SOCIAL EQUITY IN THE DECARBONISATION OF THE EUROPEAN BUILT ENVIRONMENT

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CONTENT

1. ABSTRACT

The purpose of this field scoping is to identify core social equity issues and actors related to the decarbonisation process of the built environment in Europe. This concerns issues of decarbonisation that may reinforce existing social inequalities or enhance social equity in the built environment, as well as social equity issues that may reinforce the decarbonisation process.

The report presents a broad look at social equity in the built environment as well as a closer look at three key themes: Job creation and workforce, housing, and health. Supplementing this is an introduction to key governance dynamics, which influences social (in)equity in the decarbonization of the built environment. Finally, the report identifies generic tools and ways of working that actors can use across the different issues of social equity in the built environment.

The report is written as a scoping review that maps issues of social equity according to relevant media, actors, experts and academic literature. The mapping has been done through two phases. First, an explorative phase, covering as broad a spectrum of issues as possible. And second, a phase that, probes deeper in selected areas.

The report is based on 19 interviews with key stakeholders from across Europe, two focus group interviews, with the groups comprising a total of 13 key stakeholders, as well as desk research of more than 50 reports and articles.

2. EXECUTIVE SUMMARY

In the aftermath of the Corona-pandemic, Europe is starting to rebuild post-Covid economies. This happens amidst a situation of a looming climate crisis and a growing awareness that the social contract of society itself needs to be revisited.

Too often, social sustainability and environmental sustainability have been perceived and handled as two distinct issues. In this report, we argue that we should be focusing on creating a green *and* just transition as one and the same process[1]. Or, to put it more bluntly, there can be no green transition without a just transition. The transition to a sustainable future need to serve and benefit the many – leaving no one behind.

Through the past year's global lockdown, we have all experienced how the buildings and urban settings we live in truly shape our lives, affecting our health and wellbeing. The built environment needs to be part of the change.

The decarbonisation process in Europe will be driven by several initiatives and developments. One key driver is the EU, which in 2019 decided upon a European Green Deal[2]. At national level and in a number of European cities, a just and inclusive transition is also high on the agenda among political stakeholders and civil society actors.

The decarbonisation of the building sector is vital to deliver on the EU's 2030 and 2050 climate and energy objectives, given that buildings are responsible for 40% of total energy consumption and 36% of energy-related greenhouse gas emissions in the EU[3]. On top of that, European states are spending billions on COVID recovery. The EU alone will spend 1.8 trillion Euro to help rebuild a post-COVID-19 Europe[4].

However, efforts on advancing the climate transition so far indicate that doing so may have a negative impact on social equity, if social equity is not addressed as an integrated dimension of the decarbonisation of the built environment. On the positive side, experts also highlight, that the decarbonisation process may actually entail an opportunity to advance social equity in the built environment in Europe, if issues of social equity are identified and addressed alongside decarbonisation. The aim should be to create socially equitable European societies where all citizens, on equal footing influence, shape and have access to a decarbonized built environment.

In this report, we argue that a strong focus on social equity should be informing build back better strategies and the decarbonisation process in the built environment in Europe as a whole. Now is the time to make sure that the decarbonisation of our built environment is just and benefits the many.

[1] United Nations, Transforming our World: The 2030 Agenda for Sustainable Development, A/RES/70/1. European Commission (2019), Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee for the Regions – The European Green Deal.

[2] https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en.

[3] European Commission (2021), Inception Impact Assessment, Revision of the Energy Performance of Buildings Directive 2010/31/EU.

[4] Recovery plan for Europe (www.ec.europa.eu/info/strategy/recovery-plan-europe_en).

The study identifies a number of themes of social equity in the built environment. Out of these, the study deep dives into three selected themes: 1. Job creation and workforce, 2. Housing and 3. Health. The study identifies and describes both positive and negative likely outcomes of the decarbonisation process in terms of social equity within the three themes.

Looking at the field as a whole, one of the key findings in this study is that there is no single "field of social equity in the built environment". Currently, actors are working alongside each other concerned with specific issues that touch upon one another, but they lack a common understanding and conceptual language to describe the field of social equity in the built environment. There is no strong knowledge or evidence base. Rather, knowledge of key issues exists without being linked conceptually.

In order to remedy this situation – and to advance social equity in the built environment - the study also identifies three drivers of change that cut across all themes and subthemes covered in this report. These drivers of change are:

- *Development of a common language, awareness and knowledge base:* A key driver for change would be the building of a common language and facilitating a common understanding of the key challenges and issues at stake. This concerns something more than the coordination between stakeholders and initiatives, but rather a common approach to the field.

- *A holistic and inclusive approach to decarbonising the built environment:* A social equity lens has to be systematically integrated across the full lifecycle of the building in the decarbonisation process: From the decision making to the design, planning, building, renovating and tearing down of the building. Also, the decision making process has to be inclusive, i.e. it has to engage and place citizens at the heart of the design, and explore and take into account the different needs and preferences of different citizen groups, across gender, age groups, ethnicity etc.

- *Multi-stakeholder collaboration and commitment:* There is a need for strong multi-stakeholder collaboration and commitment to ensure that social equity is considered, driven and implemented as part of the decarbonisation process. As the built environment is characterised by multilayer and multidimensional decision-making processes, this requires a number of different tools depending on stakeholders, sectors and the character of the intervention.

Because of the lack of coherence in the field of social equity in the built environment, the present field scoping cannot be seen as a final mapping of the field, but rather provides a first scoping of key issues and actors related to the decarbonisation process, which invites further knowledge building and research.

3. INTRODUCTION

3.1 Purpose of the field scoping

Laudes Foundation has asked Ramboll to undertake a field study of key issues and actors relating to social and gender issues in the built environment. The purpose of this field scoping is to identify core social equity issues related to the decarbonisation process of the built environment in Europe. This concerns issues of decarbonisation that may reinforce existing social inequalities (or, conversely, enhance social equity in the built environment), as well as social equity issues that may reinforce the decarbonisation process.

In this report, we present a broad look at social equity in the built environment as well as a closer look at three key themes: Job creation and workforce, housing, and health supplemented by an introduction to key governance dynamics. Finally, we identify generic tools and ways of working that actors can use across the different issues of social equity in the built environment.

3.2 Definitions used in the field scoping

In the field scoping, we understand the decarbonisation process as the process of removing or reducing greenhouse gas emissions across the lifecycle of buildings. We focus specifically on buildings and everything that affects the process of decarbonisation in relation to them, from the production of materials, planning, financing and construction of buildings, to using and dismantling buildings. Along with the urban planning and urban renovation processes, insofar as we find these to be decisive as the framework for decarbonizing and planning the buildings.

In our understanding of social equity, we mirror The American Planning Association which defines social equity as "just and fair inclusion into a society in which all can participate, prosper, and reach their full potential…"[5]. We understand social equity as related to a broad range of inequity dimensions in the built environment, e.g. socio-economic status, gender, age, race/ethnicity, disability, sexual orientation etc.

3.3 Methodology

We have approached the assignment as a scoping review, where we have mapped issues of social equity according to relevant media, actors, experts and academic literature. The mapping has been done through two phases. First, an explorative phase, where we covered as broad a spectrum of issues as possible. And second, a phase where we have probed deeper into selected areas. As part of this phase, data was analysed, and two focus group interviews conducted in order to validate hypotheses and explore further knowledge. Finally, knowledge has been summarised in this report.

The report is based on 19 interviews with key stake holders from across Europe, two focus group interviews, with the groups comprising a total of 13 key stakeholders, as well as desk research of more than 50 reports and articles. The methodology and data material are described in detail in chapter 6.

[5] American Planning Association (www.planning.org/knowledgebase/equity/).

4. MAPPING THE FIELD

4.1 The importance of social equity in the decarbonisation of the built environment

We find several different arguments in the literature and among the interviewed experts that underscore the importance of working with social equity as an integrated and crucial dimension of the decarbonisation of the built environment. Key arguments are:

Firstly, knowledge indicates that the needs, interests, and resources of all social groups are not equally integrated in policy and decision making in the built environment.[6] Governance processes related to the decarbonisation of the built environment are generally described as not sufficiently inclusive. The point being that, as decision making and planning of the built environment are not inclusive, the shaping and outcome of the built environment will not be socially equitable and just.

A second aspect concerns the risk of further polarisation of society, for instance through so-called renovictions. The risk being that energy renovations will push less fortunate groups out of their homes. This may further increase gentrification processes observed in many European countries. Groups may also be pushed out of city centers and into peripheral or rual areas. The same argument applies for the theme of energy poverty, which is not included in this report.

A third argument concerns the rights of vulnerable groups on the job market and in the housing sector. The argument is, that groups that are not well integrated at the job market and in the housing sector – especially migrant workers – do not enjoy the same protection as others. More and more people have become migrant workers in Europe, and the decarbonsation process may even further exacerbate this situation.

In a wider perspective, it is important not to widen the gap between groups of society, but to use the power of the decarbonisation process for a greater good.

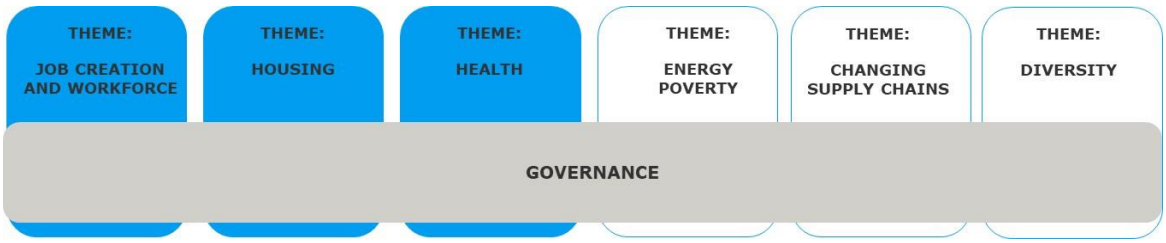
4.2 Themes of social equity in the decarbonisation of the built environment

The field scoping has identified relevant social equity issues which cover a very broad, thematic range. This is illustrated conceptually in figure 1 below, where key social equity issues are presented. The model illustrates the emerging field of social equity in the built environment. The key issues are: Job creation and workforce, Affordable housing, Health, Energy poverty, Changing supply chains and Diversity.

Boxes marked with blue are the key issues of social equity selected for deep dives of the field scoping. These issues will be described in further detail in the following sections of this report.

