing estates have been funded for conducting renovation since 2000 and in 2013 a political agreement gave the permission to the fund for spending more money on renovations and social initiatives in the troubled housing estates. Besides the focus on social problems, the organisation also invests in energy efficient solutions and sustainable development of the social housing building stock (lbf.dk). The National building fund is interested in raising awareness regarding sustainable development and for this reason they were supportive in relation with KAB's proposal of participating in the Nordic Built Challenge with Ellebo case.

"We contact LBF in order to inform them for the possibility of participating to the competition and they thought that it was an interesting possibility. We had an understanding that they would like very much to see what would come out of such a competition."

Pernille Engelund Johansen/ Project manager at KAB

Ballerup Municipality

The municipality of Ballerup is one of the important stakeholders regarding Ellebo renovation case and it is in close collaboration with KAB. They are supportive and really interested in the outcome of such a major effort regarding sustainable development. For the municipality Ellebo was a chance to increase its sustainability aspects and gain new knowledge, by pushing the limits, through a renovation that had to be done anyway. By having a demonstration project like Ellebo, they aim to promote their strategy regarding sustainability and become an inspiration for the rest municipalities. (Ballerup Municipality, 2016)

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"It is a combination for us Ellebo is really run down and it is in great need of renovation but we also have to increase our sustainability aspects."

Annegitte Hjort Architect maa. (Ballerup Municipality)

The renovation of the social housing estates is a political issue for the municipalities. Political decisions have to be made based on the local conditions, plan and municipalities policies. The last years, Ballerup municipality had to deal with many renovation cases the estates were 25-30 years old and in great need of repair and refurbishment. The first generation of these projects was mainly focused on repairing the facades or implementing new facades, insulation and maybe new balconies or closed balconies. Gradually, the focus changed as the municipality realised that this renovation approach is not enough for solving all the problems related to the estates. As a result they decided that more sustainable aspects such as energy savings had to be part of the renovation agenda (Ballerup Municipality, 2016).

Ballerup Ejendomsselskab, Tenants & KAB

The research conducted for this study has shown that the decision for conducting a renovation, in a Danish context, has to be made initially by the association owning the social housing estate and its tenants. The Danish system is a quite unique case because

the residents are in charge of the estate and play a crucial role to the decision process. If the residents do not support the renovation plan, the plan is cancelled (Danielsen-Bech, 2016).

Ballerup Property Company is part of KAB community and it is structured of approximately 60 housing organizations and companies being managed by KAB. When it was essential for Ellebo estate to be renovated; the local association (owner of Ellebo) and the tenants informed KAB regarding their wishes to renovate the estate.

The role of KAB afterwards, as in all the renovation cases, was to organise the planning process, to identify the appropriate partners, apply for funding and supervise the procedure step by step (KABb,2016). KAB apart from working on behalf of the residents has also its organisational interests regarding the renovation projects. The focus of KAB is on three areas: core operations, sustainability and well-being until the end of 2018. These three aspects are considered to be very important for the future of the housing organisations and their residents (kab-bolig.dk).

Architects, Engineers & the Danish building regulation

Architects, engineers as well as the building regulations are also part of the existing regimes. The architects and engineers cooperate with the social housing organisations and they have to follow the current building regulations in order to be possible for the project to get funded. The current building regulations have a great effect to the renovation plans.

This part of the analysis aims to clarify briefly how the Nordic Built Challenge was created in order to get a better overview. As a result it is important to mention that the architects and engineers are part of the existing regime level; however they were not involved in the process led to the emergence of Nordic Built Challenge. They were involved later where they had to develop the Ellebo project within the protected environment of the Nordic Built Challenge. Their role and their grade of influence will be analysed later in this report.

The Nordic Built was an initiative driven by the Nordic Ministers for Trade and Industry (public authorities). The Nordic Built was funded and supervised by the Nordic Innovation, being responsible of stabilising partnerships programmes within the Nordic countries (Nordic Built, 2012). The goal of this programme carried out in the period 2012-2014 was to enhance the sustainable development of Nordic building concepts. In addition, the

programme aimed to offer attractive and effective fields of collaboration, combine Nordic strengths and create concrete projects being show-cases of world class solutions. Under the umbrella of Nordic Built and the collaboration of the Nordic countries, the stakeholders/ regimes involved in social housing renovations were called to participate and experiment regarding sustainable development. This new actor among the existing regimes created a 'niche': The Nordic Built Challenge.

Getting in contact with all the above stakeholders being related to Ellebo case has indicated that the main drivers of a social housing renovation projects are mostly: technical problems affecting the building's functionality, the wish to create better living conditions for the tenants and to increase the estate's value. These are all concerns existing in the current regime level and the stakeholders have to deal with. Solutions aiming to deal with all the problems related to social housing estates have to be found. Meanwhile, environmental and energy concerns seem to be lower in hierarchy. The case of Ellebo has also revealed that the initial reasons for conducting the renovation were that the estate was not functional any more, demographical issues (age of the tenants) had to be solved and the place had to become attractive again.

"Estates from the '60s and '70s, like Ellebo, have reached an age from the beginning of '90s by then they were 25-30 years old and they need repair and refurbishment"

Annegitte Hjort/ Architect maa. (Ballerup Municipality)

"We asked during the competition to make apartments for more families which was important in order to make the estate viable on a long time basis...very small apartments had to be combined into bigger ones"

Pernille Engelund Johansen/ Project manager at KAB

This report identified that the concerns in the regime level are the ones putting more pressure in the existing regimes than maybe EU policies. As it is already mentioned all the stakeholders of Ellebo case, are aware about the national and international energy policies etc.; however these are not the basic reasons for conducting a social housing renovation. The case is able to follow the MLP pattern if it is assumed that the current landscape was one of the reasons creating the Nordic Built Challenge. It can be argued that EU policies were able to pressure the Nordic Ministries and in combination with the challenges facing at the regime level led to the Nordic Built Challenge. This is where this study was able to identify a possible pressure of the existing landscape level.

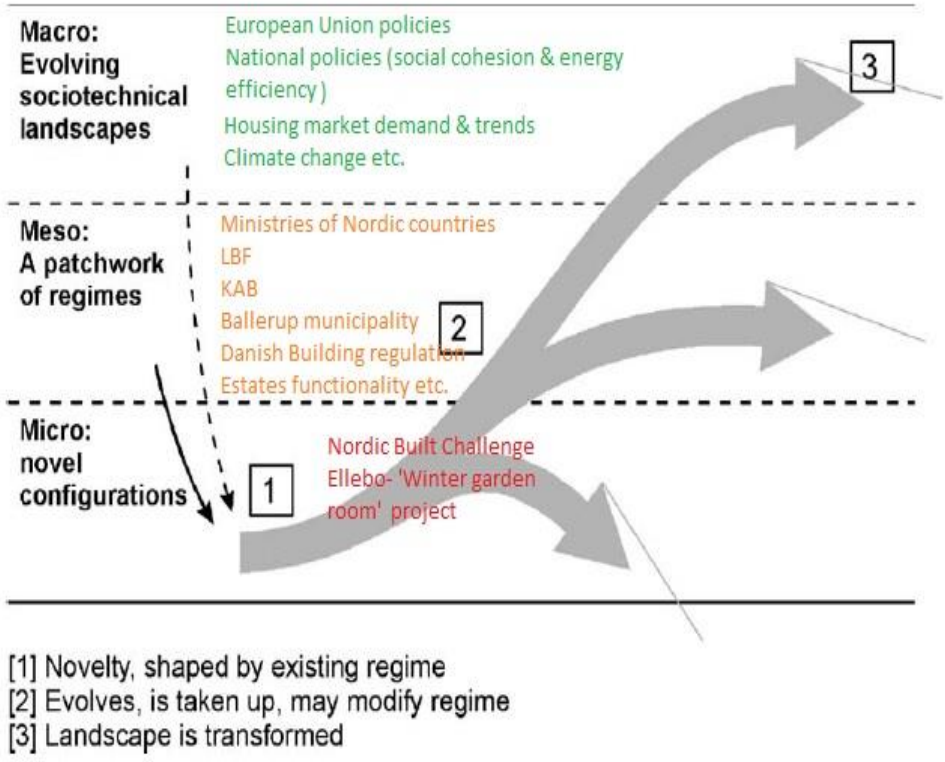

Figure 14: The three levels of MLP in relation to Ellebo case (based on Geels, 2002)

According to MLP and TT there are certain patterns that can be followed and led to the creation of a .niche'. At this point the analysis will be focused on understanding the route that led to the creation of the Nordic Built Challenge. In the theories chapter, two route types were presented 1) technological substitution, 2) wider transformation route. The research and the study regarding Ellebo case and the planning process combined with the theory revealed that the creation of the Nordic Built Challenge was a result of a wider transformation route. In the case of the wider transformation route the 'niche' that is supported by the existing regimes that might have changed their interaction. This pattern can be identified also in Ellebo case where the existing regimes (Nordic Ministries) decided to cooperate (changing their interaction) and formulate the Nordic Built as well as the Nordic Built Challenge.

The Figure 14 above shows how the different levels, according to the theory, interact. The theory's figure has been formulated in order to represent the levels in relation to Ellebo case.

As the transition theory implies a period of 'heating up' followed resulting to the idea of the Nordic Built and the Nordic Built Challenge. As a result the existing regimes had the

opportunity to experiment with alternatives and to think about different ways of structuring the current system.

"We could not have all these sustainability aspects based on the old local plan because nobody had thought about this back then. We did not have the appropriate knowledge."

Annegitte Hjort/ Architect maa. (Ballerup Municipality)

"Is easier as we have the appropriate knowledge to build new energy efficient buildings. But actually demolishing the existing one and build a new is way expensive. Solutions have to be found"

"In some cases the measurement results regarding energy efficiency after the renovation were not the expected and changes needed to be done."

Pernille Engelund Johansen/ Project manager at KAB

The new idea was supported of a 'new' network where current regimes (Nordic Ministries, KAB, Ballerup Municipality etc.) cooperate and seek for knowledge and solutions regarding the sustainable developments of social housing estates.

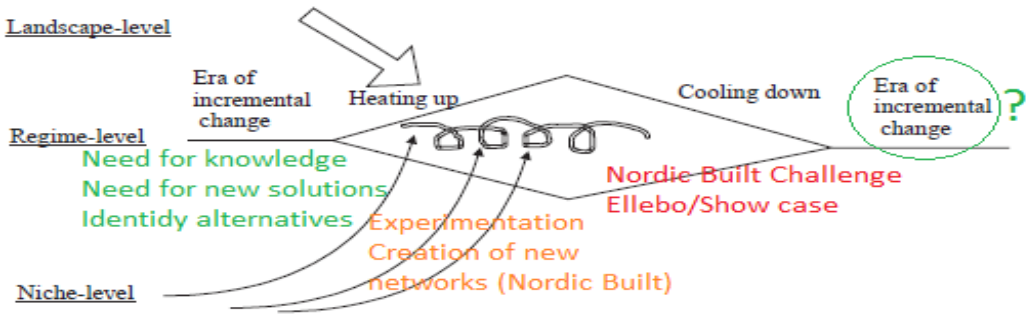

Figure 15: The wider transformation route of Ellebo case (based on Geels,2005)

According to Geels (2005) the idea/ 'niche' is often seen as a 'universal' solution that can cause changes and dominate the existing system The main idea of the stakeholders involved in Ellebo case is exactly that. Their ambition is to create an example where a holistic approach of sustainable development has been implemented with impressive results. They aim to create a new method of social housing renovation that future renovation project can follow while they want to provide a combination of solutions that can be implemented exactly the same regardless the scale of the project. Nevertheless, in this part of the analysis the possibility for Ellebo to change the existing system and

dominated will not be analysed. This will be clarified after examining how the case is different, what the planning process through a competition offered and to what extent the implementation of the plan is different from what was initially expected.

The Nordic Built Challenge and Ellebo project cannot be seen as results of a technological substitution route. Due to the fact that in this case according to the theory the 'niche' is developed under the surface and the existing regimes often ignore its existence until its outcome to the market. This theory's argument is not harmonised with the Nordic Built Challenge and Ellebo being results of cooperation among the existing regimes.

7.2 What is different about Ellebo project?

After clarifying the reasons and gaining a better picture of how the Challenge and the project were occurred, it becomes easier to identify what makes Ellebo project different. In this part the factors, distinguishing the Ellebo case from the regular renovation project, and their effects will be presented.

Preface. Regular cases: Commonly, when an estate needs refurbishment the social housing organisation is responsible to inform tenants about the need of drawing a renovation plan. In few cases the social housing organisation conducts a price competition with few participants (4 to 5) presenting their proposals in order to select the one. In most of the cases the steering group of the tenants with the housing association select local architects for the design concept. Sometimes the results of these projects are not satisfying as local architects might lacking experience and knowledge regarding social housing renovation (Bech-Danielsen, 2016).

"The housing association usually selects the architects of their preference or sometimes they conduct small competitions but in general the architects are selected locally."

Claus Bech- Danielsen Architect maa.

The initiative regarding a renovation should come from the tenants being in 'charge' of the process (Bech-Danielsen, 2016) (KAB, 2016). It is important to understand that the role of the tenants is very important in renovation projects and can affect the whole process. The tenants are the ones that will have to move out or tolerate the noise etc. during the construction period while they will have to pay more as the rent will be increased. As a result it is important to have a plan that has the support from the tenants.

Ellebo case: The same procedure as it is explained above it was also followed when KAB realised that Ellebo estate was in great need of renovation. KAB in cooperation with some architects and tenants were working on a renovation plan for almost 2 years. They also applied for Scheme A funding; however this renovation plan was never completed because the Nordic Built Competition was launched. The Nordic Built Challenge offered to the existing regimes the chance of a protected space where they could build a new network or reformulate the existing one. The competition affected and transformed all the planning process regarding the renovation of the existing estate. KAB was called among other organisations to propose a possible estate to be the case of the competition as far as Denmark was concerned. By that time KAB had already been working for two years on a renovation plan for Ellebo and they had been approved for Scheme A . As a result this made the case a perfect candidate for the Nordic Built Challenge (KAB, 2016).

"...we had already launched with LBF funding the renovations of social housing and they were positive regarding the Scheme A. So this fact was crucial because it was a guarantee that we would be able to finance the project afterwards"

Pernille Engelund Johansen/ Project manager at KAB.

The planning process of Ellebo case during the competition was also different regarding the tenants' participation. As it is already mentioned a renovation plan was already on-going, this was a great advantage for KAB and Nordic Built because the tenants were well informed regarding sustainability issues and possible solutions. For this reason Ellebo estate was a perfect candidate for the Nordic Built Competition. Having informed and active tenants regarding sustainability issues, renovation challenges and goals was crucial for making the planning process easier, more efficient and ensuring an outcome having more possibilities to be accepted by the tenants. KAB knew that had a case able to ensure the support of the tenants (KAB, 2016)

"Is also very important that you have a candidate who is dedicated to this kind of mind-set and to sustainability. Ellebo has proven that during many years"

"In another case we would have to discuss even more basic approaches to sustainability with our clients ...we had to make sure that we would have an appropriate project"

Pernille Engelund Johansen/ Project manager at KAB.