[6] Schildler, S. (2015) Architectural Exclusion: Discrimination and Segregation Through Physical Design of the Built Environment. In: The Yale Law Journal. 124, pp. 1934; Institute for Human Rights and Business (2019). Dignity by Design: Human Rights and the Built Environment Lifecycle. Accessed at: https://www.ihrb.org/focus-areas/builtenvironment/report-dignity-by-design-human-rights-and-the-built-environment-lifecycle; National Housing Association (2015). Equality, Diversity and inclusion: An insight review of housing. Accessed at: https://www.housing.org.uk/resources/equality-diversity-and-inclusion-in-housing-association-staff-in-england-our-full-report/

Figure 1 –Social equity in the decarbonisation of the built environment



Boxes marked with white contain other issues that have been identified in the inception phase, but that have not been selected for deep dives and further knowledge collection. These are:

- Energy poverty: Energy poverty is defined as a situation in which a person has difficulty obtaining the necessary energy in their home to meet their basic needs because of inadequate resources or living conditions[7]. Energy poverty results from a combination of low income, high expenditure of disposable income on energy and poor energy efficiency, especially as regards the performance of buildings[8]. Energy poverty has been recognised by the EU.
- Changing supply chains: Supply chains are changing for a number of reasons. One being sustainable procurement, which is a growing trend that is moving alongside other developments in the built environment. Sustainable procurement addresses the triple bottom line. The environmental part of sustainable procurement is a tool to mitigate the over-exploitation of scarce resources. However, sustainable procurement also reflects broader goals of social responsibility, such as inclusiveness, equality, international labor standards and diversity targets.
- Diversity: it is well documented that the built environment lacks diversity, not least with regard to gender equality. This is noted across sectors such as construction, engineering, architecture, finance etc. [9]. Lack of gender equality also applies to the workforce, where a tradition for male dominance do not support gender equality. Evidence of how and to what extent this trend is specifically related to (i.e. either enhanced or reduced by) the decarbonisation process is lacking and needs to be explored through further research.

Governance is seen as setting the framework for how social equity and inequity are shaped in the decarbonisation of the built environment, through the interactions and decision making between key stakeholders. Governance is described at the end of this report as an issue cutting across all dimensions of social equity in the decarbonisation of the built environment.

Below, we present each of the three key issues selected for deep dives. Based on an initial framing of the issue, key subthemes are described, representing either positive or negative aspects of social equity in the built environment. Subsequently, key drivers for change are presented along with a deep dive case which illustrates core dynamics of the issues.

[7] The French Grenelle II Act defines energy poverty as a situation in which a person has difficulty obtaining the necessary energy in their home to meet their basic needs because of inadequate resources or living conditions. Source: European Commission (2014). Possible approach to define energy poverty: Inability to keep home adequately warm.

[8] European Commission (2019): Energy poverty in the EU.

[9] IHRB: Dignity by Design - Human rights and the built environment lifecycle, 2019; National Housing Association: "Equality, Diversity and inclusion: An insight review of housing", 2015

4.3 A closer look at the equity dimension of job creation and workforce

Framing the issue

The equity dimension of job creation and workforce is important as the construction sector is the leading industrial employer in Europe, representing 7.5% of total European employment[10]. Approximately 15 million workers are directly employed in the European construction sector[11].

The decarbonisation process in Europe is expected to lead to a net job creation. This expectation is found in the literature study as well as among the experts who were interviewed[12]. A circular construction sector is one way of achieving decarbonisation. Circular production methods mean that the production process is likely to change towards reducing the amount of virgin resources used, as well as the amount of waste created, during the entire life cycle, through reuse, recycling or remanufacturing[13]. On a larger scale, this will lead to a change in supply chains towards more locally based reproduction and recycling. Circularity is also likely to shift jobs from material-intensive industries towards other types of jobs that may be locally based. This may lead to both positive and negative benefits to existing and future employees - depending on, for instance, investments in upskilling.

Taking this as an outset, the questions then becomes which jobs will be created, where, and who gets access to them? It is widely acknowledged that the construction sector across Europe lacks gender balance[14], especially in blue-collar jobs and in management. Also, there are well-known health and safety issues in the construction sector in Europe[15]. We acknowledge these existing and well-known imbalances. However, diving into specific social equity issues related to decarbonisation, we aim to move further in order to identify other aspects of social equity in relation to job creation and the workforce.

From this perspective, we identify two main sub-issues of job creation and the workforce[16].

Subthemes

Subtheme 1: Unknown job quality and possible skill mis match

While the renovation wave and circular economic models of construction are expected to create jobs[17], the questions remain: What kind of jobs, who gets them, what skills do they require and what quality will they have? To ensure a just transition, it is essential to consider elements such as job quality, job security, labour rights and inequalities pertaining to social aspects. It is also important to consider whether there will be a skill mismatch at the job market. What does a just transition look like in the built environment?

A recent review of existing studies by OECD concludes that the knowledge base is, as yet, not sufficiently developed to answer these questions[18]. However, there is consensus among the experts interviewed in this field scoping, that a just transition will depend on existing, national regulation and policies. Ideally, a just transition will be based on principles established through broad dialogue. This chapter features an example of public procurement principles in Oslo,

[10] European Federation of Building and Woodworkers (www.efbww.eu).

[11] Ibid.

[12] Impacts of circular economy policies on the labour market, final report (2018), Cambridge Econometrics, Trinomics, and ICF for the European Comission.

[13] https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en.

[14] Institute for Human Rights and Business, Dignity by Design: Human Rights and the Built Environment Lifecycle (2019).

[15] World Green Building Council (2020), Health and Wellbeing Framework.

[16] The subthemes have been identified through interviews and focus group interviews documented in the appendix.

[17] International Energy Agency (2020), Sustainable Recovery. Horbach et al (2015), Circular Economy and Employment.

[18] Laubinger et al (2020), LABOUR MARKET CONSEQUENCES OF A TRANSITION TO A CIRCULAR ECONOMY: A REVIEW PAPER – ENVIRONMENT WORKING R N°162, OECD.

Norway. The Oslo model aims to improve conditions for workers and is established through a dialogue between the city, unions and companies (see the Oslo Model on page 12).

Subtheme 2: Vulnerable groups, especially migrant workers, need strong protection
With an increase in construction activity in Europe, the number of migrant workers in Europe is likely to increase too. Migrant workers are reported by several respondents to be a particularly vulnerable group on the job market of the construction sector in Europe. This is also acknowledged by the Institute for Human Rights and Business[19]. Generally, migrant workers (non-European descent) are overrepresented in low-qualified job areas, including the construction sector[20]. The international Labour Organisation reports that 33 mio. labour migrants are currently working in the EU[21]. They account for 17% of the entire EU labour force and the number of migrant workers in Europe has increased 20% over the past 5 years. Some respondents state that globalisation is undermining labour rights, as these are not enforced as strictly when it comes to migrant workers. This calls for stronger protection of these groups. Throughout the world, migrants have a higher labour force participation rate than non-migrants, showing that labour migrants go where the jobs are in order to fill labour shortages. The difference is particularly high in Northern, Western, and Southern Europe (72% for migrants vs. 55% for non-migrants)[22].

Visions and future potentials
There is agreement among the experts interviewed in this report that the decarbonisation process provides an opportunity to rethink the incentive structure of the built environment with a greater emphasis on social equity. However, it is also stressed that greater social equity depends on the will to create new institutional investments and to put regulatory policies in place. Regulatory policies should ensure a strong enforcement of labour regulations – also for migrant workers – and institutional investments should enhance the incentives for the construction sector to treat workers decently.

The construction sector, along with its supply chain of building material manufacturers, is not known to be an innovative sector and the majority of companies in the construction sector mainly compete on price. For this reason, a major driver of change is public regulation, installing the appropriate incentive structures for decent work conditions like, for instance, ensuring health and safety at the workplace and ensuring that minimum wages are observed along with other basic labour rights.

There is a potential in identifying, showcasing and, possibly, scaling the numerous small projects in European cities that do exist today and that point in the direction of a more just and net zero future. This could be done by providing better opportunities to experiment between the actors in designated sand boxes and show casing processes and results.

[19] Institute for Human Rights and Business, Dignity by Design: Human Rights and the Built Environment Lifecycle (2019).
[20] Eurostat (2019), Statistics on migration to Europe.
[21] International Labor Organisation (2020), Fair employment conditions for migrant workers in the EU – How to provide better support services for migrants? (article at www.ilo.org).
[22] International Labor Organisation (2020), Fair employment conditions for migrant workers in the EU – How to provide better support services for migrants? (article at www.ilo.org).

Drivers for and obstacles to change

Below we provide an overview of possible remedies for change.

DRIVERS FOR CHANGE			
Policy	**Finance**	**Business**	**Community and end users**
Labour policies and mitigating policies at national level. Mitigating policies and funding at EU level, e.g. through the Just Transition Mechanism	Adoption of internationally recognised social equity standards, for instance for practice and reporting through aligning with the SDGs or UN Global Compact	Adoption of internationally recognised social equity standards, for instance for practice and reporting through aligning with the SDGs or UN Global Compact	Organising around social equity dimensions of work. Using existing participation and advocacy platforms, for instance trade unions.
OBSTACLES TO CHANGE			
Policy	**Finance**	**Business**	**Community and end users**
Loopholes in policy regulation that can be exploited. Business models undermining labour rights. For instance, business models where workers are not employed by the company, but self-employed.	Cultural blind spots to social equity. Failure to demand alignment with internationally recognised social equity standards from sub-contractors.	Cultural blind spots to social equity. Failure to demand alignment with internationally recognised social equity standards from recipients of finance.	Failure to use existing participation and advocacy platforms.

Examples of actors

Policy makers	Finance	Business	Communities	Foundations
United Nations, Global Compact European Union, Agency for Fundamental Rights European Union, The European Labour Authority Lead cities such as Rotterdam, Amsterdam and Oslo	Bankers without Borders Just Transition Fund The European Investment Bank	Companies participating in the UN Global Compact (more than 6.000 across Europe) Companies participating in ethical trade alliances and partnerships such as the Ethical Trading Initiative Companies with an ISO 26000:2100 certificate	None identified	Ellen Macarthur Foundation Goldschmeding Foundation Ikea Foundation

THE OSLO MODEL – Contract terms for the Municipality of Oslo's procurement of goods, services, building and construction

The Oslo model protects workers against social dumping and describes how public authorities can make demands on the working conditions to which construction workers are subjected. It has been prepared in collaboration with several stakeholders in the field, including trade unions and construction companies. The models show how much power public authorities may exercise through procurement. Oslo spends 3,5 billion Euro annually on construction projects. In this context, the municipality uses its great monetary power to change the conditions that contractors offer their employees and subcontractors.

The model consists of basic guidelines across:
- Requirements for forms of employment
- Requirements for proper wages
- Requirements for the use of apprentices
- Reduction of links in the vertical supply chain
- Certifications
- Security checks and protocols.

The Municipality of Oslo believes that increased skills ensure a better quality of work and improves conditions in general. One of the aims of the Oslo model is to ensure that workers increase their professional competences while working for the city. 170 municipalities in Norway have endorsed guidelines for reducing social dumping and promoting good working conditions. Oslo has the strictest requirements.

Source: Oslo Kommune (webpage article: www.oslo.kommune.no)

4.4 A closer look at the equity dimension of housing

Framing the issue

Across European societies, housing is on the political agenda[23]. The housing question is at the heart of the growing social divide in most European societies. While accessing and sustaining decent accommodation is primarily an issue for low-income groups, more and more people are affected by the lack of affordable housing, particularly in big cities[24]. Furthermore, the current COVID-19 pandemic has exacerbated housing insecurity, household over-indebtedness, and risk of homelessness[25].

Housing is an issue which is dealt with at international, national and local level, but where solutions need to be tailormade at local level. Cities are therefore considered to be at the forefront of dealing with housing challenges, and initiatives on a national and European level are intertwined with the local dimension[26]. It is argued by some researchers that sustainable housing strategies at local level require increasingly complex ways of thinking, as the provision of housing is often *not* the answer alone. The answer is, instead, an integrated and holistic approach considering e.g. social mix, transportation as well as educational- and health facilities[27]. This means that work focusing on the built environment will benefit from considering and factoring into the work, how the built environment is influenced by - and influences - other aspects.

The issue of affordable housing may be exacerbated by decarbonisation, as some researchers argue that as cities turn climate-friendly and a low-carbon lifestyle becomes increasingly desirable, more middle- and upper-class urban residents move from suburbs to the inner city areas – near public transport, with bike- and pedestrian-friendly streets and to higher-density mixed-use areas[28]. This drives up property values in neighbourhoods offering these amenities, thereby displacing lower-income residents that do not have the means to live in urban areas. This is a classic phenomenon known as *gentrification*, which is a process of changing the character of a neighbourhood through the influx of more affluent residents and businesses.

Decarbonisation and focus on housing on a local, national and European level will impact the built environment and housing in terms of planning, renovation, and construction. Thus, the process of decarbonising in the built environment offers an opportunity to address social equity within the housing sector. However, a thorough understanding and inclusion of social equity issues in the process, in terms of planning, renovation and construction, are of paramount importance to ensure a just transition and social equity.

Below, we list the main social subthemes identified for the built environment in relation to housing.

Subthemes

Subtheme 1: Lack of affordability

On a general level, lack of affordable housing is becoming an increasing problem in the EU. This has been exacerbated by steadily rising housing prices and rents relative to incomes over the

[23] Alice Pittini, Julien Dijol, Dara Turnbull and Mariel Whelan (2019). The State Of Housing In The EU 2019, Housing Europe, the European Federation of Public, Cooperative and Social Housing.

[24] Ibid.

[25] European CLT Policy Paper: Community Land Trusts: Building Common Ground Across Europe, Policy Paper. Interreg North-Western Europe, The Sustainable Housing for Inclusive and Cohesive Cities, 2020.

[26] Alice Pittini, Julien Dijol, Dara Turnbull and Mariel Whelan (2019). The State Of Housing In The EU 2019, Housing Europe, the European Federation of Public, Cooperative and Social Housing.

[27] Ibid.

[28] Jennifer L. rice, DanieL aLDana cohen, Joshua Long and Jason r. JurJevich (2020). Contradictions of the Climate-Friendly City: New Perspectives on Eco-Gentrification and Housing Justice, International Journal of Urban and Regional Research, DOI:10.1111/1468-2427.12740.

years[29]. Decarbonisation in the built environment requires upfront investments, which is more challenging for low-income households, and can have negative impacts on the affordability of housing through increased rents. This may also lead to so called 'renovictions´ understood as the eviction of all of a building´s tenants on the grounds that a large-scale renovation is planned[30]. Therefore, options need to be carefully designed and backed by financing and other support measures, to minimise such negative impacts and keep the cost balance neutral for residents[31].

The affordability crisis is more distinct for low-income groups, including e.g. women and migrants with below-average incomes in general[32,33]. Thus, social equity issues need to be addressed and integrated in planning, renovation and construction in the housing sector, to ensure social equity.

Subtheme 2: Community mobilisation as a lever for socially inclusive and accessible housing
It is argued that the Community Land Trusts (CLT) model[34] enables tenure security in cities across Europe, especially for the most vulnerable households at risk of eviction or unable to access traditional housing markets[35]. The CLT model represents a wider portfolio of solutions to tackle the housing crisis in relation to e.g. access to housing for low-income groups. If the CLT model can ensure access to affordable housing, it is a potential driver of change for decarbonisation, as low-income groups can own their houses and will benefit in the long term from, for example, investment in energy renovation.

We will describe the case of Community Land Trust Brussels (CLTB) thoroughly at the end of the housing theme, demonstrating the CLT model and how CLTB addresses "net-zero" housing developments.

Subtheme 3: Social imbalances in the access to energy renovations
Decarbonisation and the green renovation wave have several social implications in terms of lack of access to energy renovations. This is due to upfront investments, scepticism towards energy renovations, and reinforcement of energy poverty among low-income groups.

A study conducted and publicized by the European Commission sums up that the financial aspect is of consistent relevance as a potential trigger, driver, barrier, and incentive for energy renovation[36]. Upfront investments are necessary for energy renovation. Byr definition, increased costs disproportionally affect lower-income consumers. Thus, low-income consumers may, to a higher extent, lack access to energy renovation, as they lack the financial resources to pay for renewables.

The same study furthermore reports that low-income consumers are more sceptical towards energy renovations and the trustworthiness of building professionals, and that they more

[29] European Parliament*:* Parliament calls for action to solve housing crisis, article, 2021, 20210114STO95643
[30] European Commission (2021): Inception Impact Assessment, Revision of the Energy Performance of Buildings Directive 2010/31/EU
[31] Ibid.
[32] European Commission (2020)*:* Equal Pay? Time to close the gap.
[33] Eurostat (2021): Migrant integration statistics - at risk of poverty and social exclusion.
[34] CLT are non-profit and democratic organisations. They develop and manage homes affordable to low and medium-income households, as well as other assets contributing to thriving local communities. They act as long-term stewards of these assets, ensuring they remain permanently affordable. This is achieved through mechanisms – such as the dissociation between the land and the building ownership, or the implementation of a resale formula – enabling that any additional value generated is retained within the CLT. Source: European CLT Policy Paper: Community Land Trusts: Building Common Ground Across Europe, Policy Paper. Interreg North-Western Europe, The Sustainable Housing for Inclusive and Cohesive Cities, 2020.
[35] European CLT Policy Paper: Community Land Trusts: Building Common Ground Across Europe, Policy Paper. Interreg North-Western Europe, The Sustainable Housing for Inclusive and Cohesive Cities, 2020.
[36] Andreas Hermelink, Sven Schimschar, Markus Offermann, Ashok John, Marco Reiser, Alexander Pohl, Jan Grözinger (2019): Comprehensive study of building energy renovation activities and the uptake of nearly zero-energy buildings in the EU, European Commission, European Union, November 2019

frequently experience administrative and regulatory barriers to invest in energy renovations in comparison with higher income groups[37]. This potentially reduces the willingness of lower income groups to make a short-term investment in renewable energy sources. The study does not explain exactly why this is the case. However, it is noted that the uptake of energy renovations is a result of a complex interplay between drivers, barriers and incentives and that tailor-made policy instruments are needed to address different sub groups in terms of landlords, tenants, owners as well as age groups, income levels, private and public investors etc., to push decarbonisation forward in building renovations[38].

These factors may reinforce the issue of energy poverty defined as a situation in which a person has difficulty obtaining the necessary energy in their home to meet their basic needs because of inadequate resources or living conditions[39]. Energy poverty results from a combination of low income, high expenditure of disposable income on energy and poor energy efficiency, especially as regards the performance of buildings[40].

Nearly zero-energy buildings are expected to become cost-optimal once they are gaining market shares across Europe. The long-term financial gains of energy renovation are expected to exceed the costs, and energy renovation may also improve health (cf. chapter 2.4) and comfortability for consumers[41]. Thus, the social implications of lack of energy renovation among the low-income groups are potentially severe. As stated in a United Nation report: "(…) to overcome resistance to carbon pricing and ensuring that strong coalitions emerge in support of such policies, we must emphasize the co-benefits – for instance the fact that carbon pricing could potentially reduce air pollution – and address any socially regressive impacts". This is supported in our conducted focus groups, where an expert stated that "we need to explain the health benefits [of energy renovation] but we also need policy incentives to do it in homes that needs it the most".

Investments in energy renovation programmes in social housing are examples of initiatives that improve the climate impact of housing *and* ensure a better social balance. In Denmark, for instance, a broad political agreement on investments in energy renovation was agreed upon in 2020 to improve Danish public housing[42]. Government-run projects such as the "Habiter Mieux" programme in France (the case in chapter 2.4) and the "Better Energy Warmer Homes" initiative in Ireland provide grants and loans to improve the energy efficiency of low-income households. In Ireland, more than 130.000 low-income homeowners have benefitted from the initiative since 2001 and in France 83 percent of participating households reported that they could not have invested in the energy efficiency improvements without the programme[43].

These examples demonstrate that specific initiatives can support social equity in relation to energy renovation. In this process, governments seeking to adopt e.g. carbon pricing should ensure political legitimacy by shielding low-income households from regressive impacts of energy renovations. This can be done through subsidies, grants and tax reforms, or by making public investments, such as in public transportation infrastructure, that facilitate lifestyle changes towards carbon-neutrality and makes adaptations affordable.

[37] Ibid.: p. 57

[38] Ibid: p. 84-85

[39] The French Grenelle II" Act defines energy poverty as a situation in which a person has difficulty obtaining the necessary energy in their home to meet their basic needs because of inadequate resources or living conditions. Source: European Commission (2014). Possible approach to define energy poverty: Inability to keep home adequately warm.

[40] European Commission (2019): Energy poverty in the EU.

[41] Andreas Hermelink, Sven Schimschar, Markus Offermann, Ashok John, Marco Reiser, Alexander Pohl, Jan Grözinger (2019): Comprehensive study of building energy renovation activities and the uptake of nearly zero-energy buildings in the EU, European Commission, European Union, November 2019

[42] State of Green (2020): Denmark pushes billion euro investments for greener public housing, May 20, 2020.

[43] Note by the Secretary-General, United Nations (2020): Extreme poverty and human rights, A/75/181/Rev.1, 7 October 2020

To ensure a just transition and social equity in the housing sector, several interviewed persons recommend moving away from business cases focusing on financial incentives alone. Business cases, as well as other types of studies, policy programmes and measures should include a broader perspective on e.g. social and health issues, and clarify the life cycle costs (and benefits) of energy renovation for stakeholders on a macro (society, including finance and business sector) and micro (individual and community) level.

In this respect it is important to distinguish between characteristics of low-income groups. Some groups are more marginalised than others in terms of e.g. income level, social network, and language barriers. In the conducted focus groups, migrants were emphasised as a marginalised group in general, that often is overlooked in terms of policy initiatives aiming to increase social equity, e.g. social housing. However, if visions and potentials of social equity within housing are to be fulfilled, initiatives in this respect need to include the most marginalised groups in decision making, planning, construction and as end users, to ensure equal access to decent housing for all (see also section on governance).

Drivers for and obstacles to change

Below, we provide an overview of possible divers for and obstacles to change.