Design development & stakeholders' involvement. Regular cases: Usually the design is simple. It is focused mainly on changing facades, windows, adding insulation or in some

cases an indoor refurbishment is taking place. The municipality and the social housing organisation are the ones responsible for setting higher goals regarding sustainability.

"Of course with the old renovation plan that we had we would never be able to set so ambitious goals. In other cases we have to make new plans and ask for sustainability. In this case it was not necessary."

Annegitte Hjort/ Architect maa. (Ballerup Municipality)

Ellebo case: the implementation of a holistic approach of sustainable development was the goal design plan. The Nordic Built Challenge and its requirements aimed to bring also into the social housing renovation agenda, the sustainability concerns. Creating more space, areas for social activities, achieving energy savings were few of the aspects that had to be taken into account. In addition, the Nordic Built Challenge gave the opportunity to some crucial stakeholders (KAB, Ballerup municipality and Board of Ellebo tenants) to cooperate and to express their wishes regarding the renovation project. This was an opportunity that they did not in other cases. They could express their interests and develop them in collaboration with the professionals.

"The municipality in this case was involved as much as nobody could have expected."

Annegitte Hjort Architect maa. (Ballerup Municipality)

Moreover Ellebo case and Nordic Built Challenge was an opportunity for the municipality to gain more knowledge regarding sustainability issues, solutions and strategies that can be followed. The competition set high goals that maybe would not have been set by following the local plan of renovation ending up with an ordinary renovation case (Ballerup Municipality, 2016).

"Ellebo is a gift for us because it is the opportunity to try out what can be done towards this direction. In other cases and in general we talk about sustainability a lot and we mean it but maybe is difficult to find the sources to do it right or maybe we do not have the appropriate knowledge."

Annegitte Hjort Architect maa. (Ballerup Municipality)

Moreover, the Nordic Built Challenge created the right conditions for the tenants and offered them the possibility of reviewing all the 64 proposals and reflecting to the 4 last ones. This was a great advantage for the project as it is a guarantee that the result is

aligned to residents wishes and it ensures the support needed for continuing with implementation (KAB,2016)

"We know that the winner project is safely routed locally because tenants choose it themselves. We were very lucky. This helped the procedure a lot as sometimes you can have discrepancy"

Pernille Engelund/ Project manager at KAB

Selection of the renovation plan. Regular cases: The social housing organisation in most of the cases, decides about the renovation plan that will be implemented, through a price competition. In these competitions the goals and the ambition regarding sustainability issues are drawn by each social housing organisation and to some extent by the tenants.

Ellebo case: In this case the process was much more complex. More actors were involved and had to be coordinate while the tenants were engaged to the project by participating in the competition and in the final selection. During the Nordic Built Challenge the Jury, being responsible for selecting the winner, had the chance to select among 64 proposals (Danish and international ones). The Jury was formulated by representatives of Nordic Innovation, Ballerup Ejendomsselskab, KAB, Ballerup Local Council, Danish Architects' Association and Denmark's Technical University. It was the first time that in a renovation case there was the possibility of examining so many proposals. In most of the case there is not this possibility.

This huge competition pushed the existing regimes and covered a need of 'breaking through' the existing trajectories related to social housing renovation. The architects and engineers had to think differently in order to be competitive and in order to fulfil the high goals of the Challenge. A holistic approach of the problem had to be presented satisfying all the different interests in the area and meeting all the 10 principles of the Competition. The final design had to be a high architectural design able to cover people's need and provide them a beautiful place to live. In addition, the proposed solutions had to be economically, financially and environmentally feasible.

"Fantastic proposals. At the first stage we would select 18 from 64, then narrow down them and in the end 4."

Pernille Engelund Johansen/ Project manager at KAB

"We had plenty of proposals, we could choose something that was perfectly fine but also we could choose as we did in the end solution that pushes the limits."

"We choose the best of a range of fine projects. It was a luxury of course but offered new ways of tackling the sustainability issues."

Annegitte Hjort Architect maa. (Ballerup Municipality)

The Nordic Built Challenge created also the right conditions for the stakeholders involved to cooperate with the last 4 candidates in order to select the winner. They had the opportunity to move into more specific issues related to the design with a lot of dialogue having the opportunity to pose questions and ask regarding materials and certain technical aspects.

"This was an opportunity that we would not have in another case. In Ellebo for instance we conducted an LCA analysis and things like that which normally are not generate in a project."

Pernille Engelund/ Project manager at KAB

The LCA was used by the Jury as a tool to select among the 4 candidates the best project. The analysis was especially regarding energy emissions and the future energy performance of the estate and it was used for selecting the materials needed (Khan Architects, 2012).

The planning process, by the time that the decision for a renovation is made until the selection of the final plan, can be summarized shortly in three basic steps. The following two graphs visualise these steps (1.Need for renovation, 2.Design development, 3. Final design selection) and presents the stakeholders participating in each step. It is an effort to sum up briefly the new additions in the planning process, because of the existence of the Nordic Built Challenge, in comparison with the regular renovation cases. At this point of the analysis the focus is to identify if this different approach of the planning process and the involvement of more stakeholders can be seen as 'niche' and if is able to change the existing regimes.

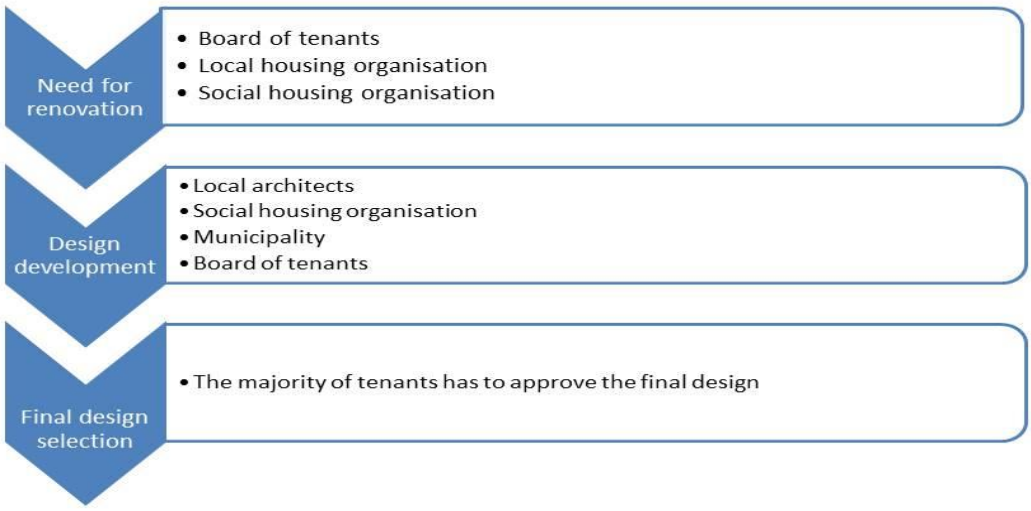

Figure 16**:** Stakeholders involved in the current planning process regarding the design.

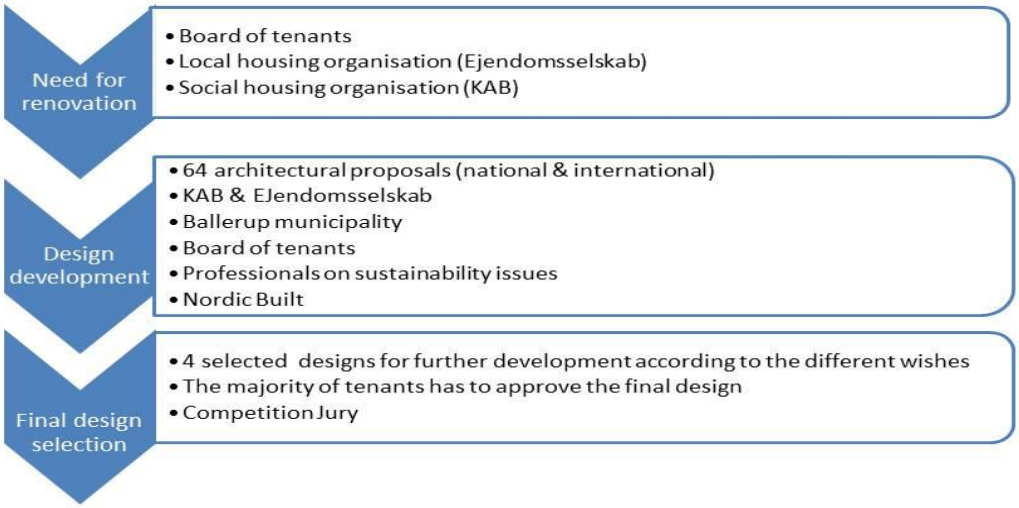

Figure 17: Stakeholders involved in Ellebo's planning process regarding the design.

The research about the process followed during the competition and the interviews with the stakeholders involved showed that Nordic Built Challenge can be considered as a 'niche' to some extent. The planning process of the renovation plan of Ellebo was conducted within a specific and protected framework formulated by the Challenge. The Ellebo project was the outcome of unique process in order to finalise and select the appropriate renovation plan. The process is characterised by the author 'unique' because

for first time all the stakeholders saw possibilities of gaining new knowledge regarding sustainability, experimenting with new solutions and cooperate with more and different professionals and stakeholders in order to achieve their goals.

All the stakeholders involved argued that there are more satisfied regarding the outcome of the competition that they would have in other cases. KAB and Ballerup municipality had the advantage to know their initial renovation plan/ design and they both agree that this is beyond their previous expectations and goals. Susann Taha representing the Ejendomsselskab, mentions that this competition and this project in general was a unique opportunity for them. They had to cooperate with famous and ambitious architects and they had to find common ground with all the different stakeholders representing different interest. This was a unique source of gaining new knowledge and experience on renovation projects.

The existing regimes were benefit by this planning process where all the different interests and concerns had to be taken into account. This report identifies that this competition gave the opportunity to the existing regimes to change their mind-set regarding sustainability issues while at the same time to cooperate with many professionals of this area. The Challenge was an attempt to push the existing regimes towards a transition. New solutions had to be found, new approaches of sustainability and new ways of cooperation among them; however it is not clear if this process achieved at the end the transition. This will be analysed part the following part. Different interests had to be balanced in order to formulate the competition requirements. It can be argued though that this different procedure, where the most stakeholders where part for first time, was extremely challenging and affected the current sociotechnical level. Different interests had to be balanced in order to formulate the competition requirements and to select the winner.

The result of the competition brought a change into the existing regimes and might become able to change also the current renovation practises. The stakeholders involved have already created a new network dealing with the sustainable development of social housing estates and this network can also be used in future renovation cases. The gained knowledge and the new approach proposed regarding sustainability issues can become a useful tool of dealing with sustainability issues and avoiding possible barriers in the future.

The last interview with Pernille Egelund Johansen revealed that the goal of the Nordic Built as well as of the KAB is the completed Ellebo project to be a niche able to generate a transition is social housing renovation. They aim to create a concept that is scalable and it can be repeated exactly the same in future cases and this goal played a crucial role in the decision regarding the winner (KABb, 2016).

"The way that we treat the estate with this plan is scalable. You can copy that in another estate. The architecture characterising Ellebo estate is widely used to other estates built in the 60s/70s in Scandinavia. Now they can look the result of Ellebo and copy it."

Pernille Engelund/ Project manager at KAB

The following part of the analysis as a result will try to figure if the implementation of the design plan and the construction methods are actually something different that can push towards a transition of the existing practices of social housing renovation.

7.3 Priorities affecting the final plan & implementation

It is already mentioned that the process followed until the selection of the architectural design and the architectural design itself make this case unique and it might be able to generate a transition regarding these steps of the social housing renovation process. Nevertheless, the goal of Ellebo project, as it was understood by the researcher, is to become a coherent proposal able to deal successfully with the sustainable development of social housing. A proposal that combines a sustainable architecture design, a well functional construction method and alternative solutions regarding sustainability issues such as energy efficiency, indoor climate etc. They stakeholders aim to create a project able to change the current system and be established in the market.

In this subchapter, the decision process after selecting the final architectural design, the challenges, the different interests and priorities will be analysed. The stakeholders analysis was used more as a guideline of the analysis in order to understand how the stakeholders interests, influenced of the process, how priorities were drawn and affect the final decisions etc. It is important to understand that in Ellebo case what was the main focus of the renovation, what role also the energy efficiency concerns claimed in the process and if the holistic approach is actually implemented.

7.3.1 Concerns regarding social issues

The social housing sector in Denmark counts 543.324 households while the residents reach the number of 943.949 (Landsbyggefonden, 2015). There is a great amount of data regarding nationality diversity, residents active in the labour market, residents that are unemployed that are often linked social problems of housing estates. In this report, however it would not be beneficial for the research to present them all. It was decided to present especially demographical data of the Danish social housing sector as in Ellebo case the demographical issues were the main social challenges. The graph below indicates that the percentage of households with one person is quite high reaching the 57%. This means that the majority of the people living in social housing is formulated by singles while Scanlon et al. (2015) argues that this percentage is formulated mostly by woman. In addition, the percentages of households with more than three persons are significantly low.

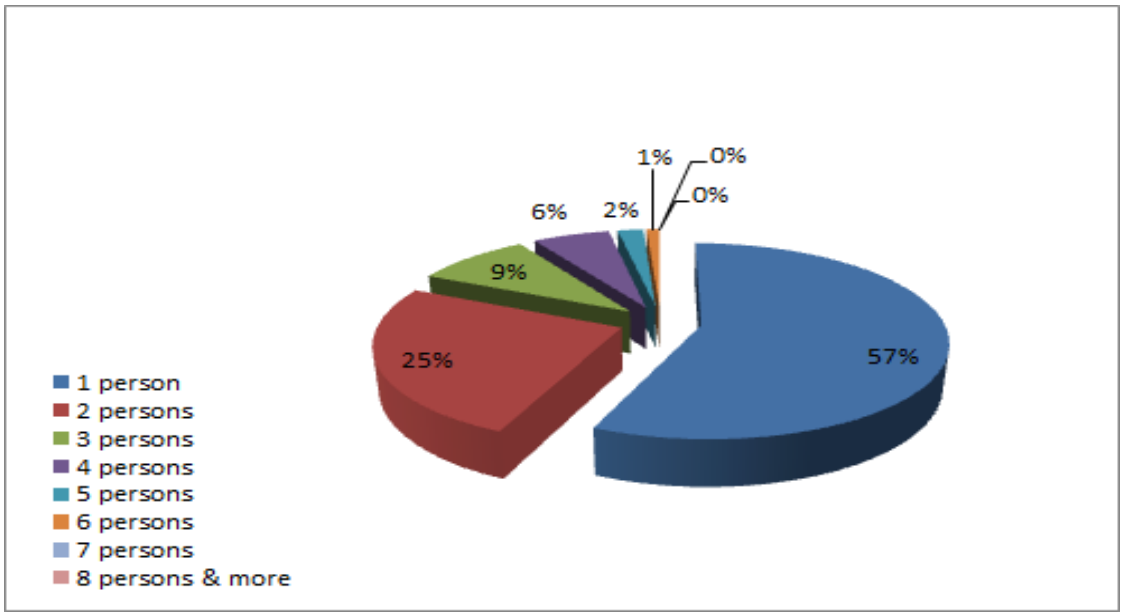

Figure 18: Household percentages per size. Denmark 1.January 2015.(Landsbyggefonden,2016).