DRIVERS FOR CHANGE			
Policy	**Finance**	**Business**	**Community and end users**
Socially fair decarbonising measures through e.g. grants, subsidies and tax reforms favourable for low-income consumers. Transparency of policy measures and their implications for social and gender equity. Requirement for energy labelling and certificates which document environmental and social sustainability. Data driven policy targets and programmes. Publicly available status updates on progress towards targets. Public investments in decarbonisation which mitigates negative social impacts increases legitimacy among citizens.	Green and social funding from e.g. the Just Transition Fund to drive changes. Innovative financial schemes promoting socially inclusive financing of decarbonisation (e.g. public/private financing) Reduction of energy costs for all residents – renters as well as owners.	Price reductions in renewable energy sources and reduced costs of energy renovation programmes and investments. Development of technical solutions and innovations making decarbonised housing and energy renovations affordable for all	Local housing initiatives such as Community Land Trusts and London Older Lesbian Cohousing. Local community advocating for socially just decarbonisation measures. Training and raising awareness of benefits of decarbonisation (e.g. energy renovations) for all groups.
OBSTACLES TO CHANGE			
Policy	**Finance**	**Business**	**Community and end users**
A narrow focus on financial business cases and benefits of decarbonisation. Lack of awareness, data and feedback loops on the social	No or low incentive to act. In some cases economic incentives for renovictions.	Low incentives for ensuring social equity in construction, renovation and technical innovation.	Lack of inclusion of the most marginalised groups in decision making.

inequalities following from or being exacerbated by the decarbonisation of the housing sector. Lack of political will to ensure socially mitigating measures and a mix of housing in cities.	Lack of awareness of social inequities arising from the decarbonisation of the built environment.	Lack of awareness of social equity issues following from decarbonising the built environment.	Lack of measures addressing the most marginalised groups as beneficiaries.

Examples of actors

Policy	Finance	Business	Community	Foundations
European Commission European Environment Agency Lead cities, e.g. Vienna, Brussels	European Bank for Reconstruction and Development Just Transition Fund Large pension funds	Social housing organisations of Europe Construction compagnies such as Ramboll, SKANSKA etc. Business members of Association for Environment Conscious Building: https://www.aecb.net/directory-members/	International Federation for Housing and Planning World Green Building Council UK Green Building Council C40 Eurofound URBACT Nordic Council of Ministers AECB (Association for Environment Conscious Buildin	Abbe Pierre Foundation Realdania European Climate organisation Velux Foundation Fondation de France The Oak Foundation

THE CASE OF COMMUNITY LAND TRUST BRUSSELS, BELGIUM

The city of Brussels is incredibly diverse and approximately 62 percent of the population is not of Belgian descent. The city also has a large wealth gap between rich and poor, with a significant percentage of new immigrants experiencing poverty. As the region is going through significant demographic growth and seeing an increase in demand for low-cost housing, its "social housing" stock (i.e., public housing or publicly subsidized housing) has declined causing an affordable housing crisis in the city.

The Brussels Community Land Trust (CLTB) was established in 2012 to address rising social inequities in the region because of high housing costs, and to offer a different model for delivering social housing for the lowest income households.

CLTB focuses on providing affordable housing for the most at-risk populations in the Capital region, such as low-income people, immigrants, single mothers, and other groups that have been discriminated against in the housing market.

CLTB develops permanently affordable housing and it uses a resale formula that allows CLT homeowners to build equity through homeownership. The CLT owner receives 25 percent of the appreciated value at resale and CLTB receives 6 percent or €3000, whichever is highest, to cover operational costs. The new income-qualified buyer pays the initial price plus 31 percent, and 69 percent of the value of the property is captured in the permanently preserved land. CLT homeowners also pay €120 annually for a 50-year ground lease to the land, which supports the administration of the CLT. CLTB also provides financial assistance to prospective homebuyers, to help them plan and develop savings for a down payment on a CLT home.

CLTB is building energy efficient "net-zero" housing developments that conform to sustainability requirements established by the Brussels-Capital Region. Net-zero housing uses a lot of technology and homeowners require training on how to use and maintain those technologies. It also increases the cost to build housing. As a result, CLTB must raise additional funds and provide training and assistance to its residents to ensure the long-term sustainability of its housing developments. Several CLTB projects are incorporating other green design features, such as green roofs, public gardens, and other community spaces to enhance both the environmental and social benefits delivered by the development. CLTB is also looking to expand its sustainability initiatives in terms of both energy and transportation.

In future projects, CLBT is looking to incorporate local energy cooperatives, leverage incentives to build renewable-energy powered housing, and shift development and mobility patterns to enhance access to transit, biking, and walking. It is working with municipal regulators to reduce per-unit parking requirements and to establish parking cooperatives to allow residents to rent parking spaces to generate an income stream.

Source: https://www.adaptationclearinghouse.org/resources/community-land-trust-brussels-belgium.html and https://cltb.be/en/

4.5 A closer look at the equity dimension of health

Framing the issue

On a general level, a strong, directly measurable effect of the built environment on both physical and mental health is well documented. A systematic review of 39 studies published in 2019 concludes that there is a strong association between health and, for example, adequate heating and ventilation. The study also finds that prioritisation of housing for vulnerable groups is correlated with improved well-being.[44]

The COVID-19 pandemic has, furthermore, demonstrated the negative impacts of unhealthy indoor environments, leading to a growing awareness of the importance of the built environment for mental and physical health[45]. It has been clear that these negative impacts primarily affect renters and citizens with low income, who are more likely to live in low-quality housing with less access to green areas (see also the social equity issue of housing, paragraph 2.3). By low quality housing we mean housing in poor physical conditions, as well as deprived social and physical surroundings.

This growing focus on health in the built environment may help to drive changes in how the built environment is constructed, renovated, and planned. This can also affect how the decarbonisation of the built environment is shaped through a stronger awareness of health outcomes: For example, decarbonisation brings along a massive wave of green renovations and retrofitting of buildings - such as electrification of buildings, district energy systems and renewable energy heating, to name a few.[46] These renovations can have various implications – both negative and positive - for the health of residents and workers constructing the buildings and a stronger focus and awareness on such implications may enhance social equity. On the other hand, the decarbonisation may also entail changes that – without mitigating efforts - reinforce existing health inequities.

Below, we have listed the main subthemes identified as part of the field scoping, some of which are closely related to subthemes mapped as part of the housing issue (paragraph 2.3). As knowledge in the field is scarce, we have included knowledge from outside Europe, mainly the United States, to the extent that such knowledge is seen to be transferrable to European context.

Subthemes

Subtheme 1: Decarbonising of buildings and urban areas leads to healthier built environment

On the positive side, in low-income housing, green renovations have been shown to improve health significantly. One example is from Minnesota in 2006-2008, where an improvement of ventilation was conducted in affordable housing. The improved air quality led to a significant improvement in overall health.[47]

Also, at the urban level, studies show that decarbonising cities by creating urban green spaces improves both mental and physical health. Several of these studies were summarised in a report

[44]Ige, J., Pilkington, P., Orme, J., Williams, B., Prestwood, E., Black, D., Carmichael, L., and Scally G. (2019). The relationship between buildings and health: a systematic review, *Journal of Public Health*, Volume 41, Issue 2, June 2019, Pages e121–e132. Retrieved from https://academic.oup.com/jpubhealth/article/41/2/e121/5076115

[45]Forbes Magazine (8/6/2020): "Why Covid-19 raises the stakes for healthy buildings" Retrieved at https://www.forbes.com/sites/hbsworkingknowledge/2020/06/08/why-covid-19-raises-the-stakes-for-healthy-buildings/?sh=3529422824cd

[46]Naimoli, S. (2020). Decarbonizing the Built Environment. *CSIS Climate Solution Series.* Retrieved from https://csis-website-prod.s3.amazonaws.com/s3fs-public/publication/201130_Naimoli_Climate_Solution_Series_Decarbonizing_Built_Environment.pdf

[47]Breysse, J., Jacobs, D. E., Weber, W., Dixon, S., Kawecki, C., Aceti, S., & Lopez, J. (2011). Health outcomes and green renovation of affordable housing. *Public health reports (Washington, D.C.: 1974)*, *126 Suppl 1*, 64–75. doi: 10.1177/00333549111260S110

by the WHO in 2016.[48] The report depicts the mechanisms whereby living in urban green (decarbonised) areas may lead to improved health: Among others, stress alleviation and psychological relaxation lead to improvements in mental health. Increased physical activity and reduced exposure to air pollutants are also examples of mechanisms leading to improvements in physical health. Besides these direct effects, the report includes studies showing that urban green spaces lead to more perceived social cohesion in the neighbourhood, which is also shown to improve health. Similar results have been found in a study from the US, indicating that both quantity and quality of greenspace in residential areas are positively correlated with health, and that this effect comes from less stress and more social cohesion.[49]

Subtheme 2: Access to healthier and decarbonised buildings may be socially imbalanced – but negative impacts may be mitigated

On the negative side, stakeholders widely express a concern that access to decarbonised and healthier buildings is socially imbalanced (see also the issue of housing, paragraph 2.3). A meta study from 2020 includes studies from both Europe and the US which have estimated a "green" premium on both rental rates and sales prices, implying higher costs for residents and potentially pushing out low-income citizens. In the European studies, the EPC certificate is used to define a green building, and the study shows that the rent premium in Europe is 3-19 pct. and the sales price premium is 0-43 pct.[50] This rent premium is interesting from a health and social equity point of view, since few low-income households own their home. Further, studies indicate a close connection between health, decarbonisation in terms of energy renovations and income level. Thus, residents with low income are less likely to invest in energy renovations and this is negatively related to their health[51].

From a health perspective, interviewed stakeholders indicate that potential negative impacts on health may be softened by public regulations and public investments in green renovations of social housing, which particularly address health outcomes of buildings. One measure for assessing the health-related dimension of the decarbonised built environment, lies in the certification programme developed by the U.S. Green Building Council[52]. For new buildings and renovations, respectively, a LEED BD+C and a LEED O+M certificate have been developed. These certificates are given to projects that measurably take into account how the building optimises health and well-being. The certificates do this by requiring developers to include goals and strategies that address both economic, ecological, and social issues. Furthermore, developers must assess and select strategies to address the issue of inequality within the project and its community, team, and supply chain.[53] Other certificates, such as e.g. DNGB Heart[54] or the WELL Health-Safety rating, also measure how the building impacts the mental and physical health of human beings[55].

[48]WHO (2016): Urban green spaces and health: A review of evidence. Retrieved from: https://www.euro.who.int/__data/assets/pdf_file/0005/321971/Urban-green-spaces-and-health-review-evidence.pdf

[49]Groenewegen, P., van den berg, A., Maas, J., Verheij, R. and de Vries, S. (2012). Is a Green Residential Environment Better for Health? If So, Why? *Annals of the Association of American Geographers. 102.* 996-1003. doi: 10.1080/00045608.2012.674899.