In addition, the Table 1 shows that majority of singles living in social housing does not have any children while the percentage of couples without children is also considerable.

Table1: Household types. Denmark 1.January 2015. (Landsbyggefonden, 2016).

	Total number	Percentage
Singles		
Men without children	30.216	27%
Men with children	1.265	1%
Woman without children	37.075	33%
Woman with children	9.894	9%
Couples		
Couples without children	17.436	16%
Couples with children	9.934	9%

The above data indicate that the social housing sector in Denmark is represented mostly be single residents without children. This concerns significantly all the stakeholders of social housing sector. There is a lot of political discussion regarding the demographic and social issues that social housing faces. *"The priorities, when a renovation project is conducted, are set in relation to these issues"* Pernille Egelund Johansen (KAB) explains. There is a need to increase the percentage of households with children. More families and wealthier people need to be attracted in social housing (Ballerup municipality, 2016) (KAB, 2016). The social organisations in cooperation with LBF want to ensure their estates for the future. Their strategy for achieving this goals is to have more families moving into the estates. In Ellebo case these social issues have been actually addressed in order to set some more specific requirements of the design concept.

Furthermore, in Denmark, there is the list of the 20 estates facing significant social issues related to social exclusion, high crime and uncertainty. The case of Ellebo, it is not in this category however demographical issues had to be solved. The majority of the residents have moved in many years ago and currently represent aged social groups. KAB and Ballerup municipality wanted an architectural design taking away all the small apartments and creating bigger apartments able to become future homes for families. The first goal of the renovation plan was to create a liveable estate and a sustainable local community. It seems that for the social housing organisation and the municipality is also important to have diversity regarding age, nationality, educational background etc. It is believed that the diversity creates a strongest community where more aspects are represented.

"The average age if fairly high. So we want to infuse having young people, more diverse age groups all the issues of social sustainability."

"It is not to say that social problems are linked to small flats but somehow in our experience we saw that larder flats with families tend to bring less of these issues."

Pernille Engelund/ Project manager at KAB

LBF also push towards this transition and addresses that the social housing organisations have to work on the possible combinations of different sized apartments that can offer better results regarding social sustainability (KABb, 2016) For Ballerup municipality this issue has been also a political issue. The municipality is responsible to supervise the range of apartments offering to its citizens. The municipality aims to create apartments that match to the existing housing market demands. They aim also to a more diverse society and to social cohesion where no one is excluded. As a result, in Ellebo case, the conversion of small apartments into bigger ones was result of many political discussions and combination of different interests (Ballerup municipality, 2016).

"As a result we believe that if we improve the building and the area will attract residents contributing to raise the quality of the place. We expect how to say to have more residents having more resources both regarding economic factors and way of living."

Annegitte Hjort Architect maa. (Ballerup Municipality)

"*It is not to say that social problems are linked to small flats but somehow in our experience we saw that larder flats with families tend to bring less of these issues."*

Pernille Engelund/ Project manager at KAB

Another political issue that was driver of taking away the smaller apartments was the goal of Ballerup municipality to encourage the use of public transport in order to reduce CO_2 footprint of the whole municipality. The estate is 3 minutes walking from the train station and it is assumed that people living there they will commute basically by using public transport. If Ellebo was far away from the station and the families had to take the car for commuting the municipality would not have allowed to construct bigger apartments (KABb,2016).

In the case of Ellebo the final architecture design was combination of more than one policies. One of the main focuses of this renovation project was in relation to solve social issues but also to reduce CO_2 emissions.

Nevertheless, the project was developed under the 'protection' of the Nordic Built where other sustainability aspects play a crucial role. Energy efficiency concerns, residents' involvement in the process etc. seemed to be high in the hierarchy. In a different case, for example, where the social problems would have been significant characterising the estate as 'ghetto' the renovation focus would have been especially in solving these issues and then dealing with energy efficiency concerns etc. The social housing organisations are aware of the problems' variety and they have to decide what is most important in each renovation case.

"If this social housing has issues like high crime or insecurity this what needs to be changed before you can start thinking about reducing CO_2 emissions. Then it will automatically drop to a lower level in the priority."

Pernille Engelund/ Project manager at KAB

In Ellebo case the completion made clear that also other sustainability aspects linked to environmental concerns, energy efficiency measures, maintain the local identity of the area etc. had to be taken into account. According to the Competition Jury and the COWI, the project was the winner as it was the only project able to fulfil all of the 10 principles of sustainable development being set. Among them were achieving zero emission over its lifecycle and push the limits of sustainable development. It is expected as a result that the stakeholders involved in the further planning process of implementing the design plan to use new technologies or approaches in relation to these aspects. This will be clarified at this point where the decision making process and the factors influence it will be analysed further. In a case of Ellebo, where the majority of the stakeholders argues that it is a unique example of sustainable development offering high results, it is expected that extraordinary methods and solutions will be implemented. It is expected that alternative practices of social housing renovation will be followed. For this reason, it is important to identify, if the stakeholders actually do things differently in this stage and what influences their decisions.

7.3.2 Concerns regarding energy efficiency

When the engineers of Rambøll started working on Ellebo case in order to clarify all the construction, energy solutions, materials etc. in order to prepare the tendering report, they had the idea of creating a 'passive' house. The tenants and KAB were also pleased with the idea of transforming Ellebo estate into a 'passive' house. At that point KAB had to find

the appropriate funding to support the works and the possible solutions that could be implemented in a 'passive' house. (Pihl, 2016).

Due to the fact that Ellebo project aims to be in the future a show-case of sustainable development and change the practises of social housing renovation, one would expect to see solutions following the energy class of 2020. According to the transition theory a 'niche' can change the existing regimes when is able to be antagonistic enough and get established to the existing regime level. To do so, the Ellebo project should be able to present the ability of applying new technologies and solutions in order to become antagonistic and to generate changes. Nevertheless, according to Daniel Pihl, when the project was accepted for funding by LBF the current energy regulations and requirements where according to the energy class of 2010. As a result, LBF was not able to support financially more energy-wise solutions and the engineers had to lower the energy requirements from the passive house to low-energy house.

"LBF supports renovations to the standard which is the current standard. What happens sometimes is that between the time the approval for Scheme A and the time that actually the renovation starts the building requirements or the municipality goals might change and the previous budget is not able to cover the new needs''

Pernille Engelund/ Project manager at KAB

This decision was in conflict with the goals of Nordic Built. As a result the stakeholders involved understood that Ellebo should be able to at least offer solutions aligned with the 2015 energy class even if it was not at this point mandatory by the existing building regulation (Pihl,2016). KAB had to work on the funding issue while engineers had to get into more details and find solutions. Currently, LBF supports financially works following the energy class 2015.

"LBF recognises that Ellebo is a special case, it already had support far beyond other projects, because they recognise that the case is something different than the ordinary, it will give very good conditions but they cannot support 2020."

Pernille Engelund/ Project manager at KAB

After failing to get the necessary fund, Rambøll engineers tried to comply between energy class 10, 15 and passive house and bridge all the different requirements. The challenges, however, and the barriers that had to be overcome were many as the structural design

was already settled. Having the structural design in place left the engineers with fewer options to improve the energy performance of the estate. A lot of discussion and negotiations regarding the implementation of different insulations on parts of the estate were conducted (Pihl, 2016). Finally, in November 2015, the proposal was finalized somewhere between the energy class of 2015 and 2020. However, it is uncertain if the proposal is going to be supported financially by LBF. (KABb,2016).

The interviews with KAB, Rambøll and Daniel Pihl indicate that the stakeholders involved had long discussions about how they could improve the energy performance of the estate; however the decisions made in November have not been reviewed again since then. It seems that the existing regimes are more focused on construction issues, economy, legislation and less in energy.

"My feeling is that the existing regimes do not change their approaches and they do business as usual. I was going to the meetings with a focus to look for energy concerns ... how they can do the energy performance as good as possible. But even I spent hours there I did not hear much about energy."

Daniel Pihl. Phd Fellow at Aalborg University

"I do not think that Ellebo is so different from other cases. For Rambøll is a usual renovation case; however this that can be considered as unique in this case is regarding the architecture. I do not think that we apply in this case something new regarding sustainability issues."

Sidsel Blegvad Seier, Architect maa.(Rambøll)

The research on this topic revealed that the existing regimes are not able to approach the energy concerns differently and they tend to follow the old fashioned practises of renovation. In addition, it becomes obvious that there was not any specific strategy drawn regarding energy efficiency. This could be a possible reason of resulting in the current plan. The existing regimes did not have a clear framework to pressure them for seeking alternative solutions except the economic one. Having economic barriers on one hand and not clear energy goals on the other hand might possibly led them to make the safe choice.

"Well there is not the best solution regarding sustainability. Our goal is to cover the needs. If we see that the solution having in our mind is out of the budget but we believe that this

solution is needed we try to see of where we should cut money in order to do it. And this makes the best solution."

"I do not think that we apply in this case something new regarding sustainability issues. Of course the goals are higher but is not that we implement for exactly some kind of alternative energy supplier solar panels etc."

Sidsel Blegvad Seier, Architect maa.(Rambøll)

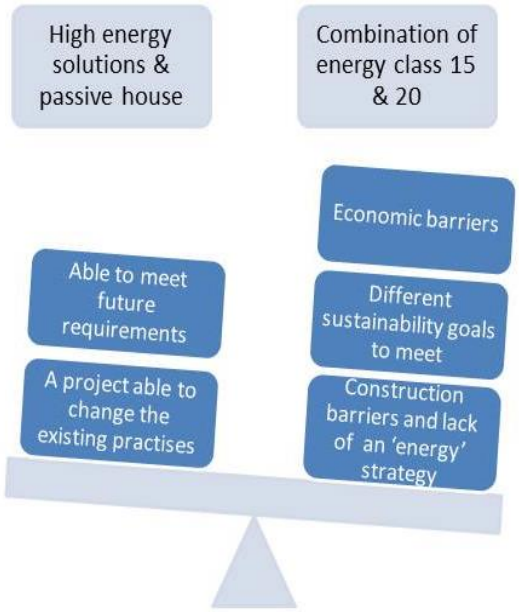

Figure 19: Why the current energy solutions were selected?

Figure 19 above summarises the reasons behind the selection of the current energy solutions implemented in the project. In Ellebo case a more holistic approach is followed, meaning that more issues had to be solved and the available funding had to cover everything. The renovation plan is extremely complex as it does not focus only on renovating the building but also on the outer spaces etc. Moreover, the construction method limited the available options regarding energy efficiency. One could argue that the development of the architectural design close to a more specific energy strategy would be able to give a better and more coherent outcome. It would be easier for the architects and the engineers to work at the same time on the architectural design and the energy solutions that could be supported.

7.3.3 The economic framework

Studying the Ellebo case has shown that the economic factor plays a crucial role and affects significantly the decision process and the development of the project. The engineers try to reduce other expenditures in order to support their solutions while KAB tries to keep the balance and to distribute the available money in the most efficient way. KAB has a key role in the decision making process when it has to deal with money. Participating in a meeting with all the stakeholders made clear to the author that even though they all wanted to have the best solutions implemented the renovation project is remarkably big and expensive. It is a project where 284 apartments, the existing landscape and the surrounding area have to be renovated simultaneously. It was extremely challenging for the stakeholders involved to deal perfectly with all these aspects by having a very strict budget and economic framework to follow.

Another issue in this case is that the project is a combination of renovating the existing estate and constructing a new building as an extension to one of the four building blocks (Block 1). This made the project much more complex and raised funding challenges. Both LBF and Ballerup municipality had to invest in this and supervise the process and how the money is actually distributed.

"We have certain line that we have to follow in order to allocate the money. There is control of how the money is actually spent during the project."

Pernille Engelund/ Project manager at KAB

The municipality offers 10% down payment for the new construction as a starting capital. This is a direct grant to the project. The other 2% comes through the tenants who pay when moving into their apartments and the rest 88% is credited (KABb,2016).

The municipality is also supervising the process. *"We have our say and we look through the projects. In order to support a project some of our "wishes"/demands should be taken into account and be implemented."* (Annegitte Hjort Architect maa.) The money that the municipality deposits as a guarantee is taken out of the municipal pot and for that reason it has to be clarified if the investment offers value for money (Ballerup Municipality, 2016).

"In this case our impression is that there is value for money. This renovation we believe that will actually improve the place and make it better for the people."

Annegitte Hjort Architect maa. (Ballerup Municipality)

On the other hand, the renovation part is different where the budget is split into works that are granted by LBF. In most of the cases these loans represent the 2/3 of the funding while the 1/3 of the construction works that LBF does not support financially are financed by loans where the municipality guarantees in order to get the money. As a result the renovation project is financed by LBF and Ballerup municipality (KABb,2016). The total amount that LBF offered for renovation grants is DKK 5,140 million in 2011, DKK 4,140 million in 2012, DKK 3,640 million in 2013 and an average of DKK 2,640 million per year between 2014 and 2016. (Ministry of housing, rural and urban affairs,2011). .

7.3.4 Does Ellebo follows a holistic approach?

At this point it is important not to forget that the renovation of Ellebo is called to deal with all the sustainability aspects (social, environmental, economic). The project not only focuses on achieving social or environmental goals but aims to adopt a holistic approach of sustainable development. It is clear that the economic barriers force the implementation of more conservative solution regarding energy efficiency of the estate; however the project is not only that. The architectural design inspired by Adam Khan & Kristine Jensen Architects can actually be considered extraordinary. The concept of building transformation is implemented for the first time in Denmark and the building envelope is developed in a way to create a feeling of closure around the central garden of the estate. The architectural design can be argued that is able to achieve the goal of the Nordic Built and change the existing practises of social housing renovation. As already mentioned, the buildings' design respects the existing architectural values. Based on them creates new additional parts, the winter garden rooms, by following the current needs and trends. In addition, according to the 7th principle of the Nordic Built Challenge, the renovation project should be able to utilise local resources and be adapted to local conditions. The Lacaton & Vassal concept followed has proven in previous cases that is able to meet this requirements. The proposal of Adam Khan Architect understands the Scandinavian architecture represented by the majority of the social housing estates built in the 60s and the new proposal is an evolution of the existing character.

"We are also in a period where our perception of what happened in the 60s and 70s is that all architects by then were wrong. But there are actually qualities in these buildings that we are not able to find them yet."

Claus Bech- Danielsen Architect maa.

Figure 20: The winter garden room (Khan Architects et al.,2013)

The design is able to offer more space to the residents and a winter garden room being able to have different seasonal utilities. This will increase the quality of living and provide residents freedom to use this room according to their wishes and their needs.

"They look for possibilities/potential and this is the main concept of Lacaton & Vassal. Search of potential that is already there."

Claus Bech- Danielsen Architect maa.

At the same time the winter garden room is able to combine its social aspect with the environmental concerns. The winter garden except for offering more space, functions as thermal zone able to keep a balance between the indoor and outdoor temperatures creating better indoor climate conditions while reducing the need for energy use.

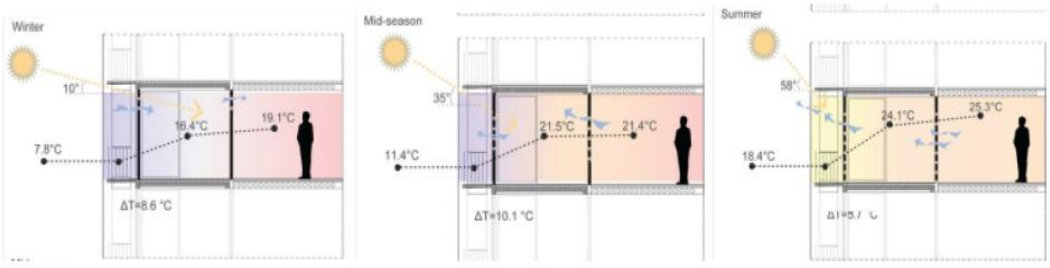

Figure 21: The thermal zone created by the winter garden (Khan Architects, 2013)

The design regarding landscape is also interesting as it is able to combine in great extent both social and environmental aspects of the sustainable development. The garden is developed around a central pond and the different parts are used for a variety of social activities. All the residents have access to their building through the garden giving them the chance to use the garden more often, to meet other neighbours etc. At the same time, the central pond is used to drainage the rainwater of the buildings' rooftops. In the garden, there will also be private gardens for the at the ground floor apartments. The residents will have the chance to spend their free time creatively, to be engaged with the estate and have a feeling of inclusion while being able to grow their own healthy food. It can be identified that the architects aim to create synergies among the different elements of the estate in order to get better results regarding sustainability. Creating synergies can be seen as a useful tool towards sustainable development.

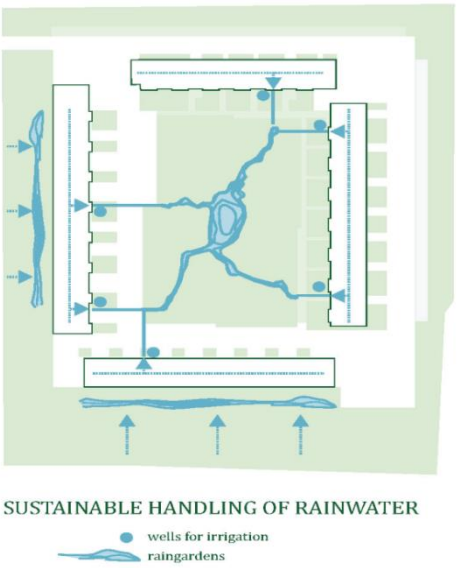

Figure 22: Rainwater handling system (Khan Architects et al., 2013)

Yet, it could be argued that the architectural concept is able to increase the quality of life resulting in a more appealing estate; however, this is not often enough to solve social issues and increase the quality also of the area where the estate is located.

"I also know that a crucial goal for Ellebo is to become a solution regarding social sustainability but I do not think that this can be actually done. Of course a good architecture will increase the indoor quality of life and the outdoor space leading to a more appealing estate but it can solve all the social problems of the area."

Sidsel Blegvad Seier, Architect maa.(Rambøll)

It is already mentioned in the introduction that in Denmark became clear very soon that a renovation focused only on the buildings' transformation is not enough to deal with all the issues linked to the social housing estates. As a result an area based strategy was considered to be the solution (Vestergaad, 2013). According to the theory of Area based interventions, it is important to see the development projects as a tool to bring a greater impact to the area, when dealing with social issues. More aspects have to be taken into

account since citizens' participation is a crucial element. It is also important to identify how the residents can utilise the area in alternative ways and how they can engage to it. Thus, the municipality plays a crucial role in this direction. Indeed, in a social housing renovation the municipality should be a driver towards the adoption of such an approach in order to create spaces that can be used by the residents of the estate and the citizens of the municipality. This can be seen a step towards achieving social cohesion and social sustainability.

"A renovation of social housing estate can be the 1st step but in order to see results in the area is depended by the municipal plans, the money that they want to invest to the area in general, other facilities etc."

Sidsel Blegvad Seier, Architect maa.(Rambøll)

Furthermore, it can be argued that social housing renovation projects are part of a greater effort that aims to create more sustainable cities. According to Mapes & Wolch (2010) creating more blue and green areas contributes significantly in this direction. These areas will offer citizens the chance to spend their free time in social activities within friendly and clean areas. As a result, a renovation case might have the potential to create these areas for the residents and the citizens of the area where the estate is located. It can be argued that in cases like Ellebo where the estate is able to provide a lot of free space the stakeholders have the possibility to think towards the implementation of this strategy.

As a result in a project like Ellebo where a holistic approach is claimed to be followed, it was expected when this research started, to identify an area based intervention strategy also. Facilities able to be used by all the citizens of Ballerup municipality could have been part of the renovation plan. Nevertheless, it seems that this is not the case of Ellebo project. The architects, the municipality as well as KAB are interested in creating a better place only for Ellebo estate and the plan is developed not taking the rest of the citizens of the community into account. As an example the new extension of the building block 1 creates an even more protected area including the central garden. The stakeholders fail to develop the surrounding area through this renovation project.

"We did not want the public space of Ellebo be used also from other citizens of our municipality except its residents. The central area which is going to be developed for social activities is quite hidden for estate's buildings. We have not seen this project as a project for the surroundings also but as a project for the inhabitants."

Taking into account every part of this analysis it is interesting to see why the competition's Jury and COWI decided that the Ellebo project is able to meet all the 10 principles of the Challenge and what are the results of this study. It is also important to mention that the research of this study indicates that the term of "holistic approach of sustainable development'' has a quite different interpretation among the stakeholders. "*Another challenge is that we are a lot of people/organisations involved in this project that we have to be coordinated. Different interests have to be satisfied.*" (Rambøll,2016). Even if they all want to achieve the best possible outcome regarding a holistic approach; they still have different concerns leading them to forget their initial focus. As a result this report identifies that the 10 principles, being accepted by the stakeholders, can possibly be seen as common meaning of the term "holistic approach of sustainable development''. The table below summarises how the stakeholders consider achieving a holistic approach and what this research supports.

Table 2: What Ellebo offers?

10 Principles	**Jury & COWI** (COWI,2015)	**Current study**
1.Made for people and promotes quality of life	• Accessibility to garden and flats • Inviting indoor environment and climate • Ellebo as a lived and loved resource for families	• More space • Flexibility • Accessible to tenants • Design according to tenants' wishes
2.Pushes the limits of sustainable performance, as a result of our innovative mind-set and high level of knowledge	• Minor interventions major impact • Teamwork on energy calculations	• New architectural design • Synergies between the different elements • Monitoring the building performance
3.Merges urban living with the qualities of nature	• The notion of shared vibrant garden • Supporting biodiversity • Winter gardens	• Easy access to the central garden Private gardens • Areas for activities & socializing
4.Achieves zero emissions over its lifecycle	• Passive environmental strategies • Sustainable energy • Holistic energy concept	• Follows the BR 15 • NOT a clear energy strategy • Basic solutions regarding sustainability and energy
5. Is functional, smart and aesthetically appealing, building on the best of the Nordic design tradition	• Danish aesthetics and social values • Prefabricated elements	• Based on Scandinavian architecture
6.Is robust, durable, flexible and timeless - built to last	• Long-lasting concrete panels	• Use of materials like concrete in order to last in time

7.Utilises local resources and is adapted to local conditions	• Water as a resource	• The rest of the society is NOT directly linked with project's goals
8.Is produced and maintained through partnerships founded on transparent collaboration across borders and disciplines	• Respecting people's lives: the tenants will remain during the construction period	• Many stakeholders involved • It is NOT possible for tenants to stay during the construction period
9. Employs in concepts that are scalable and used globally.	• Reproducible design	• The architecture design might be scalable but the focus should NOT be only at the design
10. Profits people, business and the environment.	• Demonstrates how an architectural interpretation of a place can provide a retrofitted estate with cultural and social properties.	• The architecture design is an advantage but concerns regarding energy are NOT taken into account • It does NOT change the renovation's focus

As a result is questionable how a holistic approach of sustainable development is actually implemented in the case of Ellebo. Is a matter of discussion if Ellebo project is able to generate a transition and if it can, towards which direction? Can actually change the existing regimes level regarding a holistic sustainable development or regarding an efficient and sustainable architectural design?

8. Discussion

The initial stage of the analysis was to understand how Ellebo project has emerged. The MLP and TT were used in order to understand the possible pattern followed in this case. The first step according to the theories was to clarify the landscape level in relation to the social housing renovation under which the current regimes exist and interact. In this case it was decided that the landscape will be focused especially on EU regulations, Danish policies and housing market demands. According to the theories this level puts pressure to the existing regimes, influences the stability of the network and pushes them towards a transition.

The research about Ellebo and the interviews revealed that all the stakeholders are aware of these policies at a national or international level; however these policies were not the main mechanism of influencing them. Also it was revealed, that the need for the social housing sector to become antagonistic in the housing market has a greater influence to the regime level than the policies and regulations. In addition, the national policies regarding social cohesion seem to put more pressure on social housing organisations than energy policies and EU goals. As a result, the Ellebo case cannot be considered as a clear example of the process that the MLP and TT suggest. Indeed, the landscape was not able to influence considerably the existing regimes involved in Ellebo. The only influence could be identified in the creation of the Nordic Built and the Nordic Built Challenge. As already mentioned it could be argued that the existing landscape, among other factors, has pushed the Nordic Ministries to some extent in order to seek new and more efficient approaches regarding social housing renovations. In addition, it can also be assumed that the Danish building regulation, being a crucial element of the regime level, is also affected by the national and international policies regarding energy, sustainability etc. Nevertheless, the most important drivers, of dealing with the sustainable development, are problematic areas formulating the existing regime level; issues such as functionality, social cohesion and environmental challenges that the existing regimes have to solve are the main factors putting pressure to the existing regimes. Thus, it seems that the pressure for a change comes mostly by the existing regime level itself than by the landscape level.

This research about Ellebo case indicates that the main target for a holistic approach of sustainable development was lost to some extent during the process. At the Nordic Built

Challenge all the stakeholders had to follow the 10 principles and besides that they all aimed to create a unique project. However, after the competition this was forgotten while developing the project. Taking into account the 10 principles and the results of this analysis, it is a matter of discussion what Ellebo project demonstrates after all. It seems that the project is more an example of a good architectural design aiming to combine more than one sustainability aspects, than a coherent proposal of sustainable development. Indeed, the project won the competition mainly because of its architectural design and less on new solutions promoting energy efficiency. As a matter of fact, the project demonstrates a new approach of architecture while a clear strategy regarding energy efficiency or an impact of the project in the greater area is missing. Consequently, it can be argued that Ellebo case is an example where the stakeholders have failed to change the existing social housing renovation agenda. One more time, the functional and social issues were the main concerns of the renovation while other sustainability aspects failed to gain more attention. In future projects it might be beneficial to use some kind of certification tools like the DGNB criteria. It might be a helpful guideline in order to keep the same path during the whole process and to take into account more suitability aspects. It would be also interesting for further research to identify how the use of some kind of certification could have possibly improved the planning process.

According to MLP a niche is successful when is able to be supported by a new network in order to get established in the regime level but also when it is able to generate further developments in the same level. In the case of Ellebo, a new network was formulated through the competition where the Nordic Built and the architects played a very crucial role. The architects aimed to present the best possible proposal able to cover the requirements of the competition, and achieve a holistic approach of sustainable development. The stakeholders involved in this stage were not obligated to strictly follow an economic framework so to deal with construction details and problems; as a result they could freely work on sustainability issues and examine how all the different aspects and needs could be combined in one project. After winning the competition the project had to be developed in detail and for this task Rambøll was selected. The company was selected to deal with all the construction works and implementation of the solution proposed. It can be argued that this entry changed the form of the network as it was until then. The role of the architects was not so crucial anymore, Rambøll had the lead. The architects had a secondary role acting as consultants in order to keep the implementation plan as close to the initial proposal as possible. One can argue that a reason for losing sustainability focus was that the architects stepped aside to some extent and this might made the network unstable. The new stakeholders involved perhaps had a different perspective as far as

sustainability is concerned. As a result it seems essential to have all the stakeholders involved in all stages in order to get the different aspects aligned since network's stability depends on that.

Rambøll is a Danish company aware of the current legislations and with great experience in significant projects. The magnitude of Ellebo project needed their support. Well established companies able to present more than decent projects are usually characterised by a great rate of inertia. Hence, it could be argued that for such a company it might be very challenging to change its mind-set and culture in order to support and promote a more innovative and holistic solution, in terms of sustainability, that the Elebo project initially aimed for. Especially within a very strict economic and construction framework that was not easy to be faced. Thus, it would be interesting, for future research, to investigate how the culture of the stakeholders selected to take place in such projects can affect the network stability, and the degree that they can promote sustainable solutions like the ones initially proposed for Ellebo.

It is already mentioned that Rambøll's engineers had to work on finding energy and construction solutions while the architectural design was already finalised. This was extremely challenging and to some extent a crucial limitation of their available options. The project was developed in two stages where different stakeholders were in charge. According to the author, cooperation between the architects and engineers during all the stages will be more beneficial for the project and it will offer a better outcome. The stakeholders will have the opportunity to work together, identify possible barriers and solve them by combining their knowledge and experiences.

Another issue being interesting for further study, is the ambitions of the stakeholders to create a project being scalable and able to be copied. The aim is Ellebo to be a great example of high architecture, sustainable solutions and functionality that can be copied exactly the same in future social housing renovations. Nevertheless, this might not be easy as the Ellebo is constructed and funded within the Danish context following specific regulations. In other countries the regulations might be different and the solutions or the construction methods, of Ellebo renovation project, might not be applicable. In addition, LBF as the main funding source for Ellebo is a Danish oriented concept that does not exist in other countries. As a result the barriers regarding this goal and solutions should be studied further and identify how this could possibly be achieved.

Furthermore, another topic for discussion arises when attempting to copy Ellebo project. On one hand, this will be beneficial in the future since construction time will be reduced, less resources needed and cost reduction will occur for smaller scale projects. For countries that do not have similar to LBF organizations will be a great help, while for Scandinavian countries where the architecture of the 60s in social housing is identical will be easier to adopt the same proposal. On the other hand though, the social housing sector varies among different European countries and someone could argue that it is difficult this Danish proposal to be followed and implemented in a different context. Administration, funding, culture issues might be possible barriers. In addition, Ellebo meets the current building regulations and utilises the current technologies. As a result following the same solution, even if it is successful, it might be a limitation to the future research regarding new sustainable solutions. Why to implement a proposal based on earlier knowledge and technologies while new will arise?