[50] Leskinen, N., Vimpari, J., and Junnila, S. (2020). A Review of the Impact of Green Building Certification on the Cash Flows and Values pf Commercial Properties. *Sustainability. 12(7):2729.* Retrieved from https://www.mdpi.com/2071-1050/12/7/2729#cite

[51] Andreas Hermelink, Sven Schimschar, Markus Offermann, Ashok John, Marco Reiser, Alexander Pohl, Jan Grözinger (2019): Comprehensive study of building energy renovation activities and the uptake of nearly zero-energy buildings in the EU, European Commission, European Union, November 2019

[52]UKGBC (2018). Social value in new development: An introductory guide for local authorities and development teams. Retrieved from: https://www.ukgbc.org/wp-content/uploads/2018/03/Social-Value.pdf

[53]U.S. Green Building Council (2021). LEED v4.1: Building design and construction. Retrieved from: https://www.usgbc.org/leed/v41#bdc

[54] Retrieved from: https://www.troldtekt.com/news/themes/building-health-and-indoor-climate/better-indoor-environment-with-dgnb/

[55] Retrieved from: https://www.wellcertified.com/

Subtheme 3: Decarbonisation may lead to gentrification with an increasingly unhealthy built environment in deprived areas

At the level of urban planning, the process of decarbonisation may lead to gentrification, where marginalised and low-income groups can be displaced into low-income neighbourhoods.[56] The health aspects of this development are investigated in a scoping review by Gelormino et. al. (2015)[57]. These neighbourhoods often exist in the outskirts of cities, implying a longer commute for workers living in these neighbourhoods. Longer commuting has been shown to have a negative impact on social relations (Frumkin, 2002, Putnam, 2000) and mental well-being (Frumkin et al., 2004). Deprived areas may also be less attractive for physical activity and playing activities of children, which reinforces the existing inequality in health of low-income citizens. Although studies were carried out in the US, the results are also of relevance to European context.

Subtheme 4: Workers in the building industry have poorer health

In the building industry, workers have significantly poorer mental and physical health. More than 6 in 10 construction workers have suffered from work-related mental ill health according to a UK survey.[58] This poor mental health comes from the fact that many construction workers work away from home for long periods of time. This leads to higher stress levels, increased loneliness, and depression. The physical health of construction workers is also very low due to e.g. manual handling and doing repetitive tasks. Construction workers are especially at risk of musculoskeletal disorder (MSD).[59]

In terms of construction workers employed in renovations and constructions of the decarbonised built environment, a study from 2009 finds no statistically significant differences in health as compared to other construction workers.[60] However, it is important to note that this study is fairly old, and that we have not been able to identify more recent evidence with regard to workers in the green construction sector. We have included this theme because we find it worth keeping in mind going forward, as documentation in this area will, hopefully, be strengthened.

Visions and future potentials

In the aftermath of the COVID-19 pandemic and with the increased awareness of the significance of the built environment for health, there is a potential for raising awareness on the health dimension of the decarbonisation process, pushing for stronger regulations and striving to mitigate such health inequities as the decarbonisation may entail. The positive health potential which lies in green buildings and green urban areas should serve as a starting point, with the vision of an equitable access to a healthy built environment.

Below, we list key drivers of and obstacles to change, for key stakeholders on the road to realising this vision.

[56] Emily Chong (2017): Examining the negative impacts of gentrification, *Georgetown Journal on Poverty Law & policy* https://www.law.georgetown.edu/poverty-journal/blog/examining-the-negative-impacts-of-gentrification/; Braveman P, Dekker M, Egerter S (2011): How does housing affect health, Housing and Health, Robert Wood Johnson Foundation.

[57] Gelormino, E., Melis, G., Marietta, C. and Costa, G (2015), From built environment to health inequalities: An explanatory framework based on evidence. *Preventive Medicine Reports, 2(2015).* 737-745. Retrieved from: https://core.ac.uk/download/pdf/76527947.pdf

[58] Iosh Magazine, Safety, health and wellbeing in the world of works (10/10/2019): "6 in 10 construction workers suffer work-related mental ill health, survey finds. Retrieved from: https://www.ioshmagazine.com/6-10-construction-workers-suffer-work-related-mental-ill-health-survey-finds

[59] Reddy, G., Nisha, B., Prabhushankar, T. G., and Vishwambhar, V. (2016). Musculoskeletal morbidity among construction workers: A cross-sectional community-based study. *Indian journal of occupational and environmental medicine*, *20*(3), 144–149. doi.: 10.4103/0019-5278.203134

[60] Rajendran, S., Gambatese, J., and Behm, M. (2009). Impact of Green Building Design and Construction on Worker Safety and Health. *Journal of Construction Engineering and Management 135(10).* Retrieved from: Note that this is based on recordable incident rates and lost time cases rates.

Drivers for and obstacles to change

DRIVERS FOR CHANGE			
Policy	**Finance**	**Business**	**Community**
Policy programmes and regulations for health standards in buildings, Requirements for health certificates of buildings which also address social equity for residents and workers Stronger knowledge base regarding health in buildings in Europe	Green and social funding from e.g. the Just Transition Fund with requirements for minimum health standards. Growing ethical requirements for socially sustainable investments Requirement that investments should live up to social certification standards	Business decision to use health certification of buildings systematically. More stringent ethical requirements for socially sustainable business.	NGO's and umbrella organisations to call and campaign for equal access and affordability of healthy built environments. Stronger knowledge and documentation of health challenges
OBSTACLES TO CHANGE			
Policy	**Finance**	**Business**	**Community**
Lack of knowledge and awareness of health impacts	Lacking economic incentives to ensure social equity in healthy built environments	Lacking economic incentives to ensure social equity in healthy built environments	Lack of knowledge and documentation of unhealthy built environments

Examples of actors

Policy	Finance	Business	Communities	Foundations
WHO European Commission European States Lead cities, e.g. Vienna, Brussels	E.g. AEGON asset management Clarion partners	None identified particularly for health dimension. For housing generally see theme 4.4.	International Federation for Housing and Planning World Green Building Council Well Building Institute C40 URBACT	Bertelsmann Stiftung Open Society European Climate Foundation Ikea Foundation Robert Bosch Stiftung Volkswagen Stiftung Novo Nordic Foundation

THE CASE OF THE HABITER MIEUX PROGRAMME

The "Habiter mieux" programme launched in France in 2011 is a government-funded aid initiative for economically and ecologically sustainable housing under ANAH (National Housing Agency in France). Total subsidies amounted to 500 million euros. The objective of the programme is to realise thermal refurbishments of low-income homes. Low-income homes can often also be qualified as energy-poor, implying that this programme has two dimensions. It contributes to the green transition of the built environment by taking on green renovations of energy-poor homes, and, at the same time, it has a social equality dimension by improving the living conditions of low-income households.

By 2014, the programme renovations had begun. Of these renovations, 61% were homes where very low-income homeowners (receiving less than 11.811 euros per year in 2013) resided, which further clarifies the social equity dimension.

The benefits for the energy poor households include better thermal comfort, which has a significant effect on the health of the inhabitants. Secondly, it provides lower energy bills and hence fewer financial constraints for poor households, which improves social equality. This can have an impact on psychological health, because removing financial constraints leads to less stress. Thirdly, thermal refurbishments remove mould and damp in buildings, which leads to healthier homes. Finally, a benefit of the programme is safety improvements, since old heating systems can be dangerous.

Several studies have found that there is a strong association between adequate heating and ventilation, which are ensured by the "Habiter mieux" programme, and physical health. Especially asthma can be caused by living in unhealthy homes with mould and damp (Breysse, J., Jacobs, D. E., Weber, W., Dixon, S., Kawecki, C., Aceti, S., & Lopez, J. (2011). Health outcomes and green renovation of affordable housing. *Public health reports (Washington, D.C.: 1974)*, *126 Suppl 1*, 64–75. doi: 10.1177/00333549111260S110). By improving the ventilation of low-income homes, the programme is helping to decrease the social inequality in health. The programme allows low-income households to live in homes that are as healthy as homes of higher-income groups.

Low-income households and especially very low-income households live with financial stress, which can lead to severe mental health issues (Sturgeon, J. A., Arewasikporn, A., Okun, M. A., Davis, M. C., Ong, A. D., & Zautra, A. J. (2016). The Psychosocial Context of Financial Stress: Implications for Inflammation and Psychological Health. *Psychosomatic medicine*, *78*(2), 134–143. doi: 10.1097/PSY.0000000000000276). By providing lower energy bills, the "Habiter mieux" programme can help to ease some of this financial stress, which lead to improvements in mental health of low-income households. This, eventually, will lead to more health equality.

All in all, the programme contributes to decrease the social inequalities in both physical and mental health while at the same time contributing to the green transition of the built environment.

Kilde: Dubois, U. (2015) Alleviating fuel poverty through energy efficiency measures: the French programme Habiter mieux. *ECEEE Summer Study 2015.* Retrieved from:

5. GOVERNANCE

Framing the issue

Governance is at the heart of how social equity and inequity are continuously shaped and reshaped in the context of the decarbonisation of the built environment. Governance is understood as the processes of interaction and decision-making among the actors involved in solving a collective problem, that lead to the creation, reinforcement, or reproduction of social norms and values. [61]

The governance processes and structures in the built environment are complex and multi-layered. The stakeholder field is characterised by an interaction of different actors from the political sphere at local, national and EU level, the business and financial sector, the community (understood as non-governmental actors, interest groups and consumers) and philanthropic institutions. No univocal line of decision-making exists. Rather, different stakeholders interact and play different roles from sector to sector and from situation to situation. This makes it difficult to clearly and generally locate responsibility and agency when it comes to ensuring social equity in the decarbonisation of the built environment.

In general, though, stakeholders who were interviewed have raised two main issues of social equity associated with governance processes:

Governance processes need to be more inclusive

There is a strong consensus among stakeholders that the needs, interests, and resources of all social groups are not equally integrated in policy and decision making in the built environment. This is also well-documented in literature.[62] Governance processes related to the decarbonisation of the built environment are generally described as not sufficiently inclusive, the point being that as decision making and planning of the built environment are not inclusive, the shaping and outcome of the built environment will not be socially equitable. As such, there is a need for procedural equity, which means: Governance and processes enabling equitable participation in policy and decision making.

An inclusive approach is understood as a process which 1) places people at the heart of the design process, 2) acknowledges diversity and difference in a broad sense, 3) offers choice 4) provides for flexibility in use and 5) provides buildings and environments that are convenient and enjoyable to use for everyone[63]

This, in particular, affects low-income groups and vulnerable groups such as migrants and minority communities who have less access to economic resources, networks and technical competences, and who therefore also participate in decision making to a more limited extent. As a concrete example, the point was recently raised that public-supported energy renovation programs need to ensure application processes that does not favour resourceful groups of society at the expense of less resourceful groups. This happened in connection with a mapping of energy

[61] Hufty, M. (2011). Investigating Policy Processes: The Governance Analytical Framework (GAF). In: Research for Sustainable Development: Foundations, Experiences and Perspectives. pp. 403-424.