Ellebo project might not be able to bring the change that aims; however it is able to influence the existing practises to some extent especially by the new knowledge and experience that the stakeholders gained. After this project where the economic framework has been a significant barrier, the stakeholders are quite sceptical towards LBF and its regulations. It is a political issue as on one hand there is the need for more funding in special cases like Ellebo while on the other hand there is a risk, for LBF, of losing its solitary character. Social housing sector has the potential to achieve better results regarding energy efficiency but in huge renovation cases like Ellebo is hard to be implemented because of limited funding. A possible way to implement higher energy solutions is to change the renovation strategy and regularly maintain the social housing facilities. In that way the stakeholders might be able to avoid extreme renovations, such as Ellebo, and save significant budget to fund smaller size renovations and energy wise solutions.

Finally another topic of discussion is generated by Ellebo case. The project aims to a holistic approach of sustainable development but how this is defined. The analysis has shown that many sustainability aspects are superficially taken into account while the main focus is regarding social sustainability. However, the fact that they stakeholders aim to achieve that by taking away all the small apartments in order to create houses for families has posed questions. How a sustainable development and a sustainable community can be achieved by excluding a part of society, in this case the singles. Even if the stakeholders support that individuals are connected to some extent with the social issues of the estates it is not clear yet how the strategy of moving them all out is a solution. It is

of course a strategy to spread a 'problem' within the city than to have it concentrated to an area; yet this does not mean that the problem disappears.

Limitations & suggestions for further research

The economic framework within which the stakeholders had to make their decision has affected significantly the development of the project. The role of LBF was also crucial as responsible for funding renovation projects. Nevertheless, this report does not analyse in depth the economic system regarding the social housing renovations. The focus of this study was mostly on understanding the grade of influence that LBF has in this project. In addition, language barriers made it quite challenging to understand in depth the complex process of funding renovation projects. It could be interesting in the future to study how the system is structured and maybe how improvements can be made. It is clear that the available budget affects significantly the social housing renovation agenda and the energy concerns are often left aside. It could be interesting to investigate how new approaches of funding can influence the social housing renovation agenda towards a transition from social and functional issues to sustainability issues.

The interviews with the stakeholders offered a great amount of information regarding their role in the planning and decision making process. There has been a lot of discussion on the result of the project, the uncertainty of it, tenants' involvement and behaviour after moving back to the estate. This study focused especially in identifying how Ellebo project occurred, what factors influenced the decisions and what Ellebo can offer to the existing regime level. As result a lot of information related to tenants' concerns and behaviour is not included in the study.

The Ellebo project can become also a case study after it is finished. Ellebo will be one of the few social renovation cases that the building performance will be actually monitored before and after. It will be very interesting to study and analyse the data gathered in order to identify if the goals that have been set were eventually accomplished and if there is a performance gap and what role the residents' behaviour played. The Ellebo project will also be able in the future to provide actors with information about residents' habits, how they use the additional space, if they actually use more the common facilities and the central garden. It will be interesting to know if a renovation project like Ellebo is able to transform the estate into an attractive and sustainable community. Are projects like Ellebo the way of securing social estates for the future and keep social housing sector antagonistic?

Finally, it is important to consider if the MLP and TT were the right theories to use in order to draw the analytical framework of this report. These theories were selected because when the research about Ellebo case started the Ellebo project was presented by the stakeholders as a unique case aiming to change the current practises of the social housing renovation. The research has shown that is difficult to identify a similar process, presented by MLP, to Ellebo case. The current landscape does not play any crucial role as it suggested at MLP while the Ellebo project does not seem able to generate the change that aims. It can be also argued that studying only a demonstration case like Ellebo cannot indicate if a demonstration project can actually change the existing regimes. It could be argued that studying more projects similar to Ellebo could provide a more coherent view of the problem. In addition, MLP and TT might be more beneficial and able to provide more accurate results if Ellebo project had been already completed. In this case it would have been easier to examine the grade of influence that a demonstration project has on the existing stakeholders. This study has shown that the stakeholders are quite uncertain of the outcome and they are sceptical of how this can make a difference. They all argued that they will wait to see how Ellebo will be able to meet all the expected goals and then to decide if they are willing to support similar efforts in the future.

9. Conclusion

What Ellebo offers in the end? Going back to the problem formulation of this report it is important to examine if the case of Ellebo renovation project is strong enough in order to change the existing regimes. Providing a clear answer to that is extremely challenging. It can be argued that is a matter of perspective.

Given that the Ellebo case is an initiative where the stakeholders tried to deal with all the sustainability issues and provide solutions within a strict economic framework, it can be argued that they have managed to achieve their goal to some extent. The case can be an example for future renovations where the stakeholders will be inspired by Ellebo project. They will also be able to avoid the same mistakes leading to better results regarding sustainable development. The second part of the analysis, where the focus was on identifying how Ellebo case is different, revealed that the planning process of developing the architectural design is actually a unique opportunity and has pressured the existing regimes towards a transition. Nevertheless, it can be argued that the different planning process is not sufficient to change the existing regime level, as it is very difficult to be conducted without a financial support that Nordic Built can provide. Some of the existing regimes might be sceptical of how this can be repeated outside the protected area of Nordic Built Challenge. Indeed, it is significantly difficult to conduct again a competition, such as the Nordic Built Challenge, but on the other hand through this project, a new network has almost been developed and it might support similar procedures in the future. This study draws the conclusion that the stakeholders involved are now more willing to cooperate again in the future. They have gained knowledge and skills and they can create similar planning process in a smaller scale. Especially KAB argues that with this experience is easier now for them to handle administration issues in the future that were time consuming for the process and have triggered conflicts.

On the contrary, if one wants to be more critical about Ellebo project and its ambitions, it is hard to identify the possibility of changing the existing regimes of social housing renovation. This study concludes that the architectural design has the strength to push towards a new concept when architects deal with renovation projects. On the other hand, Ellebo aims to become an easy to clone coherent and scalable alternative solution. As the transition theory suggests, a ‘niche’ by itself is not always able to generate a transition. In

this case Ellebo can be seen as an example that confirms this theory, since aspects of the project especially related to energy concerns are not able to offer something new to the existing system in order to change the regime level. The stakeholders involved followed unfortunately the existing practises regarding these issues and they were not able to seek new opportunities. Furthermore, according to the theory a 'niche' is successful not only by the developments taking place within the protected area, but also by the developments conducted at the existing regime level. In Ellebo the existing regimes do not seem willing to change dramatically the existing practises when it comes to the implementation of the renovation plan, and the rate of their inertia is quite high.

Social housing renovation: Can a holistic approach of sustainable development be implemented? What are the challenges? What a demonstration project has to offer?

Going back to the research question, this research has shown that implementing a holistic approach of sustainable development in social housing renovations is extremely challenging. Indeed, the Ellebo project is not a case where a holistic approach of sustainable development is addressed successfully. The social housing renovation agenda is strictly formulated and it was proven that the stakeholders are not able to change the hierarchy of the priorities. Social and functional issues are the main drivers of conducting a renovation while other sustainability aspects are left aside. There are many challenges that have to be faced in order to implement a holistic approach successfully. The most important one is the funding as the economic barriers seem to influence the final decision. In projects like Ellebo where the goal is to conduct an extreme renovation aiming to cover as many aspects as possible it is extremely difficult to ensure that the appropriate budget covers all different construction works and solutions.

Another challenge that Ellebo case brought to the surface is that it is quite difficult to keep the initial focus through the whole process. It was revealed in Ellebo that a lot of the initial goals regarding sustainability were forgotten during the process. The lack of a clear strategy from the beginning while the involvement of different stakeholders in the different development stages were some of the possible reasons leading to a more conservative renovation project in the end.

The study of Ellebo project led to the conclusion that a demonstration project alone it is not able to generate a transition towards sustainable development. It can offer new knowledge, opportunities for formulating new networks and it can become an inspiration

for future projects. Nevertheless, the stakeholders of Ellebo project, being a small sample of the existing regimes, can be seen as an indicator of the regimes' tendency. As a result it can be argued that the existing regimes are not yet willing to change and it is more difficult for them to change their existing practices when they have to act within a certain economic and political framework.

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Appendix

Interview – KAB

8th of March 2016- Pernille Engelund Johansen/ Project manager

The price of the project represents so much money so before we have to sign a contract with architects and engineers we needed what the municipality calls Scheme A. Is the first approval of the project that allows as to move forward with the project? In order to get this first approval we needed to ensure a positive vote from the tenants. In order to make sure that the project is funded/grounded locally with the tenants living at the building and they are representatives. They had that vote at the 20th January 2015 and they were allowed to move forward get Scheme A and also get an approval by the Danish Building fund. The project is a combination of renovation of the existing building and of adding new buildings so they had to get more approvals to continue.

How do you select the estate that has to be renovated? Why Ellebo?

First it is important to understand why Ellebo was selected in this competition to be the object for us because is true that we have so many estates that could be a candidate. We had a lot of possible candidates for being in the Nordic Built competition but it is also very important that you have a candidate who is dedicated to this kind of mind-set and to sustainability. This is something that this particular client (Ellebo) has proven during many years. Over the last 25 years they have done a lot of development projects and that made them the perfect candidate to enter in this competition

It is not unusual that (in another case) we would have to discuss even more basic approaches to sustainability with our clients and in this phase that it was about a big competition we had to make sure that we would have an appropriate project where we would have the necessary backup. The Ellebo's owner has 10 estates and they have been very interested in sustainability aspects with the buildings for many years. So that was one box that you had to check, Then something else we had to had a project in the competition that was "right"/ "ready" for renovation. By that time I had already worked with Ellebo for 2 years where we worked on a master plan regarding renovation. I was working together with the tenants' representatives and we had already launched with LBF funding the renovations of social housing and they were positive regarding the Scheme. So this

fact was crucial because it was a guarantee that we would be able to finance the project afterwards. We approached LBF before we launched into the competition with Ellebo. We contact them in order to inform them for the possibility of participating to the competition and they thought that it was an interesting possibility. We had an understanding that they would like very much to see what would come out of such a competition.

How is different from previous renovations having been contacted by your organisation?

We had had a lot of possibilities to have studied based in this particular case that would normally is not happening in a regular renovation case. They had also this competition where they could select 4 candidates to move into more specific plan/ design with a lot of dialogue and judges having the possibility to pose questions and ask regarding materials and certain technical aspects. This was an opportunity that we would not have in another case. In Ellebo for instance we conducted an LCA analysis and this like that which normally are not generate in a project. We had 3 judges regarding architecture and 1 regarding technical issues and another one who was a bit more into the construction aspect, ventilation and things like that. We had a lot of expertise at hand in order to challenge the proposals. It was a fantastic possibility for us that we usually not have.

On which factors /sustainability aspects the project is more focused? (improve of facilities and living conditions, social cohesion, energy efficient building, climate change adaptation etc.)

Of course in some extend we are focused in all sustainability aspects, however we do have some that are more important than others. COWI had made a report about the 30 most sustainable buildings and according to their analysis they mention that Ellebo have won the Nordic Built competition because it was able to cover all the 10 principles of Nordic Built and no other building that they looked in has done that. One of the things that is very important for KAB is the social side meaning that they way of tenants participating in the development of the project locally. This is very important to us.

Also the transformation that will happen to the estate socially we asked during the competition to make apartments for more families which was important in order to make the estate viable on a long time basis. We had a lot of very small apartments that have gone away to make way for bigger. Then we have some new apartments as well added on the roof. Those were some of the aspects.

Then of course we were very interested in energy efficiency. We are going to save a lot of energy with this building. But that also falls back to the tenants because they pay directly for the energy that they use. You could say that for KAB we secure the estate for the future making the best possible homes for families in a price that is competitive in the market. Energy wise said that we would be able to save 138khW/ m2/ year down to 35khw/m2/year. That is of course interesting meaning that in the future this building will not use the energy that does today.

The materials being chosen for the outer envelope of the building have been actually renovated in 90s and the renovation turned out that it had not been done in the right way and this opened the possibility for financing a new facade. There is a lot of focus on the performance of the outer envelope and also on materials maintenance. We go for some low maintenance materials and materials that will get old but still look beautiful this is also crucial for all the new parts that will be added.

Where the residents able to express their feelings about the designs etc. and make changes?

In all of our estates is the way of how social housing is organised in Denmark. All the estates have legal representation which is a board selected among the tenants by themselves. This representation on board locally they have been involved in the development of the competition programme. They had also been involved in the development of the renovation scheme that was on-going for 2 years before the competition. They knew a lot about the possibilities of the building and the problems of the estate. If we go back on that time the process is as it follows: we meet with a group of people which is usually some members of the local board and some members of the owners. And in this case the lady who is director of (THE OWNER) for all the 10 estates she is also head of the board in this particular estate. So in this case was the same person which is very good because the communication is much easier all this time between the two parts (KAB AND THEM).

It could have been different though; it could have been two different persons as it was in the beginning. But now she is there and she has three local members of the board and this is the team that follows up the process of the project and we have regular meetings where we present parts of the project, selected for them either to commend on or to

approve. All this time we had these meetings and this how all the time they have been informed about the progress and also about the layout of the new apartments, how the bathrooms will be or the kitchens will be , the outer facades etc. But they have been involved already before we had the Nordic Built Challenge and then when we wrote the programme for the competition they were also part of that. They approved the programme before it was launched on the 8th of November 2012. They have been also on the board that evaluated the project, actually all the competition projects.

They were 2 persons representing them (back them was the director of the owner and the lady head of Ellebo). So they have been involved right from the beginning and I can easily say that we were 16 people on the evaluation board and this is why that we know that the winner is safely routed locally because they choose it themselves. We were very lucky to have a project being so convincing because it was an anonymous decision it was not that the judges had to persuade them to choose something else. This helped the whole process actually. They chose it at a very very early stage so that was very lucky. Sometimes, you have discrepancy.

They have participate in the whole process of the competition meaning that all the 64 proposals were given to every member of the committee in order to make a choice, They have the opportunity to read through all the projects. They liked that a lot, they thought that it was very interesting. Fantastic proposals. At the first stage we would select 18 from 64, then narrow down them and in the end 4. Next, we had another run for three months with these 4 and finally to chose the winner. It was a long process, it was time consuming but it could not be done any quicker. It takes a lot of time to read that many proposals but the result was more safe. We knew at the end that we had the right winner. This is very important part. We had a very good process and I also think that this was one of the reasons why this project actually won the Nordic Built Challenge because it is actually a very good project and really fulfilled all the 10 points of the challenge. We look so much forward to start built next year.

Did you find any resistance from the residents? About what where their concerns? How you deal with that?

They always have a lot of concerns and they especially have a lot of concerns regarding the tenants who live in the estate. Because they actually represent the tenants. Initially, we planned to make this whole renovation with people living in the buildings and there was a part in the proposal describing how this could have been done. That was a

main concern from the start, how are we going to illustrate and explain how you can live in your apartment while we have workers coming in and out, the bathroom and kitchen will not function etc. When the facades will be away how you can at your house without a facade to the outside. This scenario was well explained and in depth.

Nevertheless, when we moved forward it has been necessary to conduct further environmental analysis which has shown that there is a lot of led in paint of the building and we have been working on that for some time trying to identify if we could avoid rehousing in general but the conclusion is that now everybody has to moved out during construction. It was a matter of health protection or the residents and workers also it the terms of how these contaminated materials would be transferred out of the building. So only two weeks ago we presented them this new strategy of construction meaning that they all have to move out.

It was something that people react in a mixed way because some people have been basically very worried about that they would have to live with people coming and working in their house and this is really understandable. We would like to select rehouse as an option right a way but the cost of rehousing is enormous. It was not easy to put it in the budget without thinking of other options. In this case the total price of rehousing plus renovation regarding security measures runs up to 37 million kr. In that more than half is only the expenses regarding the loss we have for not having any income from the apartments because the project has to cover that as well. People will move out they will pay rent somewhere else but the rent being lost the project will have to pay that. This loss is about 20million kr. So what we get from this? We get that we will have safety regarding construction but besides this these are money that you cannot see them anywhere at the estate (facades, solar panels etc,). So we are still working on how we can finance it. It is still not clear but it is among other things that we work on.

This issue will not have any impact in the future rent. The future rent has already been decided. It is decided according to the maximum level for the area. So maybe we will have to cut for somewhere else in order to finance the rehousing option. As soon as we will have a clear idea of will be we would have a better solution. What the people asked the first time when we told them that they have to move. The first question how this will affect my rent. As long as we cannot answer that we are not going to have a huge meeting where we present this. First we need to clarify this and then communicate it to the tenants. We had a communication all this time where we post information for the tenants, then there will be a general meeting for everybody and then there will be

meetings for one block at the time with more specific information. However, we already know that some are very happy about moving out because they have been really concerned about living in their apartments during the construction, maybe they have children, maybe they have children with special needs, asthma, or they can not tolerate dust, they could many reasons. So some people will be actually very satisfied with this solution but it will be a very little of both. Some will be very unhappy to move out for 6-8 months but when they will be back they will have a new apartment (new kitchen, bathroom) and all the works inside the apartments will be finished and we will still be working on the outside and on top of the building but basically everything that is inside will be already done.

Actually only one block will move out, and we will use that block as a hotel for everybody else during the construction. What we actually going to do is: we are going to move people in this block out (block 1) for the whole construction period etc. That is the most efficient solution economically that we came up with. We also had a study with Pulmdens on site but the price was 25% higher than this.

How much the rent will be increased after the renovation?

That was already information when they had to vote for the project and they approved it. So the rent will increase for 40.8%. Of course some of these apartments are going to be larger because we eliminated small apartments in order to make bigger apartments. So you have to pay if you get more square meters. Then some of the apartments will be accessible after the renovation meaning they will have elevator and they will get a bigger bathroom that facts will also add to the rent. If you should live to one of those apartments you have to pay more. In addition, apartments on the ground floor, that will have a private garden they are going to cost more. So the rent is a combination of a lot factors actually. Depends on what will happen to your particular apartment. We also sent out huge information material with all the new apartments, all the renovated apartments where the tenants could find their place and then they could look how is going to be after the renovation. In some apartments they lose one room, so they have less square meters but also an increase in rent, however these cases are very few.

Are they going to move at their old apartments or they can choose another one?

Well, some want to get back to the apartments that they used to have. But for instance, we have this apartments that it was small before and now not. Basically in blocks 2 and 4

all apartments will get bigger. And a lot of people living there maybe the 30% are happy for having bigger apartments but also some of them would prefer not to have more space/ square meters so maybe they will ask to move into smaller apartments. We expect to have lot of people moving in the estate. Then of course we have all the new apartments, so they can chose also to live in one of them. The added square meters has an impact to the rent.

If you used to pay for 60m2 and now you have 55m2, you will have a reduction at you rent, however because of all the renovation the price of square meter itself is going to be higher. For its apartments the rent was calculated individually. We had 4-5 meeting to inform the tenants about that and we could just go around looking at the illustrations and find their apartments and the future changes. Where they would like to live, do they need more or less space etc.

It was my impression that people were excited about that. If you get older, or you used to have you family in your apartments but now not maybe you should move to a smaller apartment. Or maybe you should move to one of the accessible houses, we have already today 2 tenants that they cannot come out of their apartments and this is sad. So I suppose that all these people are excited about having this potential to choose. Some of course are very unhappy for changing their apartments they like it as it is. But it can be avoided unfortunately we cannot satisfy them all.

Energy labels about the materials? Energy class of the insulation? Energy label on electrical equipment?

No in fact this is something that we are going to discuss because we are supplying new kitchens in all the apartments, so usually the owner will not supply any appliances for the tenants. The appliances are owned by the tenants, so you could say that they can buy whatever appliances they want but also they are responsible for fixing them if they broke down. But now we are going to have a discussion about this if it is possible to do something different here. Today there are two washing stations in the basement one in block 3 and ne in block 1. We are not supplying anything for this. We have still to decide whether there will be solar panels to the building but we have to financing them. So we are going to tender them as a possibility and if we have enough money the board of tenants will decide if we are going to prioritise this or something different. Right now we are looking on a model of solar panels in order to generate the washing machines stations and the new ventilation systems. It's about 23khw.

Why are you not planning to use solar panels?

It is not necessary. But if there is an option in our economic frame it would be prioritised But we need to organise the tender in such way and prepare themselves for other cuts in order to keep the project in our economic frame agreed. The solar panels are not necessary in order to fulfil the energy frame. So this is not something that must be done but i think that they will do it with regret because they are looking into sustainable solutions and their goals are high and solar panels is something that they really like to have.

Energy demand about space heating, ventilation and domestic hot water. What about the central facilities of the building? Lighting elevators etc.

We have of course some energy use in the common spaces, (I am not actually sure if the stairwells are heated but because the access is only for the facades are very protected). That time was to decide about the ventilation system. Our experience is that if we had chosen a central ventilation system would have a huge energy demand, high energy bill in order to operate this system. But now we have decentralised ventilation systems, one per apartment, but it turned out that they are still going to run by using the common electricity. So it is a matter of how you divide the use of energy. Where it will be in the personal bill of the tenants, that was one possibility but if we had to choose this we had to rebuilt all the electrical system of the apartments and the project simply cannot afford this. So we had to go a step back and run all the ventilation system by using the common electricity

Was there any ventilation system before? Are you going to implement heating or water meters?

There was not any ventilation system before. They have already individual heating meters. We must measure their heating and they have meters for that. Also now that we change water installation the water will be measured and the electricity is measured individually too. But now of course we need to find a solution regarding the ventilation systems. Cause now the common bill is divided by the tenants is just going to be larger.

Will be the tenants able to operate the ventilation system or not?

They will be probably be able to turn it up or down but they can not turn it of. This is something that is very complicated about has is going to be done and basically we are going to put a CTS system on the ventilation in order to transmit information for our maintenance people who are there locally. So they will now if someone turns off the ventilation. Now they will put it on the common electricity so they will not be able to turn it on and off. But they will be able to regulate it as they wish.

Do you have a CTS system for the heating system? Are you going to implement one?

I do not think so that we are going to implement a CTS for the heating. The heating will operate as it does today which is individually and the tenants decide how much heat they want and how much energy will consume. We hope that with the new insulation they will not have the same need for heating as now. We only going to change one radiator which is in front of the winter garden. All the other installation for heating will remain the same.

The winter gardens are not heated. Are you afraid of the fact that tenants will try to heat them somehow with this having impact on the energy consumption?

I am sure that some tenants will do exactly what they do today. They put small electrical heaters, they also have glass covered balconies today. The balconies are covered only by one layer glass which is not tight and I have seen in a number of apartments, also in the winter, that the door will be open and they have an electrical heater. Of course we cannot prevent that. But we will inform the residents regarding the energy use and the new glass in the winter garden means that there is not going to be so cold as it is today. Also it is important to understand that winter garden is a special room is not a larger living room. It is a special room and they have to try using it accordingly. But this have also to do with the fact that they are not paying for the square meters of the winter garden. The winter garden is not counted into the BBR because it is not heated This is because the winter gardens are very large and 10 square meters will be unacceptable for the rent. All the winter gardens are private.

Regarding the energy frame we had initially energy class 2015 for the old building and 2020 for the new additional apartments but this caused problems so now we have something near to 2017 so to avoid having the facades click back and forth. In the design of the winter gardens we changed the folding doors as we always look for solutions that we are sure that will be able to work for a long time without maintenance. We have not

been convinced that we could find these folding doors that would not demand a lot of maintenance. So instead we have ordinary doors like garden doors with light frame and glass. This looks a bit more simple but the doors can open up completely and it still looks very nice and you can still open it very much in order to be in contact with the garden outside. This have been finalised we are still waiting to see bathrooms, kitchens and facades etc. All these have to be approved and the tender process will start at first days June. So we will have the prices and then is starts all over again in order to fit everything into the budget.

Larger apartments mean more square meters per person and at some point increase of energy consumption? Have you consider about that?

We are not actually taking that into account and we are not going to regulate somehow how many people will leave into the apartment and if the all space that they have they actually needed. Nevertheless, this regulated in a different way. Many of our tenants they will get a help for the rent by the municipality because they do not have so much money and this regulates normally the size of the apartments that people normally choose. Because for one person you can only get this up to size of 65m2 if the apartments is bigger they will deduct in what they get. The larger your apartment is the more the money will deduct. If you are two people it is up to 95m2 meaning if they want to use the biggest apartment of Ellebo which is 150m2 they will deduct for 20m2. Most people will think about that when they will choose apartment. So we do not need to regulate this, people are very good about regulating themselves. If a couple wants to get a larger apartment and they can afford it it is their choice and maybe they plan to have children in the future.

About the waste management what are you going to implement? Have you talk with the resident? Local municipality? Etc? Available data for previous waste management project?

We are closing the garbage shoots and we make garbage handling in the ground in 2 stations where you will be able to separate all your waste. We decided to close them because we had a lot of problems at first, we could not make the tenants separate their trash for recycling. If we have these shoots people tend to throw away everything together. So we need to propose a different solution. As a result Ellebo is going to have 2 stations with all the containers in it being underground.

We believe that is going to be a lot better if we offer a solution being well designed. Having the garbage shoots creates also a very bad working environment for our maintenance people. It is very difficult to work with the garbage in these rooms so it is something that we like to take away. We want better environment for our employees. But in some municipalities they want allowed that but Bellerup is very forward in this.

As I can see the project is very aligned to municipality's plans. What about the new building being out of local plan etc.?

The municipality is very into that project because they also signed at the Nordic Built and they were part of the board dealing with the competition programme. They were also part of the group that process all the competition and selected the winner. So the municipality have been deeply involved since the start. Bellerup municipality want to have this project as an example for the other municipalities.

Are you going to do any assessment of the procedure and also after?

Yes. We are currently monitoring 6 apartments so we will have a year of measurements and then the day when people will move back we will do it all over again so we will have the new data so to conduct an evaluation and see how well it works. We have also funding for the Nordic Built 3 in order to monitor the building performance. We would like to have something that can monitor the energy use to the tenants something like display but this is matter of the budget. But is very difficult and there not a lot of products in the market.

Interview – KAB

4th of May 2016- Pernille Engelund Johansen/ Project manager

How exactly Ballerup municipality has invested money to this renovation project and why?

They invest directly in the new building that is going to be constructed. If you split the project into the new built part and the renovation part, the municipality puts 10% down payment for the new construction as a starting capital. This is a direct grant to the project. The other 2% will come through the tenants when they put the down payment so to move to their apartments and the rest 88% are financed by loan in the credit organisations. This is the was on financing the new construction of social housing.

For the renovation is different. The renovation's total budget is split in works that are granted, attractive loans under LBF that is all the works giving this fund. In most of the cases these loans represents the 2/3 of the funding/finance, the rest which are the works that LBF does not support representing the 1/3 will be financed by loans where the municipality will offer the guarantee in order to get the money. So the whole renovation project is guaranteed but is financed by LBF and the municipality. If we say for example that the new built cost 100 million the municipality has to invest 10 million you can realise that this is a significant amount of money. It is a huge amount for a municipal budget for just investing it.

Is the Scheme A offered by LBF or the municipality?

It is also some kind of combination. The scheme A is actually given by the municipality but also by LBF. The finance package before the renovation is a combination of many different grants. You cannot have the one without the other. The LBF and the municipality work together so when we apply for Scheme A it is in the basis that we have a case considered able to pass by LBF. We sent the application at the same time to both parties and we deliver information also to a digital base that both parties can follow. So the Scheme A is basically made by the municipality but we also receive a Scheme A by LBF, called something different. The economy between the two and the project passed is identical. In the case of the renovation the municipality will have more information regarding the renovations works that they should put a guarantee. And LBF will have more information about the works that they support. This description though is very

superficial. Comparing to the new built, handling the finance and the economy of a renovation is much more complex. We have specialists dealing only with that. We have also certain line that we have to follow in order to allocate the money. There is control of how the money are actually spent during the project. This funding system is Danish specialised structure. It does not exist anywhere else.

LBF wants to support more solutions regarding energy efficiency in renovated buildings. To what extent they actually do it? Do they push for better solutions or they remain to the basic requirements?

This is a very hard topic. Some times between LBF and the municipality there are matters of interests. Interests in conflict. Basically, LBF supports renovations to the standard which is the current standard. What happens sometimes is that between the time that we have been approved for Scheme A and the time that actually the renovation starts we have very long periods for a variation of reasons. Basically in most of the cases is because the tenants are reluctant to go on with the renovation. As a result we can not do anything and we have to wait. So in between new building regulations might be implemented but the money are from earlier time so what to do? The grant that LBF gives is only within the current building regulation. They do not donate money for project being above from the current standards.

But here we have a case aiming to be a showcase of sustainable development and energy efficiency solutions. Now you follow energy class 15 why not the energy class of 2020? So Is it actually a different case or it is not?