[62] Schildler, S. (2015) Architectural Exclusion: Discrimination and Segregation Through Physical Design of the Built Environment. In: The Yale Law Journal. 124, pp. 1934; Institute for Human Rights and Business (2019). Dignity by Design: Human Rights and the Built Environment Lifecycle. Accessed at: https://www.ihrb.org/focus-areas/builtenvironment/report-dignity-by-design-human-rights-and-the-built-environment-lifecycle; National Housing Association (2015). Equality, Diversity and inclusion: An insight review of housing. Accessed at: https://www.housing.org.uk/resources/equality-diversity-and-inclusion-in-housing-association-staff-in-england-our-full-report/

[63] Institute for Human Rights and Business (2019). Dignity by Design: Human Rights and the Built Environment Lifecycle. Accessed at: https://www.ihrb.org/focus-areas/builtenvironment/report-dignity-by-design-human-rights-and-the-built-environment-lifecycle

renovation programs in North European cities[64]. Also, the case of Airey (see following page) illustrates this point very well. Moreover, the gender dimension is not integrated equally in the planning and construction of the built environment[65], either.

Decarbonisation needs to be driven from a more holistic perspective

Stakeholders indicate that, so far, the decarbonisation of the built environment has, for the main part, been driven from the technical domain with a focus on technical innovation and solutions. The technical domain includes sectors such as energy, transport, construction, environment/waste etc. The social equity dimension of decarbonisation has not been systematically integrated in policies and programmes setting directions in the field as well as the welfare and technical domains traditionally are not in close dialogue. This leads to a lacking awareness and evidence of how the green transition impacts social equity, and a lack of concrete efforts to address the potential social imbalances following from the green transition. As exemplified in the case from the Aireys in the Netherlands (see deep-dive), a polycentric approach to governance is needed to realise a participatory intervention and ensure social inclusion. The integration of the technical and social fields enables the embedding of the solutions in the environment where they are applied and ensures that the objectives of both social equity and the green transition can be met[66].

As described in the introduction of this field scoping, there is an emerging focus on and awareness of the importance of the social equity dimension of the green transition among top level policy makers as well as at local level. This growing awareness must be expected to also influence the built environment, through e.g. green regulations on Zero Sum buildings, urban planning etc. So far, though, a social equity lens has not been systematically integrated into national or local policy making on buildings and urban planning.

[64] Ramboll (2021 – forthcoming), Energieffektivisering i eksisterende byggeri – hvad gør andre byer og lande?

[65] Jenkins *et al.* (2016) Energy Justice: A conceptual Review. In: Energy Research & Social Science. 11, pp. 174-182.
Institute for Human Rights and Business (2019). Dignity by Design: Human Rights and the Built Environment Lifecycle. Accessed at: https://www.ihrb.org/focus-areas/builtenvironment/report-dignity-by-design-human-rights-and-the-built-environment-lifecycle

[66] Goldthau, A. (2014). "Rethinking the governance of energy infrastructure: Scale, decentralization and polycentrism. In: *Energy Research & Social Science.* pp. 1, pp. 134-140 ; Breukers *et al.* Institutional 'lock-out' towards local self-governance? Environmental justice and sustainable transformations in Dutch social housing neighbourhoods. In: *Energy Research & Social Science.* 23, pp. 148-158.

THE CASE OF AIREY - Community mobilisation as a driver for a socially equitable green renovation

In 2013, a plan was made to renovate the Aireys, a Dutch, deprived neighbourhood in the city of Eindhoven, aiming for a green and socially inclusive transition of housing in the area. The case of the Aireys exemplifies how community mobilisation may enable the development of an integrated technical and social solution, which is embedded in the local built environment. As the case demonstrates, geniune community involvement is needed for an inclusive social transition which, at the same time, effectively meets the objectives of the green transition. In the case, a stepwise process was necessary to develop a participatory approach which did not reproduce top-down solutions but was able to meet the needs and realities of the local community.

The Airey neighbourhood in the Dutch city of Eindhoven is exemplary with regard to the challenges many deprived neighbourhoods face: degraded housing stocks, high energy bills, low comfort levels due to low energy efficiency, socio-economic decline, social deprivation and lacking social cohesion, and a high degree of indebtedness and long-term unemployment. The area includes 238 houses and 56 apartments built from prefabricated steel frameworks filled with concrete building blocks with very poor energy efficiency. Such neighbourhoods have received special status due to their specific characteristics as well as a legal obligation to maintain a certain percentage of homes within the cheapest rental segment. Thus, the neighbourhood was considered worthy of restoration and retrofitting instead of demolition.

To address a demand-driven approach to neighbourhood improvements in line with the green transition, the housing association Woonbedrijf initiated a "Neighbourhood Transformation" approach, focusing on renovation and improved energy efficiency in co-creation with the local community. Different 'tools' were used aimed at getting to know and engage with the community in the Airey: At first, a survey on matters related to solar panels, sustainability, energy and public spaces was initiated. Furthermore, a home in the neighbourhood was retrofitted to function as a 'street chamber' to be used as a meeting place for the residents, the tenants' association, welfare workers, etc. Also, a 3D Building Information Management (BIM) software application was developed to help the residents in choosing renovation options.

However, the applied tools did not have the intended effect of placing the residents at the centre and allowing them to co-shape: The survey did not result in any insights into who was thinking what and why, the street chamber was not a great success as only a small percentage of the residents (mainly the tenants' association members) visited the place and the BIM software did not work as intended. The BIM had been presented with the message that, on average, the increased rent would be offset by the reduced energy bill. It thus lacked the recognition of diversity and distributional risk among tenants.

As Woonbedrijf realised that the neighbourhood transformation was not taking off, a proposal to conduct interviews in the Aireys was accepted. The aim was to deepen the understanding of the residents' opinions on their own homes, social dynamics in the neighbourhood, quality of public spaces, and their relationship with the housing association. Importantly, the interviews revealed that there was a local lack of initial interest in energy saving issues. However, this did not mean that there was no interest in neighbourhood improvements. Needs for temperature management, safety, social cohesion and public spaces were demonstrated. Also, four broad segments of tenants were identified who differed in their needs and capabilities to partake. The interviews revealed that the local needs and aims needed to be identified in addition to energy and ecological aspects in order to create a locally defined sustainability concept, formed as a part of the intervention design and implementation.

The case illustrates the importance of ensuring the quality of participation at all levels, and not to reproduce top-down solutions that do not meet the needs of the users. An active process of capacity building is, on the other hand, capable of achieving energy efficiency goals while also being socially inclusive with the needs of the intended beneficiaries being met. Thus, as a counterweight to institutional reproduction of social inequalities, an inclusive approach can be used to examine the conditions for local self-governance, to be addressed in a participatory intervention.

Source: Breukers *et al.* Institutional 'lock-out' towards https://docplayer.nl/15952947-Buurttransformator-in-het-aireygebied.html

6. DRIVERS FOR CHANGE

It is a key conclusion of the field scoping, that the social and environmental dimension of sustainability must go hand in hand if the decarbonisation process is to be socially equitable. This is needed to realize a vision of all European citizens on equal footing influence, shape, have access to and benefit from the transition to decarbonised built environment. Governance is at the heart of this process, as an inclusive and multi-stakeholder approach is essential to drive social change of this character

In this final chapter, we will offer a meta perspective on needs and potentials for driving change (6.1) and point to calls for action including further knowledge to be explored and what action to be taken (6.2). The following is our advice for how to move forward.

6.1 Needs and potentials from a cross-sectoral perspective

Lifting the analysis to a cross-sectoral level, the field scoping indicates three key needs and potentials for driving change. These are described below. Afterwards, we present what each stakeholder group can do to drive change towards stronger social equity in the decarbonization of the built environment.

Development of a common language, awareness and knowledgebase

As it has been described, there is a lack of common language and understanding of the "field of social equity in the decarbonisation of the built environment". Currently, actors are existing alongside each other, concerned with specific issues that touch upon one another, but without knowing each other. There is no conceptual language, agreed upon by all actors, which can be used to describe the "field of social equity in the decarbonisation of the built environment" in its totality. For this reason, the field currently bears many meanings, depending on the actors' viewpoint and interests - and there are no established forums or networks where the subject is discussed and where a common understanding may emerge.

A key driver for change would be the building of a common language and facilitating a common understanding of the key challenges and issues at stake. This concerns something more than the coordination between stakeholders and initiatives, but rather a common approach to the field, a recognition of key challenges and network building, which could enable a joint understanding and prioritisation of challenges and steps forwards.

Establishing a stronger knowledge base is a key element of this: Presently, there is a lack of meta studies which brings together knowledge from existing fields. Knowledge is country-specific and specific to the scientific disciplines or sectors. The lack of meta studies means that available knowledge is fragmented and dispersed across different sub-issues, and that it is, in most cases rather weak as it is based on one or very few studies, with opinions being formed by reference to anecdotes and single cases. A stronger knowledge base would enable stakeholders to identify key challenges, what to do, what works and who to cooperate with. See the following paragraph for a list of key questions to address.

Facilitating networks and knowledge-sharing platforms is also a key element in building a common language and field of social equity around decarbonisation of the built environment. For instance, hosting gatherings and meetings where actors come together and start identifying with each other. It is a social process as much as an academic knowledge building.

A holistic and inclusive approach to decarbonising the built environment
As mentioned in the chapter on governance, it is a key challenge that the mindset of decarbonisation is dominated by technical logics, with the social dimension being seen as – at best – an add on. There is a need to change this mindset towards a recognition that social sustainability and environmental sustainability are mutually interdependent and that a green transition can only exist in so far as it is also socially sustainable. This holistic approach to sustainability is by no means new. It lies in the very concept of the triple bottom line as defined in the Brundtland report[67], but it is not yet the dominating approach to the decarbonising of the built environment.

Two steps would be important to support this change: Firstly, a social equity lens has to be systematically integrated across the full lifecycle of buildings in the decarbonisation process: From the decision making to the design, planning, building, renovating and tearing down the building. A number of concrete tools already exist, that may be used or amended to fit the built environment, like for instance the principles of the Human Rights Declaration, the European Pillar of Social Rights, the Sustainable Development Goals, the UN Global Compact and The World Green Building Council Health and Well-being Framework. In a sense, it's not so much a matter of the need to define social principles as it is a question of making them understandable and applicable to the bult environment – and to start enforcing them. The report: Dignity by Design - Human Rights and the Built Environment Lifecycle by IHRB offers a useful starting point to adapt social principles to the built environment. In order to obtain the power to enforce such principles, one method could be to develop an overarching Sustainable Buildings Regulation (SBR) aligned with the Paris Agreement and EU SDGs, as argued by European Environmental Bureau (EEB) and OpenExp[68].