A lot of people ask the same question but you have to understand and remember what LBF is and how it is structured. All the estates that have been built after the 70s part of the rent that they pay they pay it to LBF. LBF then receives grant applications for renovations, where they will decide who is going to be given money. So on behalf of all the estates built after 70s LBF has to decide who is going to take money for the renovation. They have to be fair as possible and it has been already decided by the parties that pull their resources into the LBF, the level of the project that you can actually have money for. It is the same as when we build a new housing it defined within an economic frame. It cannot be extravagant. Thought sometimes it allows us to make very advantage buildings. Especially when the prices on the contractors are low then we can buy a lot within the frame. We have done energy class 2020 since some time ago. But LBF, they are limited

to work with the existing building regulations. They recognise that Ellebo is a special case; it already had support far beyond other projects, because they recognise that the case is something different than the ordinary, it will give very good conditions but they cannot support 2020. In this case will have as I said before we have an energy class of somewhere in between 15 and 20 so LBF now funds works that in real they do not support. That might be a discussion at some point but right now they are not aware of this decision/ strategy. We will have to deal with this when it comes out. They also do not support solar cells. They are aware that these days the renovation agenda regarding sustainability, energy efficiency etc. has shifted but they are waiting from the politicians to change the framework in which LBF exists. It has to come from the politicians, the way they support energy use now is very strange. I think for instance that if i have a renovation project, we go out and presented to the tenants and you inform them that you have this reduction at your energy bill each year. Then you do the renovation and it comes out that is half as you promised then you can apply for money in order LBF to cover the difference. This is a very bad way to do it because it does not encourage the engineers to make precise calculations. Because at the end we can just ask LBF to cover the difference. Personally, I am a bit suspicious of the way to do it.

How social issues and energy issues can be high in the renovation agenda of a social housing? How priorities are set?

That is very difficult. In each of these cases you have different objectives. Not all the estates have social problems. We have some where we have serious social problems but this is not the case in Ellebo. Here we most talking about securing the estate for the future. Here is more about attracting more families to move into the estate. There are different problems and concerns and we have to decide what we consider as the most important ones when we talk about a renovation project. Whether as are the social issues or the building issues or energy issues etc. Depends by the local conditions in the estate, we have a list in Denmark about the 20 estates considered to be ‘ghettos’. If for instance we have a project in one of these the focus it will be mostly on the social profile. And we will try to see what tools we can use in order to change the existing situation. Combination of tenants maybe? So this becomes very important. If this social housing has issues like high crime or insecurity this what needs to be changed before you can start thinking about reducing CO_2 emissions. Then it will automatically drop to a lower level in the priority. So you could say in this order for in cases like that social issues will come first. We will try to find solutions like a different combination of flats in order to take away the small flats, It is

not to say that social problems are linked to small flats but somehow in our experience we saw that larder flats with families tend to bring less of these issues. It might be right it might be wrong but it is one of the things that LBF addresses and ask us to change in these estates and they support it.

So you could say that in Ellebo we have this priority in order to change the combination of the tenants but not because the estate has social issues. In Ellebo case we have issue with the demography because people moved in years ago and they are now quite old. The average age if fairly high. So we want to infuse having young people, more diverse age groups all the issues of social sustainability. We want to combine as many as different aspects possible in order to have a sustainable group of tenants. It becomes then easier if you have tenants with special needs or mental issues, or immigrants all this becomes a lot easier if we have a strong framework where different aspects are represented.

Are you going to have any small apartments after the renovation?

In this case no all they going to transformed into larger apartments. It has to do with another political issue in this case. The estate is 3 minutes walking from the station and there is the political goal within the municipality that they want to encourage people to use public transport in order to reduce CO_2 footprint of the whole municipality. So that is why they have allowed us bigger flats in Ellebo because it is close to the station. So you can say that people living there they will commute basically by using public transport. If Ellebo was far away from the station and the families had to take the car for commuting they would not have allowed us to make bigger apartments. So here you can see that this project is a combination of more than one policies.

What about the tenants of the smaller apartments?

This is all addressed in our rehousing scheme. We have a whole department here at KAB dealing with this issue. They have to find 16 new apartments for the people that have to move out. They work on this issue for one year and a half now so people living in one of these apartments going away , they will be offered either slightly larger apartments at Ellebo or to move to another estate. It is their own choice. Of course this process cost money but they all had a personal interview in order to clarify what are the possibilities, what they would like to have in the future. 2 options will be given to them to move away from Ellebo to an apartment that will be approximately to the same size and price. But we can not help them with more than 2 offers. But if they want to stay because of course

some of the people living in these small apartments are young people where you have a perspective of finishing your education, getting a job, earning more money and possibly creating a family. In that way you will get a better economy lots of the tenants actually have this perspective. There are also some who they are older that they are not in this part of their life and they usually want to go somewhere else with less space and less expensive. So our rehousing team will take care of that.

Interview – Ballerup municipality

6th of April 2016- Annegitte Hjort / Architect maa.

It was mentioned at the competition that the local plan does not permit/considers any new construction. How the extension of block 1 was allowed? Why the municipality is so interested in this project?

We are really interested in this project because we would like to have Ellebo case in the future as a case of sustainable development. It is a combination of the fact that Ellebo is really run down and in great need of renovation and we also have to increase our sustainability aspects. I think it was KAB that made us be so interested in this project.

It was my boss by that time responsible but I believe that KAB approached us, informed us about the Nordic Built Competition and propose to us a close collaboration and team-up so to participate at the competition with this specific case. For us the issue was not about having some additional new construction, we did not want to have whole new buildings. For us demolish and reconstruction was not an option. We could have some new construction but now total new buildings because we had to meet the economic demands. The proposal is not a whole new building is an addition to the existing. Even if we wanted to demolish the whole estate and build a new one it would not be allowed. There is the need to seek permission in order to do that and it is not so easy to get it. We can say we would never get that.

How this is case different from other social housing retrofitting cases in your municipality? How this case can influence the way of retrofitting the social housing stock until now? Was your role different in this case (more active or less? etc.)?

The municipality is always involved in social housing renovation projects. Municipal money is given in these kinds of projects and the municipality in these cases should guarantee some loans. So every time that there is a project like this the municipality has to put some money and it has to keep track where the money go and what the housing organisations do. Supervise the procedure in a way. We have our say and we look through the projects. In order to support a project some of our “wishes”/demands should be taken into account and be implemented. We had a lot of these projects the last 15-20 years because all this big concrete estates from the ‘60s and ‘70s had reached an age from the beginning of ‘90s by then they were 25-30 years old and they needed repair and

refurbishment. The first generation of these projects usually the renovation was focused on repairing the facades. Insulation, new facades and maybe new balconies or closed balconies. So that was it but gradually, we have been focused more on energy savings and other sustainable aspects. Of course Ellebo is the most ambitious project.

We were involved in a great extent as a lot of political decisions had to be made. We participated also in setting the framework of competition challenge. And we realised that the goals of the competition were the same goals that the municipality wanted to achieve. Of course the KAB and the municipality have the same interests more or less. We were also part of the meetings were the proposed projects were discussed and up on the winning project. So we followed the process all the time.

Social housing organisations maybe they have conduct in general small competitions but I think often they select an architecture office and they work with them only. Having a competition like this is costly there are the travel cost, the whole process and administration of it. We usually say that a competition costs almost a 1 million DDK. This one probably was more as it was much more complex. So it cost a lot of money but the competition was really interesting because it showed to us new ways to solve sustainability issues and issues regarding social housing refurbishment. We had plenty of proposals, we could choose something that was perfectly fine but also we could choose as we did in the end solution that pushes the limits. We choose the best of a range of fine projects. It was a luxury of course but offered new ways of tackling the sustainability issues.

)In other cases we would have to clarified what sustainable issues should be solved and then make a new local plan that can cover this need. In this case we had the project have a holistic approach of the sustainable development of Ellebo estate that could actually fit to the old local plan without changes. Of course with the old plan that we had we would never be able to set so ambitious goals. We could not have all these sustainability aspects based on the old local plan because nobody had thought about this back then. We did not have the appropriate knowledge. So if we did not had the competition we would have a totally ordinary building renovation. In other cases we have to make new plans and ask for sustainability. In this case it was not necessary.

How can this process be repeated?

If we want to repeat in a way the same procedure as the things are now social housings have to find the money for funding a possible competition and I do not think that this is a possibility. Municipality and KAB for example are not able to find the amount of money needed for organise a competition like that again. Usually the tenants for example are quite informed about sustainability issues or renovation, but in most of the cases they are in dialogue with only one architect while in this case they had a lot of options. These social housing projects have always a lot of tenants involvement, because is a very democratic construction and the tenants decide in the end. Even if you have all the plans ready if they say “no” you can do the renovation.

The planning process also was not so difficult because we had already a local plan where the architects’ proposal could fit. We might repeat a competition but the housing association has to pay we cannot afford it. From our point of view we wait to see what this project will give us, the results and then maybe we will seat down and discuss with KAB or another housing organisation and say ok what we learned from this. Where we should continue and where we should recognise that our ambitions have not been accomplished. It will be a waste of time in the future. But we have not talked about how we will use this case until we will see the result.

What was the local plan about?

Yes, we had a local plan and old actually. It was a local plan for Ellebo estate. There was room enough for the new plan to add this new needed square meters. So we looked the local plan to see if there anything that has to be changed in order to make that project and there was not anything to change. We had only one small dispensation regarding the building high but this was solved easily. In other cases we would probably do a new local plan but in this case we could use the existing one and save time, money and energy.

What additions did you make to project? What were your proposals? Do you see the area be used also by other citizens except the residents?

No this was not the aspect. We did not want the public space of Ellebo be used also from other citizens of our municipality except its residents. The central area which is going to be developed for social activities is quite hidden for estate’s buildings. We have not seen this project as a project for the surroundings also but as a project for the inhabitants. There was an issue for some of the smaller apartments and now they have been

combined into larger ones. The diversity in apartment sizes has been also a political issue. It is political issue in the municipality what range of apartments we want to ensure that we can offer to our citizens. So the fact that some of the smaller apartments have been taken out has been discussed politically. Is this what we want, we do not want to exclude people we have to have a range of houses that matches the demand. In this case apart of the technical aspects the goal was to find solutions that make the residents feeling included and part of a community within the housing project.

What other benefits do you see?

When is finished Ellebo will be an example of sustainable development. We aim to that. We expect to see the results. We wait to see if the measures being taken are worthwhile and if they worth the cost. Showcase that this measures should be followed. If we see that this costly procedure has not the results we expect we can avoid the same mistakes. We can learn from this case of retrofitting the Ellebo estate.

How can social housing renovation been seen as an area based intervention? Did you have an approach like that in this case?

The Ellebo buildings are close on the rest of the buildings in the area. There are buildings in the row in this area were Ellebo is located. The effect of developing the central area will not so big outside. However, we urban planners we always hope that a good development plan of area will affect the most the whole surrounding area and the citizens living there. But in this case the important thing was to create a good place for those people living there and increase the quality of life and at the same time to be sustainable of course. We have to be that increasingly. Ellebo is a gift for us because it is the opportunity to try out what can be done in this direction. In other cases and in general we talk about sustainability a lot and we mean it actually but maybe is difficult to find the sources to do it right or maybe we do not have the appropriate knowledge. So we hope that Ellebo case will offer to us the knowledge that we need. In that way this will influence the area you could say but in a more abstract way. Our future planning or our future projects maybe will be improved/ affected from Ellebo case.

Are you satisfied with the process?

We have a lot of people working on that project some of them dealing with the technical aspects while others with more social issues. I can say that we are very satisfied with the

collaboration having with KAB. It is fine. We could always say that we are not supporting this project because this is our money and this is not good for our municipality. The municipality in this case was involved as much as nobody could expect.

The money that you offer is for Scheme A or something else?

We deposit certain amount of money as a guarantee for the project. So we have to take that money out of the municipal box and put it away so every time we do that we have to see if this give us value for money. In this case our impression is that there is value for money. This renovation we believe that will actually improve the place and make it better for the people.

Are you planning to implement some public activities or public spaces near by so to enhance the interaction of the area with rest of the citizens?

No we are not going to do something. There is no point because of the design of the estate itself. However there is a lot of discussion in Denmark the last five years regarding the distressed areas so called harshly “ghettos”. Some of these projects of 60s and 70s are so large and impersonal and the social mix of people living there could be problematic. We are always looking out of this housing estates to see if everything is okay or if things going to a bad circle. As a result we believe that if we improve the building and the area will attract residents contributing to raising the quality of the place. We expect how to say to have more residents having more resources both regarding economic factors and way of living. People that will want to support a community and social cohesion within the estate and the society in general. Running down places often are connected with running down residents we want to spread things out so to have diversity regarding different social groups.

So in the future you might consider social housing renovation as a tool of area based interventions?

Yes this could be actually happened. Social housing renovation could be helpful in the further development of an area.

Interview – Rambøll

12th of April 2016- Sidsel Blegvad Seier/ Architect maa.

Have you ever before participated in a social housing renovation?

We usually have 4 to 5 projects per year regarding social retrofitting. In some cases we are responsible for the architecture and design and in other cases like Ellebo we are responsible of conducting the construction only. In a way we have projects that cover all the steps from planning to construction. Another case quite similar to Ellebo is the renovation of Tingberg.

Was Rambøll involved in the project from the beginning? With the competition?

Rambøll was not involved from the beginning. Neither was part of the competition. There were other engineers working on design and energy calculations for the competition. Rambøll was called to take over the construction by KAB. It was important to have a Danish construction company with experience on this field in order to cooperate with the Architects from London. A lot of things going on with regulations, policies etc. in the area and as a result there was a need for having a company knowing all these and overcome possible time consuming issues.

What is exactly your role and to what extent you influence the process?

Our role is only about conducting the refurbishment of the existing building and construct the new ones. We are not dealing with the reformulation of estates' gardens and common outdoors areas. We did not change things of the approved design/plan. We try to be loyal to the initial plan designed by the architects, winning the prize and being approved by the tenants.

Is the case of Ellebo different? What you do differently compared to previous cases? What is better or not?

I do not think that Ellebo is so different from other cases. For Rambøll is a usual renovation case; however this that can be considered as unique in this case is regarding the architecture. I am talking about the winter garden. This kind of room is going to be implemented for first time in Denmark. We have of course the balconies being closed

usually by a layer of glass but these is not the case of Ellebo. This room is well insulated, it is not cold during the winter as we experienced in other cases and it can be used differently related to seasons. This is what I think that is the difference in this case.

What are the most crucial challenges that you have to overcome?

Two are the main challenges affecting our work. The first is that the architects of the project are in London. As you can imagine we have to be constantly in contact inform them about our plans/problems/solution and ask somehow their approval. This sometimes is very time consuming and creates often misunderstandings. But is also an advantage because we are obligated by the distance to be in contact almost all the time and we have a good cooperation and as a result we get a great help of them in order to be loyal to the initial plan. Our goal is to deliver what is expected without making huge changes. Another challenge is that we are a lot of people/organisation involved in this project that we have to be coordinated. Different interests have to be satisfied. KAB, Danish building fund, Ballerup municipality, Adam Khan Architects, Kube Management (consultants of KAB), the architects working on landscape renovation, Ramboll and the board of tenants have to cooperate and this is extremely challenging.

Do you think that this holistic approach of sustainable development of Ellebo is more beneficial and why?