Secondly, the process has to be inclusive, meaning that it has to engage and place citizens at the heart of the design and explore and take into account the different needs and preferences of different citizen groups, across gender, age groups, ethnicity etc. Methods already exist in the field of citizen engagement and citizen participation, as well as when it comes to ensuring a gender, age or race perspective on decision making and design. For instance, a number of cities have begun to experiment with Citizens Assembly methods in order to include a direct citizen's voice in decision-making processes. This is done through forming a representative body of citizens to discuss an issue of importance. The idea is to study the public opinions available on certain questions and to propose answers to these questions through rational and reasoned discussion. In Europe, citizens assemblies are known to have been used in Denmark[69], United Kingdom[70] and Poland[71]. This could even be scaled to a European level as a European Citizens Assembly, as proposed by European Environmental Bureau (EEB) and OpenExp[72]. Such a European Citizens Assembly could serve to rebalance industry's involvement in policy and to help close the gap between high level European policy making and the lives and needs of everyday people.

Multi-stakeholder collaboration and commitment
Finally, the field scoping underscores that there is a need for strong multi-stakeholder collaboration and commitment to ensure that social equity is recognized, driven and implemented as part of the decarbonisation. As the built environment is characterised by multilayer and multidimensional decision-making processes, this requires a number of different tools depending on stakeholders, sector and the character of the intervention: E.g. from advocacy, campaigns and

[67] Our Common Future (1987), The World Commission on Environment and Development.
[68] European Environmental Bureau and OpenEXP (2021), A Blueprint to deliver a healthy, affordable and sustainable built environment for all.
[69] Citizens Assembly by the Danish Ministry of Climate, Energy and Utilities (www.kefm.dk/klima-og-vejr/borgertinget).
[70] Citizens Assembly in UK (citizensassembly.co.uk).
[71] Citizens Assembly in Gdansk (www.resilience.org/stories/2017-11-22/solutions-how-the-poles-are-making-democracy-work-again-in-gdansk/)
[72] European Environmental Bureau and OpenEXP (2021), A Blueprint to deliver a healthy, affordable and sustainable built environment for all.

coalition building, to policy making/innovation, regulations and standards, collective action, thought leadership etc.

To make this more tangible and useful for further action, we have listed these potentials/tools for driving change by each of the five stakeholder groups, policy makers, finance, business, community/end users and philanthropy. It builds on the drivers for change identified in the thematic chapters, but takes the analysis a step further.

This embodies the risk of – once again – enforcing a sector perspective, so there is a need for a robust structure of cooperation, which should be pushed from both above (policy makers) and below (community and activism), coupled with more informal networking to share key insights. There is also a need for the various stakeholders to join forces. This is further elaborated in section 6.2

POTENTIALS FOR DRIVING CHANGE				
Policy makers	**Finance**	**Business**	**Community and end users**	**Philanthropy**
Requirement for the integration of the social equity dimension in policies and programmes for the green transition at EU, national and local level. Including all citizen groups in decision making Strengthening knowledge base on social equity issues in the built environment relating to the decarbonisation Setting standards and requirement for e.g. certifications, procurement etc. Creating economic incentives that open up for inclusive decision making. Protecting and enforcing labour rights. Setting the good example and promoting best practices. Making campaigns that raise awareness of rules and best practices on social equity	Adoption of internationally recognised social equity standards, for instance for practice and reporting through aligning with the SDGs or UN Global Compact. Complying with national policy requirements. Ethical and formal commitment to invest in a socially responsible way. Monitoring of social impacts of investments in green transition. Supply chain accountability	Adoption of internationally recognised social equity standards, for instance for practice and reporting, through aligning with the SDGs or UN Global Compact. Including citizens in design and construction processes Complying with national policy requirements. Monitoring the impact on social sustainability and equity of concrete efforts, e.g. buildings, neighbourhood renovations etc. Ethical and formal commitment to invest socially responsible. Supply chain accountability	Organising and building networks around social equity issues at local, national and international level. Using existing participation and advocacy platforms. Advocating for inclusion of citizens in decision making. Gathering and spreading evidence and knowledge on social (in)equity in the built environment related to decarbonisation. Promoting campaigns for selected issues. Setting the good example and promoting best practice.	Organising and building networks around social equity issues at local, national and international level. Strengthening the knowledge base and spreading evidence. Creating platforms for collaboration and creation of common identity. Campaigns and awareness of social equity issues. Promoting accountability. Promoting inclusive design and decision making

6.2 A call for action

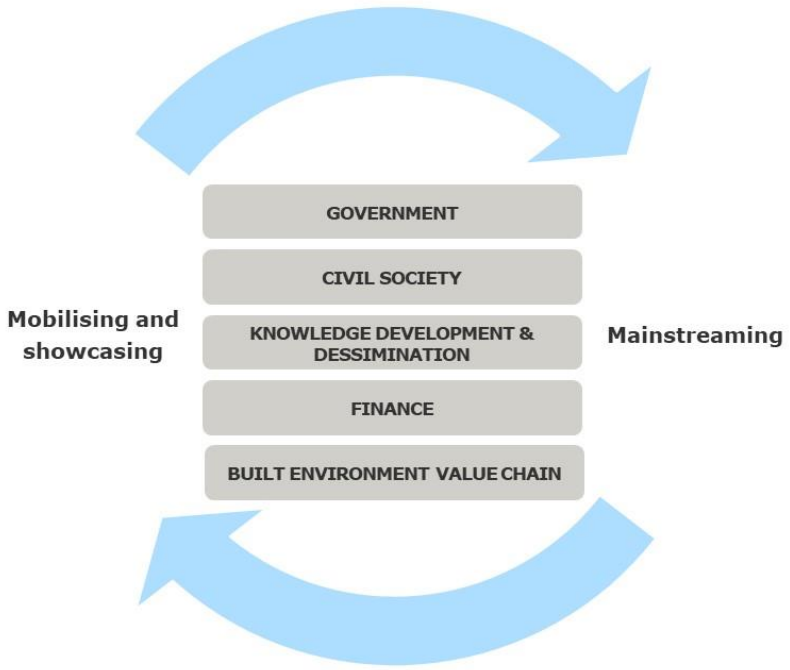
In summary, we call for action to ensure socially equitable European societies where all citizens, on equal footing, can influence, shape and have access to a decarbonised built environment. Societies in which all can participate, prosper, and reach their full potential.

Based on inputs from interviews and focus groups, we propose a dual strategy that aims to mobilise a coalition of willing actors, and to change the incentive structure of the built environment in order to mainstream social equity.

The built environment – understood as the construction sector - is often said to be an industry that is more driven by price competition than by innovation. Certainly, the industry in Europe is regulated through a number of public policies at national level, such as national building regulations and environmental laws, as well as planning regulations and procurement practices at urban level and regulation of the frame work conditions of the construction sector by for instance tax policies to labour policies. On the other hand, there are actors within the construction sector and urban development who are experimenting with innovative processes and methods.

We therefore propose to work through a strategy of double pressure: A mainstreaming pressure (applied top down) and a mobilization pressure (applied bottom up) as illustrated in figure 2.

Figure 2 – A dual strategy



Source: Adapted from Built environment system map – Race to zero, Nexial and Laudes foundation

The bottom-up pressure is achieved through nurturing, aiding and facilitating actors that are interested in experimenting with new standards of governing processes, in single projects or confined urban areas. The purpose is to experiment with small scale innovation and to test how these ecosystems for change work and what impacts they have.

While the bottom-up strategy is an experimental governance strategy, the mainstreaming strategy, on the other hand, is based on the existing governance set-up. This strategy involves advising policy makers at European and national levels (as well as actors involved in self-regulation at industry level, for instance industry organisations) on how to achieve greater social equity by regulation. The aim is to define, implement and sanction new standards of social equity in the built environment. This could, for instance, be through supporting organisations aiming to influence policy making processes concerning the Energy Performance Buildings Directive and its national implementation. It could also be by supporting organisations aiming to develop and spread knowledge from experiments with new governance practices. The latter needs to be informed by examples from practice.

Through such a dual strategy, it would be possible to both experiment with new social equity standards and to mainstream them throughout the built environment.

7. METHODOLOGY

The methodology in this field scoping followed a two-phase strategy. In the first phase, a preliminary desk study and interview round was done. After this, themes for deep dives were selected. In this section, we describe the two phases as well as the limitations encountered in the data material.

Preliminary desk study and interviews
Initially, the preliminary desk study included a broad scope focusing on three main themes:

i) Planning and establishing the built environment
ii) Use of and access to the built environment
iii) Main issues of decarbonization in the built environment

The main objective for the preliminary desk study was to establish a solid foundation for the deep dives and the analysis in the next phase. In order to obtain initial knowledge on the literature gathered, we conducted an initial revision of knowledge where literature has been read, and key points have been distributed along the main themes. Furthermore, we assessed the literature and categorised it with scores for the different levels of evidence.

The main objective for desk study in this phase was to obtain initial knowledge on the gathered literature. Key take-away points were deduced, and the level of evidence was assessed in order to guide the focus for the deep dives and data collection in the next phase.

To obtain, revise and assess initial knowledge, the literature gathered was screened and coded according to the following codes:

- Key themes/research questions addressed
- Brief overview of knowledge obtained, split by key issues
- Assessment of knowledge products divided into four categories (1 = highest knowledge product; 4 = lowest knowledge product)
    1. Peer reviewed academia.
    2. Evaluation or analysis based on solid and transparent methods (not peer-reviewed).
    3. Analysis or publication based on non-solid or non-transparent method.
    4. Other knowledge product (e.g. newspaper articles, position papers etc.).

In total, 35 publications, articles and books were screened in this phase. However, in the initial broad scope focusing on all three themes, it became clear that the literature is comprehensive with regard to theme i and ii. For theme iii, the literature is solid when including urban planning. A redefined scope from 6th January 2021, focusing mainly on theme iii related to buildings and, secondly, on urban planning made it clear that the literature within social issues in decarbonization of buildings is limited.

As we did not find many relevant publications related to social issues of decarbonisation of the built environment *and* buildings, we selected search terms related to social issues in the built environment to identify relevant publications. The search terms are listed below:

Search terms	
Just transition of the built environment	The built environment and effects on health
Social Equity in the built environment	Sustainable building and health

Social dislocation and the built environment	Sustainable buildings and social dislocation
Negative externalities of the built environment in Europe	Sustainable buildings and social equity
Gentrification and the built environment	Social determinants and the built environment
Anti-dislocation policies in the built environment	Urbanisation and the built environment
Affordable housing and decarbonisation	Social issues in the green transitioning
Social Dislocation in the transition to green economy	Green transitioning in Europe
Equitable transition and decarbonisation	Social dislocation and the built environment in Europe
Health and the green transition in the built environment	Energy poverty in the built environment

We conducted explorative interviews - parallel with the desk study - in the initial phase, to inform the thematic research questions and help identify relevant types of material/publications and key stakeholders. In total, 11 interviews were conducted in this phase.

Refinement of methodology and focus groups
From the data collection in the initial phase, it was clear that there is not yet an established knowledge field or coherent body of literature covering the intersection between the built environment and social equity issues. Therefore, it was decided to refine the methodology by downsizing desk research, conduct more interviews and add two focus groups focusing on specific themes and drivers of change.

The themes addressed by the focus groups were guided by the following steps:

1) Selecting key themes at the *inception meeting* and the *expanded list-follow-up meeting*: At the meetings, Laudes Foundation and Ramboll discussed and decided which key themes to study further.
2) Conducting interviews with informants with profound knowledge within the selected theme(s). The interviews constituted a solid foundation for selecting *deep dives-themes*. In total, 8 interviews were conducted in this phase. For these interviews, we conducted a *framework analysis* systematically coding the qualitative data. The purpose of this method was to address and weight significant results including similarities and differences across informants and (sub)themes. Structuring and coding informants and (sub)themes and questions in a coding scheme enabled us to systematically identify, study and assess relevant issues within each (sub)theme related to decarbonisation in the built environment.
3) Focus groups focusing on drivers for change related to the (sub)themes.

The stakeholder mapping is based on data gathered through interviews and desk study.
The stakeholder setting is highly complex. Thus, we focus on stakeholders of interest to Laudes Foundation and propose four groups: Foundations, lead cities, knowledge partners and institutional investors.

Limitations on data
Through this study, it has become clear that the field of social equity in the built environment is not a mature knowledge field. The knowledge foundation is weak in the sense that there is a lack of meta studies and hard evidence. Also, links between themes are weak or missing. In practice, most knowledge is found at the level of sub themes, not at themes level and certainly not across themes. Also, actors will give different names to sub themes that have or could have an overlap or a common meaning. For this reason, it has not been possible from the outset of this study to outline the themes to be studied in the field scoping. Rather, it has been a dynamic process of exploring different themes and sub themes and assessing which are to be part of the field of social equity in the decarbonisation of the built environment.

8. APPENDIX

8.1 Bibliography

In the bibliography we have listed the literature, specifying author, title, institution and year of publishing.

Berg, Janine (2015): Labour Markets, institutions and Inequaility: ILO, 2015.

Biörck, Jonas, Sjödin, Erik, Luis Blanco, Jose, Mischke, Jan, Strube, Gernot, João Ribeirinho, Maria and Rockhill, David (2020): How construction can emerge stronger after coronavirus: McKinsey and Company, 2020.

Bracewell, Michael (2020): The State of "Inclusive Design" in 2020 - a study of importance towards Usability and Identity: Blueclaw, 2020.

BUILD Aalborg University (2021): Build-rapport: Middelklassen skubber ofte de gamle beboere ud, når almene boligselskaber renoverer: BUILD Aalborg Universitet, 2021.

C40 cities (2020): Equitable Impacts: C40 cities, 2020.

C40 cities (2020): How to build back better with a 15 minute city, 2020.

C40 cities (2020): Inclusive Community engagement - C40 cities, 2020

CABE (2008): Inclusion by design Equality, diversity and the built environment: Commission for Architecture and the Built Environment, 2008.

Dialogue On European Decarbonization Strategies (2019): To decarbonise Europe, we must decarbonise cities – and do so sustainably: Dialogue On European Decarbonization Strategies, 2019.

Doherty, Sean & Hoyle, Seb. (2020): Supply Chain Decarbonization: World Economic Forum, 2020.

Ellen MacArthur Foundation (2020): 10 Circular Investment Opportunities for a low-carbon and prosperous recovery: Ellen MacArthur Foundation, 2020.

European Commision (2020): A European Green Deal: EC, 2020.

European Commision (2020): Communication from the Commission - A clean planet for all, 2020.

European Commision (2020): How can cities become more inclusive? 2018.

European Commision (2020): Legislation: Clean energy for all Europeans package, 2019.

European Commision (2020): Legislation: Energy Performance in Buildings Directive EPBD, 2018.

European Commision (2020): Legislation: Renovation wave, 2020.

European Commision (2020): New European Bauhaus: Commission launches design phase, 2020.

Ezgi Canpolat Sophia Georgieva (2019): Incidence of Price Subsidies on Households and Distributional Impact of Reform — Qualitative Methods: Energy Sector Reform Assessment Framework, 2019.

Geldermalsen, Marieke van, (2006): Gender Equality And Urban Development: Building Better Communities For All. Munich: Global Urban Development.

Govindan, Kannan & Hasanagic, Mia (2018): A systematic review on drivers, barriers, and practices towards circular economy: a supply chain perspective: International Journal of Production Research, 2018.

Gray, Jennifer A., Zimmerman, Jennifer L., and Rimmer, James H. (2012): Built environment instruments for walkability, bikeability, and recreation: Disability and universal design relevant? London: Dissability and Health Journal.

Heylighen, Ann (2008): Sustainable and inclusive design: a matter ofknowledge?: Local Environment, 2008.

Heylighen, Ann, Van der Linden, Valerie, Van Steenwinkel, Iris (2016): Ten questions concerning inclusive design of the built environment: Building and Environment, 2016.

Heylighen, Ann (2008): Sustainable and inclusive design: a matter of knowledge? Local Environment, 2008.

Hoff, Jens V., M.B. Rasmussen, Martin, Birch Sørensen, Peter (2020): Barriers and opportunities in developing and implementing a Green GDP. Copenhagen: Copenhagen University.

Hoff, Jens, Gauesset, Quentin, Lex, Simon (2020): The role of non-state actors in the green transitioning. Copenhagen: Taylor and Francis Group.

Hoof, Soost van, Dikken, Jeroen, Buttigieg, Sandra C., Rudy F., Hoven, M. van den, Kroon, Esther and Marston, Hannah R. (2019): Age-friendly cities in the Netherlands: An explorative study of facilitators and hindrances in the built environment and ageism in design. London: Indoor and built environment.

Hua Dong, P. John Clarkson, Julia Cassim & Simeon Keates, (2015): Critical User Forums - an Effective User Research Method for Inclusive Design: The Design Journal, 2015.

ILO (2020): The construction sector can help lead the economic recovery – Here’s how: ILO blog, 2020.

Institute for Human Rights and Business (2019): Dignity by Design - Human rights and the built environment lifecycle: Institute for Human Rights and Business, 2019.

Litman, Todd (2020): Urban Sanity: Understanding Urban Mental Health Impacts and How to Create Saner, Happier Cities. Melbourne: Victoria Transport Policy Institute.

Luck, Rachael (2018): Inclusive design and making in practice: Bringing bodily experience into closer contact with making: The Design Group, School of Engineering and Innovation, 2018.

Magazine of the society of Women Engineers (2020): Inclusive Design for Living Longer: Magazine of the society of Women Engineers, 2020.

Martin, Reinhold (2015): The Art of Inequality: Architecture, Housing, and Real Estate: Ara Institute of Canterbury, Department of Engineering and Architectural Studies, 2015.

Mulligan, Kerry, Calder, Allyson, Mulligan, Hilda (2018): Inclusive design in architectural practice: Experiential learning of disability in architectural education: Disability and Health Journal, 2018.

National Housing Federation (2020): Equality, diversity and inclusion: An insight review of housing association staff in England: National Housing Federatio, 2020.

NewClimate Institute (2018): CLIMATE OPPORTUNITY: MORE JOBS; BETTER HEALTH; LIVEABLE CITIES: NewClimate Institute, 2018.

Policy Department for Citizens' Rights and Constitutional Affairs (2019): Women, Gender Equality and the Energy Transition in the EU: Policy Department for Citizens' Rights and Constitutional Affairs, 2019.

Pritchard, Erin (2014): Body Size and the Built Environment: Creating an Inclusive Built Environment using Universal Design. Newcastle: Newcastle University.

Rice, Jennifer L; Cohen, Daniel Aldana; Long, Joshua; Jurjevich, Jason R., (2020): Contradictions of the Climate-Friendly City: New Perspectives on Eco-Gentrification and Housing Justice: International Journal of Urban and Regional Research, 2020.

Roe, Jenny (2016): Cities, Green Space, and Mental Well-Being. London: The Centre for Urban Design and Mental Health.

Schindler, Sarah (2015): Architectural Exclusion: Discrimination and Segregation Through Physical Design of the Built Environment. Maine: The Yale Law Review.

The Buildings Performance Institute Europe (BPIE) (2016): Driving transformational change in the construction value chain: The Buildings Performance Institute Europe (BPIE), 2016.

The Nordic Council of Ministers (2020): Socially sustainable transition in the Nordic countries (Socialt bæredygtig omstilling i Norden - NMR): The Nordic Council of Ministers, 2020.

UN women, U. (2019): Safe Cities And Safe Public Spaces For Women And Girls Global Flagship Initiative: International Compendium Of Practices: UN women, 2019.

Vitali Roscini, Arianna, Fabbri, Mariangiola, Glicker, Jessica, Janković, Ivan, Rapf, Oliver and Toth, Zsolt (2020), An action plan for the renovation wave: The Buildings Performance Institute Europe (BPIE), 2020.

8.2 List of interviewed persons

In the final analysis we have conducted 20 interviews. The interview persons throughout the field scoping are listed in the table below. In total we have contacted 30 potential interview persons.

Person	Organisation
Simon Hansen	C40
Neil Wilkins	Institute for Human Rights and Business
Morten Kjaerum	Wallenberg
Annalise Johns	Women Building Group
Judit Kockat	Buildings Performance Institute
Renee and Ting	European Climate Foundation
Helen Carter	Action Sustainability
Mari Jussi	Estonian transportation planning
Eva Kail	Executive Group for Construction and Technology
Mette Magrethe Elf	Realdania
Garret Tankosic and Ana Brakovic	SEE change net
Anthony Zacharzewski	CEO, DemSoc
Ruth Mourik	DuneWorks
Suzanne Biegel	GenderSmart/Catalyst at Large
Kirsten Newitt	Ergon Associates
Catriona Brady	World GBC, Director of Strategy and Development
Levente Polyak	Eutropian
Kristen Van Haeren	PhD student, at University of Copenhagen.
Anna Maria Gran	Nordic Working Group for Climate and Air (NKL)
Karen Refsgaard	Nordregio

8.3 List of participants in focus group interviews

Two focus groups were conducted. A total of 6 respondents participated in the focus group regarding job creation and workforce and 7 respondents participated in the focus group regarding health and housing. Besides the respondents Ramboll participated with three and Laudes Foundation with two representatives.

Name	Organisation
Focus group on social equity in the built environment - job creation and workforce, including governance/participation in decision making processes	
Renee Bruel	European Climate
Joost Beunderman	Dark Matter Labs
Patrycja Pogodzinska	European Union Agency for Fundamental rights
Sebastien Storme	Just Transition
Annabel Short	IHBR
Sarah Ong	Regal Springs
Focus group on social equity in the built environment – health and housing, including governance/participation in decision making processes	
Danielle Patti	Eutropian
Eva Kail	Executive Group for Construction and Technology
Anthony Zacharzewski	Democratic Society
Catriona Brady	WCBG
Rufsana Begum	CIDT
Annabel Short	IHBR
Annalise Johns	Women Building Group