I do not think that we apply in this case something new regarding sustainability issues. Of course the facades, windows and everything will be changed and the estate will be renovated from the scratch; however we do the same process as in any other case of renovation. Of course the goals are higher but is not that we implement for exactly some kind of alternative energy supplier solar panels etc. I also know that a crucial goal for Ellebo is to become a solution regarding social sustainability but I do not think that this can be actually done. Of course a good architecture will increase the indoor quality of life and the outdoor space leading to a more appealing estate but it can solve all the social problems of the area. It is not only the appearance of the buildings creating social differences. The new design will help to improve the building, safety, facilities and appearance in order not to look like as “ghetto” but only that.

How do you think that retrofitting of a social house can also help the surrounding area? Is this a possibility for Ellebo?

As I said a renovation of social housing estate can be the 1st step but in order to see results in the area is depended by the municipal plans, the money that they want to invest to the area in general, other facilities etc.

What do you think it can be improved regarding the process or be done differently?

Move out the tenants. It Is very difficult and time consuming for us to start and finished the construction while the residents remain to their apartments. The facades will be removed; the new part of the apartments will be added etc. All this having the tenants there will be extremely complicated. The best for us it would be to move out everyone complete the construction and move them in again. Of course this cannot be happened as it is too expensive and the KAB will lose enormous amount of money.

Are you going to inform/ train the tenants or the people maintaining the building about the expected energy performance etc.? How they should behave regarding energy use?

Yes I consider that the energy performance of the building after the renovation is linked closely to the residents and maintenance people regarding energy use. But it is not our responsibility to train them and inform them about this. Is KAB that is responsible and has to do it if it thinks it essential. We can and we will provide all the essential data, information and materials needed for informing and training the residents etc. It is also important to consider here how much interested are the residents themselves regarding this issue. I believe the main idea of the project here is that a group of residents will be well-informed and trained and then they will train each other.

How the budget affects the solutions that you propose? Are you aiming for the best solution regarding solution or for a cost-effective one?

Well there is not the best solution regarding sustainability. Our goal is to cover the needs and achieve our goal. If we see that this solution having in our mind is out of the budget but we believe that this the solution needed we try to see of where we should cut money in order to do it. And this makes the best solution.

A reason of winning Ellebo the Nordic Built competition is that: Utilises local resources and is adapted to local conditions. How this is achieved?

I think that they mean that they follow the Danish architecture concept.

Interview – Aalborg University

15th of April 2016- Claus Bech- Danielsen/ Architect maa.

The concept of Lacaton & Vassal is focused more in renovating the building itself. Do they work on the landscape of the estate?

They probably could do but yes they are mainly care about the buildings. In Denmark now the main concept is renovating the buildings but at the same time to look the estate as part of the whole city. Try to connect the estate with the city that what we try to do in Denmark right now. The LBF is mainly pay for renovating the buildings so that is tricky.

The concept was presented to a competition at Paris where the plan was actually demolishing the existing building. What Lacaton and Vassal did differently was that they saw resources and potentials of renovating the existing building instead of demolishing it. They look for possibilities/potential and this is the main concept of Lacaton & Vassal. Search of potential that is already there. They claim that their approach is also environmentally sustainable but I think this is probably discussable. Because you can build an energy efficient building and during the next 10 years you would have probably saved more energy than renovating the existing one.

Lacaton & Vassal also argue that renovation is less costly than demolition. What is your comment on that?

In Denmark this is not the case. At least not always. It is extremely expensive also to renovate in Denmark. Very often when you renew the cost can be very very closed to rebuilding a new. But we are also in a period where our perception of what happened in the 60s and 70s is that all architects by then were stupid. But there are actually qualities in these buildings that we are not able to find them yet.

The Scheme A is a funding programme by the municipality or by the Danish Building Fund?

The scheme A is funding by the Danish Building Fund. LBF is a special danish invention. Works like this: when you build a house you go usually to the bank and get a loan. Typically, in Denmark you have to pay this loan back during the next 30 years. Similar is also the case of social housing. They get the money and they have to payback

through the rent of the residents. Then after 30 years you could actually cut the rent drastically because you do not have to pay for the loan anymore. But in Denmark all social housing has this solidary system where those who are finished paying their loans they will continue paying the same rent. The rent remains to the same level and in stead of paying to the Bank they pay LBF. So you can imagine all social housing in Denmark being more than 30 years old paying all the rent into this Fund (LBF). This is enormous amount of money. It is a huge fund. That is why if you travel around Europe you will realise that the general quality for maintenance etc. regarding social housing in Denmark is relatively high comparing to other European countries. Because we have this fund to pay for. The money that LBF has is actually owned by all the social housing estates in Denmark. It is not linked directly to the ones paying. It is a solidarity system meaning that the ones that will need money for renovating their estate in the future they can apply for funding. So they will apply for Scheme A and typically they will get the money. So the first 30 years the rent from the social housing will go to pay the loan from the bank and then they will continue to pay LBF for having money in the future.

How they select the case that will get the money?

The social housing organisation running the estates has to document technical problems. They cannot apply for reasons like: they would like to have new kitchens or new more beautiful facades. They have to document that they have problems with the facades (damaged) or a leaking roof technical problems regarding the building functionality. Then a dialogue usually starts where LBF sets some other requirements also that have to be done during the renovation.

Is Scheme A the first phase of the procedure or is only that?

There are more phases but if you get the Scheme A means that you are allowed to continue for sure.

How the decision is made for renovating an estate? Who makes the decision? Here in Ellebo case they had been already involved in a renovation plan for two years before the competition was launched.

KAB would certainly go to an architect. Well, KAB is an organisation that administrate a lot of social housing associations around in Copenhagen. Each housing association has its owned board and the residents are part of this board and that board is in charge of the

estate. So KAB would perhaps say ok this estate really needs a renovation and they will have a dialogue with the tenants but the initiative has to come from the tenants and it usually comes from them, from each individual housing association/estate.

The residents are in charge, if they do not like it the renovation plan is cancelled. The housing association usually select the architects of their preference or some times they conduct small competitions but in general the architects are selected locally. Sometimes this is a problem because they often go to the small local architecture company because they know them and they are not always good enough. So the result is not so satisfying

In the case of Ellebo the decision process . was very different that the usual. This huge competition took place and of course this was tricky one. When you conduct a so big competition like this one and ensure residents' democracy, having local democracy was challenging. They were involved but they were not part of the jury selected the winner so it is questionable. Residents were not part of this jury and then the housing organisation had to keep going with this winner project and just hope that the residents will like it. This was a challenge because if residents would have said no they had to stop. But here is where LBF plays a crucial role as there are the ones investing a huge amount of money for renovation and they look also at the rent. Sometimes the rent because of the renovation is somehow exploded and here is where LBF will say we cannot charge more this amount of money per month. So if the rent is higher than the local level rent then LBF will cover the difference in order to have the rend cut down to the normal level of the area. So the residents will be told you will have this project the rent will be increased only by this and you will have a renovated apartment, better insulation, a better view etc.

Does the municipality supports financially social housing renovations cases?

The municipality offers a 20% of the money when you built a new building no when you renovating. However the municipality has a financial risk to the area of the original loan that they have offered. They also use time and resources but I do not think if they pay any for the renovation of the estate.

Is Ellebo able to solve the social problems that is expected to solve? Is the architecture design able to solve social problems?

There is a lot of discussion in Denmark about that. How can architecture influence social life? It can of course influence part of it. The goal is to push up hierarchy the social

housing to the local housing market. They want to have people with resources to move in so they have to make the estates well designed becauses the ones that will have the economic potential will choose the better. So architecture has firstly to make the estate attractive.

So if you make the estate more attractive in order to attract wealthier residents or families how you avoid exclusion?

That is what happens everywhere. Vesterbro for example was renews 15-20 years ago before that only burglars etc. could be found at the area but then it was renewed and became extremely popular. As a result the middle class moved in and everybody was very happy but then we started discuss that we have similar problems as we used to have in Vesterbro in other areas of Copenhagen at North West quarter. This is how we actually move the problems all around the city when we renew that a problem really.

But what architects can do, when they renew a social housing estate, in order to solve social problems. They can solve a social problem if they look at it as municipality. They should look and think that they cannot have these island of problems within our municipality. And if we see it in a city framework we cannot have an isolated area in the middle of everything. So you renew it and then you have made some of the problems not to be vanished but be spread around in the city and that could be a goal. If you are aware of what you are doing this could be a strategy/solution in order not to have too many problems together and isolated. But is important to know what the goal is. Is the goal to help an area in order to not be isolated or is the goal to help each individual. These are two different objectives. Renewing an area or an estate means that some groups of people dealing with social issues will probably move around the city they are not going to disappear. They will continue to have the same social problems. We could argue that if we want to solve the social problems and renovate an estate we should educate these people offer them job etc. but then you start looking at the individual. So is clear that there are two different strategies really. In my point of you is really important to keep in mind that as there is a tendency in order to increase the quality of live to move out the small apartments (one room apartments) and combine them in order to create larger ones. So where all these people end up? Usually nobody knows.

Interview – Aalborg University

12th of May 2016- Daniel Pihl/ Phd Fellow at Department of development and planning.

I study Ellebo because the idea was to study a project being ambitious energy wised. They won the Nordic Built Challenge. This was one of the reasons to deal with this project as it was ambitious regarding energy reduction. It is also a social housing project so there is some kind of interactions between the tenants and the professionals. I wanted to see how the tenants are represented in process. I started to follow the progress of the planning process the last september.

The energy engineer of Ramboll, calls himself 'an engineer for everything', he is studious in this case to figure out the energy specifications. He did a note on November where he specified how they should deal with the energy demands and requirements. He was new to the project, he had just started a couple of months before that. They started out with the of a passive house, an idea that the tenants also wanted to have. There is a board of tenants that is close to the project they wanted a passive house standard for a better indoor climate etc. KAB was also pleased with that so they tried to figure out how they could possible get the funding for that.

They got some funding by LBF, but LBF does not supports extra energy wise solutions and requirements. They do not finance extra insulation, better ventilation systems etc. The requirements back then was drawn by the 2010 energy class. So the requirements went down from passive house to low energy house requirements of 2010. So they had to complying with this but later with the competition they stated that they want to try and comply with class 2015 even though it is not mandatory yet. But the the energy engineer noticed that if they could deal with certain energy specifications they could comply both 10, 15 and passive house to some extent. He actually tried to bridge all the different requirements.

At this point they are now, but during the process there are always negotiations. So when he said that the insulation should have a certain thickness they had to negotiate and fine if there was a possibility to implement different insulation on different spots. So they have these negotiations because sometimes the construction itself is more important.

Who are part in these negotiations?

Is mostly an internal process taking place between Ramboll engineers. As move in more details regarding the project and the construction of it the have to be very specific about the solutions. They try to fit in all the different concerns and there are many, facades, drainage, heating etc. Some of these concerns have been at the discussion point for a year now and they are settled somehow and now they do not want to reopen these topics. Sometimes the debate ends up by saying that we are not going to open this discussion again. For example, the structural part is staying as it is. So they have to fit all the other things around it.

Can this project change the existing regimes?

My feeling is that the existing regimes do not change their approaches and they do business as usual. I was going to the meeting with a focus on energy to look for energy concerns. I was looking specifically for see when they are talking about energy solutions etc., how they can do the energy performance as good as possible. But even I spent hours there I did not hear much about energy. When they talk about energy concerns they refer to the Ramboll energy engineer but usually all the talk is about construction concerns mostly, legislations, economy all the other staff that apparently are more important for the project.

One strategy could be that you take on a passive house strategy so you try to develop the house and design the building in order to follow this strategy as possible but it seems that they do not work with this kind of strategy. So I tried to figure out what strategy they follow regarding the energy performance. And it turned out that they do not have a strategy regarding that. There is no doubt that the energy engineer mention all the u values, materials, he also made a specification for the heating recovery regarding the ventilation etc, so he specified everything for the building to help his co-workers to design the building. In this stage they need to know all the small details. The nore was also made for showing to the municipality that the project is compiled to the building regulations but since then it remains still. I have never heard about that. It was on November and by then I have not heard about about any changes.

The problem also right now is that they are really pressured by the time and economy they have to hand in the project in a month or so. I heard them a lot of times to say that if they could have some time or have some more money to investigate the problems and solutions, they would like to start over again the whole energy strategy. Maybe some of these solution could have worked in a different way. If the energy concerns were more upfront the engineer says that he would have been able to suggest other possible solutions in the construction.

Right now the construction design and method is fixed and they have to work on that for the rest and for the energy efficiency issues. They can not change anymore anything regarding construction in order to have better results about energy efficiency.

They approach of the project is similar to other cases. If they had a strategy things might be better but it seems that they never had a strategy. The only thing that it was important to them is to meet the requirements of the building regulation.

I expected to see on this case something extraordinary regarding sustainable development as they aim to have it a show case. Nevertheless, I am not sure that there is any what is your point of view on that?

All come down to the economy at the end. The social housing has a really strict process of funding, they have to stick in this programme and the available funding. Even though the engineers and project managers have ideas about possible better solutions but they always try to fit it with the economy of the project, if it can be afforded and unfortunately the current budget can not afford extras.

What do you know about the LCA that they have conducted and how the results were used?

So we have KAB, Rambøll dealing with the project management and Adam Khan Architects in England but there is also Synergeia. Synergeia is another engineering firm and they are doing the LCA. They made some daylight and indoor climate calculations back in September. LCA is their responsibility and Nordic Built is a joint fund somehow and Synergeia is part of that. So they are doing the job for KAB meaning that Rambøll is not into that. So Rambøll tries to plan it all in detail and make the tender documents for the possible contractors while Synergeia deals with all the energy staff let's

say. Synergeia conducts the LCA and is the one responsible for monitoring the performance of the building. They wanted to monitor as much as possible apartments but the fund was not enough so they had to stay with 5 to 10 apartments. Other institutes are doing the same like Teknologisk Institut, they work cases monitoring before, in between and after the renovation. They also talk with some tenants but no se deeply is about how the tenants have experience their coming into the renovated apartments

What tenants believe about the project?

The tenants voted for one project. I participated to their latest meeting and there were a lot of feeling alerted. Some of them were really against the project while some of the were very supportive. Mixed feelings. One of the tenants was really against as he supported that the tenants never asked for bigger apartments and he could not understand why this project is continued. But this was a decision made by KAB and the municipality. This need it can be seen also in the current trend, we want bigger apartments not because our families are bigger but because we want more square meters per person. Then him and another person also complained that they had now to move out. In the beginning of the project they vote it also because they could stay at their homes during the construction period. One of the tenants complained also about some things during the process. She said that if they had to vote today they would have voted for something else. But other tenants argued that they were informed about everything from the beginning and during the whole process. We have been told about everything in the process and we were aware so it is your own fault if you do not like the project and you can just move out.

Do you think that the project actually achieves to have a holistic approach regarding the sustainable development?

When you have a task like Ellebo renovation is huge and very complex. A lot of risky assignments are taking place and is important to share duties among the professionals. I think the landscape architects are the ones that actually achieve let's say a holistic approach; they aim to create a sharing community, other activities, synergies etc.

Area based intervention?

I think that they are working against that.